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Impact Evaluation of the SHARPE Programme in Ethiopia: Academic Report

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About this research project paper

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Abstract

The Strengthening Host and Refugee Populations in Ethiopia (SHARPE) programme uses a market systems development approach to promote increased self-reliance and economic opportunities for refugees and host communities through the piloting and scaling of interventions across different sectors. This approach is based upon understanding the economic barriers that refugee and host communities face, and working with key stakeholders – including businesses, government, and service providers - to improve market function for people in these regions. This report focuses on evaluating the impacts of investments SHARPE has made in the financial market system, which have focused on developing markets for digital financial services in refugee hosting areas. A highlight of the evaluation are two co-developed randomized control trials, designed to help SHARPE and its partners overcome constraints found while implementing the programme.

The report finds evidence that robust markets for digital financial services are emerging in refugee hosting areas near Jijiga and are a little farther behind in Dollo Ado. Enrolment in the mobile money product, HelloCash, has been quite robust, though lower among women and refugees. HelloCash users are more likely to report financial inclusion (beyond inclusion through Hello Cash); they are 8.8 percentage points more likely to report being self-employed; they are 6.1 percentage points more likely to report typically having enough income; and they appear less food insecure than non-users. To try to enrol more women and refugees and catalyse HelloCash use among those groups, we conducted two randomized trials, one which allowed high volume customers to refer customers and receive a small bonus for doing so, and one which provided inactive customers with small incentives to start using the system. The former trial led to increased enrolment, but the share of women and refugees enrolling did not change; the latter led to increased use among women, but not refugees. We conclude with some ideas about further experiments to catalyse more use among refugees.

1. Introduction

Objectives of the project

The Strengthening Host and Refugee Populations in Ethiopia (SHARPE) programme is funded by the UK Government Foreign, Commonwealth and Development Office (FCDO). SHARPE is designed to support the Government of Ethiopia (GoE) to implement the pledges made in the Comprehensive Refugee Response Framework (CRRF), the Refugee Proclamation and the pledges made at the 2019 Global Refugee Forum. SHARPE operates in three refugee hosting regions in Ethiopia – Dollo Ado and Jijiga in the Somali region which host approximately 182,000 and 39,000 Somali refugees, respectively; and Gambella which hosts approximately 397,000 South Sudanese refugees (UNHCR, February 2022).

SHARPE uses a market systems development approach to promote increased self-reliance and economic opportunities for refugees and host communities through the piloting and scaling of interventions across different sectors. This approach is based upon understanding the economic barriers that refugee and host communities face, and working with key stakeholders – including businesses, government, and service providers - to make markets work better for people in these regions. SHARPE conducts market analysis and offers support to market actors through technical assistance, capacity building and financing. In doing so, SHARPE aims to improve the quality of life and reduce vulnerability of refugees and host communities in the peripheral regions of Ethiopia.

In all three refugee hosting regions SHARPE is partnering with financial service providers to expand access to host community and refugee households, and to improve access to finance for small businesses. This report focuses on investments SHARPE has made in the financial market system, which can potentially support a "cash first" agenda for humanitarian aid by building an infrastructure in refugee hosting areas for digital payments.

SHARPE was intended to help pave the way for a transition to (digital) cash transfers for refugees to replace the current dominant model for refugees in Ethiopia, which is in-kind assistance. The potential benefit of such a transition has been well documented. Unfortunately, however, since the inception of SHARPE there has been no significant change in the modality of aid delivery to refugees. In this report, then, we consider ways the mobile money "infrastructure" can be strengthened to better ready it for digital cash transfers, if they were to begin or be scaled up in the future.[1]

For refugees, being financially included and therefore able to receive aid in cash rather than in-kind, as well as receiving income or remittances, supports their economic agency – it offers choice, increases self-reliance and opportunities for income generation. For host communities, an increase in regional demand for goods and services due to the presence of refugees, as humanitarian aid starts to flow through the regional economy instead of bypassing it, presents an opportunity to expand and diversify economic activities. Greater

[1] Some pilot projects have been run with digital cash for social protection transfers in Ethiopia (GSMA, 2021).

financial inclusion can therefore assist small business growth across all sectors, where access to finance is consistently reported as the most significant constraint to business growth.

The gap in financial service provision to remote host and refugee communities is large. Although commercial banks have moved downmarket and expanded to more rural areas, they mainly offer savings products to customers. Commercial bank loans are largely out of reach for most micro and small business owners due to the collateral requirements of the banks. Micro-finance institutions (MFI) are better equipped to serve these communities and offer a range of loans and a service that is more accessible – but are limited in their outreach. Digital financial services (DFS) providers have offered a potential solution to reach more rural and remote communities, and although still a small percentage of the financial market in Ethiopia are growing rapidly. Although digital platforms such as mobile money are understood to reduce transaction costs (Ethiopia Digital Strategy 2020), the pace of DFS expansion is influenced by the high costs of establishing an agent network and cash-in cash-out infrastructure, regulations which restrict the kind of people/businesses who can become agents, low financial and technological literacy among potential clients, and limited phone and SIM card ownership in rural areas. Although CRRF related regulations have now made it possible to include refugees in financial service provision, it remains practically challenging.

Contribution to the literature

Our research contributes to three related literatures: evaluation of market systems interventions, financial inclusion, and refugee-host relations. We describe each in detail below.

Evaluating Market Systems Interventions

Market systems development proponents hail market systems programs as a sustainable way to catalyse development broadly within the fields in which it has worked. In fact, an organization (BEAM exchange) dedicated to moving market systems work forward presents an annual evidence review, to demonstrate the effectiveness of this approach (e.g., Osorio-Cortes and Albu, 2021, for the 2021 review). However, anything more than a cursory look at both the 2021 evidence review and the associated evidence map suggest there are substantial methodological and statistical gaps in the evaluations that have taken place. A main concern is that most of the reports listed are either only based on qualitative research, or solely on before-after comparisons (Table 1). Observing before-after changes makes it challenging to infer what might have happened in the counterfactual, and as such it is difficult to attribute any positive changes listed in the review to market systems development.[2]

Perhaps in part due to the challenges enumerated above, there have been very few attempts at serious quantitative evaluation of market systems development programs (e.g., Osorio-Cortes and Albu, 2021). Ghebru, Grant and Smart (2021) list all but one of the interventions that have been evaluated quantitatively, and there is virtually no peer-reviewed academic literature that even attempts to evaluate aspects of market systems interventions.[3]

[2] The most famous example, though not market systems development, is the Millennium Villages Project, which attempted to attribute all sorts of before-after changes to its interventions, most of which were already occurring in the country (Clemens and Demombynes, 2011).
[3] The only exception is de Brauw, Kramer, and Murphy (2021), which examines labour changes in a panel of jute producers collected to study a market systems intervention in rural Bangladesh (the

Table 1. Selected "Evidence" of Impacts from Market Systems Development Programs

Program	Research Design	Challenges
PROFIT (Zambia)	Baseline/Endline plus qualitative, heavy attrition. Also qualitative	Problem was shifting districts because implementation did not initially go well. So, baseline was useless. No attempt to deal with selection bias
CPM (Uganda)	Ex post; mixed methods including trader level surveys	No real attempt to learn about counterfactual, rather spillovers and sustained changes among former participants. Almost completely descriptive
MDF (Multi-country)	"Mix of quantitative and qualitative"	No attempt to even describe measurement in reporting, though claiming that additional income among beneficiaries is "actual" income
AVC (Bangladesh)	No information except "beneficiary-based monitoring survey"	Impact evaluation on two value chains suggests no measurable benefits when using a counterfactual (de Brauw, Kramer, and Murphy, 2021)
INOVAGRO (Mozambique)	Baseline/Midline/Endline with non-experimental control group, plus qualitative	Very few groups of farmers included in treatment and control groups, not randomised, so potential bias in impact estimates and statistical inference challenging (and not correct in reports as it does not account appropriately for the low number of clusters)

Source: Osorio-Cortes and Albu (2021)

The claims made in the Osorio-Cortes and Alba (2021) review may be overstated when contrasting them with other contributions in the literature. For example, the Mercy Corps ALCP program took place in Georgia between 2008 and 2019. The program claims to have helped over 36,000 farm households gain approximately $3.38 million in additional income. Yet there is no effort to consider how these numbers compare to a counterfactual, or even

USAID Agricultural Value Chains project). There are several reports publicly available related to projects, but none are peer reviewed (e.g., Dunn, Schiff, and Greevey, 2011; de Brauw, Kramer, and Murphy, 2019; Ghebru, Smart, and Mogues, 2019).

what kind of survey could identify this size of an impact. According to the National Statistics Office of Georgia, household income in 2019 was about $362 per month, or $4345 annually on average. The increase in income, then, that the ALCP claims is attributable to the project is around $93, or about 2 per cent of the average. Farm income is notoriously variable. If one had run a randomised trial, under what is probably a heroic assumption (that the standard deviation of income is roughly equivalent to the average; it is typically higher), then the sample size needed to identify that change is about 39,000 households, without accounting for any survey design effects. In other words, it is not possible to design a sample frame to statistically demonstrate what they claim, even from a randomised trial.

None of the reports described in the BEAM exchange review describe the statistics or methodologies used to generate them in any detail, despite that they sometimes even claim the increases are "actual", as in the case of the multi-country MDF project. Since samples tend to either be quite small or they do not attempt to provide any details related to the sample, a sceptical reader will immediately question these figures. And other claims in the Evidence Review are directly refutable, like claims about the Bangladesh USAID AVC project (see the report by de Brauw et al., 2019).

Other than the study by de Brauw et al. (2019), there is one impact evaluation that attempts to define a counterfactual. Gebru, Smart, and Mogues (2022) design an impact evaluation of the INOVAGRO project in northern Mozambique, which attempts to increase incomes among smallholders through dissemination of improved soya and pigeon pea varieties. The impact evaluation design was initially supposed to be a randomised control trial but ended up with a small number of administrative units in a treatment group, with a comparable "control" group of administrative units chosen by the project at some geographic distance from the project units. Only 16 units were chosen, which has a cost; cluster-based sample theory is all based on asymptotics, meaning that the number of clusters must be large enough to appeal to the law of large numbers, else standard statistical tests over-reject (e.g. Cameron, Gelbach and Miller, 2008). The paper does not report correcting for survey design, suggesting it underestimates standard errors both due to the lack of a correction for survey design effects and the lack of a correction for the small number of clusters (such as a wild bootstrap; again, see Cameron, Gelbach and Miller, 2008). So, it is in fact unclear whether any reported effects of the program are statistically significant or not.

A Note on Gender and Market Systems Development

A second shortcoming of market systems development programs in general is the lack of attention to gender in project design. Since market systems development projects tend to work directly with private sector firms, beneficiaries are typically reached in an indirect manner. If programs are implemented in a "gender neutral" way, then there is little hope they will have differential gender effects (Jones, 2016). A great example is the Bangladesh AVC project noted above; in the value chains studied by de Brauw et al. (2019), there was no effort made by project management to make the project anything but gender neutral, and so even in the face of (male) migration changing opportunities in the jute value chain, women's empowerment did not change (de Brauw, Kramer, and Murphy, 2019). Programs that are implemented in a gender-neutral manner may suggest impacts on women, but they may tend to be in markets in which women were already active. But they may also be taken over by men if market prospects are enhanced (von Braun and Webb, 1989). Without emphasis

placed on trying to change outcomes by gender, market systems development programs at best will not help raise the profile of women and at worst may harm their prospects.

Financial Inclusion, DFS, and Low and Middle-Income Countries

The second literature closely linked to this study concerns mobile money and its potential as a vehicle to lead to increased financial inclusion. In 2017, the World Bank Findex began to ask whether respondents had used a mobile phone or the internet to access an account (whether at a financial institution or not). There is a wide variety of experiences among low- and lower-middle-income countries. Ethiopia was on the low end of the spectrum, at less than 1 per cent of respondents using a mobile account, while neighbouring Kenya was at 72 per cent due to the influence of m-Pesa (Demirguc-Kunt et al. 2018).[4] Jack and Suri (2016) find that m-Pesa has had positive long run effects on outcomes beyond financial inclusion such as consumption, financial resilience, and savings; the latter effect is strongest among female-headed households.

Further, interventions strengthen the case that access to mobile money can increase financial inclusion. Casaburi and Macchiavello (2019), for example, study payments made via mobile money for milk, finding that if payments are made infrequently, then household savings increase; the mobile money account in this case worked as a savings commitment device. Breza et al. (2020) study the introduction of mobile money accounts as payroll accounts; they find workers learned how to use accounts, increased their savings, and became better able to cope with negative shocks to well-being.

That said, several authors demonstrate that mobile money is not a panacea. For example, Creti (2014) describes technological difficulties and the low familiarity of potential users with technology as clear barriers. CEGA (2020) further emphasizes that as it can take time to learn about new technologies, and how to use and trust them, some people could begin to avoid them if the transition takes too long. Along the same lines, reports by Chamboko et al. (2018) and GSMA (2021) suggest that because women have less access to mobile phones, they face higher barriers to DFS adoption. Iazzolino and Wasike (2015) argue that cash is "sticky," so people will continue to rely on it even in the presence of a robust mobile money system. In addition to the practicalities of cash for small expenses, paying in cash is expected for social obligations such as meetings for micro-savings groups (e.g., *chamas* in Kenya) or church fundraisers.

Refugee-Host Relations

Finally, this project links to a literature on refugee-host relations. One of the overall goals of SHARPE is to help improve refugee-host relations through improved markets. There are some clear factors that lead to challenges in such relationships (e.g., Aukot, 2003). For example, refugees often receive benefits that host community members do not receive; hosts in turn often blame refugees for problems in areas. Policies historically further discourage integration, though that has begun to change in some countries and contexts. Agblorti (2011), in the context of Ghana, suggests that relationships can be positive if host community members perceive positive benefits for themselves from the presence of refugees; otherwise, the relationships are likely to be tense. However, host populations can be vulnerable as well

[4] Even restricting the sample only to rural respondents, 71 percent of Kenyans had used a mobile money or internet account.

and therefore jealous of aid they observe going to camps, or they can be misguided in their understanding of what leads to improved living standards among refugees, both of which can lead to tensions. Barbelet and Wake (2017) further describe how uncertainty among refugee situations can affect tensions, since despite different economic conditions and challenges for refugees they often have similar goals and aspirations. Longer-term planning would help their integration, though with fickle aid budgets for UNHCR and WFP donors that is unlikely to occur.

Nonetheless, empirical studies often suggest the presence of refugee camps is often positive economically for host community members. Masterson (2016) finds cash grants given to Syrian refugees in Lebanon benefited local economies and did not cause inflation. Alix-Garcia et al. (2018) argue increases in night-time luminosity in northwest Kenya suggest improvements in the local economy near the Kakuma camp. However, not all estimates are positive; for example, Alix-Garcia and Saah (2010) suggest that refugee camps near Rwanda lead to higher agricultural prices; however, there are positive wealth effects in rural areas, in terms of asset holdings, beyond the camps (though negative ones in urban areas).

Policy relevance

According to the Global Findex (2017), only 35 per cent of Ethiopian adults have access to a financial account, which is well below the world median of 59 per cent. To increase financial inclusion, the Government of Ethiopia (GoE) has developed a strategy implemented by the "National Council for Financial Inclusion," which is accountable to the Prime Minister. The strategy includes the promotion of savings products, digital financial services, and credit services for under-served poor populations. The Council is supported by the National Financial Inclusion Steering Committee, which is composed of representatives from relevant ministries and business associations, including the Ministry of Finance and Economic Development, the Ministry of Education, the Ministry of Agriculture and Natural Resources, the Ethiopian Bankers Association, and the Association of Ethiopian Microfinance. The Steering Committee is chaired by the Vice Governor of Financial Institutions, under the National Bank of Ethiopia.

Mobile Money Directive of 2020

The GoE has also issued a new directive on mobile money in January 2020, related to the licensing and authorization of payment instruments. The directive allows companies not registered as financial institutions (e.g., telecom providers and fintech companies) to provide digital financial services, expanding the types of financial services possible. The directive also increased the transaction limits by agents and allows agents to be associated with more than one provider. These directives clearly expand the market for digital financial services and imply new potential for market development.

"Cash First"

"Cash First" is a GoE policy on the form of transfer for humanitarian and development assistance. The Cash First policy, not surprisingly, encourages the use of cash for beneficiaries to ensure the effectiveness, efficiency, and dignity of transfers. A wide range of donors have agreed on a common approach, and the policy is in line with increasing the number of cash transfers used in global humanitarian assistance.

Comprehensive Refugee Response Framework

Ethiopia's Refugee and Returnees Service (RRS) manages the government's refugee response and participation in the Comprehensive Refugee Response Framework (CRRF). The CRRF includes pledges related to access to finance among refugees, and RRS directives state clear procedures on how refugees can engage in wage work and/or self-employment. The directives provide a foundation for refugees to become self-sustaining members of society in Ethiopia.

Innovation and relevance to CEDIL

Our evaluation is clearly relevant to CEDIL as it proposes a method for attempting to evaluate market systems development programs more rigorously. As noted above, evaluations of such programs typically do not even attempt to define a counterfactual. We document our procedure in the methodology section and how a program can adaptively design an evaluation alongside a market systems development project. While we were not able to perfectly apply the method, it represents an advance on previous methodology. Second, we identify a way to ask focused questions relevant to attaining rigorous evidence that can foster adaptive management. Therefore, our project represents both a method of conducting a specific type of complex evaluation and adds to mid-level theory by attempting to generalize the methodology to a broader class of programs.

2. The intervention

Activities and context

SHARPE is uniquely designed as a market systems intervention in refugee hosting areas in Ethiopia. As described above, a market systems intervention contracts with local organizations to conduct activities that are consistent with project goals; the idea is that those organizations then build up the market system in a more sustainable manner than if a project directly worked with beneficiaries, creating longer lasting change. In the financial services market system, SHARPE has partnered with two banks that use Hello Cash, a product of Belcash Technology Solutions, as their mobile money product. In Somali region, they initially partnered with Somali MFI, which is now known as Shabelle Bank, and in Gambella, they partnered with Wegagen Bank. As the latter partnership did not start until early 2022, we largely focus in this report on the partnership with Shabelle Bank and activities in Somali region.

In Somali region, at the time of SHARPE's inception in 2019, Hello Cash was the dominant mobile money operator in the Somali region, with more than 300,000 customers and over 1,500 mobile money agents. However, in the more remote host communities close to refugee camps the agent network was underdeveloped, with fewer than 100 agents operating in refugee hosting areas in Jijiga and Dollo Ado (prior to SHARPE). As a result, the customer base would seem to be skewed towards the host population, and away from refugees.

The impact evaluation concentrated on understanding impacts of activities that SHARPE managed in the financial market system and focused on areas in Somali region, since they began much earlier than activities in Gambella region. Their activities can largely be thought of as being broken down into two different categories: promotion of digital financial services and aiding with refugee business licensing. We describe how these two activities are linked below.

First, the idea is to promote digital financial services through partnership with a financial institution. In Somali region, this institution is Shabelle Bank, known as Somali Microfinance Institute (MFI) when the contract was initially signed. Shabelle Bank was given specific targets for onboarding customers, agents, and merchants. Customers were onboarded in target communities with the aid of Know Your Customer (KYC) officers, who helped with door-to-door visits, distribution of promotional materials and flyers, participating in public meetings, or other related activities. They also advertise through TV and radio, billboards, and other ways. The second component of the Shabelle Bank activities was to help identify viable small businesses with the potential to become mobile money agents, focusing on the target areas and businesses associated with refugees. Finally, Shabelle Bank worked on signing up merchants to accept HelloCash in all the target areas; an illustrative picture of a merchant poster is in Figure 1.

Figure 1. Example of a HelloCash Merchant Poster, Sheder town, Jijiga, Ethiopia

The process of agent onboarding, it should be noted, took place somewhat slower than SHARPE had hoped. Part of the problem is that the National Bank of Ethiopia (NBE) has relatively strict requirements for mobile money agents. NBE directive FIS/01/2012 specifies that mobile money agents must be a commercial business owner, licensed by the respective authorities and with a TIN number. Prospective agents must also have minimum liquidity, set at ETB 25,000 for Shabelle Bank. These requirements are a strict constraint for small businesses in remote areas becoming mobile money agents—many businesses with the

potential to become agents operate informally and lack the necessary collateral. While the collateral requirement is a barrier to both hosts and refugees, the business licensing issue can be overcome for host community businesses since they have the necessary documents to register. However, for refugees early in the project it was impossible—they could not register their businesses with a refugee ID.

A second early impediment to SHARPE attaining goals was access to refugee camps. At first, KYC officers could not access refugee camps, hindering their ability to conduct any activities among refugees. SHARPE worked with the RRS to ensure that KYC officers could be given permission to access camps; the promotional activities took place in the Dollo Ado camps first, then Jijiga camps, which meant that refugee enrolment first grew in Dollo Ado.

Second, as the challenges of recruiting agents within refugee camps became apparent, SHARPE followed a two-pronged process to address these barriers. Note first that the Refugee Right to Work Directive (No. 02/2019) of the GoE specifically refers to self-employment opportunities for refugees, so the GoE has creating those opportunities as a goal. However, there was a lack of clear operational guidelines for refugee entrepreneurs to secure resident or work permits, making it impossible for them to formally register their businesses. After formal registration, these businesses could potentially become agents.

To facilitate agents being registered in camps, SHARPE established a team to identify viable refugee businesses and help them obtain resident permits and business licenses. The idea was to create an operational process that could be documented, in collaboration with UNHCR and RRS, to help implement the Refugee Right to Work Directive. To do so, an assessment was first conducted in all five refugee camps in Dollo Ado, all three in Jijiga, and Tierkidl and Pugnido in Gambella. Businesses were first assisted in obtaining resident permits, if needed, and then business licenses to formalize their businesses. By September 2022, SHARPE had been successful in formally registering 15 businesses as agents, and another 15 were in process.

The impact of the Covid-19 pandemic

The COVID-19 pandemic substantially disrupted the implementation of SHARPE and the impact evaluation. From an implementation perspective, movement restrictions associated with the pandemic began just as SHARPE was organizing initial studies of the market systems in which it planned to work. Consequently, those studies changed from being partially interview based within regions to being predominantly desk based. As a result, it became more difficult to find and develop initial partnerships; as a result, it is not unfair to say it took SHARPE additional time to start designing its market systems development interventions across markets.

The impact evaluation first needed to choose market systems to use as examples; this step was impossible without the specific market analyses initially conducted by SHARPE. The impact evaluation also faced movement restrictions, making it difficult to build ideas about how to design the impact evaluation, particularly about how to build a sample that could be used in a counterfactual manner. The COVID-19 pandemic also heavily restricted the amount of in-person fieldwork that was conducted, to avoid spreading the virus through in-person

fieldwork. This restriction was largely led by internal review boards (IRBs); the IFPRI IRB only gradually began to relax this restriction in late 2021.

A second challenge arose due to budget uncertainties in the first half of 2021. As it turned out for the financial market system, that timing would have been ideal for the research team to conduct a baseline survey, had in-person surveys been possible. Given the complexity of trying to develop a sample frame from afar solely using phones, uncertainty related to budgets and project continuance, and a baseline survey did not occur. Therefore, any matching of participants with non-participants that will occur based on endline data will be questionable at best, since there will likely be inherent reasons that some people participated and some did not; the research team will not interpret these differences as causal.

That said, the research team will be able to develop some pre-SHARPE statistics from a World Bank survey conducted in 2017, which was meant to develop a "skills profile" of both refugees and host community nationals in refugee hosting areas throughout Ethiopia (World Bank, 2018). That survey includes 871 observations among refugees and 303 observations among host community members in Somali region. We describe those data later in the report.

Theory of change or model

As it was designed to cover several different market systems, the theory of change initially developed by the SHARPE project was quite general; as an adaptive intervention methodology, it is somewhat impossible to initially develop anything but a quite general theory of change. As a result, the IFPRI impact evaluation initially developed its own theory of change for the financial market system (Annex Figure 2). This theory of change is somewhat dated, in that we have done quite a bit of learning since then but illustrates what we think are some of the key issues in developing financial inclusion among refugees and host populations and illustrates some of the challenges faced in extending mobile money models to external populations. In a sense, we adapted the theory of change as we learned more about the market system and the SHARPE interventions to attempt to improve it.

We can first think of a "generic" theory of change for a new technological development that we assume is likely to spread due to obvious advantages over available technologies (Figure 2). We assume that actors in the economy (or market system) will act on their own to catalyse adoption of that technology, with the expectation they will reap returns from use. Without any intervention, there would be some outcomes from the technology or product adoption, based on incentive structures within the economy.

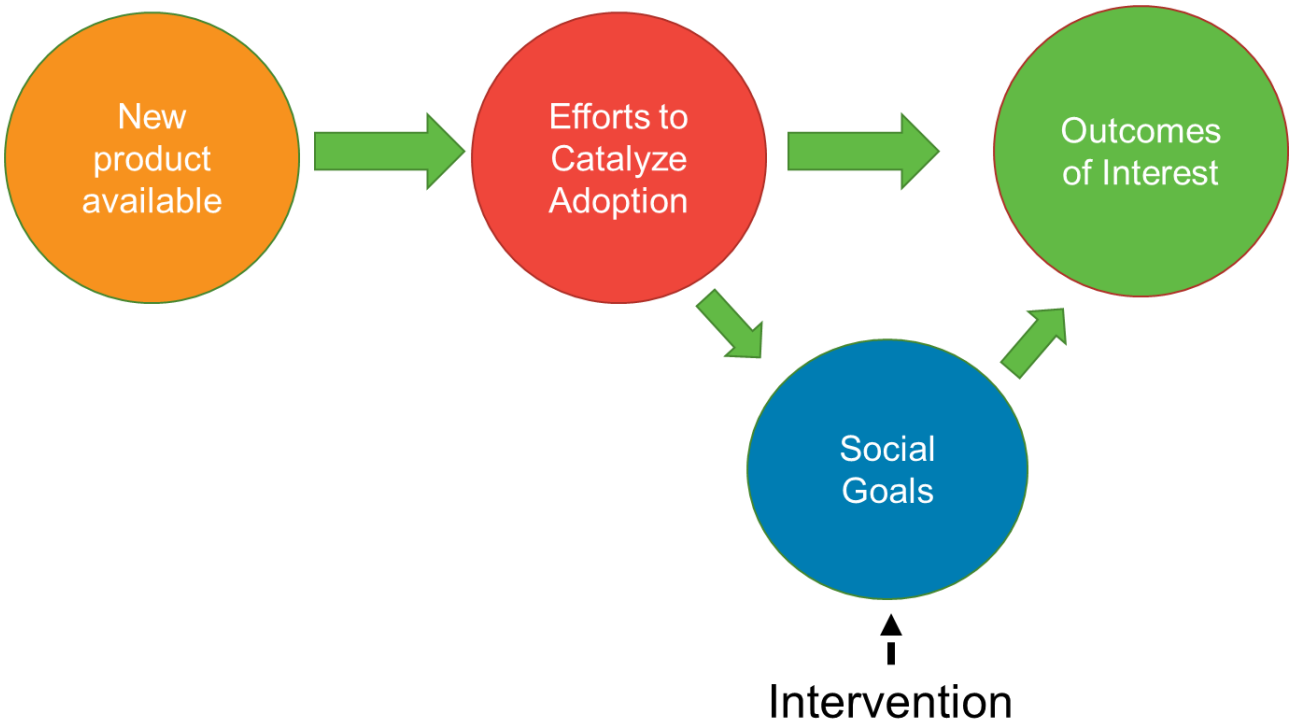


Figure 2. Generic Theory of Change for a New Product or Technology

However, the incentive structures within the economy may not reflect social goals for the new product. It is easy at least to imagine new technologies that exclude certain groups, such as women, minorities, or the poor. It is conceivable that they are excluded, in fact, even if it is profitable to include them, but the "owners" do not perceive it as so. If social welfare would be higher in aggregate if those groups were included as users of the technology, then it would be possible to change outcomes through well-designed intervention.

We next apply this type of a model to digital financial services, first focusing on those efforts to catalyse adoption (Figure 3). We recognize there are two parts to the adoption decision—a decision to enrol in digital financial services, and then a decision to use the system once one is enrolled. We want to highlight two types of constraints that might affect that decision—we term them internal and external constraints. The idea is that a social program or an actor within the market system could potentially affect the internal constraints, but they would not be able to affect the external constraints.

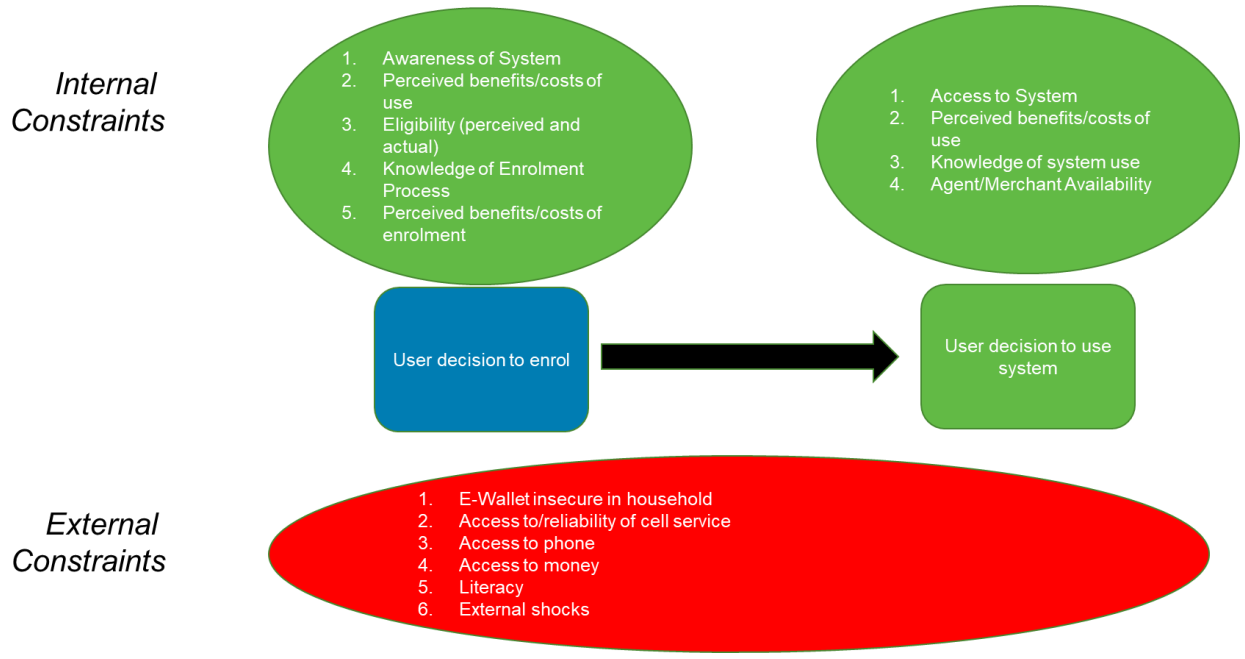


Figure 3. Constraints affecting Key Efforts to Catalyse Adoption of Digital Financial Services

We identify five internal constraints for the decision to enrol. Individuals may not know about the system; advertising that meets specific individuals can overcome that constraint. Second, if they know about it, they may perceive that the benefits of using the system do not outweigh the costs. Note that as perceptions change, this calculation can change for potential users. Third, potential enrolees must believe they are eligible and that it does not affect availability for other benefits; if people think that signing up for digital financial services will reduce their eligibility for other benefits (e.g., resettlement to the West), they may not enrol. Fourth, they must understand the enrolment process. Fifth, if there are costs to the enrolment process (whether monetary or non-monetary), they must be able to overcome those costs.

On the other hand, there are several reasons people might not enrol that cannot be handled within the market system. First, households may only have one phone, and target individuals could consider the digital financial service insecure within the household if they do not trust other household members with it. They may lack a phone altogether. Cell service may be too poor to rely upon in the general area, and if so, households may not value digital financial services. They may perceive there is no use for digital financial services because they lack money or liquidity too often, and they may face a literacy constraint; if no household members (or specific household members) can read the phone, it means they cannot use the phone. Once people have enrolled in digital financial services, the next challenge is to use them. External constraints to use are somewhat like those for enrolment; poor cell service will hinder use, and here external economic shocks could negatively affect use and are beyond the control of actors within the market system.

The actual use of the mobile money system could be hindered if the system is difficult to access, either because of server problems or because of poor interface design on the phone. Second, actual use cases matter; if no one accepts mobile money or will exchange mobile money for physical money (lack of agents or merchants), or service pricing is too high, customers may not use it. These constraints can all be addressed by actors within the market system who stand to benefit from its use.

We then put the diagram together to begin to consider study outcomes (Figure 4). As mobile money comes available, the first outcomes of interest are whether users decide to enrol or not, and conditional on enrolment, system use. These outcomes should lead at least towards the two planned final outcomes, which are increased financial inclusion and improved refugee-host relations. To attain the latter goal, additional steps are likely needed, however.

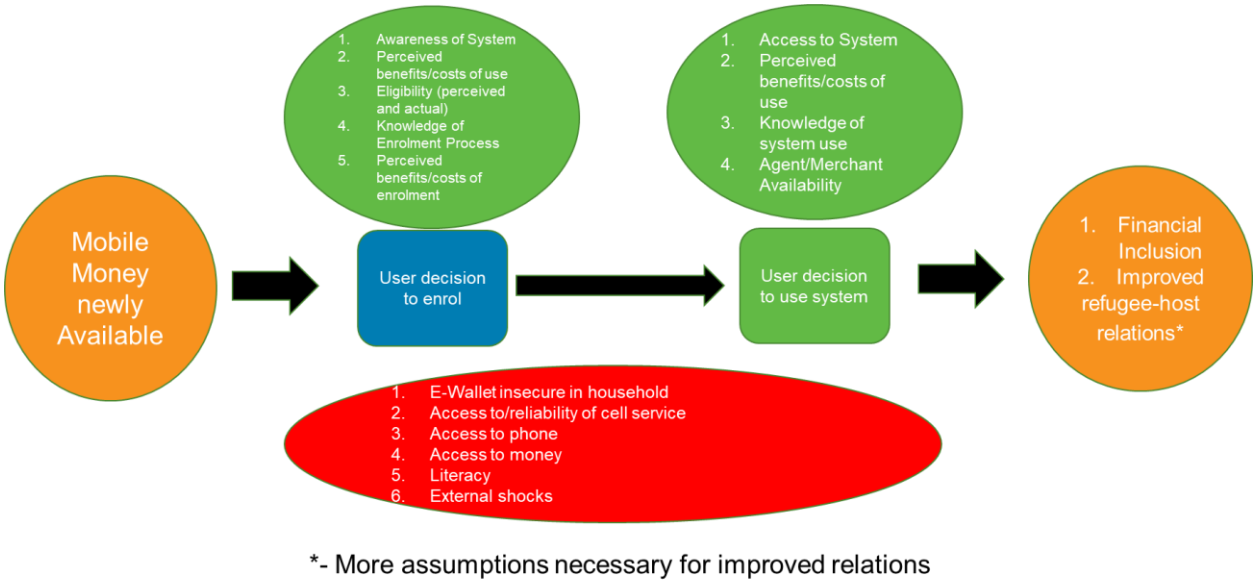


Figure 4. Representation of Theory of Change, Mobile Money Availability

We next identify these steps, which more closely follow our original theory of change in the appendix (Figure 5). We envision (at least) two paths by which DFS adoption can lead to improved refugee-host relations, which are characterised on the figure as increased local inclusion. First, the increased feasibility of mobile money transfers may lead refugees to have increased funds (via transfers), which they could either swap for physical cash (by using an agent) or use directly (at merchants). Under the assumption that refugees would often have to use host-owned businesses for either type of transaction, we could envision more economic interactions between refugees and hosts. Second, DFS leads to the potential for increased savings. Following the literature from similar settings, increased savings could lead to improved investments and new business services offered to the wider community.[5] Under the assumption that these investments lead to services desired by both hosts and refugees, these investments could then lead to increased economic interactions between hosts and refugees, and therefore increased local inclusion.

[5] See, for example, Garz et al. (2020) for a review.

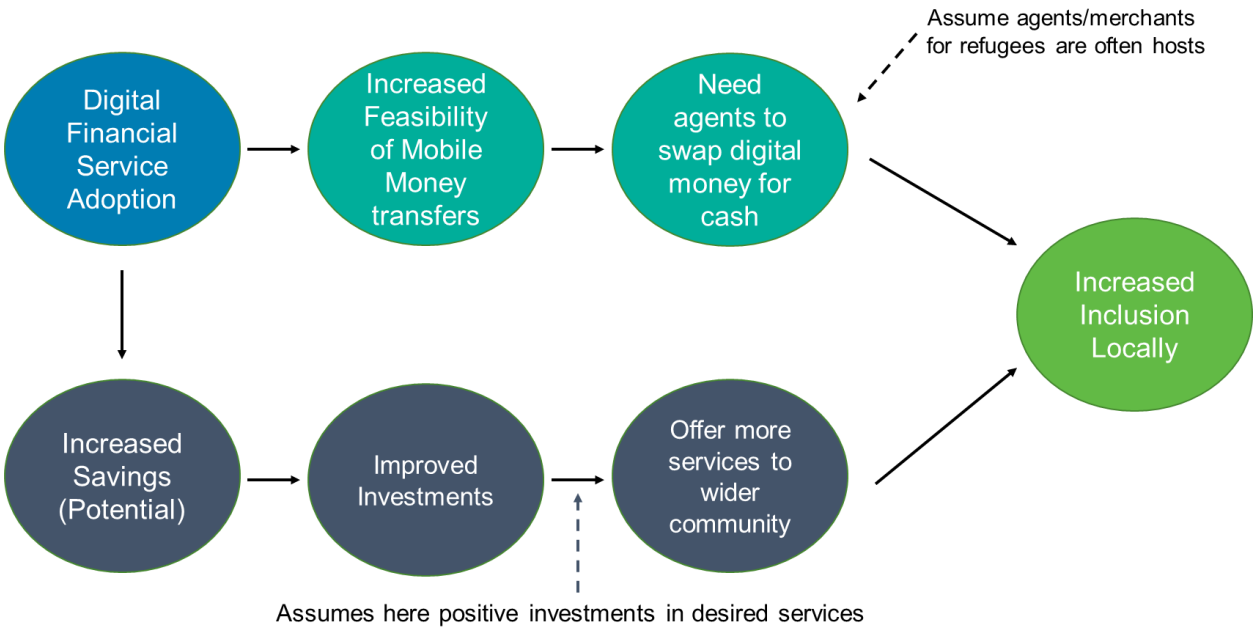


Figure 5. Further Steps required for improved refugee-host relations locally

Mechanisms

As described above, SHARPE is designed as a market systems intervention. Instead of interacting directly with households or target beneficiaries, market systems development programs work indirectly with specific actors to show them how change in their business practices can be mutually beneficial to firms and their customers, which include targeted beneficiaries. As many market systems development programs have focused on agriculture, it is useful to illustrate the contrast between the market systems development approach and the traditional agricultural approach more concretely. In a traditional approach, an intervention might be designed to hire a large local training staff to teach farmers new techniques, quality standards, etc. However, as in the example above, the argument is that once an agricultural program is over, it removes the infrastructure that existed to ensure the program worked and change that might have occurred may not last.

By working with local companies with incentives to grow, it is argued that market systems development programs lead to more sustainable local improvements. Such programs often work through a "lead firm," with the idea that the lead firm will model behaviours that would be mimicked by other system actors (e.g., competitor firms). If that lead firm required a certain type of input for processing (for example, aflatoxin-free maize for blending chicken feed), they would need to teach farmers to grow it themselves or provide inputs so farmers could do so. Helping local companies see and develop methods to overcome those constraints to their growth is the hallmark of market systems development programs. Turning once more to the introductory example, a market systems development project might work with a specific type of crop processor, who would then do the work of convincing farmers to organize in groups to sell their output, as selling it through groups would be beneficial to the processor. And those groups would last beyond the project, since they would have developed through the inherent market system, rather than through exogenous intervention.

In the context of the financial market system, then, SHARPE would need to identify a financial partner to act in the market system that could align with project goals of increasing financial inclusion, particularly among women and refugees, and in potentially also improving relations between host country nationals and refugees. In turn, the mechanisms depend upon choices made both by the SHARPE team and the partner about how to approach meeting contractual goals agreed upon with SHARPE. Although as noted we do not study Gambella in detail in this report, there is a nice illustrative difference between the Shabelle Bank approach and the Wegagen Bank approach in Gambella. Shabelle Bank expended effort in both increasing its agent base and its merchant base in areas near refugee camps in Jijiga, while Wegagen Bank has only worked on increasing its agent base. Transactions beyond cash-in and cash-out, then, are limited in areas near refugee camps in Gambella, simply because only a few merchants accept HelloCash for payment. However, the strategy is determined by the partner, not the project.

Outcomes

The theory of change points to both intermediate outcomes and a set of final outcomes that we measure or the overall evaluation. Here we describe how we measure these outcomes.

Intermediate Outcomes

The first clear intermediate outcomes for the project relate to system enrolment and use. Here, it is both difficult to ascertain a counterfactual, particularly for system enrolment; we therefore use administrative data on sign-ups and disaggregate them by gender, refugee status, and location (Jijiga and Dollo Ado). We also measure use as the number of transactions made by each customer. These two outcomes are particularly important for the randomised trials discussed later in the report.

Final Outcomes

The second important outcome along the theory of change is financial inclusion. We want to consider mobile money enrolment as a form of financial inclusion. However, to ensure we learned about both HelloCash users and non-users in the quantitative endline survey, we stratified on HelloCash enrolment, and as a result the endline survey data will clearly show high financial inclusion among enrolees. So, we instead define financial inclusion in two ways, excluding HelloCash. First, we define it as any household reporting they have a formal financial account (e.g., at a bank or a microfinance institution). Second, we expand that definition to include households reporting they use forms of mobile money other than HelloCash.

Third, we examine measures of income, which we hypothesize are important for local inclusion to build. We consider three different measures of income—first, we construct a per-capita income measure, based on questionnaire modules quite like those asked in the Household Income and Expenditure Survey. Second, we asked some more subjective questions, and we use two of those as alternative measures: one asked household respondents if the household has enough income to meet basic needs, and a second one asks if income is declining at present. Third, we include the Food Insecurity Experience Scale (FAO, 2018), and measure it on a raw basis as the number of questions that receive a “yes” response. The higher the measure, then, the worse the food insecurity of the household.

Finally, we measure social inclusion using a battery of questions that were asked of respondents in the quantitative endline. Each host respondent was asked if they ever bought items from the market from a refugee, sold items to a refugee, provided services for pay to a refugee, received services for pay from a refugee, and if they ever attended cultural, social, or religious gatherings with refugees. Similarly, refugees were asked If they did the same things from, to, or with hosts. The affirmative answers to these questions were summed into a simple index ranging from 0 to 5 (0 for none, and 5 for all of them).

The quantitative outcomes measured by the project are summarized in Table 2 below.

Table 2. Intermediate and Final Outcomes

Variable	Description
HelloCash enrolment	Discrete Variable (administrative)
HelloCash Use	Number of transactions (administrative)
Income from Self-Employment?	Discrete variable
Total Self-Employment Income, Household	Annual (birr)
Per Capita Income	Annual (birr)
Income Enough for Basic Needs?	Discrete variable
Income Declining?	Discrete variable
Food Insecurity Experience Scale	0-8; larger numbers imply more food insecurity
Social Inclusion, Refugees	0-5 scale; only half the sample
Social Inclusion, Hosts	0-5 scale; only half the sample

3. Data

Quantitative data and survey modules

We use four different sources of quantitative data in the report. To establish something akin to baseline information about the population in Somali region, including refugees, we use statistics from the World Bank Skills Survey conducted in 2017 (World Bank, 2018). Second, we use administrative data from Shabelle Bank records. As part of their contract with SHARPE, Shabelle Bank has been compiling data monthly on phone numbers that have signed up for HelloCash in SHARPE target areas and submitting them to SHARPE; we have been given access to some of these data for both descriptive purposes and for the randomised trials. These data are the sole source of data for the second RCT.

World Bank Skills Survey (2017)

The World Bank conducted a large survey of households in both refugee camps and host areas nearby in 2017 (World Bank, 2018). From the portion of the survey conducted in Somali region, we can learn something about both host nationals and refugees relevant for our study, establishing some basic facts about the population relevant to our study.

In Somali region, the survey took place among 871 refugee households and 303 host country national households. Though the goal was to keep these sample sizes relatively similar, in each region, in Somali region some conflict hindered the survey and as such it does not include as many host households in Somali region as had been planned. The households are largely in the Dollo Ado area, in the far south of Ethiopia (Table 3). As the SHARPE project is working in both Jijiga and Dollo Ado areas of Somali region, the data are not completely comparable as a result.

Table 3. Sample Composition, by Household Refugee Status, World Bank Skills Survey, 2017

Location	Hosts	Refugees
Bokolmayo	110	248
Buramino	95*	153
Hilaweyn		168
Kobe	90*	159
Melkadida		96
Kebri Beyah (Jijiga area)	0	47
Awbarre (Jijiga area)	8	0

Note: Number of observations is 1,174; of which 871 are refugees and 303 are hosts. 95 hosts live near both Buramino and Hilaweyn; 90 live near both Kobe and Melkadida.

Shabelle Bank Administrative Data

Second, we use data provided by Shabelle Bank to SHARPE for the purposes of monitoring the intervention. Every month, Shabelle Bank provided SHARPE with a list of customers, merchants, and agents who had enrolled in SHARPE, and on a quarterly basis they also provided the list with cumulative transactions since the project started. We use these data in several ways in the report, including as a way to measure impacts of the two rapid RCTs. It is important to note that these data do not represent the "universe" of HelloCash users in

Somali region; the data represent the users who were signed up in SHARPE target areas. Second, we note that Jijiga town was a target area until April 2021; at that point, the decision was made to focus on the Dollo Ado area and parts of the Jijiga area surrounding three refugee camps (Kebri Beyah, Aw Barre, and Sheder). We report on data collected through November 2021.

Phone Survey Data and Sampling

Third, we collected phone survey data as a baseline on community referrers for the first randomised trial. Our objective was to develop a sample of 800 "active" HelloCash customers from areas where SHARPE was currently working, near Dollo Ado (Bokolmayo, Buramino, Dollo Ado, Hilaweyn, Kobe, and Melkadida) and Jijiga (Awbare, Harta Sheika, Kebri Beyah, Lafa Ise, and Sheder). Given SHARPE's focus on gender and refugee status, and differences between the two locations, we aimed to include participants across the various combinations of these characteristics. Thus, we included eight strata in selecting the sample: Dollo Ado male host, Dollo Ado male refugee, Dollo Ado female host, Dollo Ado female refugee, Jijiga male host, Jijiga male refugee, Jijiga female host, Jijiga female refugee. The sampling process is described in more detail in Annex A.2.1.

The phone baseline survey included the following modules:

1. Demographics
2. Social Networks
3. Mobile Phone Use
4. Mobile Money Use
5. Financial Inclusion (excluding mobile money services)
6. Food Security (Food Insecurity Experience Scale (FIES))

After the baseline survey, we randomly assigned each respondent to either the control group or one of the three treatment groups, again stratifying by gender, refugee status, and location. Thus, 200 active HelloCash customers were assigned to each of the four intervention arms, split across the eight strata. These customers were the CRs for the study. As described in the previous section, we subsequently attempted to contact each of these 800 CRs by phone and text message to inform them of the referral hotline and the associated rewards if relevant.

In October 2022, we surveyed both community referrers and referred individuals at this time. The following modules were included in the endline surveys, listed by type of respondent.

Table 4. Differences between Surveys for Community Referrers and Referred Individuals, Phone Survey Endline for Referral Study, October 2022

Community Referrers	Referred Individuals
Demographics + Labour	Demographics
Mobile Phone Use	Mobile Phone Use
Mobile Money Use	Mobile Money Use
Experience with Hello-Cash Pilot Referral Program	Financial Inclusion (excluding mobile money services)

At baseline, we implemented the Food Insecurity Experience Scale (FIES) module developed by FAO (Ballard, Kepple, and Cafiero, 2013). A major concern that enumerators and their supervisors brought up was that it was difficult to implement this food security module with male respondents, particularly over the phone. This module was not included in the endline surveys.

In Person Endline Data

Fourth, we conducted a quantitative endline survey in September and October of 2022. The survey was designed to learn about outcomes among both HelloCash users and non-users and targeting both refugees and women. The survey was compounded by challenges in developing a sample frame, since there is no sample frame available (and any sample frame would not include HelloCash use). We describe the sampling procedure we followed in Appendix A.2.3.

The modules included in the endline quantitative survey include:

1. Demographics
2. Labour and other income sources
3. Livestock
4. Housing and Assets
5. Expectations on Income
6. Social Networks and Integration
7. Mobile Phones
8. HelloCash and other Mobile Money types
9. Financial Inclusion
10. Food Security
11. Women's Decision Making and Control over Resources

Qualitative data

We collected qualitative data at two different points in time for the impact evaluation. First, we collected qualitative data in July 2021 to help the IFPRI team better understand the context before international travel was once again allowed. Second, we conducted qualitative data collection close to the time that the endline was conducted. We describe each effort in turn.

Scoping Data Collection

The scoping work in 2021 was meant to help the research team broaden their understanding of the financial market system and to try to help design the rapid randomised trials testing test whether behavioural and price mechanisms could increase use of digital cash particularly among target groups. To design these trials, it is important to understand the specific constraints facing various market actors either in using digital cash or providing services around digital cash – including potential policy, institutional, and behavioural constraints, among others.

Underlying this rationale is an assumption that the spread of digital financial services is a positive outcome. We believe this assumption is justified on several levels. First, digital financial services can provide a safe mode of savings for a population that is largely unbanked from a formal perspective. Second, it can facilitate some transactions that were previously costly; for example, utility bills could be paid with mobile money, whereas in the past people

had to queue to pay them, incurring larger costs. Third, remittances to friends and family elsewhere in or outside of Ethiopia may also now be possible, where sending or receiving cash was not. Fourth, money held digitally is often safer and is less visible than cash, which can give the user more control over their balances when there are strong norms to share any available cash.

We include the list of primary questions that were asked in Annex B. This survey was carried out in the Jijiga area as we had difficulty getting enumerator transportation into the Dollo Ado area.

Endline Qualitative Data Collection

Endline qualitative data collection was carried out in the Jijiga and Dollo Ado areas within Somali Region in October 2022. In Jijiga, the survey work incorporated areas near the Kebri Beyah and Sheder camps, while the Dollo Ado work was conducted in the Dollo Ado area more generally.

The informants of the qualitative component of this study include community referrers (CRs), newly registered HelloCash clients (NRCs), HelloCash agents, ARRA camp managers, know-your-community officers (KYCOs) and Shabelle Bank managers. Community informants including CRs, NRCs and agents are both from refugee and host communities. In total 15 key informant interviews (KIIs), 13 focus group discussions (FGDs) and 5 case studies (CSs) were carried out as part of the overall SHARPE program evaluation; the referral program was included as a focus of some of the questions. The list of primary questions and a table of interviews conducted is in Annex C.4.

The qualitative data collection was carried out by two field teams, each with two members. A team consisting of a facilitator and note-taker was responsible for running FGDs. In most cases, CSs and KIIs were carried out by one facilitator. Semi-structured interview questions were applied to guide the FGDs, KIIs and CSs. These data collection instruments were pretested in Sheder before the data collection was launched. The pretest exercise helped the team members to refine the qualitative questionnaire and to acquaint themselves with the tools and approaches.

With the permission of informants, discussion voices were recorded. These voices were translated and transcribed into English text by the field team members. These transcribed data were thematically organized based on a reporting outline prepared for this purpose. The thematically organized data brought from different informants were analysed by comparing, contrasting, and linking them with SHARPE's objectives, including the referral pilot.

Data quality

We followed carefully developed procedures to ensure data quality during both the phone surveys and the in-person endline surveys. During the phone surveys, data quality was ensured using the following procedures:

- IFPRI developed survey programs and closely checked skip patterns and constrained values to plausible ranges where important to do so.
- The team recruited highly qualified supervisors and enumerators.

- The survey form was brief, so the team conducted a one-day training that included several practice exercises.
- Nightly checks of the data were performed to ensure consistency.
- Randomly selected respondents were called back to check answers.
- During the phone survey baseline, cell phones were used; the team learned afterwards that Somalis often do not trust cell phone numbers they do not know but do trust landlines (which can be identified by the first digits in the phone number calling). Therefore, we shifted and conducted the endline using landlines to spend less time building trust.
- During the baseline, one enumerator was found not to be providing quality data through back checks, and the person was dismissed, and data discarded.

For the in-person endline survey, during fieldwork the survey team led by EconInsight followed a set of procedures to ensure data quality. Specifically, they did the following:

- First, EconInsight employed a data monitoring dashboard embedded on Google Sheets. Further to checking the survey progress and completion regularly, the dashboard permits validating data accuracy and troubleshooting early-on. As data comes in from the field, the dashboard is dynamically populated to remain up to date.
- Second, they recruit highly qualified and motivated supervisors and enumerators.
- They conducted an intensive two-week training including classroom training, mock interview, pilot testing and debriefing.
- Senior field coordinators made random call backs to ensure that data has not been omitted or falsified and that the survey protocol is strictly always observed.
- They instituted routine checks on data quality in parallel with data collection so that mistakes can be rectified during the survey. A do-file written by our quality control specialist in close collaboration with the activity manager and the IFPRI RA was constantly run by the quality control specialist to ensure that entered data is complete, reliable, internally consistent, free from bad outliers and of acceptable quality. Whenever the EconInsight quality control specialist flagged errors, omissions, mistakes or data anomalies, the quality control specialist sent back the consolidated flagged potential errors to the senior field coordinators and supervisors with detailed comments on the variables that warrant corrective action.
- Survey programmers were tasked with managing data flow processes in real time during the survey implementation.
- While we rely on constant monitoring to ensure that high quality data is collected, the prospect of long-term and continued employment in EconInsight projects, which is conditional on performance and honesty, would solicit more desirable behaviour from the survey team.
- The use of electronic data collection gave one additional opportunity for quality control. During the design stage, EconInsight exploited the capabilities of the SurveyCTO program to incorporate automatic skip patterns and constrain responses so that the enumerator will not have unlimited leverage to continue recording responses even when the data is clearly incorrect, invalid, or inconsistent.

Though we followed procedures to ensure quality data were collected during the project, the administrative data have some limitations. While they accurately reflect customers, merchants, *bajaj* drivers, and agents who enrolled in target areas, after data delivered in December 2021,

they no longer reflect the total number of transactions, nor type of transaction, those individuals had made since the project began. Apparently, the reason is that the HelloCash server filled up, and began to overwrite old transactions that had occurred in the past to be able to record new ones. In fact, the server was so overloaded that at times it had trouble recording transactions. This problem was noticed by monitoring personnel at SHARPE and manifested itself for customers as slow times for processing transactions (or an inability to connect to the system). In July 2022 the server was replaced with a much larger and faster server (it can handle five times as many transactions per second), and the server is now located at EthioTelecom headquarters. Hence, in analysing the "business case," we cannot rely on the transaction records during roughly the January to July 2022 period.

4. Methodology

Evaluation design

We designed the evaluation as a mixed methods evaluation of a market systems development program, meant to follow the theory of change and account for key characteristics of market systems development programs. To begin the evaluation, we first needed to wait for the initial research component of the project to take place, since the initial research informed the design of its first interventions; as we describe below, SHARPE did not start with a clear idea of the companies or other partners with which it would work to attempt to affect change in the financial market system. To begin this section, we consider what those characteristics are, followed by a discussion of how a research project can address those characteristics. We finish this section with a brief description of how the evaluation design was both meant to be implemented in this project, and then how it was implemented, as it was constrained by the COVID-19 pandemic.

Key Characteristics of Market Systems Development Programs

Some characteristics of market systems development programs make them difficult to evaluate with one or any of the above characteristics. In this section, we describe four characteristics of these programs that make impact evaluation challenging: adaptability, a commitment to learning, the indirect nature of the intervention, and their inherent complexity, which makes attribution difficult. We describe each of these four difficulties below.

1. Adaptability
2. Learning
3. Indirect
4. Complexity/Attribution

An important consideration is that market systems development projects are adaptive by nature. Their adaptability is somewhat linked to the next attribute, learning, but is worth considering separately. The inherent adaptability of programs could potentially change both the intervention structure and the area in which it takes place. From an evaluation perspective, both types of adaptability could be difficult. First, if the project goals change, it could become difficult to even define what the primary research questions are for an impact evaluation; or they could be meaningless by the time the endline should take place. A project may also find that its first target areas were not quite correct and could move to other areas that have higher potential for meeting its goals. If so, then even a baseline survey might not be useful, since it could have taken place in an area not covered in the end by any of the programming attributable to the project.

Linked is the idea that market systems development programs are set up to be learning throughout the course of the project; as a result, their understanding both the market system or systems being studied and the constraints affecting those markets may improve over time, which feeds into the adaptability discussed above. Learning may necessitate new or evolved research questions at the centre of the evaluation, as the questions initially asked may not be relevant after learning occurs.

Third, market systems development programs intervene with smallholder farmers and or their intended beneficiaries (if not smallholder farmers) indirectly—they always operate through partnerships. These partnerships should be with partners that the project believes can act to improve the market systems—to either help begin to differentiate products between different quality attributes, or to overcome constraints within the targeted market system. From an evaluation perspective, the indirect nature can create several challenges for developing an evaluation strategy. First, it is inherently uncertain how large the groups of beneficiaries might be. For example, if a market systems development partner helps improve the fertilizer market in a specific country (by improving its offerings), beforehand we do not know how many customers might even consider purchasing their fertilizer, or how it might affect them if purchased. Second, note that even if an evaluator could trace those changes, the outcomes could change versus a standard development project. Continuing the same example, a fertilizer company will have fewer incentives to go steps beyond their offerings, to encourage farmers to also follow practices that would enhance their productivity (e.g., de Brauw, Kramer, and Murphy, 2019). Third, companies may be faster to abandon practices that they perceive are not making them money. As a corollary, if companies are nimble, they might be faster to abandon practices in specific localities they perceive are not making them money. And finally, given the uncertainty it might be tempting to do large surveys to try to trace beneficiaries, but they may make up a small proportion of populations, again making it difficult to find a large enough proportion of them to demonstrate impact.

The fourth issue can be termed either complexity or attribution; the latter concept ties into the indirect nature of interventions. Since the interventions are indirect, it can be challenging to attribute benefits to the project in general; there may further be a large cohort of indirect beneficiaries that are also hard to trace (especially if business practices and/or offerings do improve in general because of interventions). But further it is difficult to know what in the projects "worked" and what did not work to attempt to understand what to learn for future projects, due in part to the adaptive nature of these programs, and in part due to the indirect nature of such projects. Finally, because market systems development projects tend to involve multiple partners and different markets may have very different needs, they can end up quite complex, again making evaluation difficult.

Addressing Challenges

Given the four challenges described above, it is quite clear it is impossible to come up with a randomised "gold standard" evaluation for a market systems development program. Therefore, we next describe some principles for developing a strategy to rigorously evaluate a market systems development program, and how those principles can help address the challenges that we have enumerated above.

One thing to note is that it might not be necessary or even feasible to study an entire program. For example, agricultural market systems development programs often target multiple crops, products, or markets. If so, then it is worth considering conducting impact evaluation on a selection of value chains or markets, rather than on all the markets. Some of the market systems may only be targeted with smaller interventions, which would be challenging to evaluate; here discussion with project implementers as they are starting is key to select the right markets for evaluation.

"Baseline" Data

First, baseline data can help "unlock" several potential evaluation strategies, such as difference-in-difference strategies, for evaluation, or synthetic control methods, which require larger numbers of controls. The former can be combined, potentially, with matching or other propensity score based methods, to further reduce bias in impact estimates. There are two principles that can help evaluators collect useful baseline surveys for market systems interventions.

Given the discussion above about how even the location of a market systems development program can change, it is important to think about how to time the baseline survey for an impact evaluation. Somewhat obviously, such data are much less useful if they are collected in places that are never targeted by project partners. So, it is quite important not to rush a baseline survey; the survey for a specific market system should only occur once the location for that market is well known, likely through initial studies conducted by the project. So long as the market system is agreed upon, impact evaluation researchers can ready themselves with questionnaire development and broad logistics, leaving sampling and more detailed logistics for later stages when clear locations for the project have been developed.
It is important to make sure that two types of outcomes are measured in the baseline survey. First, projects always have outcome targets; any measurable outcome targets should be included in the baseline survey so that they can be traced among targeted groups over the course of any interventions. Second, the surveys should include any variables related to assumptions, constraints, or intermediate outcomes along the theory of change that the evaluation team is reasonably sure will not change over the course of the project. While the theory of change likely will need adapting as the project learns, the availability of some key points will help with contributory analysis as described later in this section.

Rapid Randomised Trials

It is possible to enhance the evaluation using rapid randomised trials or simple A/B trials in the following way. It could be that there are ways to test overcoming those constraints using reasonably fast randomised trials. By rapid, the idea would be to develop trials interesting to both the project and evaluation team that can be implemented quickly and do not take a long time for results to be realized, so that trials can be adapted, or so that results can be incorporated into the project. An example would be testing different types of messaging to see which ones are more salient with customers; a second example might be encouraging specific types of behaviours and market actors that could improve the way the market works. The goal would be to set up the trial(s) such that 1) administrative data can be used to measure outcomes, both among treatment and control groups; 2) any data collection is done using computer assisted personal or telephone interviews (CAPI or CATI, respectively) and outcomes are kept simple so that they can be compiled quickly after the trials are over and/or during the trials; and 3) (preliminary) results are sent back to the project quickly so that they can be adapted if constraints are not being overcome. Ideally such trials are set up so that they do not take much time to set up, so that several can be conducted over the course of the project.

Triangulate with Administrative Data

The data from rapid randomised trials and other administrative data can be used to help understand how project outcomes might have occurred. For example, consider a project that

we believe has a 20% increase in consumption among beneficiaries relative to a control group. If there is administrative data from the project, we can use that data to understand both participation in the project and participation intensity, as well as potentially participation intensity over time. It is unlikely that the data would include consumption but depending upon the outcomes captured by partners it could very well include some type of income (or revenue) which could be helpful in determining whether or the extent to which the final outcome could have flowed through changes in outcomes tracked by project partners.

Embrace Ambiguity

Given the complexity of most market systems development programs, the overall goal of an impact evaluation of a market systems development project should not necessarily be to answer questions with precision, but rather to be able to say something about what actions appear to have worked and which ones might not have helped attain final outcomes. The different measures available to analysts, though, should be combined to do something more like a contributory analysis. Take, again, the example of a measured 20 per cent increase in per capita consumption expenditures. Through intermediate outcomes tracked from the baseline to the endline survey, through other intermediate outcomes tracked through the qualitative work, and finally through administrative data collected from the project, one can either assign ranges of probabilities or ranges of percentage contributions to those components on the theory of change. For example, if we assume that in an agricultural intervention high quality input availability increased, and survey evidence suggests that farmers in areas exposed to the intervention begin to use more high-quality inputs. Yet other things also changed in those areas, so the change in input availability is not the only change that occurred. Given the other evidence generated by the project, analysts might either conclude that, for example, increased input availability contributed to increased farmer incomes with 75 to 95 per cent probability, or somewhere between 20 and 50 per cent of the change in incomes.[6] Potential ranges balance the desire of analysts not to make statements that cannot be supported by evidence, while helping practitioners develop future, similar projects by providing them with some input about what has worked in the past.

Planned and Actual Quantitative Methods

In the context of studying the financial market system activities of the SHARPE programme in the Somali region, we initially planned the following activities: First, we planned to conduct a baseline survey in the two areas of interest. The idea of the baseline survey was to at least capture information about the residents of areas that we would hope the intervention would affect. So SHARPE's planning and contracting had to be far enough along to be able to predict these areas with certainty. A challenge could be, in this context, if an initial intervention or partner "failed" and they had to seriously adapt plans; ideally, the geographies would not change but the result of the intervention might be known before the endline survey would take place.

Once the evaluation team had basic information about the market system and plans to affect change, we planned to work with SHARPE and their partners to design at least two adaptive randomised trials, that would test a way to overcome some behavioural constraint. These randomised trials might involve some of their own survey work, as planned. Third, we

[6] Ideally, rapid RCTs can help make some of these statements more precise, at least for overcoming specific constraints within the theory of change.

planned qualitative work that would help us understand effects of interventions that SHARPE was conducting to overcome some other constraints within the theory of change. And finally, we planned endline quantitative data collection, ideally a panel. We then planned to use difference-in-difference methods to learn about how SHARPE activities differentially affected users or targeted individuals than non-users, which could be combined with matching or propensity score methods to reduce bias (e.g., Busso et al., 2014).

As noted above, the COVID-19 pandemic and to some extent conflict within Ethiopia affected these plans. First, we could not conduct a baseline survey, since as SHARPE really began activities when travel was not allowed, and internal review boards were not allowing in-person data collection. We substituted some qualitative scoping work, which took place in the summer of 2021, as the IFPRI-Dadimos research team felt some qualitative scoping work would help define constraints that could be addressed with a randomised trial, and it was difficult to ascertain this information just through phone meetings.

The randomised design process began in September of 2021. At that time, there was clear learning that had taken place in the project itself, so the research team, SHARPE, and Shabelle Bank collaborated to start discussing the primary constraints to meeting project goals that had been identified. The design process began as agnostic about what actual trials would run. These discussions led to the idea of trying to use referrals to gain customers in the hosting areas, and to consider ways to increase use particularly among specific types of customers (women and refugees) in those areas.

The randomised trial research commenced with a phone survey conducted as a baseline for in April 2022. However, the trial did not start until August 2022; there were some research related delays but also delays at Shabelle Bank, based on problems they were having at the time with the HelloCash server. The second trial was designed in mid-May of 2022, but again it did not start (and end), largely due to a miscommunication between partners, until November 2022. We had initially tried to run it in September, but the delay in the first trial created miscommunication that meant the initial text messages were not sent. Though both ran successfully, adaptations of the two trials were less successful since they ran towards the end of the project. It specifically ran between November 17, 2022, and December 5, 2022. To be able to include results from the first trial in qualitative work, the qualitative work and the endline quantitative work both took place in October, with the quantitative work beginning in late September.

Integration of qualitative and quantitative methods

As noted above, integrating qualitative and quantitative methods is crucial to learning about complex programs. qualitative data can help understand how overall impacts might have evolved, but it cannot be used in isolation effectively, as it leaves too much ambiguity about what quantifiable impacts the project might have had. Quantitative data alone might be good for understanding the average impacts of a program on some intermediate outcomes or even final outcomes, if surveys and in particular samples are well designed. However, they are unlikely to give much information about what aspects of a program helped cause those impacts, either on their own or in combination with other outcomes. They may also miss more nuanced information on why programs might or might not have worked.

Therefore, we envision the following steps for integrating qualitative and quantitative research in a market systems development program evaluation. First, it is good to recall the role of quantitative data collection. It should be used to understand how key outcomes have changed for beneficiaries and non-beneficiaries during project implementation. Since the goal of market systems development programs is to create lasting change, it is worth considering setting aside funds to conduct a further round of data collection sometime after the project is over. Key outcomes, both intermediate outcomes and final outcomes, should be clearly enumerated in these surveys, which should take place among key demographic groups the project has targeted.

The qualitative survey work should be designed to accompany the quantitative survey. The goal of the qualitative survey is to fill in the theory of change; meaning, it should be designed to either try to understand how the project has affected outcomes that are harder to quantitatively measure, how it might have affected government or other processes necessary for markets to positively evolve, or outcomes that might not have affected enough actors during the project to measure quantitatively. The qualitative work would then act to compliment the quantitative survey in determining why outcomes occurred, as we describe in more detail later.

Application to the SHARPE Financial Market Systems Activities

There are three ways qualitative work was and is being used to understand impacts of SHARPE market systems activities. First, some initial qualitative work was conducted to help the research team contextualize the types of randomised trials that could be possible, through what we called a scoping exercise. Second, the two rounds of qualitative work can help us understand the relative importance of SHARPE activities on overcoming some of the constraints identified against both take-up and use of mobile money; this analysis is completed in the final section in the consideration of "contributory analysis" combining the qualitative and quantitative evidence. Third, we can use it to better contextualize the importance of the randomised trial involving referrals.

Identification strategy

We follow a two-pronged identification strategy for the evaluation. The first prong relates to the rapid randomised trials; the two trials will be identified through randomization, in ways that we describe more completely below. To attempt to identify more general impacts of the financial market systems activities, the design is to use a difference-in-difference strategy using propensity score methods to better match the participants with non-participants. We describe how this strategy was implemented in practice below.

Randomised Trials

The first randomised trial was randomised at the referrer level. Potential referrers were randomised into four groups: A "high-high" payment group, a "high-low" payment group, a "low-low" payment group, and a control group. The "high" and "low" refers to the bonus each individual would receive 50 birr and 25 birr, respectively, for referring a new customer. The "high-low" group refers to the fact that this group would receive 50 birr for referring women, but only 25 birr for referring men. Randomization was stratified by gender, location (Jijiga area or Dollo Ado area), and refugee status.

The second randomised trial was randomised at the individual level. The sample were all individuals who had enrolled in September but had not made a transaction by September 30th. That sample was randomised into three groups—a group that received 25 birr and a text message asking them to use it (unconditional group); a group that received a text message telling them that if they made three transactions by December 5, they would receive a 25 birr bonus, and a control group. As with the first trial, the randomization took place stratifying by gender, location, and refugee status, with a twist; the two groups of male hosts (from both locations) received much lower probabilities to appear in the unconditional and conditional groups, so that the treatment groups would include a large number of women and refugees, who are targeted for additional enrolment.

Quasi-Experimental Identification: Overall Evaluation

For outcomes measured with the quantitative endline data, we do the following to be able to measure differences between HelloCash users and non-users. First, we stratified the sample to ensure that we had both HelloCash users and non-users—literally trying to find the same number of both. We then measure differences in means between the two groups and adjust the groups to look similar using a doubly robust propensity score weighting estimator (e.g., Imbens, 2000; Hirano and Imbens, 2001; Band and Robins, 2005).[7] The propensity scores were generated using a LASSO procedure (e.g., Ye, Zhu, and Coffmann, 2021); we use separate LASSO procedures when generating estimates for population subgroups. We are cautious, however, about calling these impacts causal as we cannot control for trends, nor baseline differences between groups.

We use the LASSO procedure to develop robustness tests for main outcomes; in this case, we test robustness for estimation method. First, we use the variables identified in the LASSO to use nearest neighbor matching (Abadie and Imbens, 2006); we test using the two and four nearest matches, and use a bias adjustment based on the same variables coming from the LASSO, since we have no statistical reason to exclude any variables (Abadie and Imbens, 2011). Second, we use them in two kernel matching procedures (using the Epanechnikov kernel and the rectangular kernel). We use both within the region of common support, though in practice few observations drop, and with a bandwidth that follows Huber et al. (2015).

[7] Busso et al. (2014) show the inverse probability weighting estimator with regression adjustment performs well when compared with other propensity score methods and other matching methods.

5. Qualitative analysis

Implementation fidelity

As described in section 2, adaptive management is a feature of market systems development programs. Initial planning is only conducted in a broad manner, with details filled in as learning about the market system occurs. Since within a market system the goal is to affect change by working through partners, from an internal perspective implementation could only lack fidelity if partners cannot be located, or if partners are revealed as poor fits (in which case they can be replaced through adaptive management). Externally, budget changes or challenges can cause implementation to be adjusted; the latter is important in this context.

The initial plan was to help build up the financial market system in both Somali and Gambella regions to help facilitate changes in other market systems as well. For example, initial SHARPE analysis suggested that digital financial services could help smooth transactions in the chicken value chain as the EthioChicken company developed or increased operations in Jijiga and Gambella. Digital financial services could also be used in the aid market system, by moving refugee transfers onto a digital system; however, to do so it is important to have a digital ecosystem with several characteristics: a large share of intended beneficiaries must be able to receive transfers digitally; they must be able to easily use them or convert them to physical cash; and they must feel comfortable that their money can be stored safely in digital form.

One major change was made to the overall impact evaluation plan. Initially, we had planned to study both the financial and aid market systems, using further investments that were planned in the aid market system—the increase in use of digital financial services could be used to pilot digital cash transfers to refugees. The latter investment did not take place due to several factors, including the COVID-19 pandemic, the Tigrayan conflict, and changing budget priorities within FCDO. Therefore, the impact evaluation was limited to studying the financial market system.

Take-up

The intended goals of SHARPE in the financial services market system in Somali region relate to onboarding customers, including a specific number of new DFS clients, mobile money agents, merchants, and *bajaj* drivers. We cover client enrolment or take-up in the next section but suffice to say that the only goal that was not exceeded was the number of mobile money agents that were recruited by Shabelle Bank and SHARPE. By the end of September 2022, just before the endline qualitative work took place, 281 registered agents had been registered in the Shabelle Bank database, just short of the overall project goal of 300. Yet agent registration had dramatically slowed by September, so it is worth considering challenges to agent registration in the following section. In that section, we also consider the fact that fewer women and refugees have taken up HelloCash.

Since most of the quantitative goals were met by the end of September, we focus the remaining part of this section on two further topics. First, we discuss evidence that take-up is leading to sustainable changes in the market system. Second, we discuss take-up of the

referral RCT, as the referral program was ongoing during the endline qualitative data collection.

Sustainability

Perhaps more important than HelloCash take-up is to understand whether the market systems in refugee hosting areas appear sustainable. There are several signs that the HelloCash ecosystem is sustainable, at least in some of the refugee hosting areas. For the ecosystem to work on its own, agents, merchants, and customers must all feel comfortable using the system, and they must use it.

First, all the agents interviewed in the qualitative component suggest that they plan to continue to work as agents in their respective areas. In the Jijiga area (Sheder and Kebri Beyah), the interviewed agents are participating in another component of the SHARPE project, which provides loans for business expansion, using agent performance as a form of collateral. The agent in Sheder also works as an agent for two other digital financial services (Sahay and e-Birr), and the agent in Kebri Beyah plans to work for those two services in the future as well if the opportunity arises. In fact, the agent in Sheder suggested HelloCash business was declining somewhat as fees for the other two services are lower.

Several agents shared positive anecdotes about business growth after becoming agents. One agent in Sheder suggested his customer base had substantially expanded since becoming an agent; these customers do not just send HelloCash transfers, as they also purchase goods from their stores. A quote from an agent in Kebri Beyah summarizes this phenomenon well:

> "I got a two-pronged benefit from HelloCash, including commissions from the delivery of Hello Cash services to clients. Moreover, working as a Hello Cash agent has created big market opportunities for my stationary business." *HCA, Kebri Beyah*

While one agent in Sheder suggested a HelloCash decline, the HelloCash agents in Dollo Ado and Kebri Beyah both suggested that both host and refugee clients were regularly using HelloCash services. Customers come to their shops for HelloCash transactions, but also to use other services available in their shop:

> "I am dealing with both the host and refugee community in a proportion of roughly 70% and 30% respectively. I have good working relationship with the refugee community." *HCA, Kebri Beyah*

In all areas, HelloCash agents actively register new customers as well:

> "Yes, I am registering new men and women Hallo Cash customers from the host and refugee community. I am promoting Hello Cash mobile money specially the advantages of using e-money whenever they come to my shop for either purchasing stationary or getting the Hello Cash service." *HCA, Kebri Beyah*

> "Yes, I have registered new users from both the host community and the Sheder Refugee Camp; both men and women. Majority of the newly registered clients were from the refugees." *HCA, Sheder*

Newly registered customers interviewed in focus groups all suggested they feel comfortable leaving money on HelloCash. However, most customers did not feel comfortable leaving money on HelloCash required for immediate needs, due to the inherent unreliability of the mobile phone network. Customers suggested they would either use or were already using HelloCash to send and receive private transfers and purchase goods from merchants who accept it.

The Community Referral System

Part of the endline qualitative study focused on the community referral (CR) system, which was still being implemented during the study. The study focused on trying to learn about reasons for take-up or lack of take-up among CRs, and how well the system functioned. Among CRs who had received calls, they found messaging both by phone and by text quite clear. Some had used the hotline system to register new clients; others had let the local KYC officer know names and numbers of potential new clients. So, the basic set-up of the CR system seemed to be quite solid. Focus group discussions revealed some potential explanations for the lack of take-up among CRs. CRs may have decided not to participate because they did not have enough airtime to call the hotline or did not have any free time to dedicate to the referral program.

> "...some of the CRs communicated are old age, some businessmen who are busy, a guard who said that one shift I go to my farm and the other shift 8 hours am on duty so I don't have to for a job that is not permanent." *HCA, Dollo Ado*

> "They may not have sufficient airtime to refer to new clients." *HCA Host Community, Sheder*

Challenges

As noted above, one challenge to attaining SHARPE's quantitative targets has been to sign up agents. We discuss agent enrolment below. We then explore the fact that women and refugees have been less likely to take up HelloCash. Finally, we discuss some challenges that affect usage of HelloCash in general that could affect future sustainability.

Agent Enrolment

As noted above, agent enrolment may not quite attain overall project goals by the end of the contract between Shabelle Bank and SHARPE (December 2022). It is somewhat difficult to explain why this target might not be attained using the qualitative work done for the project, and there are at least two sensible constraints that SHARPE might not have fully understood when designing or declaring their targets. First, there may simply not be enough businesses with available capital that also meet formality requirements in refugee hosting areas. The number of agents that appear quite successful in each of the refugee hosting areas are discussed in the following section, and this number is much lower than 300. Note that it

might not be necessary to maintain 300 agents in these areas for the digital ecosystem to be successful; however, it is likely helpful to have multiple agents available to all customers in each area if possible (in less populated communities that might not hold).

Second, as noted in section 2, there were substantial difficulties getting any agents enrolled within refugee camps, due to multiple constraints. Given the importance of enrolling agents in those areas, after learning more about the characteristics of successful agents, the increased emphasis within SHARPE in working with partners to help potential agents obtain documentation to become agents was probably the most effective possible strategy and likely deserves further emphasis either in a second phase of SHARPE or in further donor-driven work as returns even to donor agencies should be relatively high.

Take Up Differences by Gender and Refugee Status

As is described in detail in the next section, there have always been difficulties enrolling women and refugees in HelloCash relative to men from the host community. Since community integration is a SHARPE goal, both take-up by women and refugees are important goals; as discussed above, the two rapid RCTs were developed specifically to measure whether methods of increasing take-up and use would be effective in increasing use among women and refugees.

The qualitative survey did cover reasons that women are less likely to use HelloCash or other mobile money services. The constraints are quite different in the host and refugee communities. Among newly registered host women, various factors illuminated by the focus groups hinder the use of HelloCash by women. For example, respondents mentioned cultural barriers restrict the role of women to domestic work, a general lack of awareness of HelloCash services among women, and poor economic potential and illiteracy among women as barriers keeping women from using HelloCash or other digital financial services. Several participants noted that older women are even less likely to use HelloCash services since they are more likely to be illiterate than younger women. Other barriers also mentioned by some new users included the limited awareness of HelloCash agents or KYC officers that they could encourage women to enrol, the absence of other HelloCash users within families, and high service charges (which would affect all users). Some representative quotes from interviews include the following:

> "...there are a lot of women who want to use HelloCash but can't because they are uneducated and cannot read or write." *NRC Refugee Men FGD, Kebri Beyah*

> "The women in the youth age bracket are using HelloCash services better than older women. This is mainly attributed to the high number of literate women found in this age category." *Male HCA, Kebri Beyah*

Among refugees, focus group discussions suggested that in fact women are more active users of HelloCash, since they are mainly responsible to manage procurement of basic necessities. Since social transfers to refugees have not generally occurred on HelloCash, the number of

potential transactions could therefore be limited.[8] Refugee women in Sheder suggested that they do not use HelloCash to buy airtime, as the steps to do so are a bit difficult to understand and complete.

> "The Hello Cash services used by men are higher than women in the host community, and this is the opposite in the refugee community. I can roughly estimate that in the host community the proportion of men to women would be 70% and 30% respectively. Whereas, in the refugee community the proportion would be the opposite that men compose 20% and women 80% respectively. Women in the refugee community engaged in petty trade activities as opposed to men. In the host community men mainly doing the business activities and women stay at home." *HCA-Host Community FGD, Sheder*

> "The services women don't usually use include the airtime service of HelloCash because it's difficult to understand the steps of buying airtime via HelloCash." *NRC-Women FGD, Sheder*

> "More women use HelloCash than men because most of the men in the refugee camp are unemployed. Women do small businesses and are the breadwinners of their families. So, they use HelloCash to pay the family bills and save money." *NRC-Women FGD, Sheder*

Among refugees, in Kebri Beyah around three of ten are using HelloCash; this percentage is probably high as some people reported that unregistered people (e.g., other household members) use the accounts of other HelloCash clients when they are needed. Based on a focus group in Sheder, women usually use their husband's account while younger people provide such access to older parents. Reasons that refugees do not enrol include illiteracy (particularly among older people and women), and a lack of personal ID cards for registration (the latter is apparently more prevalent among refugees). Refugees also make the excuse that they are concerned that if they begin to use services like HelloCash, they would not be eligible for repatriation (to OECD countries).

> "Alike other aspects of life such as education, men use HelloCash more than women, and the members of the host community use HelloCash more than the refugees." *Men CRs-Refugees FGD, Kebribayah*

> "…there are people who use HelloCash but not registered. they use it to receive money from relatives who are registered, especially mothers and old people use their children or husband HelloCash account." *Men CRs-Refugees FGD, Kebribayah*

Network and Fees

Two clear challenges came up as part of the qualitative fieldwork—first, there were several complaints about the HelloCash network. We can separate that complaint into two parts—one

[8] In Kebri Beyah, refugees in a focus group suggested they have received some social transfers on e-Birr. However, recent expenditure reporting by WFP for Ethiopia suggests that if that has occurred it has occurred on a very limited basis.

is a complaint about mobile service generally, either in its unreliability or in its lack of service to specific parts of the areas studied. There is a second complaint, however; any transaction occurs by contacting servers for the mobile money service, and if those servers are busy (with transactions or other activities), transactions can notably slow down. In this case, the latter issue would be a HelloCash (and therefore a Shabelle Bank) issue.

The former issue is outside the scope of the market system and its actors. The latter problem, with slow transactions, came up in the interviews:

> "HelloCash service network has a problem. It becomes busy while you are in need of withdrawing or transfer cash." *Dollo Ado NRC Host Community Men FGD.*

As noted in Section 3, the HelloCash server indeed had a problem at the beginning of 2022, which slowed down transfers. However, that problem was addressed by replacing and updating the server and locating it differently—it is now located alongside Ethiotelecom servers. According to Shabelle Bank, the new server can handle 5 times as many transactions per second as the old one. So, this concern would appear to be dated, unless the system had grown so much that the new limit was being reached; however, Shabelle Bank seemed confident that the limit was not being reached.

The second challenge relates to fees. Mobile money transactions typically have a small fee attached to them; this fee is what makes the bank and the mobile money service profits. A challenge in Ethiopia is that e-Birr and Telebirr are not charging fees at all. The former is a financial platform that only works with the cooperative bank of Oromia, while the latter is run by Ethiotelecom. HelloCash must then differentiate itself by having better services (e.g., help using the service, a better interface on the phone, a denser agent network, etc.) than these free services.

Shabelle Bank charges relatively high fees for its services, and these fees came up several times in the interviews. For example, a focus group respondent stated:

> "HelloCash has two main problems, i.e., poor system network, and the high service charge. If you want to send or receive money, the service charge is about 2%." *Kebribayah NRC Host Community Women FGD.*

Another respondent stated:

> "(The) HelloCash service network has a problem. It becomes busy while you are in need of withdrawing or transfer cash." *Dollo Ado NRC Host Community Men FGD.*

However, as some other respondents point out, the services that Shabelle Bank provides for HelloCash are quite valuable. For example, a respondent in Kebri Beyah stated:

> "We come to Shebelle bank whenever we need help for the service. Yes, we know how to find help and we ask the staff working in the bank." *NR FGD*

Others noted communications from Shabelle Bank:

> "Yes, we received SMS from Shebelle bank. For instance, they sent us *838# to use it for changing languages. It was clear and acceptable." *NR Women FGD, Sheder*

Similarly, the NR women FGD participant from Kebri Beyah discussed her experience saying that:

> "I received once SMS message from Hello Cash. It was about receiving money from abroad using Hello Cash financial service. Yes, it was clear and acceptable." *NR Women FGD, Kebri Beyah*

So, the fees charged are paying for something (the increased amount of services). That said, SHARPE and the research team have both discussed complaints about fees with Shabelle Bank executives; the response was quite technical. They responded that after changes in fees they have not found much change in use behaviour—to provide a near direct quote, they stated that demand for HelloCash was inelastic. As a result, unless growth in product use were to change, they are unlikely to reduce fees. One such change could be the impending introduction of Safaricom and m-PESA to the Ethiopian market, both of which have been approved by the government.

Enablers

Since the relaxation of restrictions on ownership requirements for digital financial services in early 2020, several e-money products have become available in Ethiopia; in Somali region, there are even more available in border areas as services from Somaliland, Somalia, or even Kenya become useful. So, in selecting partners for Somali region (and Gambella region), it was important to understand the market system in advance to find partners willing to expand services into refugee hosting areas of the region(s).

Therefore, a clear choice had to be made about what service to use as a partner (and what bank, if the product was not developed by the bank). As we have discussed, SHARPE decided to work with the HelloCash product of Belcash Technology Services, which was already working with (then) Somali MFI, as well as other banks. In SHARPE's initial analysis of the financial market system, two products clearly dominated—HelloCash and what is now known as e-Birr, and it was clear by the number of branches that Somali MFI had established suggested it could provide the most support in target areas. Hence, at the time Somali MFI—again, now Shabelle Bank—was a clear choice for a partner. The choice of partner was a clear first enabler for any success in the project since another choice would have led to different outcomes.

Perceptions of HelloCash versus other services

The qualitative survey asked respondents about their perceptions of HelloCash, how secure they felt using it, and whether they had impressions of HelloCash versus other mobile money services. If perceptions of HelloCash are poor or people have difficulty registering or using it, then the enrolment growth catalysed by SHARPE will not lead to a sustainable market.

Most respondents could not name an aspect of HelloCash they did not like. Most respondents received calls during their registration process for HelloCash, and found those calls concise,

clear, and acceptable. Some users, though, reported they did not receive calls when registering; that said, it is not clear that every registration would require phone support. Nearly all focus group participants also recognized Hello Cash services as a safe and secure way of financial management. Saving, money transfers, and safety were all mentioned as positive aspects of HelloCash. For example, a Dollo Ado respondents said that:

> "We indicated that it is safe and secure, and the money transfer service is good for us." *NRC FGD*

A respondent in Dollo Ado suggested:

> "We can use it the service without carrying cash at hand once we have it in the form e-money. So we can purchase different commodities and services from home or away to support our families and parents." *NRC FGD, Kebri Beyah*

Qualitative respondents also found SMS messages received from HelloCash clear and acceptable. Most respondents received SMS one way or another about Hello Cash services including how to receive money from abroad, how to change languages as and when required.

> "Yes, we received SMS from Shebelle bank. For instance, they sent us *838# to use it for changing languages. It was clear and acceptable." *NR women FGD, Sheder*

Similarly, the NR women FGD participant from Kebri Beyah discussed her experience saying that:

> "I received one SMS message from Hello Cash. It was about receiving money from abroad using Hello Cash financial service. Yes, it was clear and acceptable." *NR Women FGD, Kebri Beyah*

That said, there were also respondents who stated they never received any SMS messages, which would seem strange if HelloCash or Shabelle Bank were sending bulk messages to all customers. Such customers may simply not have seen those messages.

Improvements in HC services

A big advantage that HelloCash has built up in Somali region is its wide client and agent bases. This advantage makes it convenient to use, as users can find agents in different locations, and respondents stated as such. These advantages can help them outweigh any negative aspects of the service that customers might perceive. For example, a focus group respondent stated:

> "All digital financial service providers provide the same services. However, they differ in their system networks and service charges, and HelloCash has the worst system network and the highest service charge."

Another respondent suggested:

> "Currently, we are using Hello Cash only. We started using it based on the advice we got from my neighbour. It is quite a recent experience." *NRC Men FGD, Sheder*

Comparison with other services

Though the service and agent network were seen as positives, some respondents were also using other services. In fact, respondents suggested that services provided by DFS providers are similar. To choose which provider they use, factors include network accessibility, the number of contacts on the service, agent availability, and service charges. Respondents suggested that e-Birr and Sahay services have good networks, and some products (such as e-Birr and smaller products such as EVC and e-Dahab) have no service charges. Similarly, Sahay has lower service charges than HelloCash according to respondents. Moreover, according to newly registered HelloCash clients in Dollo Ado, some other services such as EVS Plus and E-Dahab give small bonuses when charging mobile phones airtime through them.

> "Sahay and E-Birr are fast and better than HelloCash but their customers are not as large as HelloCash's." *NRC Women FGD, Kebribayah*

Users generally had two complaints about HelloCash in relation to other providers: that it has weak network connections, and high service charges relative to other digital financial service providers. Note that here we should differentiate between the phone network and the servers that run HelloCash. The former problem, as noted in Section 2, is beyond the control of market system actors to solve, and it equally affects all digital financial service providers.

> "HC service network has a problem. It becomes busy while you are in need of withdrawing or transfer cash." *NRC Host Community Men FGD, Dollo Ado*

> "HelloCash has two main problems, i.e., poor system network, and the high service charge. If you want to send or receive money, the service charge is about 2%." *NRC Host Community Women FGD, Kebri Beyah*

The KYC Officers

A crucial component of SHARPE support for Shabelle Bank and HelloCash was to hire additional KYC officers who were specifically resident in areas near refugee camps. So, it is important to understand whether the KYC officers were effective. To be effective, they should have been supportive of registration processes and available for any other issues that customers might have had. We found that some focus group respondents did not know the local KYC officers. But others did, and they generally suggested that KYC officers were supportive in registration and service use.

Nearly half of the respondents in Dollo Ado, Kebri Beyah, Sheder said that KYC officers helped us how to use Hello Cash services. But others in the same areas who do not meet KYC officers at all so they are obliged to look for other sources of support such as CRs. The women respondents who often see the KYC officer in the case of Kebri Beyah ranges between 2 days and several times in a week.

> "I contacted the woman KYC officer four times in the last one month; I frequently contacted her frequently as she came to my place and I also went to her office; I met her twice for awareness creation and account opening sessions to join the Hello Cash services." *NLFGD, Kebri Beyah*

Respondents met KYC officers in several places, though perhaps not as much in refugee camps as would be ideal. For example, in Dollo Ado respondents found the KYC officer in the bank and in town generally. However, he reported his movement was somewhat restrained by the quite hot climate in Dollo Ado. That said, in Sheder refugee camp, the discussants see the KYC officer only once to brief them about opening of Hello Cash accounts. In Kebri Beyah, the KYC officer bluntly said that he no longer needs to use any mechanism to attract HelloCash users, as the community is well aware of the Hello Cash service delivery areas.

Finally, the KYC officers were asked to play a supporting role in the community referral RCT. The KYC officer in Dollo Ado indicated how new clients attracted to Hello Cash services by working closely with the community referrers (CRs). The CR respondents said that they passed their names and phone numbers of new HelloCash agents to KYC officers for registration multiple times. On the other hand, the CRs normally give names and numbers of new clients to hotline operators, but whenever there is a need for corrections, the KYC officers complete them.

Findings and conclusions

The qualitative interviews close to the end of the impact evaluation shed light on several aspects of the theory of change described in section 2. In particular, we find evidence that several aspects of the theory of change are met. Related to enrolment, people are aware of HelloCash (and other systems), they are clear on benefits of use, and the enrolment process appears to be simple and well-understood. Similarly, other than when external constraints bind, most people appear to have no trouble using the system once they are using it; interfaces are easy to use and well understood by most customers.

That said, there are clearly external constraints that affect the consumer experience. Mobile coverage is not always reliable, which means that when cash is needed for immediate needs, people feel the need for cash rather than being able to rely on digital payments. Among some respondents, illiteracy is also an issue. Neither of these constraints can be dealt with in the short term by a project like SHARPE.

An internal challenge that came up repeatedly in the focus groups and other interviews was that of service charges. HelloCash has relatively high service charges, which could lead some customers to use other services. At present, it appears that those high service charges help Shabelle Bank to provide services, such as KYC officers and a robust agent network that are not present for other mobile money services. These services are backed by a large branch network that helps mitigate problems often seen in nascent mobile money networks, such as agents running out of physical money (the bank branches help deal with this problem). However, that situation could always change if other services make large investments in the same geographic areas.

In sum, the qualitative evidence suggests that many of the building blocks for final outcomes in the control of SHARPE appear to have been met. Where there are challenges noted by respondents—specifically, considering network quality and service costs—they have either been addressed by Shabelle Bank management (the Belcash server) or have at least been analysed carefully by management (service costs). We return to some of the challenges in the final section, as we consider ways to put together the qualitative and quantitative study components.

6. Quantitative analysis

Impact of the intervention

In this section, we trace the theory of change towards final outcomes as follows. First, we present descriptive analysis pre-SHARPE using the 2017 World Bank Skills survey, which included a relatively large subsample in Somali region. Second, we begin to trace the theory of change by examining HelloCash enrolment through administrative data. Third, we focus on constraints to moving along the theory of change that can be measured with the quantitative data, before describing changes in the final outcomes, which include the two measures of financial inclusion, the two measures of self-employment income, the four measures of income or food security, and the two measures of social inclusion. Finally, we broadly describe the results from the rapid RCTs conducted with Shabelle Bank and SHARPE, providing more information about the intermediate outcomes of HelloCash enrolment and use among specific target groups.

Descriptive Analysis, World Bank Skills Survey

We begin by developing some basic facts about the two areas in Somali region that host refugees from the World Bank Skills Survey, conducted about two years before SHARPE began. We first examine daily consumption per capita, including service imputed from housing and other assets (Table 5). The average which is 23.7 birr among hosts, and 19.5 birr among refugees; this difference is significant at better than the 5 per cent level. The average reduced coping strategies index, which is a measure of food insecurity developed by WFP and FAO, is about the same at 14 (out of a possible 56); about half of households in the data suffer from high food insecurity.

Table 5. Various Indicators related to Living Standards and Time to Services, Somali Region, 2017, by Refugee Status

Variable (Past Seven Days)	Hosts	Refugees
Daily per Capita Consumption (Birr)	23.7	19.5**
Food Security Coping Strategies Index	13.8	15.2
Share, High Food Insecurity status	46.8	54.1
Average Minutes, reach school (one way)	20.4	22.6
Average Minutes, reach health clinic (one way)	24.2	31.2**
Average Minutes, reach water source (one way)	13.2	6.3**
Average Minutes, reach market (one way)	18.8	31.8**

Note: Number of observations is 1,174; of which 871 are refugees and 303 are hosts. **-indicates difference is significant at the 5 per cent level or better.

The time to travel for various services can also be considered as a well-being indicator (Table 5, rows 4-7). Host households report living closer to both health clinics and markets than refugee households in terms of time; refugees must travel over half an hour on average to reach a health clinic or a market. Refugees report having better access to water than hosts; they travel an average of 6 minutes to obtain water, whereas hosts travel an average of 13

minutes. The latter difference may reflect camp infrastructure for water that does not exist in host areas.

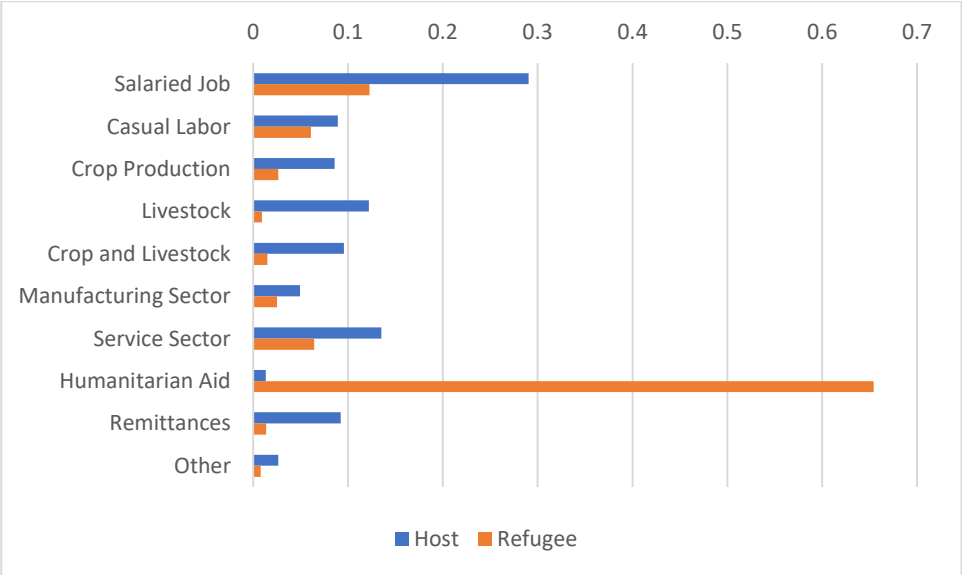
We next study some of the components of the reduced food security index in more detail (Table 6). These statistics demonstrate that households in both host and refugee areas use several coping mechanisms for a lack of food. On average, households eat less preferred foods more than twice per week; they borrow food from others more than once per week, and they limit portions; the latter is more prevalent among refugees. They also reduce the number of meals eaten, on average, by close to two days per week. As evidenced by the statistics above and number of coping mechanisms used by households, households in this area faced a lot of difficulty obtaining enough food during this period.

Table 6. Food Security Indicators among Households, by Refugee Status, Somali Region, World Bank Skills Survey, 2017

Variable (Past Seven Days)	Hosts	Refugees
No money for food	39.2	48.8
Number of days, ate less preferred foods	2.3	2.7
Days, borrowed money or food from others	1.8	1.7
Days, limited portions	1.7	2.2
Days, Limited Adult portions	1.5	1.7
Days, reduced number of meals	1.9	1.7

Note: Number of observations is 1,174; of which 871 are refugees and 303 are hosts.
Source: World Bank Skills Survey, 2017

The questionnaire also asked about livelihoods or primary income sources among respondent households (Figure 6). The majority of refugee households suggest humanitarian aid is their main source of livelihoods, whereas host households make a living in one of several other ways. Most common are either salaried jobs or jobs in the service sector; a small share of households state that their main source of livelihoods is through crop production, livestock, or a combination of the two.



Source: World Bank Skills Survey, 2017.
Figure 6. Household Main Source of Livelihoods, Somali Region, by Host/Refugee Status, 2017

We next consider variables that are aligned with the digital financial market system (Table 7). At the time of this survey, a reasonably high share of households reported having some access to the internet, at 15 per cent among hosts and 17 per cent among refugees. Hosts, though, are much more likely to have cell phone reception at home than refugees (35 per cent versus 22 per cent). As the study was largely conducted in Dollo Ado, we should remain cognizant of limits to progress that might occur due to lack of reception.

Table 7. Per cent of Households with Access to Technology or Finance, Somali Region, World Bank Skills Survey, 2017

Variable	Hosts	Refugees
Access to Internet?	15.1	17.2
Phone Reception at or near Home	35.6	22.3
Household member has a bank account	10.9	1.3
Household member has a mobile money account	2.0	0.7

Note: Number of observations is 1,174; of which 871 are refugees and 303 are hosts.
Source: World Bank Skills Survey, 2017

We also consider financial access, whether through mobile money or not. Only 11 per cent of host households had a bank account, whereas 1 per cent of refugee households did; similarly, neither host nor refugee households had mobile money accounts at the time. This finding is consistent with the Global Findex finding described earlier in the report. The latter figure is also consistent with relatively slow mobile phone penetration in Ethiopia; in fact, only 45 per cent of all households in Somali region in the survey had a mobile phone; relatively similar shares of host and refugee households had a phone (51 per cent versus 43 per cent, respectively).

Finally, a goal of the SHARPE project is to encourage both economic and social integration of refugees and host community nationals. The survey asked a battery of questions on the Likert scale (5 points, from strongly agree to strongly disagree); the first questions were asked of both refugees and hosts, whereas the latter questions were only asked of hosts. Among all respondents, when asked whether refugees and Ethiopians have good relations in this area, 75 per cent strongly agreed and 20 per cent agreed. Hosts were asked if they agreed with statements that most Ethiopians want refugees to return home, whether it has made it difficult to find work, and whether the presence of refugees has increased insecurity. There is a hint of challenges with relations in these questions (Figure 7), but by and large hosts seem to accept the presence of refugees in their home areas.

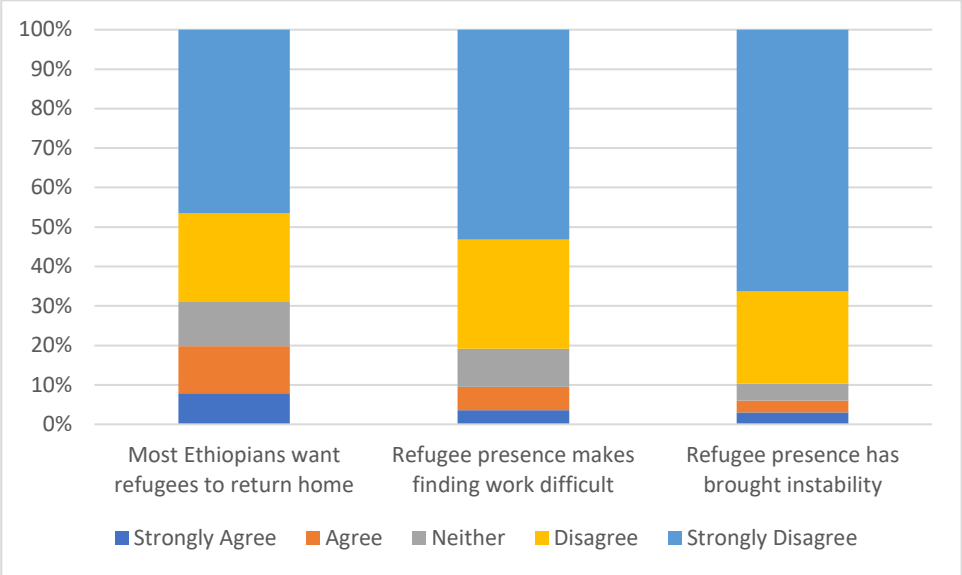


Figure 7. Host Agreement with Statements on Refugee Presence, Somali Region, 2017

In sum, we can use the World Bank skills survey to fill in some basic characteristics about households in the study prior to the beginning of SHARPE. Both host and refugee households are relatively poor, with refugee households somewhat poorer and with less access to services. Food insecurity levels are quite high among the entire population, and refugees do not appear to use livelihood options; rather, they are dependent on humanitarian aid. There is a concurrent lack of financial access, implying there is a lot of improvement possible through increasing mobile money (and phone) penetration. Relations between refugees and host community nationals appear to be pretty good, though, potentially reducing the need to concentrate on improving those relationships. Alternatively, they could be difficult to improve.

HelloCash Enrolment over Time

A necessary condition to positively answer the study research questions is that people enrol in HelloCash and use it. In this subsection we explore the evolution of HelloCash enrolment over time using Shabelle Bank administrative data. We graph enrolment by month, formatting each figure as follows. The blue bars use the *y*-axis on the left and denote the total number of sign-ups on a monthly basis. The lines denote the share in specific groups—the orange line is the share that report they are refugees; the yellow line the share in the Jijiga area; and the grey line the share that are men (with the residual being women).

First, we graph all signups for HelloCash between the beginning of the SHARPE involvement with Shabelle Bank and June 2022 (Figure 8). There are several notable features to the graph, which are quite consistent with program changes in 2021. After a slightly slow beginning, there are large numbers of sign-ups reported between October 2020 and June 2021.[9] These sign-ups are all concentrated, as we can observe on the yellow line, in the Jijiga area. We also observe that men are far more likely than women to enrol (about 70 per cent of sign-ups are among men) and host nationals are more likely to sign up than refugees; refugee numbers vary but are between roughly 10 and 30 per cent of sign-ups each month.

[9] Note that a few entries were not included in this graph due to data entry issues, but they would not materially change patterns illustrated here.

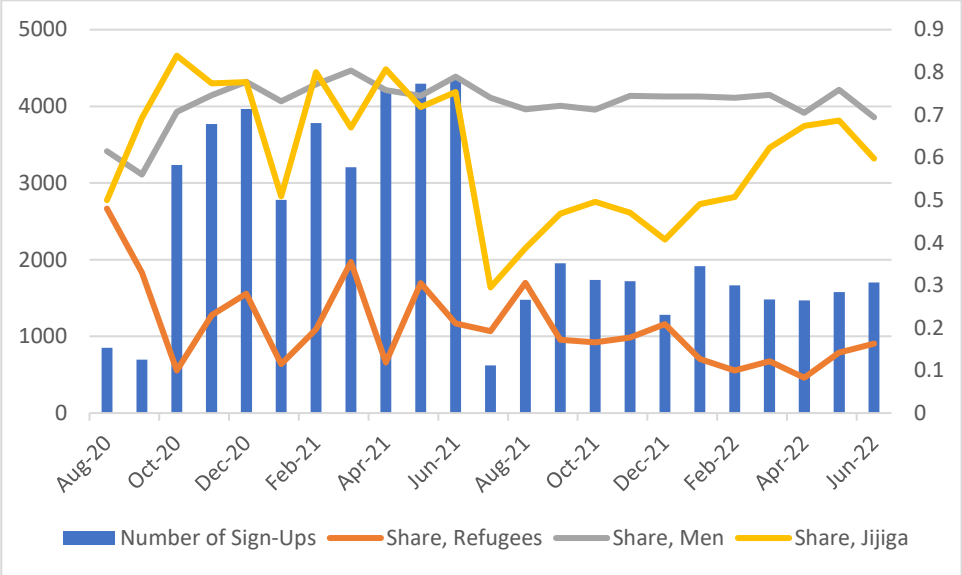


Figure 8. Composition of HelloCash sign-ups, August 2020 to June 2022

The major changes to the program that occurred in mid-2021 clearly affected the overall number of sign-ups. One decision that was made was to reduce the emphasis on signing up customers in Jijiga city. The reporting of Jijiga sign-ups ends in June 2021, so we observe the large drop to July 2021. A second change was to emphasize sign-ups in Dollo Ado, rather than in the Jijiga area. To better study these changes, we first trim out all the sign-ups in Jijiga city.

We do so in Figure 9 and extend the data all the way through November 2022 sign-ups. The remaining sites are areas near refugee camps in the Jijiga area, and then Dollo Ado and refugee camps in that area. The graph now shows that in those areas, sign-ups have been relatively constant over time, averaging something more than 1500 per month, with a few exceptions. The share of refugees jumped in the middle of 2021 when the programmatic emphasis first changed, but then lowered again. Meanwhile, the share of men who sign up is relatively constant over time, and the share in Jijiga is lower, but rising after the change. There is a jump in enrolment in September and October of 2022, when the referral pilot was fully running, but once it ends in November, monthly enrolment returns to its normal pace.

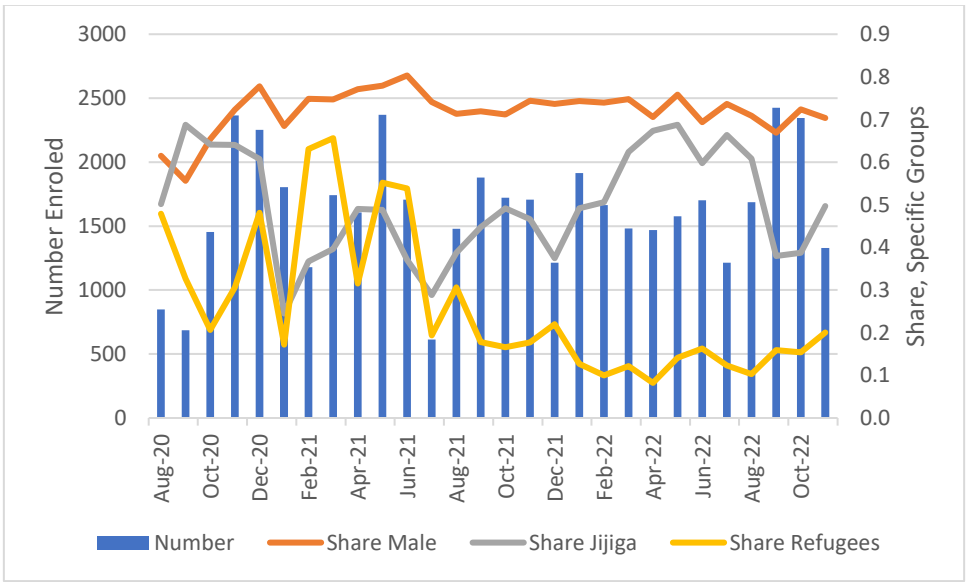


Figure 9. Composition of Hello Cash sign-ups, August 2020 to November 2022, no Jijiga town

To illustrate even more clearly the difference between October and November and other months, we focus on enrolment over the last twelve months (December 2021-Novmber 2022; Figure 10). The increase in enrolment in September and October is quite noticeable, as is the change in location; whereas the share of enrolment in the Jijiga area had been closer to 65 per cent most months, it drops to less than 40 per cent in those two months. However, male and refugee enrolment did not change; it is relatively stable over the whole year. So, the referral program appears to have increased enrolment and shifted it towards Dollo Ado at first glance but did not change enrolment patterns among women and refugees.

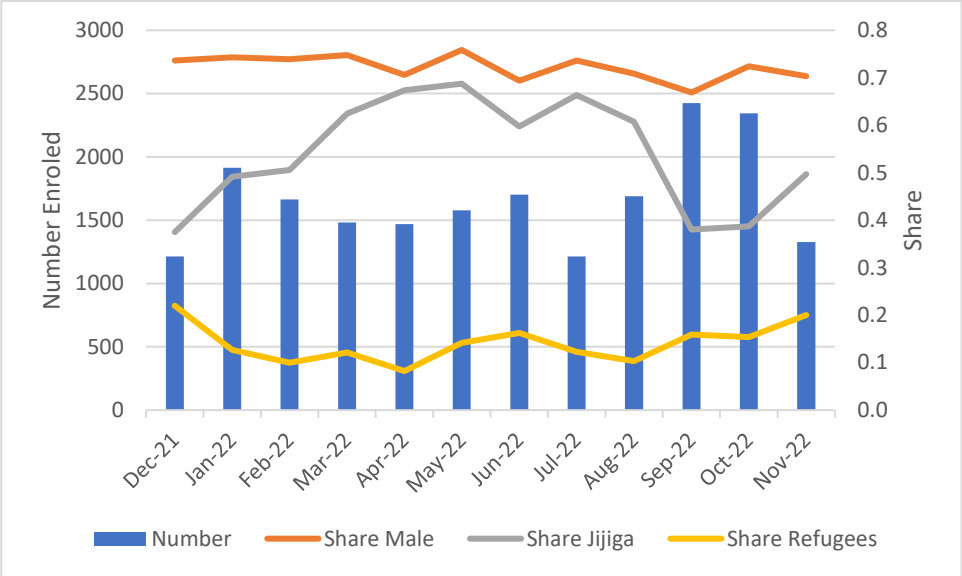


Figure 10. Composition of new HelloCash sign-ups, December 2021 to November 2022

Agent Enrolment

Shabelle Bank also enrolled agents, merchants, and *bajaj* drivers in HelloCash to build up a market in refugee hosting areas of the Jijiga area and the Dollo Ado area. A sign of a robust mobile money market, and an indicator that constraints to use are being overcome, are really the presence of agents who are meant to both take deposits and allow for physical cash withdrawals. Therefore, it is worth examining the pattern of agent enrolment in the areas near refugee camps (including Dollo Ado town), to understand where markets are beginning to develop. We further consider the sustainability of changes to the ecosystem, including analysis of data on merchants, in the following subsection on cost effectiveness.

To do so, we examine the number of agents working in each camp area, not including Jijiga city (Table 8). We categorize the total number of agents and the total number of agents handling more than 200 transactions since they signed up; to make the figures consistent, we use data from December 2021. We observe that there are a good number of active agents around four of the nine areas, and two of the three are in the Jijiga area: only the Sheder area, which is smaller, has a smaller number of active agents. The implication is that there is still some room for some of the digital financial services markets to develop, but a few of them had developed quite well even by the end of 2021.

Table 8. Number of Agents Enrolled in HelloCash, by proximate refugee camp, Jijiga, Ethiopia, December 2021

Refugee Camp/Area	Total Agents	Agents with more than 200 cumulative transactions
Jijiga		
Aw Barre	23	11
Kebri Beyah	17	5
Sheder	7	1
Dollo Ado		
Bokolmayo	9	4
Buramino	4	2
Dollo Ado	10	7
Hilawayn	2	2
Kobe	2	1
Melkadida	3	2

Notes: Numbers do not add up to total agents under SHARPE as other areas are omitted. One agent in Kebri Beyah already had handled over 20,000 transactions by the end of 2021.

Saturation?

After the referral program ended, we began to wonder whether the refugee camps were becoming saturated with HelloCash sign ups, particularly given information coming both anecdotally and from the qualitative work that refugees are more likely to share a phone and a HelloCash account (or another account) within a household.[10] To come up with a relatively crude measure of saturation, then, we need to measure the total number of HelloCash sign-ups versus a measure of total camp populations. For a denominator, we use the most recent population numbers from the UNHCR for each of the eight refugee camps, finding there are roughly 250,000 refugees across the eight camps (Table 9). We then note that in the quantitative data collected for the evaluation, the average household size is 6.2 in refugee camps, with 3.3 adults per household. Applying this percentage evenly, we estimate the adult population of each camp, and then under the assumptions that refugee status is accurately reported in the HelloCash database and that those people live in the refugee camps, we estimate the share of adults in each camp that have enrolled in HelloCash.

[10] Ideally, we would do the same with the surrounding areas (e.g., among hosts). However, there has not been a population census in Ethiopia since 2007, and so the population estimates of surrounding areas would require a lot of assumptions that are unnecessary within camps, where UNHCR registers residents. So, we do not attempt to measure the percentage of sign-ups outside camps.

Table 9. Refugee Camp Populations versus Number of Refugee Sign-Ups by October 2022, Somali Region, Ethiopia

Refugee Camp	Camp Population	Estimated Adult Population	HelloCash Sign-Ups	Estimated Share of Adults enrolled in HelloCash
Jijiga				
Aw Barre	13,084	6,964	955	13.7
Kebri Beyah	17,314	9,215	2,431	26.4
Sheder	14,458	7,695	838	10.9
Dollo Ado				
Bokolmayo	32,515	17,306	880	5.1
Buramino	46,160	24,569	1,391	5.6
Hilaweyn	48,105	25,604	1,362	5.3
Kobe	37,275	19,389	1,914	9.9
Melkadida	41,371	22,020	538	2.4

Note: Camp population from UNHCR records and current as of September 30, 2022.

The share of adults that are enrolled in HelloCash ranges from a low of 2.4 per cent in Melkadida camp in the Dollo Ado area to 26.4 per cent in Kebri Beyah. In general, a larger share of adults appears to be enrolled in the Jijiga area, which is not surprising as Shabelle Bank has a larger presence there. Note that other constraints may affect Melkadida; it is one of the two camps that are farther from Dollo Ado town and as such it may be quite negatively affected by external factors (e.g., poor cell phone reception). If we assume that households can get away with one HelloCash account, we can roughly triple the numbers in the table; that would imply that the camps in the Jijiga area—particularly Kebri Beyah—are likely at a point at which enrolment must slow, since there may not be many additional potential customers available in the population. However, the camps in the Dollo Ado area have room for substantial growth in enrolment. This point illustrates the heterogeneity in digital financial market development within SHARPE intervention areas.

Constraints within the Theory of Change

Reaching final outcomes in the theory of change in the financial services market system is predicated on two types of potential constraints being alleviated by either external factors or by internal factors. The external factors include poor network service and whether phones are readily available, and then several social factors, such as whether e-wallets are secure within households, whether people have money to put in the e-wallets in the first place, and literacy levels, which could preclude people from using the service. Internal factors, which could be solved by a project working with HelloCash, include knowledge of the system, whether the system is user friendly or not, and eligibility.

On several levels, the endline data suggest that cell phone availability and service are not issues in refugee hosting areas. Given the data we described from 2017, this finding suggests rapid change in these areas. First, we find that almost all households (96 per cent) have a phone and many have multiple phones. 85 per cent of all households have a feature phone, with no difference in reported rates between residents of refugee camps and surrounding areas. Among those reporting at least one feature phone, households report owning an average of 1.58 feature phones within camps, and 1.51 phones outside camps. A sizeable

percentage of households report having at least one smartphone, with 31 per cent of households reporting smartphone ownership outside camps and 27 per cent of households within camps. Households in refugee camps have slightly more smartphones if they own them; such households own an average of 1.38 smartphones, with a corresponding average of 1.23 smartphones in surrounding areas.

Somewhat in contrast with the qualitative data, the quantitative data suggest that cell phone service is reasonably good, leading to frequent use. Regardless of potential reliability issues, 90 per cent of quantitative survey respondents state that they use a phone daily. Reports from the quantitative data of poor or unreliable service were in line with expectations. Almost all households stated they had service at home; between 30 and 40 per cent of respondents suggested they never or rarely face poor network coverage (Figure 11). The modal answer, though, was "sometimes" rather than frequently or always, suggesting that respondents perceive they can generally rely on having cell phone service.

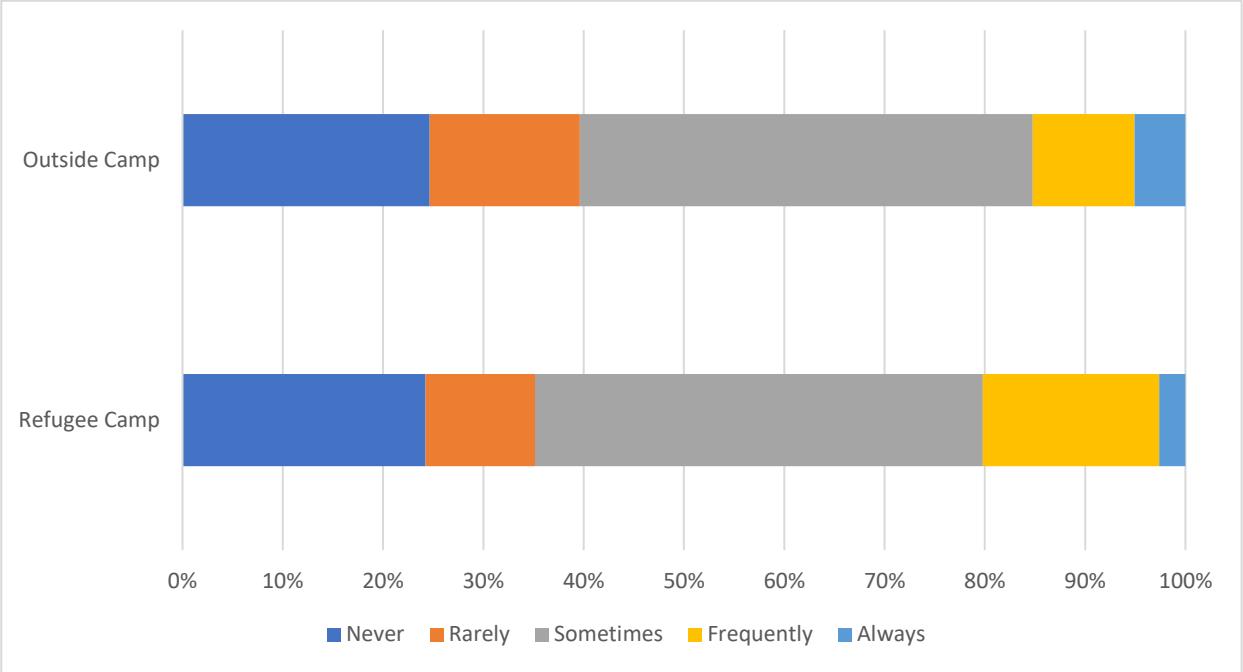


Figure 11. Per cent of Respondents Reporting Frequency of Poor Network Coverage, by Camp Residency

We return to this issue when discussing the combination of the qualitative and quantitative work in the following section.

HelloCash Perceptions

Unfortunately, we lack baseline data on perceptions of HelloCash among residents of refugee hosting areas, due to the timing of the COVID-19 pandemic. So, we cannot ascertain whether SHARPE interventions caused changes in HelloCash perceptions among survey respondents. Users were asked to report their favourite mobile money service among those available (the list included some in Somaliland and Somalia, since some merchants take mobile money from Somaliland or Somalia). Though priming could be an issue, 94 per cent of HC users suggested HelloCash was preferred to other services. 80 per cent of non-HC users also suggested that they preferred HelloCash, implying that branding is quite strong.

About 90 per cent of all respondents have heard of HelloCash. Within refugee camps, the percentage is slightly higher (92 per cent) than outside (89 per cent). Among users, they suggest on a number of levels that HelloCash is relatively easy to use. About 75 per cent of users said the sign-up was relatively easy, with only a handful calling it "very difficult" (about 2 per cent of respondents). Most users interviewed in the quantitative survey—somewhat at odds with the administrative data—reporting having made at least one transaction in the past. Among those who reported never making a transaction, 65 per cent state the reason is that they have no need, whereas only 30 per cent say it is because they find the interface difficult to use. Those finding it difficult to use are more likely to be female or refugees, but the sample is quite small (19 individuals in total). Finally, 63 per cent state they have already recommended HelloCash to someone else, suggesting that the type of network effect experiment conducted in the project may have been successful.

In sum, perceptions of HelloCash seem quite good among respondents, suggesting that at this point there is not much left to do from a marketing perspective. Since these measures are necessary for improved outcomes, they would be a first step for market systems projects to work with companies on improving (unlike cell phone access or reliability, which is out of a company's control). In Somali region, HelloCash appears to have a good reputation among respondents, whether HelloCash users or not.

HelloCash Users in Refugee Camps

Finally, we descriptively examine both the characteristics of and outcomes among HelloCash users relative to non-users within refugee camps, to understand better who has not been reached by SHARPE supported work, both in terms of demographic characteristics and potentially differences in outcomes (without initially conditioning on any variables). The former is to indirectly examine whether there are certain types of non-users that might be difficult (or impossible) to reach, whereas the outcomes help begin the transition to their analysis.

First, we examine average values for demographic characteristics, including household size, the household head's age, gender, literacy status, and years of education, and whether a household member speaks Amharic or English or not, respectively (Table 10). We find significant differences only in the variables measuring the household head's self-reported literacy status, and years of education. HelloCash users are more likely to be literate and have more years of education on average. However, the two variables measuring Amharic and English knowledge (the most common two second languages in the sample) do not differ between users and non-users.

Table 10. Household Characteristics among Sample Households Residing in Refugee Camps, by HelloCash use

Characteristics	Average, non-users	Average, HelloCash users	t-statistic, test they are equal
Household Size	6.02	6.38	1.35
Head Age	42.6	40.9	1.58
Head Gender (1=male)	0.65	0.67	0.43
Head Literacy (1=yes)	0.54	0.65	2.39
Head, years of Education	3.06	4.28	2.62
Indicator, Household member speaks Amharic	0.092	0.093	0.03
Indicator, Household member speaks English	0.452	0.502	1.05

Next, we examine the set of primary outcomes, here only among refugee camp residents, by HelloCash status (Table 11). Here, we find very few differences that are significant. The main difference that is significant is in the number of smartphones owned by the household; households using HelloCash appear to be more likely to own at least one smartphone than non-users. It is worth noting that the raw Food Insecurity Experience Scale (FIES) is measured on a 0-8 basis, with lower scores being better, so there is some indication that HelloCash users might be slightly better off.

Table 11. Household Outcome Variables among Sample Households Residing in Refugee Camps, by HelloCash use

Characteristics	Average, non-users	Average, HelloCash users	t-statistic, test they are equal
Number of Feature Phones Owned	1.31	1.35	0.47
Number of Smart Phones Owned	0.30	0.46	2.32
Food Insecurity Experience Scale (Raw)	4.64	4.35	1.19
Enough Income (1=yes)	0.44	0.46	0.38
Income Declining (1=yes)	0.59	0.56	0.57
Per Capita Income (birr)	8976	9132	0.16
Social Network Index, Refugees to Hosts	1.78	1.79	0.08

To explore the possibility a bit further that the FIES might differ by HelloCash use within refugee camps, we next plot raw FIES scores, by HelloCash use (Figure 12). It is relatively easy to observe that there appear to be a lot more HelloCash users with low FIES scores (0-2), whereas about the same number with quite high FIES scores (7-8). As a result, there is an indication that better off households within refugee camps may be the ones signing up for HelloCash, or vice versa.

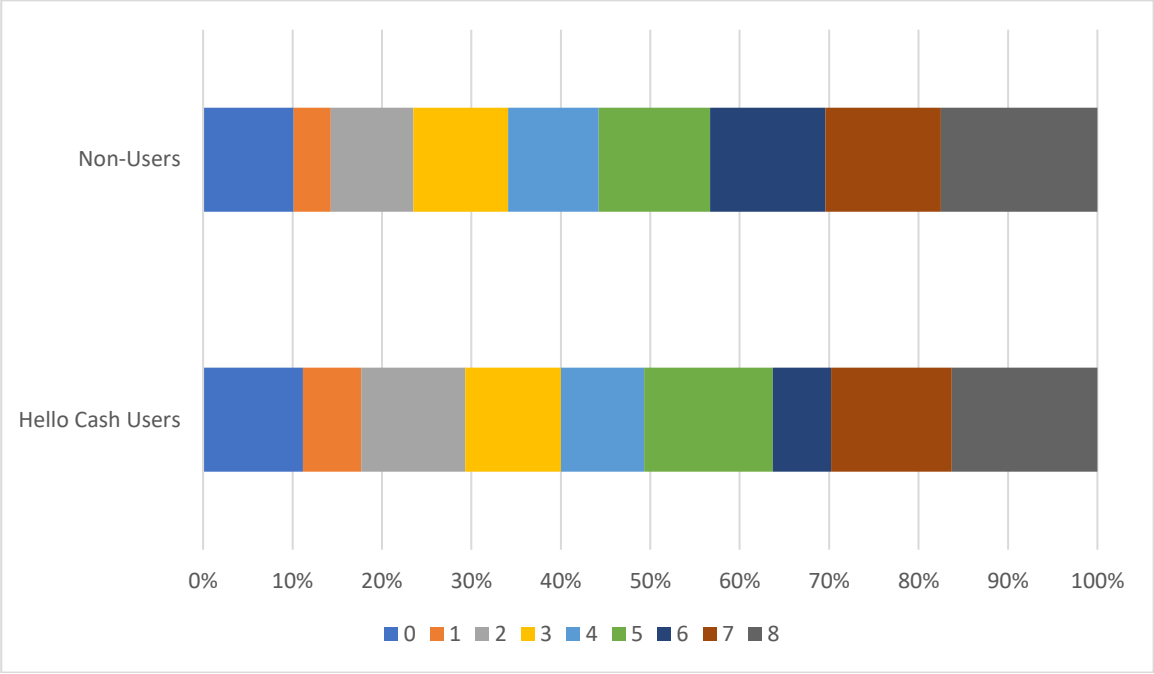


Figure 12. Raw FIES Scores, Residents of Refugee Camps, by HelloCash Usage

To examine that possibility slightly more directly, we next graph the distributions of per capita income among HelloCash users and non-users (Figure 13). We find that the two distributions lie largely on top of one another; if anything, the non-users' distribution appears to have somewhat more density at higher incomes than the most frequently observed income levels. So, it does not appear that the HelloCash users are systematically better off than non-users.

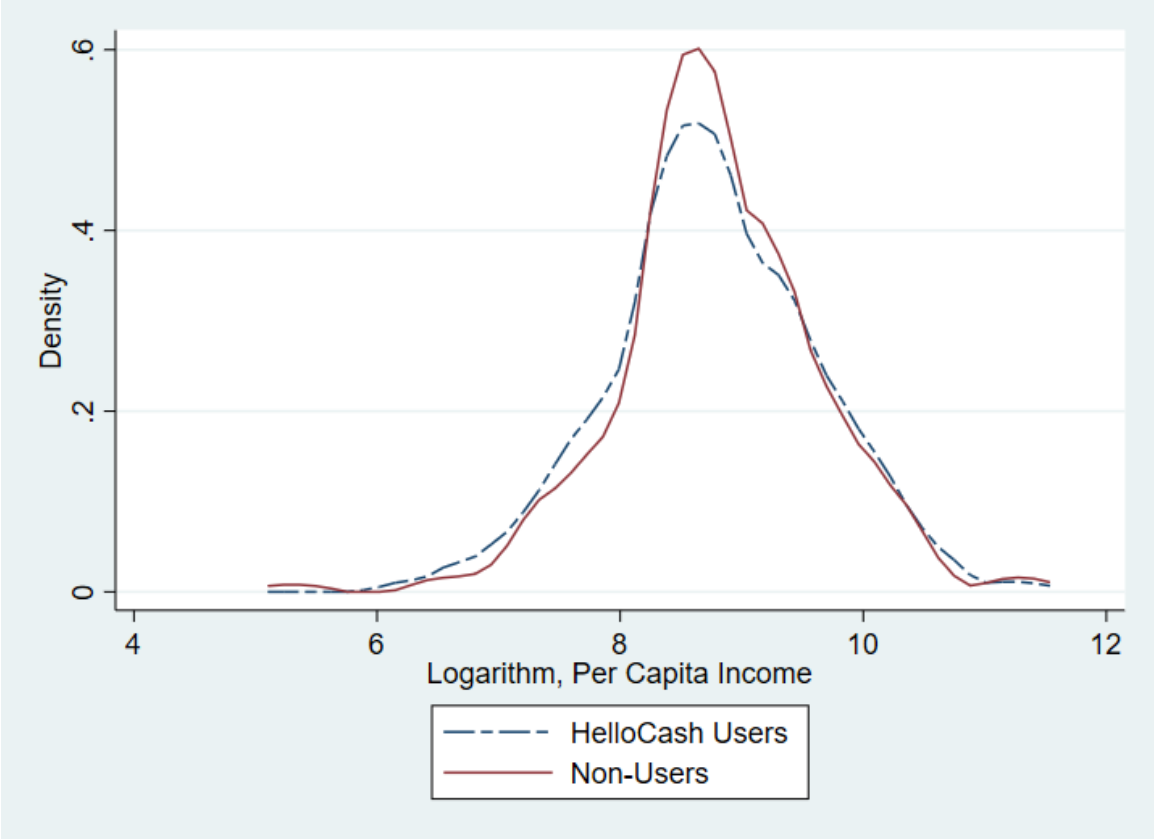


Figure 13. Distribution of Per-Capita Income (Logarithm), Refugee Camp Residents, by HelloCash Usage

In sum, we find that there is little evidence that HelloCash users in refugee camps are all that different from non-users. We do observe some differences in the literacy status and education level of the household head, and households with more smartphones are more likely to be registered. That said, there do not appear to be large income or food security differences between HelloCash users and non-users in refugee camps. These findings suggest it should be possible increase the user base in at least some refugee camps; we later explore whether the referral system tested in one of the RCTs can do so.

Impacts on Final Outcomes

In this sub-section, we provide analysis of the final outcomes listed at the beginning of the section. First, we provide some descriptive analysis of the final outcome variables along with a few associated variables also included in the quantitative endline survey. We then move on to regression analysis, which is conducted using propensity score weighted regressions as described in the methodology section. The heterogeneity analysis, which follows, is then closely linked.

We begin descriptive analysis variables associated with subjective income expectations. The four questions included in this analysis are whether the household perceives having enough income for basic needs, whether income is declining or not, whether the respondent has positive expectations about income, and whether the respondent is satisfied with employment options. When we examine these four variables by the gender of respondent, we find that average responses to all four questions are, on average, virtually the same (Figure 14). About half the sample suggests they have enough income to meet basic needs; just over half suggest household income is declining. There is more pessimism about income, as just under 40 per cent of respondents have positive expectations about income in the future, and very few are satisfied with employment options in local areas (just over 10 per cent).

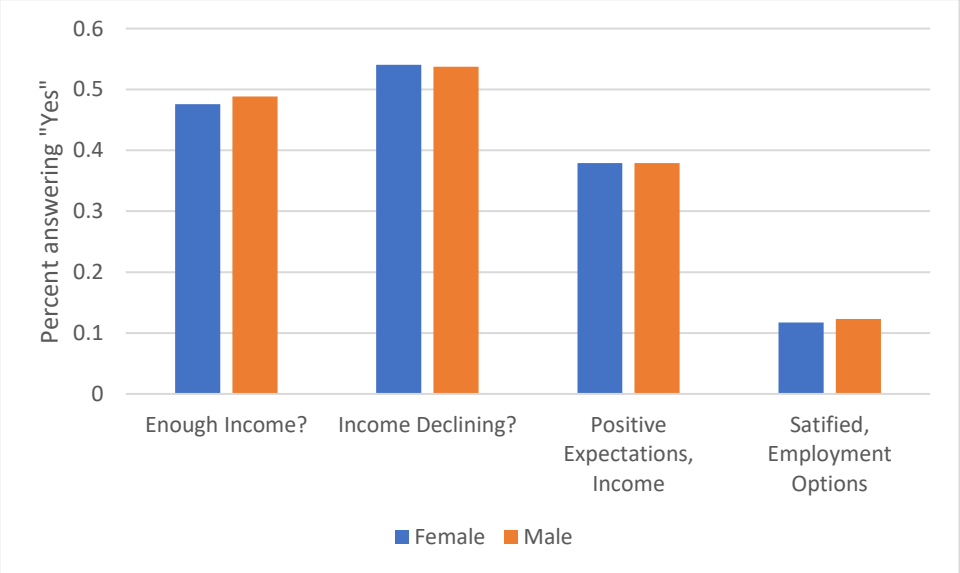


Figure 14. Difference between Male and Female Respondents, Variables associated with Income Expectations, Jijiga, Ethiopia, 2022

There are larger differences between households in the host population and those residing in refugee camps (Figure 15). Households in refugee camps are more likely to respond they do not have enough income to meet basic needs, they are more likely to suggest their income is

declining, they have fewer positive expectations about income, and they are much less satisfied with local employment options. Clearly, the more interesting heterogeneity in these questions is around host or refugee status.

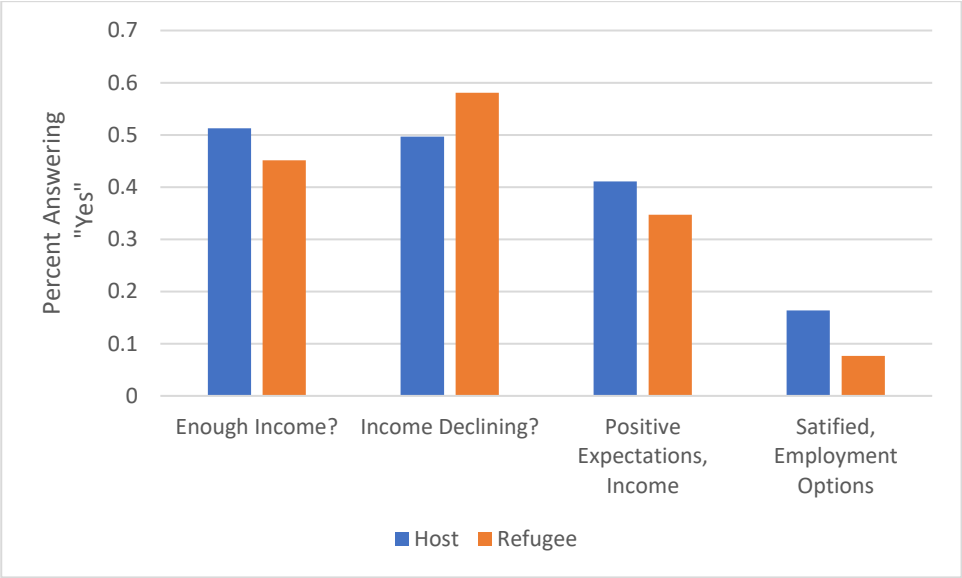


Figure 15. Difference between Host and Refugee Respondents, Variables associated with Income Expectations, Jijiga, Ethiopia, 2022

We can also examine a few variables related to computed income, from the survey form (Table 12). We compute total household income as well as per-capita income.[11] To see the effects of public transfers (e.g., food or cash transfers from UNHCR or from the PSNP), we recompute these averages without public transfers. We find that incomes in total are quite similar on average between hosts and refugees. However, they are starkly different when we remove transfers in the second row. So, transfers clearly make up a majority of refugee incomes. On a per capita basis, since refugee households are slightly larger than host household, income is slightly higher in host households on average, with a significant difference in means at the five per cent level.

Table 12. Average Variables Associated with Household Income, by Refugee Status, Jijiga, Ethiopia, 2022

	Host	Refugee Camp	t-statistic, means equal
Total income (annual)	49919	48286	0.511
Total Income (less transfers)	48237	22896	8.767
Per Capita Income	10640	9054	2.127

Regression analysis

Our primary analysis is based on regressions, which are conducted by taking each of the 8 indicators of financial inclusion, income, and food insecurity and estimating differences between HelloCash users and non-users using the following equation:

[11] Income per capita is computed from questions about public and private transfers, livestock revenue, crop revenue, wage income, and self-employment. It may be understated as crop income questions in particular were crude and did not consider self-consumption of household production.

$$Y_i = \alpha + \beta H_i + \boldsymbol{\gamma X_i} + \theta D_i + \varepsilon_i \quad (1)$$

where H represents HelloCash users, X are the vector of variables included in propensity scores, D represents a location indicator for Dollo Ado, epsilon is a mean zero error term, and i indexes households. Regressions using equation (1) are always weighted with a weight of 1 for HelloCash users and $\hat{p}/1-\hat{p}$ for non-HelloCash users, where $\hat{p}$ represents the estimated propensity score. In the following tables, Column (1) reports the beta coefficient estimate for a regression only including the HelloCash indicator, column (2) reports the same estimate for a regression including the HelloCash indicator and the region dummy, column (3) reports β from equation (1) without the region dummy, and column (4) presents the estimate with everything included.[12] These same patterns are followed in the heterogeneity analysis that follows in the next section.[13] The results of the LASSO procedure used to estimate propensity scores can be found in Appendix Table A.1.4, and we illustrate propensity score estimates for both the treatment and control groups in Appendix Figure A.1.1.

For the social indexes, it does not make sense to include hosts in regressions related to interactions with hosts, nor refugees in regressions related to interactions with refugees. Therefore, the regressions describing differences between HelloCash users and non-users in relationships with hosts only include refugees, and regressions explaining relationships with refugees only include hosts.

Table 13 presents the results for the first eight outcomes. We find significant differences at the five per cent level or better for two of the outcomes in all four specifications, and for two others when all the covariates are included. There is always a positive difference for the two financial inclusion definitions between HelloCash users and non-users; this difference could reflect that HelloCash users were more likely to have accounts before they signed up for HelloCash; it could also reflect real changes in financial inclusion. As the second definition includes all other types of digital accounts and the post estimate is much larger, HelloCash could have acted as a vehicle to start using digital financial services. Unfortunately, without a baseline, all these thoughts should be considered somewhat speculative.

[12] Column (3) is included as the regional indicator was included in the LASSO procedure but was not selected as a regressor, so column (3) presents the "pure" LASSO estimate.

[13] For the primary eight outcomes, robustness analysis is conducted using both nearest neighbour and kernel matching methods; these estimates use the full set of explanatory variables from column (3) and are presented in Appendix Table B.9.1 for the primary results.

Table 13. Associations Between Primary Outcomes Related to Financial Inclusion, Income, and Food Insecurity, and HelloCash Use, SHARPE Evaluation, Jijiga, Ethiopia, 2022

	(1)	(2)	(3)	(4)
Financial Inclusion	0.096	0.095	0.087	0.086
	(0.029)	(0.029)	(0.028)	(0.028)
	0.001	*0.001*	*0.002*	*0.002*
Financial Inclusion	0.1486	0.1463	0.1410	0.1387
Definition 2	(0.033)	(0.033)	(0.032)	(0.032)
	<0.0001	*<0.0001*	*<0.0001*	*<0.0001*
Self-Employment Income?	0.090	0.099	0.088	0.093
	(0.054)	(0.051)	(0.047)	(0.046)
	0.096	*0.054*	*0.059*	*0.041*
Self-Employment Income	309	437	355	455
	(883)	(843)	(825)	(805)
	0.727	*0.604*	*0.667*	*0.572*
Per Capita Income	727	761	579	616
	(886)	(889)	(827)	(830)
	0.412	*0.392*	*0.484*	*0.459*
Enough Income?	0.066	0.071	0.061	0.065
	(0.037)	(0.036)	(0.034)	(0.033)
	0.076	*0.052*	*0.071*	*0.051*
Income Decline?	-0.013	-0.015	-0.013	-0.014
	(0.037)	(0.037)	(0.034)	(0.034)
	0.736	*0.693*	*0.705*	*0.685*
FIES	-0.362	-0.367	-0.338	-0.348
	(0.202)	(0.201)	(0.173)	(0.171)
	0.073	*0.068*	*0.050*	*0.043*

Notes: Robust standard errors accounting for survey design in parentheses; *p*-values below them in italics. Self-employment income and per capita income measured in Ethiopian birr; FIES from FAO (2013) and is on a 0 to 8 scale with higher numbers implying higher food insecurity. Each cell represents a separate regression. Regressions in column (1) include no additional regressors; column (2) includes a location indicator for Dollo Ado; column (3) includes all regressors in the propensity scores; and column (4) includes all regressors in the propensity scores and the location indicator. Sample size is always 865 observations.
Source: Authors' calculations based on the quantitative endline survey data.

The latter two significant coefficients on the HelloCash use indicator are on the indicator for self-employment income, and for the food insecurity experience scale. These two coefficient estimates are only significant at the 5 per cent level or better when the covariates are included in the regression. The former estimate is suggestive that HelloCash could have helped individuals start income generating activities that were not possible beforehand; it could also suggest that individuals managing even very small businesses might have found it advantageous to begin using digital financial services. Similarly, the negative and significant

coefficient on the FIES is suggestive either that households that use HelloCash are inherently more food secure, or that households using HelloCash have become less food insecure.[14]

The two social cohesion indicators are treated somewhat differently since we separate hosts from refugees for analysis. Nonetheless, we find no statistically significant differences between HelloCash users and non-users, whether focusing on the sample of hosts or refugees, whether only weighting the non-users (Table 14, columns 1-2) or using doubly robust estimation (columns 3-4). Therefore, it does not appear that social cohesion—at least measured in this manner—has changed with the introduction and promotion of HelloCash in these areas. Given prevailing levels of social cohesion pre-intervention found in the World Bank Skills Survey (albeit using different measures), this finding may not be surprising.

Table 14. Associations between Social Cohesion Indices and HelloCash Use

	(1)	(2)	(3)	(4)
Social Index (Hosts)	0.118	0.146	-0.059	-0.033
	(0.201)	(0.169)	(0.147)	(0.145)
	0.558	*0.388*	*0.687*	*0.820*
Social Index (Refugees)	0.023	0.018	0.087	0.079
	(0.159)	(0.158)	(0.134)	(0.130)
	0.883	*0.909*	*0.519*	*0.543*

Notes: Robust standard errors taking into account survey design in parentheses; *p*-values below them in italics. Index is measured on a 0-5 basis. Each cell represents a separate regression. Regressions in column (1) include no additional regressors; column (2) includes a location indicator for Dollo Ado; column (3) includes all regressors in the propensity scores; and column (4) includes all regressors in the propensity scores and the location indicator. Sample size is 433 observations in row 1 and 432 observations in row 2.
Source: Authors' calculations based on the quantitative endline survey data.

In all these cases, we are taking the most careful interpretation of the coefficient estimates; that is, we are trying not to make causal interpretations. That said, it is worth emphasizing that the estimator used adjusts for observable differences between HelloCash users and non-users, and so any bias in the coefficients must be caused by unobservable differences. That said, we cannot control for initial differences between users and non-users, making causal interpretation less believable.

Impacts from Referral Study

Before discussing the heterogeneity analysis around the full program, we summarize results from the two RCTs. The referral study was conducted from August to October 2022, with the previously stated goal of increasing enrolment among women and refugees. It was implemented as a randomised control trial; the community referrers (CRs) were selected from administrative data, using eight different strata: the strata were location (Jijiga or Dollo Ado); gender (male or female); and refugee status (host or refugee). For each group, we ranked the number of transactions each individual had done with HelloCash using administrative data

[14] The result on the FIES outcome is only significantly different from zero at the 5 percent level or better with one of the four matching procedures in Appendix Table B.9.1, so this result should be interpreted with further caution.

and began with the top 100 in each stratum. When we could not get someone on the phone for the phone baseline survey, we added the individual with the next largest number of transactions, until each stratum had 100 observations.

Once the study was ready to run, we began the study by attempting to call each CR, who had been randomised into four groups: A treatment for which each individual would receive 50 birr for each successful referral; a treatment for which each individual would receive 50 birr for successfully referring a woman, and 25 birr for successfully referring a man; a treatment for which each successful referral was worth 25 birr; and a control group, who were to be offered the chance to refer people but were not promised any money for doing so. Whether CRs could be reached or not by phone with this offer, they were sent a text message repeating the instructions for making referrals, and the rewards.

Referrals were called into a central hotline, typically by the CR, and then simple data were recorded in a Google Sheet (name, phone number, gender, refugee status, CR name and number). The hotline was run by Shabelle Bank.[15] The hotline operators then checked whether individuals were signed up and called them to try to sign them up if they were not current customers. At times, a local KYC officer helped by calling in the referrals on behalf of the CR. The success or lack thereof for each referred individual was then also recorded in the Google sheet.

Midway through the trial, we considered sending out reminder text messages to the CRs about the referral study. In analysing the data, we realized that all the referrals to that point had come from the individuals reached by phone. At that point, we decided to continue to run it as it was, since it would not be possible to call the potential CRs with a reminder. We also had planned to end it by the end of September, but Shabelle Bank was extremely enthusiastic about results so we continued it one more month at that point; here, we can describe the data from the google sheet used for enrolment but can only link those data to sign ups through the end of September at present.

The results of the referral program were somewhat unexpected (Table 15). Only 55 of the 800 CRs attempted to make a referral at all, or 7 per cent; only 41 CRs made successful referrals. However, those 41 CRs made at least 2,406 successful referrals in total, or an average of close to 59 per successful CR. In fact, that number masks substantial heterogeneity, as is hinted by the breakdown by treatment group. There was one extremely active CR—she registered 1,354 unique individuals herself. So, the results were substantially influenced by one extremely active individual, which obviously affects the distribution of treatment effects once one computes them. Though not that much different among women than most sign-up rates, the proportion who were refugees is a large improvement over trends illustrated in Figures 8 and 9, giving some hope that the referral project may have in fact led to further sign-ups among refugees.

[15] Shabelle Bank, on their own accord, worked with Belcash Technologies to develop a referral platform that could be used remotely, but the platform was not quite ready for use by the time this pilot began.

Table 15. Selected Findings from the Referral Study

	50 birr men, 50 birr women	25 birr men, 50 birr women	25 birr men, 25 birr women	Control
Number of CRs contacted by phone	147	147	127	41
Number of CRs making referrals	17	24	12	2
Number of CRs making successful referrals	14	19	7	1
Number of total referrals	2,032	648	211	6
Number of successful total referrals	1,859	396	150	1

Notes: There were four CRs who we could not be reached by phone but made referrals. They are in the following groups: 2 in the control group, 1 in the 25 birr/25 birr group, and 1 in the 25 birr/50 birr group. The google sheet used in the referral workflow described in the text may not have had completely accurate data on registration, so we will follow administrative records to find "final" numbers of successful referrals.

We can somewhat directly test the potential for increased enrolment of women directly by merging sign-up data from the referral program with administrative data from September (Table 16). Among the 2,427 individuals listed; the referral program can account for 1,117 of September enrolees. While it is not clear whether they would have enrolled on their own or not, almost half of all enrolment took place through the referral program, and the standard enrolment number is otherwise in line with monthly enrolment in 2022. The share of enrolees who were women was about the same whether through the referral program or not, and the referral program signed up a lower share of refugees than the standard enrolees in September, the referral program was quite successful in signing up new enrolees in Dollo Ado. This figure is helped by the fact that the "super referrer" is a Dollo Ado resident, but it is still a striking difference.

Table 16. HelloCash Enrolment in SHARPE Target areas, by Referral Program or not

	Through Referral Program	Through Standard Enrolment
Number of Enrolees	1,117	1,310
Per cent of Enrolees, Women	33.7	32.6
Per cent of Enrolees, Refugees	13.2	18.2
Per cent of Enrolees, Jijiga area	14.8	48.6

Notes: When disagreement occurred between referral enrolment data (gender, refugee status) and HelloCash admin data, we follow the HelloCash admin data.

The latter point—that the enrolees are shifted to Dollo Ado—is in fact an important one. In a more "standard" market systems project, one adjustment would likely have been to shift resources away from Dollo Ado, since other market systems were in a better position to grow. SHARPE was required to continue to work there, so that shift was not possible. The referral study, then, represents a way to change the primary location of enrolment.

In sum, the referral program worked differently than we expected, and so we leave more detailed analysis from the pre-analysis plan in the paper describing it (Gilligan et al., 2022). There was pretty substantial new enrolment, and it accounted for nearly half of all SHARPE related enrolment in September and October. But the impacts hinge on a "super referrer", who accounted for nearly 70 per cent of all referrals; the remainder of the distribution is also skewed. But back on the positive side, it increased enrolment substantially in Dollo Ado, and broadly the share of enrolees who are women appears quite high. We return to thoughts about the referral program, and how either SHARPE or Shabelle Bank might use it in the future, in the conclusion.

Impacts of Bonuses

The second randomised trial, described in section 4, offered small transfers to try out HelloCash to one group (the unconditional transfer group), offered the same size transfers to a second group who made at least 3 transactions in a three-week period in November and the beginning of December 2022 (the conditional transfer group), and both can be compared to a control group. We ran a simple regression to estimate the impacts of the unconditional and conditional transfers:

$$Y_i = \beta_1 U_i + \beta_2 C_i + \mu \boldsymbol{Z}_i + \epsilon_i \quad (2)$$

where U represents the unconditional transfer group, C represents the conditional transfer group, and **Z** represents the variables that were used in stratifying the sample (gender, refugee status, and location). To test whether results differ for women or refugees, we then estimate an alternative model:

$$Y_i = \beta_1 U_i + \beta_2 C_i + \beta_3 X_i U_i + \beta_4 X_i C_i + \mu \boldsymbol{Z}_i + \epsilon_i \quad (3)$$

where X represents either an indicator for men or for refugees. All models are estimated using administrative data pulled for this purpose, including transactions made between the time when texts and unconditional transfers were sent out in November, and December 5th, which was given in texts to the conditional group as the last day of the promotion.

We present estimates of equation (2) in Table 17, using three variables as outcomes: whether an individual has made any transaction, the number of total transactions, and the total value of transactions. We find positive coefficients on both the unconditional and conditional transfer groups, but only the coefficient on unconditional transfers is significantly different from zero.[16] That group is 9.3 percentage points more likely to have made a transaction at all. We do not find that the conditional transfer led to higher probabilities of making any transactions, nor do we find changes in transaction volumes. Given the large control mean, it is clear that some of the customers in all three groups had begun to make regular transactions between September 30 and mid-November when the promotion began, as the average transaction size is quite large (the distribution includes a substantial number of zeroes as well, suggesting conditionally it is even higher).

[16] Tables 17 and 18 are taken from de Brauw et al. (2023).

Table 17. Impacts on Variables Measuring Transactions, Transfer Treatments, Jijiga, Ethiopia, November 2022

Dependent Variable	Any Transaction?	Number of Transactions	Total Value of Transactions
	(1)	(2)	(3)
Unconditional Transfer	0.093**	0.058	-245.8
	(0.029)	(0.060)	(292.2)
Conditional Transfer	0.032	0.045	8.69
	(0.021)	(0.471)	(327.8)
Control Mean	0.189	1.873	1175.5
Number of Observations	1675	1675	1675
p-value, Unconditional=Conditional	0.035	0.292	0.411

Notes: Robust standard errors in parentheses.
Source: Shabelle Bank Administrative Data.

We then present results for equation (3) in Table 16, with columns (1), (3), and (5) using an indicator for male respondents as the interaction variable, and columns (2), (4), and (6) using an indicator for refugee status as the interaction variable. We find that for the unconditional transfer, effects of the transfer at least suggestively appear to be concentrated among the host population. The additive coefficient on the indicator for any transaction by males is positive but imprecisely estimated but suggests both men and women respond to the unconditional transfer. Men have a lower total value of transactions than women (column 5); this coefficient is also significant at the ten per cent level, though the sum is not statistically different from zero.

Table 18. Heterogeneity Analysis—Impacts on Variables Measuring Transactions, Transfer Treatments, Jijiga, Ethiopia, November 2022

Dependent Variable	Any transaction?		Number of Transactions		Total Value of Transactions	
	(1)	(2)	(3)	(4)	(5)	(6)
Unconditional Transfer	0.081*	0.110**	0.673	0.761	388.5	-415.9
	(0.044)	(0.034)	(0.529)	(0.523)	(301.1)	(332.5)
Conditional Transfer	0.056	0.041*	1.150**	0.273	1278.8**	-69.4
	(0.037)	(0.024)	(0.539)	(0.363)	(572.4)	(379.4)
Unconditional*Male	0.028		0.932		-860.0*	
	(0.059)		(1.051)		(515.2)	
Conditional*Male	-0.037		-1.41**		-1874.6	
	(0.045)		(0.69)		(696.6)	
Unconditional*Refugee		-0.076		-0.967		777.6
		(0.068)		(2.495)		(668.3)
Conditional*Refugee		-0.058		-1.29		464.3
		(0.055)		(2.25)		(737.2)
Control Mean	0.189	0.189	1.873	1.873	1175.5	1175.5
Number of Observations	1675	1675	1675	1675	1675	1675

Notes: Robust standard errors in parentheses.
Source: Shabelle Bank Administrative Data.

For conditional transfers, we again observe some differences by gender relative to the control group. The coefficient for the number of transactions is statistically different from zero among women, and suggests the conditional transfer nudged them to make 1.15 additional transactions, on average. The additive coefficient among men is negative and statistically different from zero, suggesting women are more likely to conduct more transactions with the promotion, but men are not.

We next turn to the three columns including interactions with refugee status (columns 2, 4, and 6). Here, we find that both promotions were more likely to lead to any transactions among the host community (column 2), but not among refugees, according to the additive interaction terms, which are both negative in magnitude. Coefficient estimates in models explaining the other two variables are not statistically different from zero, suggesting that the promotions affected transactions on the extensive margin, but not the intensive margin.

In sum, the unconditional transfer led to more likelihood of making a transaction, but not more transactions or transactions of higher value, at least in the short term. These effects appear concentrated among women, and among the host population, rather than refugees. The conditional transfer led to slightly more likelihood of transactions among the host community, and more transactions among women. We discuss the results in a bit more of the project context below.

Heterogeneity of impacts

In this section, we provide regression results for heterogeneity for the overall evaluation of SHARPE. We focus on two specific forms of heterogeneity: gender and refugee status. We

note that the estimation procedure has lower expected statistical power than the full sample, so there is a lower chance of finding statistically significant coefficient estimates.

Gender

Our initial heterogeneity analysis for the overall evaluation questions splits the sample by gender. We attempt to re-estimate the propensity scores among both men and women before applying weights. However, among women the LASSO procedure found a minimum objective function for a model including only a constant. As a result, we provide results within this subsection using the propensity scores developed for the whole sample as weights (from Appendix Table A.1.4) and provide unweighted results in Annex B.7.

The first table of results, then, follows the main results above, but uses the subsample of women respondents (Table 19). As in the main results, we find positive, statistically significant coefficients on the two indicators for financial inclusion; these findings either suggest that HelloCash users are more likely to have bank accounts due to HelloCash, or even having attempted to control for observable differences between the two groups, people who were already in the financial system are more likely to also use HelloCash. The latter variable shows only a few additional women use other forms of mobile money. The only other variable that shows a statistically significant coefficient is the one on whether the respondent felt their household income was declining; this coefficient is only statistically different from zero at the 10 per cent level if the explanatory variables are included as in columns (3) and (4).[17]

[17] It is also statistically different from zero using the four matching models (Appendix Table B.9.2).

Table 19. Associations between HelloCash Use and Final Outcome Variables, Women Respondents, SHARPE Evaluation, Jijiga, Ethiopia, 2022

	(1)	(2)	(3)	(4)
Financial Inclusion?	0.077	0.076	0.071	0.069
	(0.039)	(0.039)	(0.037)	(0.037)
	0.048	*0.050*	*0.057*	*0.067*
Financial Inclusion?	0.093	0.091	0.092	0.086
Definition 2	(0.045)	(0.045)	(0.043)	(0.043)
	0.041	*0.044*	*0.031*	*0.044*
Self-Employment Income?	0.089	0.099	0.103	0.117
	(0.082)	(0.075)	(0.066)	(0.065)
	0.278	*0.188*	*0.118*	*0.074*
Self-Employment Income	1110	1266	1145	1431
	(1366)	(1286)	(1209)	(1180)
	0.417	*0.326*	*0.344*	*0.226*
Per Capita Income	1505	1538	1303	1375
	(1060)	(1057)	(917)	(912)
	0.156	*0.146*	*0.156*	*0.133*
Enough Income?	0.030	0.036	0.052	0.064
	(0.052)	(0.051)	(0.044)	(0.043)
	0.560	*0.489*	*0.242*	*0.141*
Income Declined	-0.059	-0.061	-0.083	-0.084
	(0.053)	(0.052)	(0.046)	(0.046)
	0.268	*0.245*	*0.069*	*0.066*
FIES (raw)	0.026	0.019	-0.219	-0.242
	(0.284)	(0.282)	(0.238)	(0.239)
	0.928	*0.946*	*0.358*	*0.312*

Notes: Standard errors accounting for survey design in parentheses, and p-values below them in italics. Each cell represents a separate regression. Regressions in column (1) include no additional regressors; column (2) includes a location indicator for Dollo Ado; column (3) includes all regressors in the propensity scores; and column (4) includes all regressors in the propensity scores and the location indicator. Sample size is always 435 observations.
Source: Quantitative Endline Survey Data.

Next, we examine the association between the social inclusion indices and HelloCash use among women (Table 20). Whether examining hosts or refugees, coefficient estimates are positive, but not statistically different from zero. Therefore, we cannot conclude that among women, social cohesion had necessarily improved between host community member women and refugee women.

Table 20. Associations between HelloCash use and Social Indices, Women Respondents, SHARPE Evaluation, Jijiga, Ethiopia, 2022

	(1)	(2)	(3)	(4)
Social Index (Hosts)	0.146	0.153	0.018	0.031
	(0.290)	(0.240)	(0.191)	(0.191)
	0.616	*0.525*	*0.923*	*0.869*
Social Index (Refugees)	0.102	0.102	0.258	0.245
	(0.234)	(0.233)	(0.177)	(0.176)
	0.664	*0.662*	*0.148*	*0.166*

Notes: Standard errors accounting for survey design in parentheses, and p-values below them in italics. Each cell represents a separate regression. Regressions in column (1) include no additional regressors; column (2) includes a location indicator for Dollo Ado; column (3) includes all regressors in the propensity scores; and column (4) includes all regressors in the propensity scores and the location indicator. Sample size is 219 observations in row 1 and 216 observations in row 2.
Source: Quantitative Endline Survey Data.

The third table in this section repeats the set of primary regressions for men (Table 19). The same financial inclusion result is found as for women; the coefficient estimates are larger in magnitude among men.[18] We also find a negative, statistically significant association between the raw FIES score and HelloCash use; it is significant at the 5 per cent level without the explanatory variables in the regression and is significant at the 10 per cent level with them.[19] This association suggests that households with male respondents are less likely to be food insecure if using HelloCash than otherwise, even controlling for observables. As this association was found among the entire sample, it suggests it is concentrated among the male respondents.

[18] The result for the narrow definition of financial access does not appear to be robust to using matching methods (Appendix Table B.9.3). However, male HelloCash users are more likely to have financial access by the second definition, suggesting that though one would think the different types of mobile money should be substitutes, there are clearly complementarities.
[19] The nearest neighbor matching estimates are consistent with this statement, but not the kernel matching estimates.

Table 21. Associations between HelloCash Use and Final Outcome Variables, Men Respondents, SHARPE Evaluation, Jijiga, Ethiopia, 2022

	(1)	(2)	(3)	(4)
Financial Inclusion?	0.094	0.094	0.077	0.077
	(0.049)	(0.049)	(0.047)	(0.047)
	0.054	*0.053*	*0.100*	*0.099*
Financial Inclusion?	0.186	0.185	0.163	0.162
Definition 2	(0.053)	(0.053)	(0.051)	(0.051)
	0.000	*0.001*	*0.002*	*0.002*
Self-Employment Income?	0.060	0.066	0.027	0.030
	(0.081)	(0.077)	(0.067)	(0.065)
	0.460	*0.391*	*0.686*	*0.648*
Self-Employment Income	94.6	165.6	-122.6	-71.8
	(984.8)	(964.5)	(956.6)	(933.6)
	0.924	*0.864*	*0.898*	*0.939*
Per Capita Income	341.0	352.9	338.0	340.8
	(1619.7)	(1632.8)	(1593.2)	(1596.0)
	0.833	*0.829*	*0.832*	*0.831*
Enough Income?	0.071	0.075	0.046	0.046
	(0.057)	(0.056)	(0.044)	(0.044)
	0.211	*0.181*	*0.298*	*0.299*
Income Declined	0.045	0.043	0.062	0.061
	(0.056)	(0.056)	(0.049)	(0.049)
	0.428	*0.441*	*0.210*	*0.211*
FIES (raw)	-0.610	-0.612	-0.498	-0.495
	(0.303)	(0.301)	(0.256)	(0.256)
	0.045	*0.043*	*0.052*	*0.054*

Notes: Standard errors accounting for survey design in parentheses, and p-values below them in italics. Each cell represents a separate regression. Regressions in column (1) include no additional regressors; column (2) includes a location indicator for Dollo Ado; column (3) includes all regressors in the propensity scores; and column (4) includes all regressors in the propensity scores and the location indicator. Sample size is always 430 observations.
Source: Quantitative Endline Survey Data.

Finally, we examine variables associated with social inclusion among the male respondents (Table 22). We find point estimates that are largely negative among men, unlike women (among whom they were positive). However, they are not statistically different from zero, suggesting that we cannot conclude HelloCash use is associated with increased social inclusion, at least according to this measure.

Table 22. Associations between HelloCash use and Social Indices, Men Respondents, SHARPE Evaluation, Jijiga, Ethiopia, 2022

	(1)	(2)	(3)	(4)
Social Index (Hosts)	-0.027	0.046	-0.362	-0.281
	(0.354)	(0.284)	(0.247)	(0.254)
	0.940	*0.873*	*0.144*	*0.270*
Social Index (Refugees)	-0.158	-0.158	-0.146	-0.135
	(0.236)	(0.228)	(0.202)	(0.194)
	0.503	*0.490*	*0.471*	*0.489*

Notes: Standard errors accounting for survey design in parentheses, and p-values below them in italics. Each cell represents a separate regression. Regressions in column (1) include no additional regressors; column (2) includes a location indicator for Dollo Ado; column (3) includes all regressors in the propensity scores; and column (4) includes all regressors in the propensity scores and the location indicator. Sample size is always 216 observations.
Source: Quantitative Endline Survey Data.

Hosts versus Refugees

We next explore whether there are heterogeneous coefficients by host and refugee status, defined by whether the interviewed household lived in a refugee camp or not. As with gender, we first re-estimate propensity scores for each group, and then we apply the propensity scores as weights to the control group. Like other estimates, columns (3) and (4) adjust for variables included in the weights, and those variables plus a location indicator for Dollo Ado, respectively.

Table 23 reports results for refugees. Perhaps not surprisingly, we do not find many positive, statistically significant associations between any of the final outcomes and HelloCash use. The only two that are even significant at the 10 per cent level or better are the two measures of financial access. As noted above, though we have adjusted the control group to look more like the HelloCash users, these results could still reflect that the users were more likely to have set up a formal financial account or use other mobile money services, in the case of the two definitions, but are at least suggestive of expanding financial inclusion.

Table 23. Associations between HelloCash Use and Final Outcome Variables, Refugee Camp Residents, SHARPE Evaluation, Jijiga, Ethiopia, 2022

	(1)	(2)	(3)	(4)
Financial Access?	0.067	0.065	0.067	0.064
	(0.035)	(0.034)	(0.034)	(0.034)
	0.053	*0.059*	*0.052*	*0.058*
Financial Access?	0.133	0.130	0.132	0.129
Definition 2	(0.042)	(0.042)	(0.042)	(0.041)
	0.002	*0.002*	*0.002*	*0.002*
Self-Employment Income?	-0.019	-0.011	-0.021	-0.015
	(0.064)	(0.062)	(0.063)	(0.061)
	0.773	*0.860*	*0.734*	*0.811*
Self-Employment Income	449.2	594.0	444.8	582.7
	(1175.2)	(1132.4)	(1174.4)	(1138.8)
	0.702	*0.600*	*0.705*	*0.609*
Per Capita Income	307.1	347.1	336.8	406.5
	(1040.1)	(1046.4)	(1025.0)	(1024.6)
	0.768	*0.740*	*0.743*	*0.692*
Enough Income?	0.013	0.020	0.012	0.018
	(0.049)	(0.047)	(0.048)	(0.047)
	0.799	*0.679*	*0.801*	*0.698*
Income Declined	-0.024	-0.027	-0.023	-0.026
	(0.049)	(0.049)	(0.049)	(0.049)
	0.617	*0.575*	*0.633*	*0.588*
FIES (raw)	-0.330	-0.339	-0.345	-0.348
	(0.260)	(0.260)	(0.254)	(0.254)
	0.206	*0.193*	*0.176*	*0.172*

Notes: Standard errors accounting for survey design in parentheses, and p-values below them in italics. Each cell represents a separate regression. Regressions in column (1) include no additional regressors; column (2) includes a location indicator for Dollo Ado; column (3) includes all regressors in the propensity scores; and column (4) includes all regressors in the propensity scores and the location indicator. Sample size is always 430 observations.
Source: Quantitative Endline Survey Data.

We next repeat the procedure for host community members (Table 24). We find a few additional positive coefficients that are statistically different from zero. Along with the financial access variables as we found among refugees, an indicator for whether a household has self-employment income or not is also positive and different from zero; it is large in magnitude as well. However, self-employment income does not differ by HelloCash use, suggesting that if there is an effect, it is on the extensive margin (here, we treat households as having zero income if they do not report self-employment). However, it could be that households with self-employment income find HelloCash more useful. We also find households using HelloCash more likely to respond that they have enough income to meet basic needs among hosts, but not among refugees, suggesting something of a concentration

of this correlation among the host population. This last effect is typically only significant at the 10 per cent level.[20]

Table 24. Associations between HelloCash Use and Final Outcome Variables, Host Community Members, SHARPE Evaluation, Jijiga, Ethiopia, 2022

	(1)	(2)	(3)	(4)
Financial Access?	0.118	0.117	0.102	0.103
	(0.047)	(0.047)	(0.046)	(0.046)
	0.012	*0.012*	*0.025*	*0.026*
Financial Access?	0.165	0.161	0.149	0.145
Definition 2	(0.052)	(0.051)	(0.049)	(0.049)
	0.002	*0.002*	*0.003*	*0.003*
Self-Employment Income?	0.199	0.223	0.214	0.234
	(0.100)	(0.091)	(0.078)	(0.078)
	0.047	*0.015*	*0.006*	*0.003*
Self-Employment Income	600	951	771	1177
	(1358)	(1216)	(1160)	(1109)
	0.659	*0.435*	*0.507*	*0.289*
Per Capita Income	1975	2057	1429	1413
	(1311)	(1308)	(1223)	(1213)
	0.133	*0.116*	*0.243*	*0.245*
Enough Income?	0.111	0.120	0.099	0.109
	(0.059)	(0.059)	(0.053)	(0.053)
	0.058	*0.042*	*0.061*	*0.038*
Income Declined	-0.029	-0.032	-0.033	-0.036
	(0.059)	(0.058)	(0.053)	(0.053)
	0.624	*0.585*	*0.535*	*0.501*
FIES (raw)	-0.341	-0.335	-0.312	-0.326
	(0.318)	(0.316)	(0.264)	(0.265)
	0.285	*0.290*	*0.238*	*0.220*

Notes: Standard errors accounting for survey design in parentheses, and p-values below them in italics. Each cell represents a separate regression. Regressions in column (1) include no additional regressors; column (2) includes a location indicator for Dollo Ado; column (3) includes all regressors in the propensity scores; and column (4) includes all regressors in the propensity scores and the location indicator. Sample size is always 430 observations.
Source: Quantitative Endline Survey Data.

Cost-effectiveness analysis

We did not collect cost data on the overall SHARPE project. However, we can provide some estimates of how much money different types of actors are making or have made from HelloCash, and we use that to analysis to consider what types of cost level data make participation profitable. This analysis can be considered thinking about the "business case" of working with HelloCash in refugee hosting areas. Next, we consider the costs of running the two rapid RCT programs and suggest the levels of per customer revenues that would be

[20] Results using matching estimators are largely consistent with all statements in this paragraph (Appendix Table B.9.5).

necessary for Shabelle Bank to run either of them profitably without SHARPE or research team involvement. Note that we again cannot demonstrate that these are causal estimates, as each actor might have signed up on their own during the implementation period. However, it is reasonably clear that SHARPE has catalysed additional sign-ups in each of these areas, particularly based on the qualitative evidence described above.

Before we begin to describe estimates, recall that the main source of HelloCash revenues to Shabelle Bank is through small service fees on transactions by consumers. Agents earn commissions on specific transactions they facilitate (cash-in, cash-out, and top-ups). Merchants and *bajaj* drivers do not earn extra money from taking HelloCash, so they do so primarily as a convenience to their customers (as do agents). We provide some statistics here on their projected revenues from HelloCash as well, which is also suggestive of long-term viability.

Ideally, we could just examine the administrative data on customers signed up in SHARPE target areas during the intervention to understand how much money each type of actor makes through HelloCash participation. However, as discussed in the data section, the administrative data are only reliable through December 2021, and then again from August 2022 on. So, we need to come up with a method of projecting revenues forward from the accurate data as both new customers join, and as old customers continue to use their accounts.

Customers

First, we tested a few different models for estimating Shabelle Bank revenue from customers, from the December 2021 data. We computed the share of customers who had ever transacted on HelloCash, the share of women customers, and the share of customers who were refugees, and then tested simple linear models (at the month level) exploring the revenue per customer regressed on the months since enrolment, the share of active customers, the share of women, and the share of refugees among enrolees (Table 25). We initially settled on a model just including the months since enrolment and the share of active users (column 2), since the share of women and refugee variables do not add explanatory power to the model; we then test adding an indicator for July 2021 in column 4, when enrolment was particularly low. However, it also lacks explanatory power, so we prefer the model in column 2.[21]

[21] We also tested a model using the logarithm of revenues per user, but from the perspective of both scatterplots and explaining variation it did not out-perform the simple linear model, so we use the simple linear model. We recognize that if active users find the system particularly useful and increase their use over time, we are underestimating the value of new customers using a linear projection method.

Table 25. Simple Regression Models used to Predict HelloCash Revenues per Customer, using December 2021 Shabelle Bank Administrative Data

Variable	(1)	(2)	(3)	(4)
Months Since	7.82**	3.00*	5.53*	2.70
Enrolled	(1.67)	(1.69)	(2.98)	(1.77)
Share, Active		243.5**	172.6*	266.0**
		(61.2)	(89.4)	(69.5)
Share, Women			68.2	
			(125.8)	
Share, Refugees			-143.7	
			(93.7)	
Indicator, July 2021				20.7
				(28.4)

Notes: Standard errors in parentheses. *- indicates significance at the 10 per cent level; **- indicates significance at the 5 per cent level. Since SHARPE had been running for 17 months in December 2021, there are 17 monthly observations.

We then use the model to project revenues as follows. We first take actual total revenues to December 2021, and then add revenues among the existing customers by projecting how much they would increase among existing customers using the model above, through September 2022. We then take new enrolees from January 2022 through September 2022 and use the model to predict revenue from their activity. We come up with a total of 5.43 million birr, implying that the additional enrolees from SHARPE have provided about $103,000 of added revenue at the September 30, 2022 exchange rate.

Agents

Agents are the next most important component of a mobile money ecosystem, and if they are not profitable then similarly, they drop out of the system. In December 2021, we find that of the 192 agents enrolled under SHARPE, 14 of them have no transactions at all, implying they did not ever really participate in HelloCash (despite making efforts to join, including licensing and providing a cash deposit for their float, or mobile money stock).

There are three other pertinent points about agents that make modelling their revenues more difficult. First, over three-quarters of enrolment took place between November 2020 and June 2021. The data suggest that there was a clear push to enrol agents early in the project, and then it likely occurs when there is demand among specific businesses (or a push from the project in refugee camps). Second, there is substantial heterogeneity in total revenues. Among agents in the December 2021 data, there are 4 agents with less than 100 birr of total transactions, and another 4 with more than 13 million birr of transactions, with a median of 206,000 birr and a maximum of 47 million birr, or nearly $1 million. Similarly, some agents have handled less than 5 transactions, whereas others have handled 10,000 or more. Clearly, some agents have established themselves as important mobile money agents with plenty of liquidity for cash-in and cash-out, whereas others have been nearly inactive. Third, the small commissions paid to agents differ by type of transaction, so average commission rates vary substantially by agent as well.

These two points make it difficult to convincingly model revenues in the same way as we did for customers. In fact, if we scatter plot the average revenues per agent signed up versus the months since they signed up, we find that there are much higher revenues per agent from months 9 through 15 than other times, which is likely consistent with some particularly high revenue agents enrolling in months with higher revenues (Figure 16). As a result, a better way to try to predict revenues would be with individual level agent data; unfortunately, we lack multiple observations on the same agent.

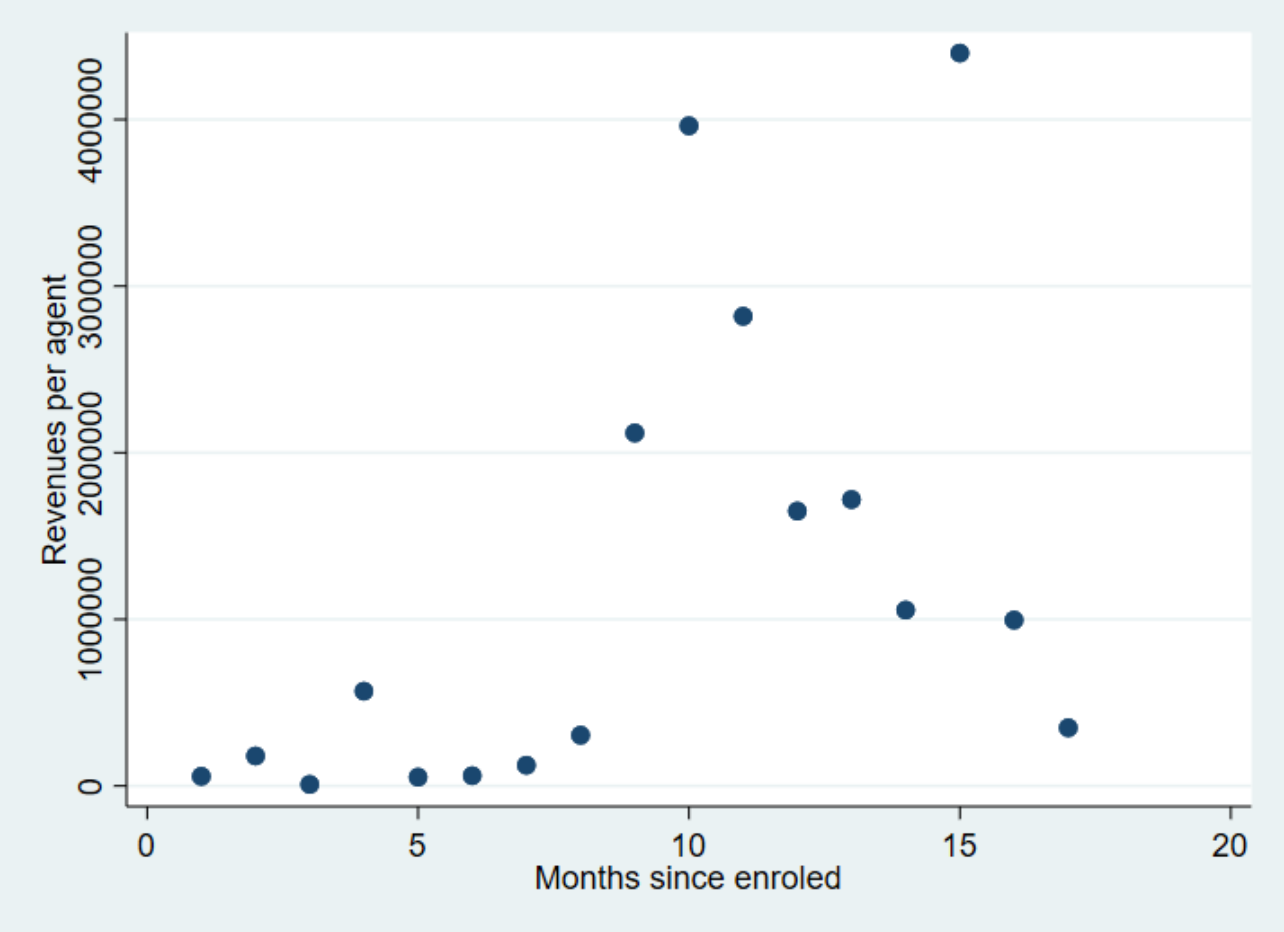


Figure 16. Revenues per Agent versus Months since Enrolled in HelloCash, December 2021

Therefore, it is difficult to conclude much about agent commissions beyond what we know from the December 2021 data. At that time, they had earned a total of 725,151 birr from transactions in total (between the 178 active agents). By June 2022, there were an additional 57 agents; of those, 51 more were active, and some of them quite active—though we do not know if the transactions are complete, the administrative record suggests that total commissions among those agents alone were 357,297 birr. So, we can state that agents signing up through SHARPE have made more than 1.08 million birr through June 2022, or over $20,578 in dollar terms, with an average of about $89 per agent. Given heterogeneity, some agents are clearly finding HelloCash worthwhile, whereas others are either inactive or nearly inactive. Nonetheless, it seems that some agents have clearly established for themselves that their agent status is worth the opportunity cost.

Merchants and *Bajaj* Drivers

The last segment of the HelloCash infrastructure are merchants and *bajaj* drivers. In December 2021, a lot more money had flowed through merchants than *bajaj* drivers; over 56

million birr had flowed through the 1567 merchants that had enrolled, versus 2.8 million birr through 456 *bajaj* drivers. Therefore, we concentrate on measuring economic activity through merchants.

We follow the same logic as used for customers to project out the value of business conducted by merchants using HelloCash. 63 per cent of all merchants have some revenue, but the variable had less explanatory power in helping explain revenues per merchant. Therefore, we just correlate the revenues per merchant with the months since they enrolled and assume linear growth in the aggregate revenues (again, likely a strong assumption). We then project out additional revenues past December 2021 to September 2022 and add estimated revenues for merchants who join between January and September 2022. Last, we replace the predicted revenues with actual revenues for September, since they exist. This method results in an estimate of 110 million birr of total activity with merchants enrolled under SHARPE, or over $2 million. Again, there are clear ways this is an underestimate (e.g., ignoring growth and *bajaj* drivers), so we can safely say that merchants enrolling under SHARPE have handled more than $2 million in HelloCash transactions in total since enrolling.

Summary

In summary, we have considered the revenues earned by three different types of actors enrolled in HelloCash through SHARPE involvement: customers, agents, and merchants. We find that merchants have conducted well over $2 million in transactions through HelloCash; agents have earned more than $20,000 in commissions, and we estimate that customers have generated at least $100,000 in revenue for Shabelle Bank, as of September 2022. Again, noting that these numbers are estimates rather than actual amounts, they suggest that there are at least a subset of agents and merchants who make enough money to make continued HelloCash participation worthwhile.

Going back to SHARPE's original rationale for intervening in refugee hosting areas, we recall that financial inclusion among refugees was a primary goal, but that is only possible if Shabelle Bank can make money from providing services near refugee camps. Shabelle Bank would have to compare the costs of continuing outreach to customers through KYC officers with the flow of benefits; if we assume that the revenue will continue to grow somewhat, however, it seems probable that marginal benefits outweigh the costs. We find substantial heterogeneity in agent and merchant performance; some agents make substantial money from HelloCash, whereas a handful seem to have never started working as agents. As the goal is to make sure there are ways to use HelloCash in all localities, it is not necessarily important that there are a lot of agents in each area, but at least some in each area turning over business. The data suggest that there appear to be quite strong agents near the camps in Jijiga, but more work might need to be done to find additional agents near the Dollo Ado area camps. There do appear to be merchants near most of the camps who are doing a lot of business through HelloCash; the Kobe refugee camp in Dollo Ado is an exception.[22]

[22] We base these broad statements on the cumulative administrative data to September 2022, under the innocuous assumption that the incomplete activity reports in those data are correlated with overall activity.

7. Conclusions

This report describes the impacts of SHARPE's work in the financial market system in areas surrounding refugee camps in Somali region, both in the Jijiga and Dollo Ado areas. We used several sources of data, including publicly available data, administrative data from Shabelle Bank, phone survey data, and qualitative and quantitative data collected by the research team to conduct this analysis. Though there are many data sources, all of them have advantages and drawbacks, and we have tried to use them all critically to develop a picture of how SHARPE's activities have affected the financial services market system. Throughout the report, we have tried to keep drawbacks of each data source in mind as we present results.

The impact evaluation project worked with SHARPE and Shabelle bank to design, implement, and assess two randomised trials that were meant to attempt to catalyse more enrolment and use of digital financial services among women and refugees, respectively. The trials were broadly designed as we collectively knew that the customer base was skewed towards host community nationals and men, and that about half of customers sign up for HelloCash but never use the service. The first trial implemented a referral program, in which good customers were selected as CRs, and those CRs were provided small incentives for bringing in new customers. The trial worked differently than planned; only a few CRs tried to make any referrals, but at least one CR made a large number of referrals and as such it was deemed a success by Shabelle Bank. It did not change the proportion of women or refugees among new customers. A second trial attempted to catalyse more use; a small amount of initial money seemed to create more transactions but providing a bonus for trying out the system did not. Among targeted groups, the unconditional transfer worked among women in the host population, but it did not seem to move the proportion of refugees using HelloCash.

Limitations of the project

As discussed throughout the report, a main limitation of the impact evaluation was that we were not able to collect baseline data, which really hinders our ability to make causal statements about changes to final outcomes. We are left being able to describe differences between HelloCash users and non-users, but we do not claim causality due to the nature of comparisons we can make between users and non-users.

A second limitation was with timing related to both COVID and the internal conflict between the government and Tigray region. The timing of the impact evaluation was heavily affected by both shocks. COVID made it impossible to travel for business until early in 2022; from the evaluation team perspective, the Tigray conflict compounded problems, as much of the lead organization's internal staff left Ethiopia, at least for an extended duration. At times, SHARPE's international staff also left Ethiopia for extended periods. These disruptions affected the research team's ability to build a local understanding of the context, to work on relationships needed to manage the project, and to solve problems from a local perspective. The project would have likely been more successful if it had been able to move faster locally, which as noted was heavily constrained by these external shocks.

A third issue that is worth discussing here is to take a critical look at the randomised control trials. As discussed in the methodology section, the idea was to run rapid randomised trials. Neither of the two trials worked as we would have liked. The first trial, the referral trial, took a long time to set up and was likely too complex for a "rapid" RCT, and the second trial ran too late to run in another version in a second round.

The referral trial was first complex to explain to partners, then it was complex to come up with procedures to both choose people invited to participate (the CRs), to come up with systems to invite them, and then to get the whole trial off the ground. To summarize, nothing about it was rapid—this assertion is true both from the research side and from the implementation side. By the time we were able to run the trial, it was too late to "adapt" it in a market systems development context. Another unforeseen challenge is that it used a great deal of the project bandwidth, particularly among Dadimos and Shabelle Bank. As a result, Dadimos did not have enough time available to run qualitative work in advance of the quantitative endline survey; we could not learn from the qualitative work for the endline as a result. In fact, it ate up so much of the Shabelle Bank bandwidth that they missed the start date for the second trial, which was scheduled for September. Conditional on receiving the administrative data on time, we had the potential to run an adaptive trial but no longer had that time once we reset procedures and collaboratively ran the trial.[23]

As a result, a key finding is that if the goal is to use rapid trials, then the trials actually have to be rapid. Before proposing rapid trials, it is important for the research team to think through the changes—and the amount of time necessary—to implement it. It took us nearly a year to get the referral study started; it could have gone a little faster with additional travel early, but a great deal of that time was unavoidable.

That said, Shabelle Bank made investments outside the SHARPE programme through Belcash Technology Services for additional functionalities that can let them make referrals without the need for the call centre set up during the randomised trial. One can think of the referral pilot as "proof of concept" for Shabelle Bank. The referral pilot led Shabelle Bank to see that a referral system can be used and does increase enrolment (and in one target area, Dollo Ado); although it would likely work a lot differently than in the trial, the increase in enrolment likely convinced them to finalise the referral software option. So, we already know that Shabelle Bank considered it a success and are to some extent waiting to see if they will finish their investments in creating an option to refer other customers through a software option. Note that Shabelle Bank works in a much larger geographic zone than covered by SHARPE, so they could potentially use this learning elsewhere in a context in which it might be easier to implement.

This is an excellent point in time to consider the potential risks of running randomised trials or A/B tests in collaboration with a private company. Here, we want to make several points. First, in the context of market systems development projects, it is unavoidable to work with private companies, since market systems development projects always work through private companies; as described in the beginning of the report, this choice is

[23] The second trial, however, was not difficult to run once it did run, and should be considered rapid.

made to attempt to ensure sustainability of practice changes within a specific market system. Second, SHARPE was not just working with Shabelle Bank to increase its market share—it specifically pushed Shabelle Bank into specific markets in which it would not have worked otherwise. The randomised trials took place in this context—in places that would not have been targeted for any investment without SHARPE. Third, the term "private company" is a bit questionable in this context, as Shabelle Bank is at least partially state owned, which means its objective function may differ from that of a purely profit-making company.

That said, there might be a risk that it appears unethical to conduct randomised trials with companies that have a profit motive. Here, it is important to make clear the goals of trials are to ensure specific types of disadvantaged groups are the target of such trials—hence, for example, we downweighted men from the host community in the treatment groups for the second trial. Second, it is important to consider other gains from trials. We largely worked with one person at Shabelle Bank on both trials, and we can consider the capacity building that took place as helping his individual skills, which could transfer, of course, to other companies if he moves on from Shabelle Bank.

A final thought is that perhaps the idea of "rapid" RCTs is too limiting—another way to adjust the evaluation framework would be to instead "allow" for more complex trials so long as they fit with the market systems logic. In this case, the referral program took place in collaboration with SHARPE and Shabelle Bank and would have either lasted longer or been changed somewhat if time had not been a constraint. Since it fit the market systems logic, perhaps the way that the referral trial was designed was not a problem for the adaptive logic, though it would be more like a longer-term component of a market systems intervention in this case.

Finally, the RCTs did not completely achieve the overarching goal to help alleviate the two challenges that they were meant to—the referral trial did not lead to a higher proportion of women or refugees enrolling in HelloCash, and the incentives trial only led to a higher proportion of women using the system and not refugees. That said, the referral trial led to a substantial increase in enrolment in Dollo Ado, which can be thought of as an alternative achievement.

It is not clear that the referral system could be adjusted to lead to more women or refugees enrolling, though one could restrict referrals to among refugees (either restricting referrers to be refugees, or only paying bonuses for enrolling refugees). From the perspective of the incentives pilot, there are clear adjustments that could be made to try to explore whether looser conditions might be effective. And with more time, it would have been worth doing phone interviews among refugees who received the unconditional cash to understand why they did not use it in the three weeks after receiving it. The qualitative data may have a hint—they may just perceive that HelloCash is a safe way to store money, so there was no need to use it quickly.

Reconciliation of qualitative and quantitative analysis

In this section, we do three things: First, we again discuss the theory of change, from the final outcomes backwards. To do so, we assume that the differences between HelloCash

users and non-users is at least partially attributable to HelloCash, since it is impossible to do analysis otherwise. We consider other evidence along the theory of change backwards to try to ascertain which factors play important or outsized roles in driving those differences.

Second, we discuss ways to reconcile differences in findings between the qualitative and quantitative sections of the report. Here, we concentrate on network reliability, where the largest differences were found. Third, we discuss a summary of the two randomised control trials, using some of the qualitative analysis from the referral project in conjunction with the quantitative data, describing what was learned from the two trials and ideas for further research on the same topic.

Returning to the Theory of Change

We first go back to the theory of change, from the perspective of final outcomes. We do not find evidence of changes to social inclusion (or differences between HelloCash users and non-users), but we do find differences in a couple of the final outcomes. Specifically, we find that there is a difference of 8.7 percentage points in the narrow definition of financial inclusion; an 8.8 percentage point difference in self-employment; a 6.1 percentage point difference in households reporting they typically have enough income; and a 0.338 point lower raw FIES score. These results fit nicely together; households more likely to be included in the (formal) financial system are more likely to be able to finance self-employment, and those households are then likely to also report having enough income to get by. Households than report having enough income also, then would be less likely to be food insecure.

According to our theory of change, moving backwards we want to first think about the evidence we have about internal constraints being overcome. First, we note that agent and merchant availability seem strong in many of the areas, though perhaps not as strong in the Dollo Ado area as in the Jijiga area, as suggested in the cost analysis subsection. Indeed, according to the Shabelle administrative data, in June 2022 enrolees in Jijiga were 19 percentage points more likely to have made a transaction than those in Dollo Ado. Second, we consider the perceived benefits and costs of using the system. Here, we know that service costs are considered high by many users, but use has continued to grow in refugee hosting areas, despite increases in fees. Third, people find the system easy to use according to the qualitative field work, so knowledge of using the system appears to exist. And finally, the system must be available—this constraint from an internal perspective has been overcome since August, when the server was replaced.

Considering the decision to enrol, we see almost complete awareness of HelloCash in both host areas and refugee camps. Clearly, their advertising has been effective. According to the quantitative endline survey, there also appears to be a great deal of knowledge about perceived benefits of use. However, if we consider the enrolment process, our information is somewhat mixed. Most people did not find it that difficult—about 30 per cent of HelloCash user respondents called it “somewhat difficult” in the quantitative survey versus “not difficult.” In general, qualitative respondents found the enrolment process relatively easy. However, if we consider the number of unfinished enrolments (around 500)

in the referral study, one might wonder why so many people left their enrolment incomplete; some of them already had accounts, but for others the enrolment was left incomplete, which could signal that some people had difficulty with it. Moreover, some people clearly feel like they may not benefit from enrolment; even if they are technically eligible, they might become ineligible (in their view) for other benefits if they enrol in HelloCash.

Respondent Differences: Qualitative and Quantitative Surveys

Respondents in the qualitative and quantitative surveys appeared to have two main disagreements. First, there were several qualitative respondents who complained about network quality, whereas the answers in the quantitative survey were almost uniformly positive. Second, the qualitative component might have made it appear like mobile money services other than HelloCash were used by a substantial number of people, while the quantitative survey suggests that very few people use services other than HelloCash. We discuss each in turn below.

Perhaps the largest disagreement between the qualitative and quantitative components relates to the difference in perception one would get about service reliability from the two types of interviews. Several qualitative respondents criticized the "HelloCash network" quite broadly and called transactions unreliable. Meanwhile, in the quantitative survey, the modal answer on poor network coverage was "sometimes," yet people reported using their phones every day, suggesting that they do not see problems using cell phones in general. However, the qualitative data suggest that individuals may have problems counting on the network at specific times, so they cannot count on HelloCash for a transaction they need immediately.

It is worth again bringing up the problems with the server that HelloCash faced, as until August 2022 they were using their original server (initiated in 2015) which had filled up. The server issue led to slow transactions at peak times, and some of the qualitative respondents may have experienced those problems. Since August, when the transition to a new server located at EthioTelecom was completed, HelloCash transactions should be no different than any other mobile money service. Therefore, the constraint that is discussed here is really external; Shabelle Bank and Belcash have addressed it as far as they can, and the reliability of the cell phone network is important to increasing reliability.

Second, many qualitative respondents brought up other types of mobile money and even suggested a preference for those types of mobile money at times due to service fees. However, these preferences would seem to be outliers according to the quantitative data collection. There are two pieces of quantitative evidence suggesting these preferences to be outliers. First, we asked all respondents if they used other services; very few HelloCash non-users suggested they used a different system (e-Birr, Sahay, or even m-Pesa from Kenya in Dollo Ado). Second, we asked a question specifically about the preferred mobile money provider, both among HelloCash users and non-users. 80 per cent of non-users stated that HelloCash was their preferred system. It is more likely liquidity constraints (or potentially phone ownership) keeping these respondents from using HelloCash, rather than preference for another mobile money system.

Learning from the Referral and Incentive Trials

Finally, we want to discuss overall learning from the randomised trials that were conducted towards the latter half of 2022. The main findings of the referral study, described in the last two sections, can be summarised as follows: Only a small share of CRs ever attempted to make a referral; that said, the referral system led to a large increase in enrolment, particularly in Dollo Ado, while the referral programme was running; and while enrolment increased, the share of enrolment recorded as women or refugees did not increase from trends. The incentives trial suggested that either men or women could be induced into more transactions through the unconditional transfer; the conditional transfer did appear to lead to more transactions among women, but not men. Neither the unconditional nor the conditional transfer appeared to affect refugee transactions.

For the first trial, the qualitative work suggests that some CRs were not appropriately targeted—they were too busy to try to make referrals, or the opportunity cost for them was too high. Because of the "super referrer," it is hard to say anything about the size of incentives at this point. So there are two obvious ways to potentially use the results. One would be to try something similar, in which the initial phone survey was used as a screening device for referrers; one could flag people with high incomes or constrained time allocations as inappropriate for referral incentives. Perhaps some screening could help increase the proportion of individuals participating. Alternatively, assuming the phone based referral system could be finalised, messages could be broadcast widely about its availability. Bonuses for several successful referrals (rather than one referral) could create enough of an incentive for some customers to participate. With a million customers in Somali region, even an 0.1% participation rate could lead to thousands of additional new customers each month.

For the second trial, the incentives clearly helped catalyse use among women (the unconditional transfers also appear to have catalysed use among men), but not among refugees. So providing intermittent incentives to inactive customers – particularly women—can play a role in getting women to participate in HelloCash. However, with more time it would have been worth doing at least phone surveys among refugees to understand why they did not participate. There could be a hint about low participation for the unconditional transfer from the qualitative work already—if people feel comfortable leaving money on HelloCash, they may not have had a reason to spend it—but more qualitative work could have helped us better understand this result.

Lessons for the interventions

We believe that there are some key lessons for SHARPE or follow-up projects that arise from the impact evaluation:

1. A robust market system has been developed in at least two targets in the Jijiga area, and the third one is small. HelloCash users and non-users alike report the system is easy to use and convenient. The market system is less developed in the Dollo Ado area, which is far more isolated. There does appear to be a relatively robust market system that has been generated in some areas, particularly near the Jijiga area refugee camps. In this context, refugee enrolment still lags host enrolment (at least

in the areas other than Kebri Beyah), but we do find merchants and agents doing robust business in those areas. Hence, the concept of market development seems feasible.

2. In the Jijiga target areas, it is worth continuing work to build up the agent network in camps, as there are entrepreneurs already identified as potential agents. More agents within camps would make HelloCash (or any mobile money product) more valuable to refugees in general. Making businesses formal that can serve as agents in refugee camps clearly takes a long time, and the difficult work both on both identifying the types of retailers that can make good agents, and in assisting their registrations through governmental processes.
    a. That said, economies are dynamic, and it is important to identify groups (here, potentially UNHCR, but perhaps there are others) who can take this work up as new potential agents emerge in the future.

3. In the Dollo Ado area, the financial market system appears to be less developed near refugee camps, suggesting more emphasis is needed to continue fostering its development. There is a strong customer base but continuing to intervene in the same way as now (building up the merchant and agent base while adding customers) would seem worthwhile. That said, it could be there is just a lot less economic activity there as well; a rapid scan of businesses outside camps could help understand the market environment. The relative isolation of Dollo Ado in Ethiopia may make it complex to develop that market system, but it is worth trying to continue given the larger number of refugees there and the efficiencies that could be gained in transiting aid to digital cash. We imagine a similar exercise could help in Gambella region as and if activities continue there.

4. The main difference between refugees who use HelloCash and those who do not—that could potentially be addressed—is through literacy. We think a valuable addition to further programming related to the digital financial system near refugee camps would be to pilot test adult phone literacy programs within camps, particularly among women.
    a. That said, such programs would not be a “silver bullet.” One thing that came up in both the qualitative scoping study and endline surveys that some refugees do not want to sign up for mobile money because they are afraid it will hurt their eligibility to move onward to OECD countries. Emphasizing messaging among refugees that having an Ethiopian phone number does not affect eligibility for those lotteries could also help, though that idea formation might be difficult to break.

5. In Jijiga, it seems that the digital financial system would appear ready to handle cash transfers to refugees by digital payments. It could only be strengthened by the presence of more agents within camps, and that might catalyse remaining enrolment. In Dollo Ado, the system appears a bit less ready, though piloting would be the way to learn if it was ready.

6. Given that Shabelle Bank worked to develop an automatic referral method within HelloCash, it is worth considering if there are ways of seeding the network within refugee camps (using referrers who can mimic the "super referrer" experienced in the trial) to try to catalyse within camp enrolment. However, those people might be difficult to identify in advance; it would be costly to do so in the same way that the referral program did.

7. The "best" learning about catalysing use among women or refugees was through the unconditional transfers; though they did not affect refugee HelloCash use, they did have a positive effect on use by women. There are at least a couple of versions of this trial that would make sense as a second attempt—one would be to confirm the effects with a larger sample (perhaps including those not targeted by SHARPE, so that a larger sample size was possible), and second would be to test a conditional version with a lower transaction threshold (e.g., 1 transaction in 2 weeks). A challenge might be getting the right type of attention from Shabelle Bank personnel, who were all quite busy and had to carve out limited time for the research activities.

General lessons

To briefly consider some general lessons from this study:

1. Creating robust digital financial services ecosystems in areas surrounding refugee camps—or just confirming they exist—would seem to be a necessary condition before transfers to refugees can be transitioned from food or physical cash. There are some substantial advantages to making this transition, as the cost of transferring money digitally is much lower than the cost of obtaining food or sending physical cash to remote regions of host countries. SHARPE provides some important lessons on how to go about this process; when a market system is already growing in a local economy (as the one surrounding HelloCash was in Somali region) this process implies shifting effort of potential partners rather than introducing a new idea altogether, greatly facilitating the process. As Ethiopia in general is behind the rest of the world in a transition to a mobile phone dominated communication system, this process might be easier than in other places, where the system is already quite entrenched and new ideas must overcome institutional constraints.
2. An important thought experiment that SHARPE's leadership should do is to think through how the program would have differed if the locations had not been decided for them; would they have stayed away from Dollo Ado, for example, which is difficult to access and work in? Market systems development projects typically will shift areas if they sense they cannot affect change in a specific area, which is sensible from a perspective of "success," but might leave some areas further behind as a result. In a sense, SHARPE represents a different type of market systems project in that it could not shift areas by design; we think considering whether that difference is positive (or not) for development in general is worthwhile by donors and practitioners alike.

3. The process of catalysing better relations between host communities and refugees is a longer process than can be completed during a short project. Continuing some investment in following whether relationships change because of a more robust digital financial service ecosystem in the future is worthwhile. While the theory of change here is compelling—digital cash (or cash in general) makes for more economic interactions between refugees and hosts, and more interactions in general—without more money in the digital ecosystem among refugees through transfers, this theory will remain largely untested. This recommendation might make more sense for Gambella region, where we understand the relationships are more contentious than in Somali region.

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Annex A1: Statistical balance

We present three types of statistical balance in this section: balance in the referral study; balance in each of the RCT samples, respectively, and then balance in the final endline sample.

A1.1. Referral Study Balance

We used baseline (strata, socioeconomic characteristics, and self-reported service use) and endline data (service use from admin data) for balance checks. Table A1.1 shows baseline balance by intervention arm. As intended with the stratification, we find nearly half of the sample is self-reported to be women, and nearly half of the sample is from Dollo Ado. Consistent with the discrepancy noted in Table 1, self-reported refugees are under-represented relative to self-reported hosts, constituting about 30% of the sample. Respondents are on average about 30 years old, have about 7 household members, and have about 8 years of education. In terms of service use of Hello Cash, in the administrative data from February 2022, respondents had about 18 to 20 recorded transactions and had been registered for about 375 days on average. In the baseline survey, about half reported currently having any balance in their mobile wallets, currently having another financial accounts, and having any other mobile money accounts respectively. About 10 per cent reported that someone else sometimes used their account. There are few meaningful differences in average characteristics across the intervention arms.

Table A1.1: Baseline characteristics of CRs by intervention arm

	(1) Control	(2) T1: LL	(3) T2: LH	(4) T3: HH	(5) P-value for test that T1=T2	(6) P-value for test that T1=T3	(7) P-value for test that T2=T3
Strata variables							
Female	0.48	0.46	0.48	0.48	0.455	0.361	0.851
Refugee	0.31	0.27	0.29	0.31	0.649	0.359	0.650
Location=Dollo Ado	0.48	0.48	0.43	0.47	0.014	0.579	0.082
Socioeconomic characteristics							
Age (years)	29.86	29.25	29.65	30.93	0.656	0.095	0.210
Household size	7.22	7.55	7.17	7.43	0.287	0.744	0.485
Education (years)	8.04	8.17	8.03	7.49	0.754	0.152	0.252
Service use (from admin data)							
# Recorded transactions	18.29	19.16	21.05	18.81	0.516	0.889	0.452
Time since registration (days)	377.01	377.61	374.75	374.86	0.757	0.752	0.990
Self-reported financial service use							
Any balance in mobile wallet	0.51	0.51	0.53	0.55	0.765	0.485	0.689
Any other financial accounts	0.52	0.50	0.58	0.51	0.135	0.921	0.161
Any other mobile money accounts	0.49	0.52	0.47	0.46	0.267	0.230	0.920
Anyone else uses account	0.08	0.12	0.10	0.07	0.628	0.120	0.286

Note: CR denotes community referrer. LL refers to the treatment arm in which CRs received 25 birr for each successfully referred individual (male or female); LH refers to the treatment arm in which CRs received 25 birr for each successfully referred man and 50 birr for each successfully referred woman; HH refers to the treatment arm in which CRs received 50 birr for each successfully referred individual (male or female).

A1.2. Incentives Balance

We present balance by transfer group in Table A.1.2. Due to the stratification, we decide to present an F-test from a regression which accounts for any other stratification variables.

Table A.1.2. Balance Table- Means by Transfer Group, Shabelle Bank Administrative Data, November 2022

Variable	Control	Unconditional Transfer	Conditional Transfer	F-Test, means are equal
Refugee status	0.156	0.268	0.201	0.92
	(0.013)	(0.025)	(0.015)	
Gender	0.721	0.634	0.529	0.84
	(0.013)	(0.015)	(0.025)	
Days since Registered on October 31	45.9	44.8	46.0	0.11
	(0.33)	(0.51)	(0.34)	
Located in Jijiga zone	0.271	0.296	0.283	0.84
	(0.013)	(0.023)	(0.014)	
Sample Size (N)	700	314	661	

Notes: F-test for equal means conducted through a regression controlling for stratification.

A1.3. Quantitative Endline Balance

We present two pieces on quantitative endline balance below. First, we examine average characteristics among HelloCash users and non-users, and test for their equality (Table A.1.3). We do not expect the averages to be the same, as we have not weighted these characteristics by the propensity scores. We then present results from the LASSO procedure for four different samples—the overall endline sample, the subsample of men, the subsample of refugees, and the subsample of hosts. We omit women because no variables increased the value of the objective function among women (beyond a constant in the model), as described in the main body of the report. Finally, we graph kernel densities of propensity scores among HelloCash users and non-users, for each of the four samples described above, showing good overlap for the most part(Figure A.1.1-Figure A.1.4). The inclusion of observations beyond the common support region would neither affect the inverse propensity score weighting results nor estimates from nearest neighbour matching, but they would affect results from kernel matching, so we only conduct kernel matching on the region of common support.

Table A1.3: Balance by HelloCash User Status

	(1) HelloCash User	(2) Non-User	(3) P-value for test that $\hat{\beta}$(User) =0
How many rooms this household occupies	2.03	1.90	0.000
Household raises livestock	0.54	0.59	0.058
Household size	5.98	5.78	0.000
Age of hh head (years)	39.76	41.39	0.000
Gender of head	1.32	1.30	0.000
Head can read or write	0.69	0.53	0.000
Education of head	5.51	3.53	0.000
Number of refugees in the household	2.99	2.77	0.070
Number of children younger than 15 years	2.88	2.75	0.000
Number of elderly (65 or older)	0.08	0.09	0.743
Number of female adults (15-64)	1.58	1.51	0.000
Number of male adults (15-64)	1.45	1.43	0.000
Share of household, refugees	0.46	0.46	0.614
Dependency ratio	1.22	1.21	0.000
Someone in hh reads/writes Amharic	0.17	0.12	0.009
Someone in hh reads/writes English	0.50	0.38	0.000
Household in area less than 5 years	0.12	0.13	0.104
House is a tent	0.43	0.46	0.028
House is a tukul	0.49	0.49	0.001
Household owns house	0.90	0.89	0.000
Household has an electricity meter	0.02	0.01	0.167
Household has an improved roof	0.60	0.56	0.000
Household member is a member of external group	0.12	0.07	0.006
Household has a TV	0.16	0.11	0.010
Household has a radio or tape player	0.11	0.06	0.003
Household has a refrigerator or stove	0.08	0.06	0.025
Household has jewelry	0.08	0.04	0.004
Household owns a car or bajaj	0.02	0.03	0.321
Household owns a small productive asset or more (axe, plough)	0.64	0.65	0.000
Household owns larger productive equipment (welding, etc)	0.35	0.36	0.033
Household owns at least one mobile phone (incl smart phone)	0.97	0.92	0.000

Table A.1.4. LASSO Propensity Score Estimation Results, by subsample, SHARPE Endline Survey, 2022

Variable	Full Sample	Men Only	Refugees Only	Hosts Only
Number of rooms, house	0.219 (0.109)	0.152 (0.163)		0.226 (0.160)
Age, Household Head	-0.011 (0.007)			
Gender of Head (1=male)	0.363 (0.169)			0.758 (0.254)
Head is literate	0.356 (0.185)	0.437 (0.294)	0.239 (0.246)	0.466 (0.270)
Years of Education, Head	0.042 (0.018)	0.061 (0.026)	0.044 (0.025)	0.045 (0.023)
Number of Refugees, Household	0.027 (0.023)	0.033 (0.035)	0.057 (0.033)	0.336 (0.290)
Number of Children, Household	0.020 (0.035)	0.069 (0.054)		
Indicator, Amharic Speaker	0.201 (0.225)			
Indicator, English Speaker	0.387 (0.161)	0.385 (0.230)		0.778 (0.231)
Indicator, present for less than 5 years	-0.180 (0.226)	-0.354 (0.356)		-0.367 (0.300)
Indicator, have electricity meter	0.794 (0.553)			0.880 (0.602)
Member of social Group	0.488 (0.279)	0.482 (0.392)		1.399 (0.410)
Indicator, TV Ownership	0.154 (0.225)			0.301 (0.314)
Indicator, Radio Ownership	0.359 (0.283)	1.146 (0.454)		0.793 (0.429)
Indicator, Jewelry Ownership	0.352 (0.325)	1.460 (0.629)		
Indicator, Car or *Bajaj* ownership	-0.611 (0.520)	-1.194 (0.800)		-1.066 (0.688)
Indicator, own large productive asset	-0.337 (0.164)	-0.584 (0.255)		-0.702 (0.251)
Owns mobile phone	0.977 (0.354)	1.694 (0.551)	0.816 (0.479)	1.162 (0.538)
Household owns livestock		-0.110 (0.124)		

Table A.1.4. (cont.)

Variable	Full Sample	Men Only	Refugees Only	Hosts Only
House is a tent		-0.254		-0.131
		(0.381)		(0.259)
House has improved roof		0.121		
		(0.388)		
Number of Obs.	865	430	432	433
Log-Likelihood	-559.823	-257.878	-292.242	-257.042

Notes: All models estimated by logit with a LASSO penalty function to choose variables included in equation. Standard errors are in parentheses. Women only model did not yield any explanatory variables that increased the objective function.

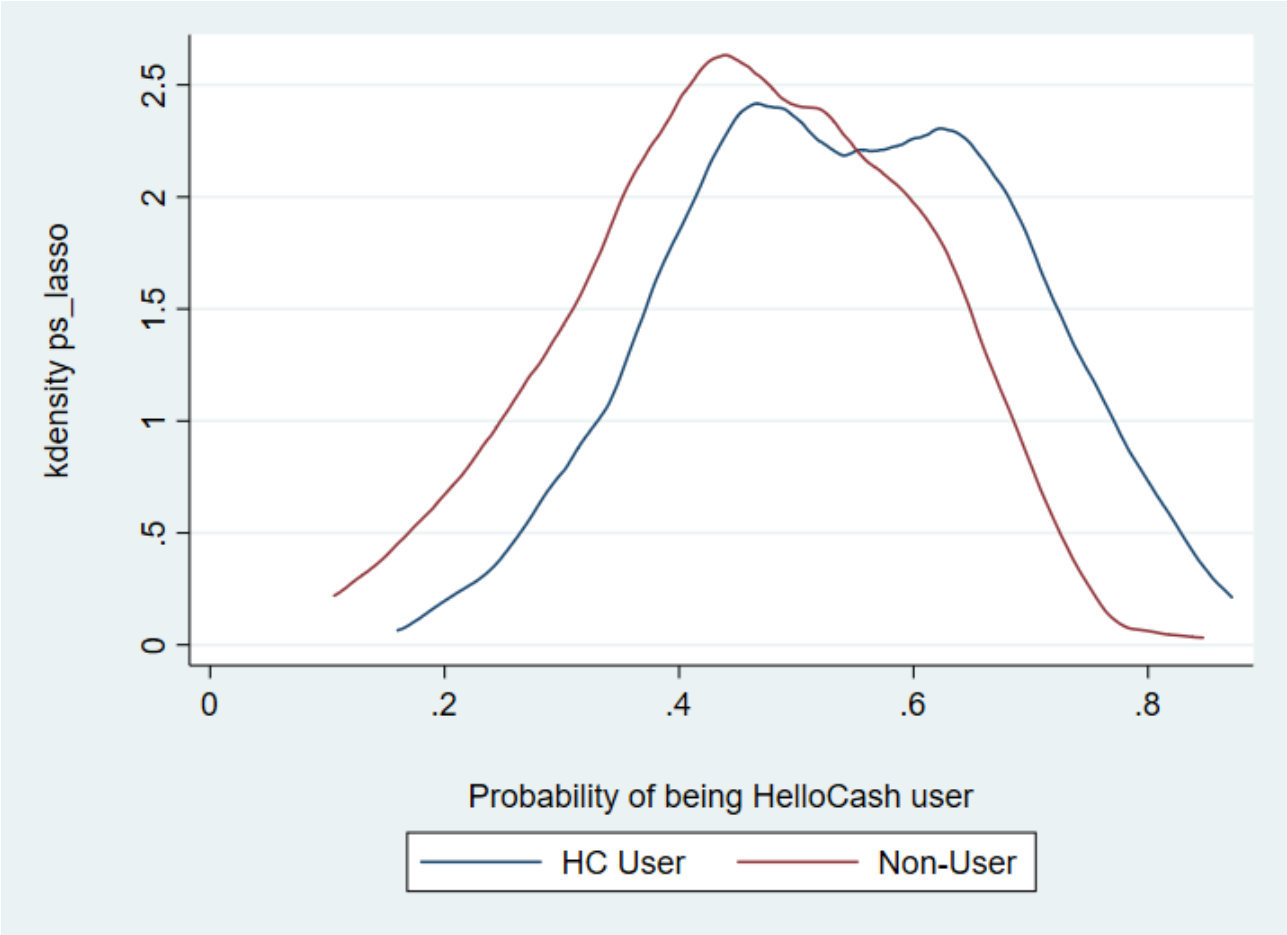

Figure A1.1: Overlap in kernel densities, HelloCash users versus non-users, following LASSO procedure

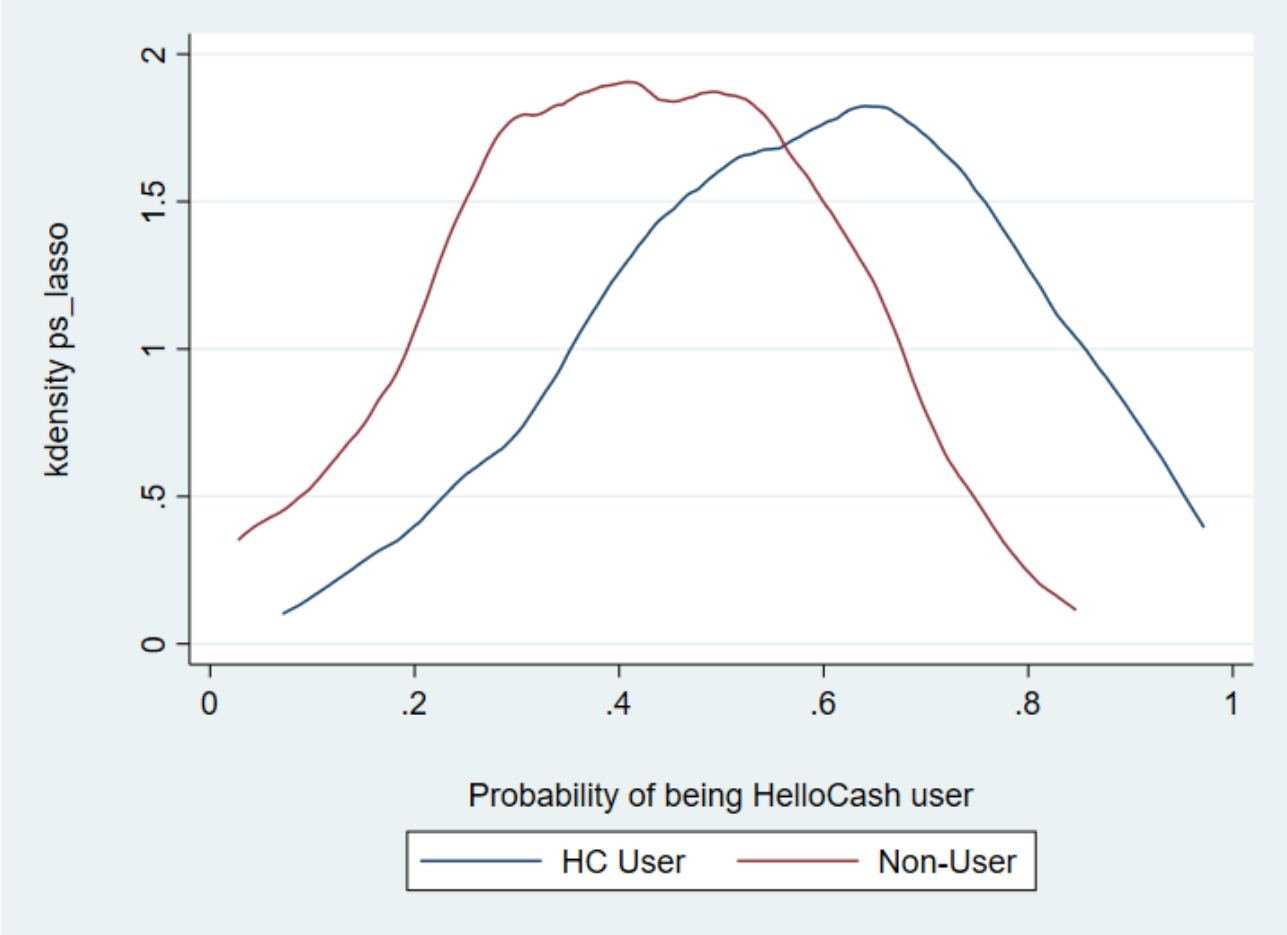

Figure A1.2: Overlap in kernel densities, HelloCash users versus non-users among men, following LASSO procedure

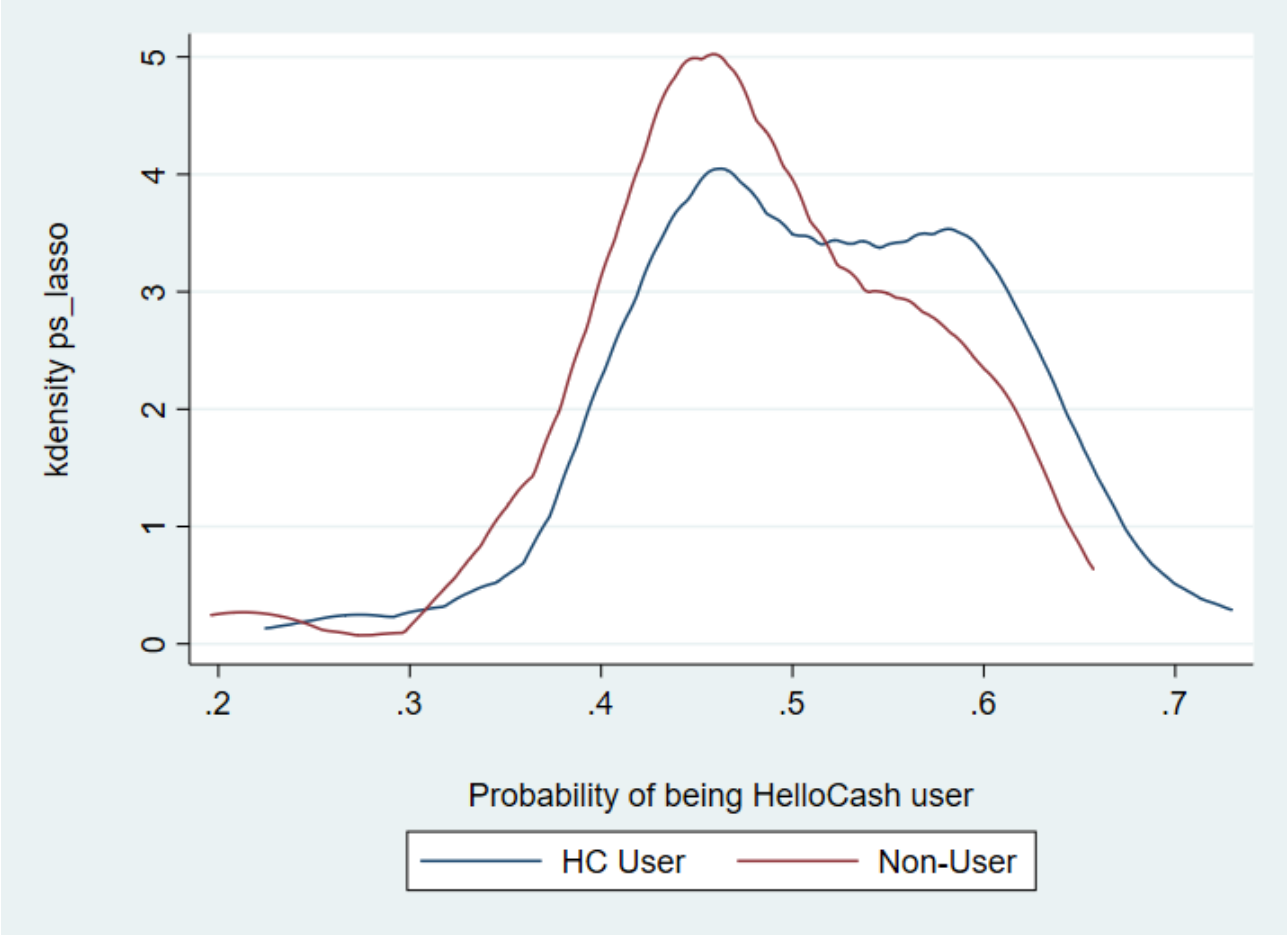

Figure A1.3: Overlap in kernel densities, HelloCash users versus non-users among refugees, following LASSO procedure

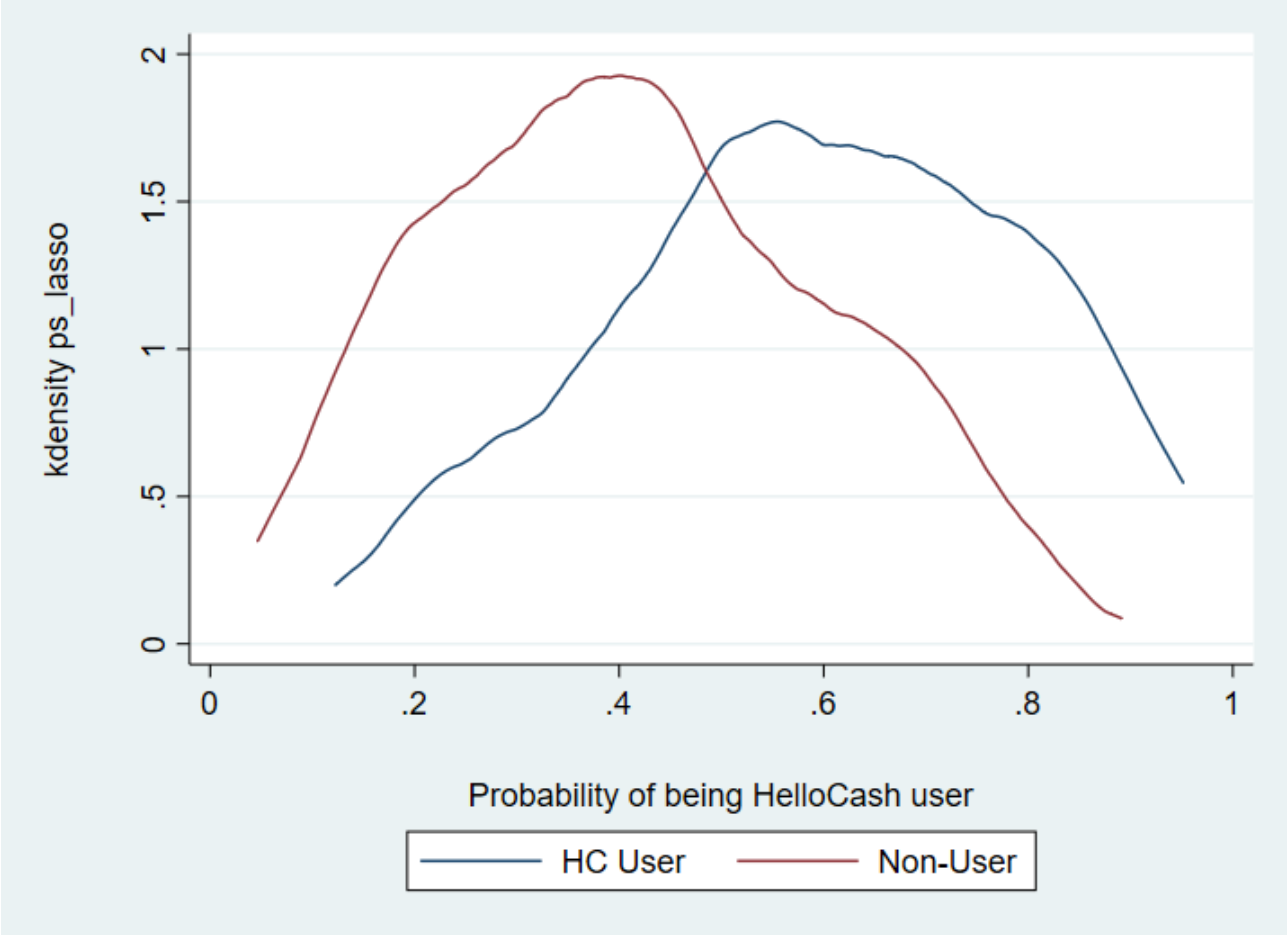

Figure A1.4: Overlap in kernel densities, HelloCash users versus non-users among refugees, following LASSO procedure

Annex A2: Sampling and power calculations

A.2.1. Sampling, Referral Study

Our objective was to develop a sample of 800 "active" HelloCash customers from areas where SHARPE was currently working, near Dollo Ado (Bokolmayo, Buramino, Dollo Ado, Hilaweyn, Kobe, and Melkadida) and Jijiga (Awbare, Harta Sheika, Kebri Beyah, Lafa Ise, and Sheder). Given SHARPE's focus on gender and refugee status, and differences between the two locations, we aimed to include participants across the various combinations of these characteristics. Thus, we considered eight strata: Dollo Ado male host, Dollo Ado male refugee, Dollo Ado female host, Dollo Ado female refugee, Jijiga male host, Jijiga male refugee, Jijiga female host, Jijiga female refugee.

For the referral study, the sampling procedure took place as follows. SHARPE provided cumulative administrative data on the list of customers enrolled in SHARPE areas between the beginning of the project and the end of January 2022. We then restricted the list to customers in the areas targeted by SHARPE since April 2022, in both the Jijiga and Dollo Ado areas. To develop a measure of how "active" customers were, we calculated the average number of

transactions per month that each customer had made since registering for the service.[24] We then restricted the list to those customers who had made a minimum average number of transactions per month since registering for the service. We set this minimum threshold such that at least 200 customers in each of the eight strata had average numbers of transactions above the threshold.[25] The threshold was at least 0.13 transactions per month.

For the baseline survey in April 2022, we attempted to reach 200 customers in each of the eight strata, anticipating a success rate of around fifty percent. We successfully reached 100 customers in each strata, for a total of 800 customers, which we then randomised into four different groups. Shabelle Bank's hotline operators attempted to call each CR to inform them of the option to use the hotline to refer community members who would then be supported to register, and informed CRs in relevant groups (based on the randomization) about rewards associated with successful referrals. Shabelle Bank subsequently sent a text message to each CR summarizing the same information, regarding the option to refer through the hotline and for those in treatment groups regarding the referral rewards (see Annex B.7 for text message scripts).

Despite our efforts to stratify on the aforementioned characteristics, we found that self-reported characteristics frequently did not match those from the administrative data. In some instances, it could have been a distinction between whose name an account was registered under and who, in practice, uses it. In others, it may have been the result of clerical errors or confusion. Table A.2.1 shows that the extent of this disagreement between the targeted samples for each of the eight strata based on the administrative data and the characteristics as reported in the baseline survey. Notably, a substantial share of refugees in the administrative records self-reported as being hosts. This is likely due to the sensitivity of asking about a person's refugee status over the phone.

Power Calculations, Referral Study

Beyond the outcome of enrolment itself, the primary registered outcome for this trial is the number of transactions that occur after the bonus among referees. Assuming that 600 new enrolees result from the referral system, then an increase in transactions of 0.22 standard deviations can be identified using this design (relative to a normalized control group). The standard deviation of that outcome in the subset of new enrolees between April and September was 23, but 14 if the top 1 percent is cut off (so we can identify an average of 3 transactions in that group). Among subgroups, if we assume 200 new enrolees instead, then we can identify differences of about 0.4 standard deviations, or about 6 transactions. The other registered outcome was the total value of transactions and acts similarly (e.g. the same power calculation holds).

[24] This variable took the total number of transactions the customer had made since registering for the service, multiplied it by thirty days, and divided by the total days elapsed since registering for the service.

[25] The binding constraint came from women refugee customers in Dollo Ado. That is, when we ranked women refugee customers in Dollo Ado by average transactions per month since registering, the threshold was the average transactions per month of the 200th woman.

Table A.2.1: Composition of CR sample – administrative data vs self-reported in baseline

	(1) Administrative data	(2) Self-reported in baseline
Jijiga		
Male		
Host	100	188
Refugee	100	42
Female		
Host	100	142
Refugee	100	57
Dollo Ado		
Male		
Host	100	136
Refugee	100	56
Female		
Host	100	101
Refugee	100	78
Total	800	800

Note: CR denotes community referrer.

A.2.2. Sampling, Incentives Study

We conducted sampling for the incentives survey on (at least) two different occasions. First, we used the data from enrolees that joined HelloCash in SHARPE target areas between February 2022 and June 2022 and had not made a transaction as of June 30, 2022. We stratified that sample into eight groups, based on whether located in Dollo Ado or Jijiga; male or female; and refugee or host, as recorded in the database. We then randomised selection into one of the three groups within each strata; we set proportions selected for one of the two treatments as much higher among both women and refugees, as most new sign-ups were men from the host community and we are inherently interested in the heterogeneity. We planned to run the trial in September.

Due to miscommunication, Shabelle Bank never sent out the texts or the bonuses to the September group; this point was realized once the end of September data were available in mid-October, and the results were clearly null results. As a result, we first discussed the issue with Shabelle Bank and jointly agreed to use the September data instead. We therefore randomised the administrative data for September using the same procedure as above (note that there were far more enrolees in September than usual, likely due to the referral study).

We therefore took the 1675 individuals who had not made a transaction by the end of September and randomised them into the three groups.

RCT 2: Incentives Study

The sample size for the incentives study was somewhat pre-determined by the number of individuals who had enrolled for HelloCash in September but had not transacted as of

September 30, 2022. We had 1675 such individuals. We randomised three groups (refugee men, refugee women, and host women) into the three groups splitting them at rates of one-fourth in the unconditional group, five-twelfths in the conditional group, and one third in the control group. We used these proportions under the impression that fewer individuals in the conditional group would be eligible for bonuses, so we wanted to increase the size slightly relative to the unconditional group. We split host men by proportions of 3/25 in the unconditional group, 19/50 in the conditional group, and half in the control. These proportions, once randomised, left us with a sample of 314 for the unconditional transfers, 661 for the conditional transfers, and 700 for the control group.

Using the indicator for "any transaction" as the primary outcome of interest, we find that we can identify a difference of 0.076 percentage points between each group with this design at 80 per cent power. If we consider a standardized continuous variable based on this sample (to simulate the other two outcomes, we can identify a difference of 0.19 standard deviations for the comparison of the unconditional transfers with the control group, and a slightly larger difference between the unconditional and conditional transfer groups (0.192 standard deviations).

A.2.3. Sampling, Quantitative Endline Survey

For the quantitative endline survey, we built up a sample frame as follows. We targeted a household sample size of 800, stratified in three ways: geographic area (Sheder, Aw Barre, Kebri Beyah in Jijiga and Buramino in Dollo Ado), user status (users of Hello Cash versus non-users) refugee status (refugees versus non-refugees) and gender (male versus female). Since there are 32 strata, the goal was to interview between 25 and 28 households in each stratum.

To develop the sample, there was a two-stage process followed. In the first stage, the contractor purposely selected a sample of nearby host Kebeles, towns or surroundings to the selected four study areas /refugee camps. There is therefore a pairing between the refugee camps and local communities built up in the first stage.

In the second stage, households are sampled as follows. Within refugee camps, the research teams interacted with authorities and secured camp access (through permission received from the RRS) and used lists to develop in-camp samples. Since neither a complete nor even adequate list was available outside the camps, the team developed a sample using a random walk combining the right-hand side rule of thumb with the 5^{th} jumping rule. Using local guides, we locate the centre of sample Kebeles where two primary roads cross one another. In some kebeles, we randomly select a starting point using lottery method. The enumerators were then tasked with walking out of the centre of the Kebele or the random starting point and towards the peripheries until he/she hits the end of the residential houses belonging to the selected sample surrounding Kebele. The enumerators enlist and interview every 5^{th} eligible household until they interviewed 25 to 28 female hello cash users, 25 to 28 male hello cash users, 25 to 28 female non-hello cash users and 25 to 28 male hello cash non -users in each of the four selected hosting towns.

The final sample was structured as illustrated in Table A.2.2, which is largely balanced between refugees and hosts, and between male and female customers as recorded in the

Shabelle Bank administrative data. It is also balanced between refugees and host community members, again by design.

Table A.2.2. Structure of Endline Sample

	HelloCash User	Non-User
Male, Host Community	107	107
Male, Refugee	110	106
Total Males	*217*	*213*
Female, Host Community	111	108
Female, Refugee	105	111
Total Females	*216*	*219*

Note: Total is 865 observations.

Power Calculations, Endline Survey

We next provide illustrative power calculations for both a discrete and a continuous outcome measured first for the primary sample, and then for the interesting subsamples (men, women, refugees, and hosts). The power calculations should be considered only illustrative because we there is no randomized trial here, and power calculations assume a randomised control trial. There are simulation methods that relate to power calculations for propensity score based methods, but they have typically only used simulated data to this point. Therefore we just note here that "true" minimum detectable effects may actually be larger. For all calculations, we either assume a discrete variable with a mean of 0.5 (to maximize the minimum detectable effect) or a normalized continuous variable.

We illustrate the minimum detectable effects in Table A.2.3. We find that for the full sample, we can theoretically identify a difference of 9.5 percentage points for a discrete variable with a mean of 0.5 in the non-HelloCash user group, and for a continuous variable the minimum detectable effect is 0.19 standard deviations. For the four sub-samples, the minimum detectable effects are not surprisingly all quite similar (due to the structure of the sample); for discrete variables, the minimum detectable effect is just over 0.13 standard deviations, and for the standardized continuous variable, the minimum detectable effect is quite close to 0.27 standard deviations.

Table A.2.3. Minimum Detectable Effects, Endline Survey, by Sub-Sample and Type of Variable

Subsample	Discrete Variable	Standardized Continuous Variable
Full Sample	0.0947	0.1907
Men	0.1335	0.2708
Women	0.1328	0.2693
Refugees	0.1332	0.2702
Host Community	0.1331	0.2699

Annex B: Other attachments

Please include here any other relevant documents produced during the project, not included in the final progress report.

B.1. Additional Figures

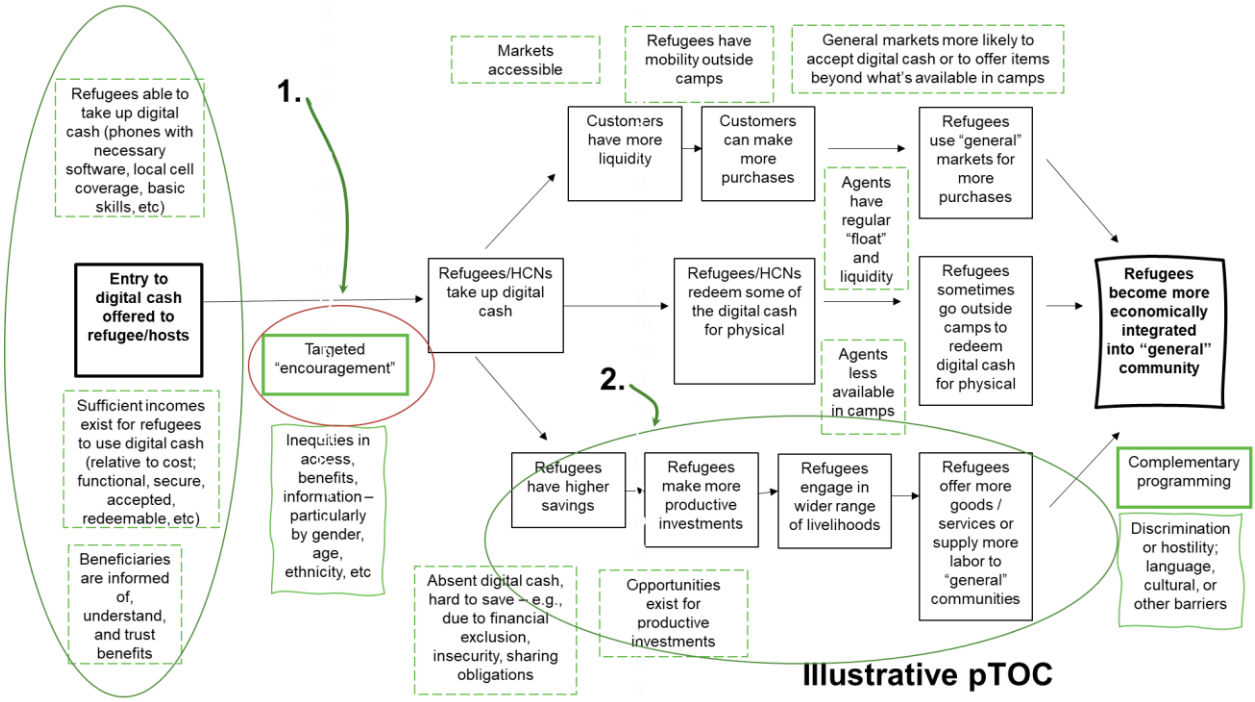

Figure B.1.1. Initial Illustrative Theory of Change Diagram

B.2. Wegagen Bank Sign-Ups in Gambella

We also measured patterns of sign-ups using administrative data from Wegagen Bank, which was only able to sign a contract with SHARPE much later than Shabelle Bank, in February 2022. Looking at the first three months of sign-ups, the pattern is somewhat like the Shabelle Bank patterns (Table B.2). Wegagen Bank signed up 7,052 customers during that period; of those, 40% are in Gambella itself. Like sign-ups in Somali region, the bulk of new customers were men and from the host community. In fact, there are fewer refugees represented among sign-ups in Gambella than in Somali region, with just under 10 percent of all sign-ups occurring among refugees.

Table B.2.1. Number and Composition of New HelloCash Sign-ups, March to May 2022, Wegagen Bank

Month	Number of Sign-Ups	Share, Men	Share, refugees
March 2022	2880	74.7	5.6
April 2022	2274	79.7	12.8
May 2022	1898	73.7	11.2

Source: Administrative Data.

B.3. Qualitative Questions: Scoping Activity

Our aim is to better understand how to improve the effectiveness of market systems interventions around digital financial services. To do so, our research project will design relatively small, randomised trials that will test whether behavioural and price mechanisms increase use of digital cash. To design these trials, it is important to **understand the specific constraints facing various market actors either in using digital cash or providing services around digital cash** – including potential policy, institutional, and behavioural constraints, among others.

Underlying this rationale is an assumption that the spread of digital financial services is a positive outcome. We believe this assumption is justified on several levels. First, digital financial services can provide a safe mode of savings for a population that is largely unbanked from a formal perspective. Second, it can facilitate some transactions that were previously costly; for example, utility bills could be paid with mobile money, whereas in the past people had to queue to pay them, incurring larger costs. Third, remittances to friends and family elsewhere in or outside of Ethiopia may also now be possible, where sending or receiving cash was not. Fourth, money held digitally is often safer and is less visible than cash, which can give the user more control over their balances when there are strong norms to share any available cash.

The **overarching questions we wanted to answer** are as follows:

(PROSPECTIVE) CUSTOMER SIDE:

We would like to understand the below questions and how each of them differs between refugees and host/local community members, as well as between men and women within those groups.

1. What is the **current situation** of households, in terms of the structure of their household, how long they have lived in their current location, where they moved from (and why they moved) if they recently arrived, what their main livelihoods and income sources are, and what their main expenses are?
2. What **financial constraints do individuals and households currently face**, and how do individuals currently try to meet their savings or borrowing needs?
3. What is **access to and use of mobile phones currently like**?

4. What is the **enrolment process for the HelloCash digital platform** like? Among people who have already enrolled in HelloCash, what was their experience with the enrolment procedure? Among people who have not yet enrolled in HelloCash, are they aware of HelloCash or mobile money services more generally, what is their understanding of the enrolment procedure, why have they not enrolled, and are there factors that would make them more likely to enrol?
5. How do people **perceive the advantages and disadvantages of the digital cash platform relative to traditional cash, as well as the different digital services available**? What factors would make them more likely to use the platform and services, and what concerns do they have about the platform or services?
6. How do (or could) digital financial services influence **economic integration of refugees** into the local economy? Do current or prospective users perceive that using digital services could change the type or frequency of their transfers with out-group members?

PROVIDER SIDE:

7. What is the current state of HelloCash adoption in the camps and surrounding areas? What is the **current strategy for HelloCash recruitment** of new customers? How are they targeting new customers? How are they trying to encourage people to enrol?
8. What **services** does HelloCash include? Which are most popular? Which services do they think have the most growth potential? How are they trying to increase usage of HelloCash services among existing customers?
9. What are the **roles of different types of agents** in providing the HelloCash service – from promoting customer enrolment to providing customer services – and how do they **interact with different types of customers**?
10. What are the **incentives of agents** to participate in providing the HelloCash service?

B.4. Qualitative Sampling and Questions: Endline Survey

Table B.4.1. Sampling distribution by informant type and program cluster area

Informants	Discussion type	Number	Cluster area		Affiliation	
			Dollo Ado	Jijiga	Refugee	Host
CRs	FGD	3	1	2	1	2
NRCs	FGD	5	1	4	3	2
NRCs	Case study	5	1	4	3	2
Agents	KII	3	1	2	1	2
ARRA	KII	2	1	1	2	
KYCO	KII	6	1	5	6	
SB bank managers	KII	4	1	3	4	

Question Guide

I. Newly Registered HelloCash Customers, FGD questionnaire

1. Status of digital financial service utilization
   1.1. Are you currently HelloCash service customers? What kind of services have you ever used from HelloCash?
   1.2. Are there other digital financial service providers operating in your area?
      1.2.1. Have you tried them? Which ones?
      1.2.2. If have tried, which do you use frequently?
      1.2.3. Why do you use some and not others?
   1.3. What are the difference and similarities among the digital financial service providers?
      1.3.1. Which ones are convenient for you? Why?
   1.4. Have you tried to change cash to e-money, or vice versa? What are the challenges in doing so?
   1.5. Do you regularly hold an e-money balance with HelloCash on your phone?
   1.6. What actions by Shabelle Bank or others do you recommend to increase your use of the different HelloCash services? (Discuss this by the type of services.)
   1.7. Will you continue to increase or decrease HelloCash usage in the future with? Why? [*Ask if participants have different views.*]

2. Interactions with hotline operators and SMS messages from the referral system
   2.1. Have you ever heard of HelloCash digital financial services? From where did you first hear about HelloCash digital financial services? What is your recent source of information on HelloCash digital financial services?
   2.2. Did you ever make or receive calls to explain to you how to use HelloCash digital financial services? When did such calls start to reach you through? How were the clarity and acceptability of the messages to you?
   2.3. Did you ever receive SMS from Shebelle Bank through your phone explaining anything about HelloCash digital financial services? What were the messages about? How were the clarity and acceptability of the messages to you?
   2.4. What actions have been taken individually after these calls and SMS?
   2.5. If you needed help to use any HelloCash services, who would you ask? Do you know how to find help?

3. Interaction with KYC officers
   3.1. Do you know a KYC officer working in your area? Is the officer a man or a woman? What roles do he/she play in HelloCash services?
   3.2. How often do you see this KYC officer?
   3.3. Is he/she coming to you or are you going to him/her?
   3.4. How often do you see the KYC officer in recent days and weeks? How convenient it is to meet KYC officers? What are the challenges? How did you overcome the challenges?
   3.5. Has the KYC officer ever talked to you in person or group? What information do you exchange when you meet the KYC officer? Is this information clear and relevant to you?

3.6. What actions have you taken after hearing the information from the KYC officer?
3.7. What other recommendations do you to increase your interactions with the KYC officers?

4. Integrations with community referrers
   4.1. Do you know people who are using HelloCash services in your area?
   4.2. Have you ever discussed with HelloCash service users about your registration to use HelloCash services? When was this kind of discussion started?
   4.3. What were the topics of your discussion with existing HelloCash users? Were the messages from HelloCash users relevant and acceptable to you? How?
   4.4. What were your reactions to these messages? What actions have you taken or planned to take on the basis of the information from HelloCash users?

5. Perception and use of HelloCash products
   5.1. What are the best aspects of using HelloCash products? What do you appreciate about the HelloCash relative to other platforms (if there are)?
   5.2. What aspects do you not like about HelloCash? What might make you use another platform instead of HelloCash, if transferring money inside Ethiopia?
   5.3. Do you feel comfortable leaving money on HelloCash? Is it safe to do that? Why or why not?

6. Conveniences of existing e-money services in the area including HelloCash
   6.1. Have you ever used HelloCash to pay for something at a HelloCash merchant? What about another service?
   6.2. How do you compare the use of HelloCash versus other services, if you have used more than one?
   6.3. If you have not tried more than one service, why not? What makes using these services difficult?
   6.4. How much has convenience of these services changed over the past two years? Can you speak to the features of HelloCash versus features of other services?

7. Opportunities and challenges of accessing and using HelloCash services
   7.1. What is the good side of using digital financial services from HelloCash? Which services are good or not good for you?
   7.2. How do you rate HelloCash in terms of service fees compared similar service providers?
   7.3. How accessible is HelloCash as compared to similar DFS providers?
   7.4. How do you compare the HelloCash use of women and men?
   7.5. Are women able to use HelloCash services? Which services are they using frequently? Why not the others?
   7.6. In your household, do more than one person use HelloCash on a phone, or is it typically just one person?
   7.7. What are the internal and external factors that hinder the use of HelloCash services by women?

7.8. Are there any actions being done by household members, community leaders, HelloCash and local administrators?
7.9. What do you recommend to increase digital financial service use among women in your community and households?

II. Community Referrers FGD questionnaire

1. Integrations with community members about digital financial services
   1.1. With whom, when and where do you discuss about the HelloCash services in your community?
   1.2. What did you discuss about HelloCash services within your community? (Discuss this by own families, men, women and youngsters.)
   1.3. What is the reaction of the community when you introduced HelloCash to them? Did any group leaders help play a role in the introduction?
   1.4. Are there people who are not registered for and use HelloCash services? What type of people are they? How do you compare the size of non-HelloCash users with the larger adult population within your community? (Facilitate to get proportions out of 10). Are they men or women? What about refugees?
   1.5. Are current HelloCash users, like you, making attempts to advise other people to be registered by the HelloCash system as new clients? Do people easily accept your idea and go for registration? What kind of people are most likely to accept or reject your advice? Why?
   1.6. What are the steps for the registration of new clients? What are the requirements? How easy or difficult is the registration of new clients to HelloCash services? What do community members do to surpass the challenges of registration?
   1.7. Do you have any recommendations to increase the number HelloCash service users within your community? Do those recommendations differ for women and/or refugees? What about older versus younger people?
   1.8. What steps do you recommend to increase the number HelloCash service users within your community? (Discuss this by the type of services.)

2. Interactions through hotline operators call and SMS messages from the referral system
   2.1. Have you received phone calls from Shabelle Bank in the past month? What information did you get from these calls? How clear and acceptable was this information to you? If not, why?
   2.2. Have you called them (HelloCash centre) back? What were the purposes of calling Shebelle Bank?
   2.3. What actions have you taken or planned to take on the basis of these calls? Please tell us typical examples from your actions.
   2.4. Have you received SMS texts on your phone from the Shabelle Bank in the past month? What were the contents of the messages? How were the messages clear and acceptable to you? If not, why?
   2.5. What actions have you taken or planned to take on the basis of these SMS? Please tell us typical examples from your actions.
   2.6. What's the level of responsiveness of Shabelle Bank?

2.7. What improvements do you suggest to Shabelle Bank regarding the hotline?

3. Interaction with KYC officers
   3.1. Do you know the KYC officers working for the HelloCash in your area? How often do you meet them?
   3.2. How convenient is it to meet KYC officers? What are the challenges? How did you overcome the challenges? Who provided support to you in this regard?
   3.3. Have you ever passed names and phone numbers of new HelloCash clients to KYC officers for registration?
   3.4. What motivates you most to refer these new HelloCash clients to the KYC officers?
   3.5. What have you heard about the registration of the new clients you referred either from them or other sources including KYC officers?

4. Opportunities and challenges of accessing and using HelloCash services
   4.1. What are the key challenges in the registration of new HelloCash clients? What have you heard from them? What are the opportunities to bring more people as new HelloCash clients? What do you recommend to attract more clients to HelloCash system?
   4.2. How do you rate hellocash in terms of service fees compared similar service providers?
   4.3. How accessible is hellocash as compared to similar DFS providers?
   4.4. What are the key challenges in the use of HelloCash services by the existing HelloCash clients, like you?
   4.5. What do you recommend to increase access and use of HelloCash services by you and other current HelloCash users?

III. Questions for KYC Officers

1. Status of digital financial service utilization
   1.1. What is the current state of use of HelloCash services by community members in your area? For what purposes do people use HelloCash system? Which services are most common by refugees and host community members men and women (ask separately)? What are the reasons for this?
   1.2. What other digital financial service providers are there in your area? What are the advantages and limitations of these DF service providers? *(Please discuss this one by one and take records.)*
   1.3. What are the most important reasons for men and women within refugee camps use or do not use HelloCash services?
   1.4. What are the most important reasons for men and women within host community members to use or not to use HelloCash services?
   1.5. How often do men and women try to change cash to e-money, or vice versa through HelloCash? What advantages do people obtain from this kind of money transaction? What are the challenges in doing so? *Please discuss this by gender and refugee status of HelloCash Users*
   1.6. Do community members regularly hold an e-money balance with HelloCash on their phones?

1.7. What are three most common complaints you receive from HelloCash users?
1.8. What do you recommend to increase your use of the different HelloCash services? (Discuss this by the type of services.)
1.9. What are the challenges and limitations in using HelloCash services?

2. Integrations with community members about digital financial services
   2.1. How do you attract new HelloCash service users? What are the strengths and limitations of these approaches?
   2.2. What role do you play in helping sign up more merchants and/or bajaj drivers? What could be improved about that process, if anything?
   2.3. What needs to be improved to bring more men and women clients from refugees and host community members to HelloCash services?
   2.4. How convenient is the MIS for you to register new HelloCash clients? What are the challenges? What do you recommend to improve this system? *[Mainly discuss the procedures, not the IT part of the system.]*
   2.5. How is the referral system *(existing HC users persuade new clients to get registered)* helping you to register new clients for HelloCash and apply its services? What are the challenges and opportunities in this referral system? *(Please discuss these questions by men and women in refugee and host communities.)*

IV. Among Agents within refugee camps and host communities.

1. Status of digital financial service utilization
   1.1. How long have you served as a HelloCash agent?
   1.2. Have you made additional money as a HelloCash agent? Do you consider that money adequate or not? Explain.
   1.3. Do customers who come in for HelloCash transactions make other purchases when in your store? Do customers in general value the HelloCash service or not, or can you tell?
   1.4. Have you observed an increase in customers since you became a HelloCash agent, or a decrease? Does that change seasonally (e.g. during Eid)?
   1.5. Do you perceive that HelloCash or mobile money in general are a benefit to your overall business or not? Can you explain?
   1.6. Do you also serve as an agent for other mobile money providers? If so, how do the systems compare?
   1.7. Do you plan to continue as a HelloCash agent over the next twelve months? What benefits do you expect if so? If not, why not?
   1.8. If not, then what would need to change about HelloCash for you to want to continue?
   1.9. If you are also serving as an agent for other mobile money providers, do you plan to continue working with them? If different than HelloCash, can you explain why?

2. Interactions with community members about digital financial services

2.1. Do you see new HelloCash service users coming to you from refugee camps and host community areas more recently? What motivates these people to come to you and use HelloCash services from you?
2.2. Have you played a role in registering new men and women HelloCash customers from refugee camps and host community areas? If so, how effective was this role in making use of HelloCash system through you?
2.3. Is it important for your business to bring in new customers to HelloCash? If so, how does it help?

V. SB head office & branch offices

1. Referral Process
   1.1. How did hotline operators and KYC officers communicated to referrals (existing HC service clients) to promote HC services among new customers including men and women in refugee camps and host communities?
   1.2. What are your experiences in prompting HC services among women and refugees through the referral pilot program? How do you compare the process and outcomes of the referral pilot program and the usual SB's approach to promote HC services among women and refugees?
   1.3. What were the main challenges in promoting HC services to new members? (Please separately discuss women and refugee issues here.)
   1.4. What attempts did you make to overcome the challenges? How effective were the attempts?
   1.5. What socioeconomic outcomes have observed or expect to observe from the referral pilot program efforts?
   1.6. Which part of the referral pilot program can be continued by SB afterwards?
   1.7. What needs to be improved by SB to progressively continue attracting new clients, especially women and refugees after the referral pilot program?

2. Other: General Information r.e. involvement with SHARPE
   2.1. Involvement with SHARPE has clearly increased the clientele of Shabelle Bank. How does Shabelle Bank evaluate the increase in clientele? Is the new clientele generally a positive or are there costs associated with them that are harder to envision?
   2.2. How relevant is expansion beyond urban areas for Shabelle Bank's future business strategy? What about expansion into refugee camps?
   2.3. Do you expect to continue to use KYC officers after SHARPE ends? What have been the advantages and disadvantages of this approach to signing up users?
   2.4. What have you learned from the SHARPE programme involvement with Shabelle Bank?
   2.5. What other pieces of your involvement with SHARPE do you think you will definitely continue? What pieces will you continue if decision makers think it is cost effective?
   2.6. How has SHARPE influenced Shabelle Bank strategies?

2.7. Do you see any of your competitors starting to mimic or use similar strategies? If so, which ones?

VI. Refugee and Returnees Service (RRS)

1. What do you see as the benefits of the SHARPE programme to date?
2. Has SHARPE helped RRS towards meeting any of its goals in Somali region or Gambella region? If so which ones?

B.5. RCT 1: Referral Program

Motivation and Background

While adoption of HelloCash has been growing, reaching refugee populations and women – particularly female refugees – has been a challenge. IFPRI and Dadimos are research partners of SHARPE and want to work with Shabelle Bank to test whether a community referral system can help Shabelle Bank to encourage individuals to enrol in and use Hello Cash. We conducted scoping research to help identify barriers to HelloCash adoption. Whereas some constraints cannot be addressed with a research project (e.g. lack of income, limited cell phone signal, illiteracy, challenges with obtaining IDs and business licenses), other identified factors included:

- Perception among refugees that there is limited benefit to engaging in a platform like DFS if they do not plan to stay in Ethiopia long, limited their interest in registering
- Limited access to agents – and particularly low access among refugees and women to agents who are also refugees and women
- Misinformation, including incorrect beliefs among many refugees that signing up for a HelloCash account in Ethiopia would make them ineligible for relocation to other countries

Objective: Research suggests that complete and accurate information about HelloCash services may not be reaching all members of key target groups, including women and refugees. The goal of the research project is to overcome barriers that might keep them from signing up for and using HelloCash.
Proposed solution: Implement a referral system in which current HelloCash users in the refugee community receive a reward when they successfully refer another member of the refugee community to enrol. Conceptually a referral system could:

- Improve accuracy of understanding and information about the HelloCash service – if current users can clarify how the system works and help to correct misconceptions about how the service works or how the data will be used.
- Address limited confidence in the system – if prospective users are more likely to trust users who are more “like them,” are more likely to be persuaded by users who understand their experiences and can speak to HelloCash uses and benefits.
- Reduce challenges connecting with agents – if current users can help connect prospective users to agents through their referrals, either by providing contacts to

agents who could follow-up or by providing needed information on where agents can be found.

B.6. RCT 2: Incentives for Use

Motivation and Background

The second randomised trial was developed around a concern raised by SMFI and developed into a researchable idea by IFPRI, SHARPE, and SMFI. A sizeable proportion of their customers sign up for HelloCash but then never actually conduct a transaction. One way to ensure that they make a transaction is to pay a small gift or bonus to their mobile money accounts upon sign-up; many mobile based businesses make such payments to try to get customers to try using their products.

The second trial will therefore offer small signup bonuses to randomly selected new HelloCash enrolees. By providing a starting balance to these customers, they will have an added incentive to at least learn how to withdraw the initial money placed in their digital wallet. At a minimum, they will learn that money placed on the system can be converted to cash when they need it and may be more willing to accept payments from others using mobile money. More ambitiously, they may start to develop greater trust in HelloCash, learn how to make transfers or payments in both directions, or be willing to store their savings in their digital wallets.

Study Design Details

SMFI provided the research team with a list of new HelloCash clients generated during the period of community referrals. From this list, the research team will help to draw a random selection of new registrants. These individuals will be sent a sign-up bonus of 25 birr to their HelloCash mobile money wallets along with a message notifying them of the transfer. The message will thank them again for registering and encourage them to use the money however they like, send it to a friend, make a payment, save it, or simply cash out. A second version asked clients to first make three transactions before getting the 25 birr bonus. Using administrative records, we can compare how these randomly selected reward winners end up using HelloCash services and viewing their value overall with the usage and views of those who did not receive the reward.

B.7. RCT 1: Text Messages Sent to CRs

Control: Hello, this is Shabelle Bank. To refer someone to HelloCash, either dial *838# to enter their information OR dial our call centre at 8246. You can do this as often as you want. Please speak with people before providing their information. AKYC officer will contact each person you referred.

Treatment 1 Low-Low: Congratulations, this is Shabelle Bank following up about our referral program. to refer someone, so as to register HelloCash dial our call centre at 8966 or 8246. You can do this as often as you want. Please speak with people before providing their information. A KYC officer will contact each person you referred so as to register. If your

referred member registered HelloCash, your payments will be sent to your wallet at the end of each week. You will receive 25 birr for each person who enrols.

Treatment 2 Low-High: Congratulations, this is Shabelle Bank following up about our referral program. to refer someone, so as to register HelloCash dial our call centre at 8966 or 8246. You can do this as often as you want. Please speak with people before providing their information. A KYC officer will contact each person you referred so as to register. If your referred member registered HelloCash, your payments will be sent to your wallet at the end of each week. You will receive 25 birr for each man and 50 birr for each woman who enrols.

Treatment 3 High-High: Congratulations, this is Shabelle Bank following up about our referral program. to refer someone, so as to register HelloCash dial our call centre at 8966 or 8246. You can do this as often as you want. Please speak with people before providing their information. A KYC officer will contact each person you referred so as to register. If your referred member registered HelloCash, your payments will be sent to your wallet at the end of each week. You will receive 50 birr for each person who enrolls.

Treatments 1-3 received the following text if any referees successfully enrolled: Hello NAME_CR, X people you referred recently enrolled in HelloCash. As a reward, X birr has been transferred to your wallet.

B.8. Heterogeneity Results (Women)

In this section, we repeat estimates of HelloCash use among women respondents, but with no weighting of the control group with propensity scores. We repeat the analysis here without propensity scores as when we conducted the LASSO exercise again among women, there were no significant control regressors at the optimum. Since we include the control regressors in regressions as additional controls in columns (3) and (4) in most results tables, we omit them here.

Table B.8.1. Associations between HelloCash Use and Final Outcome Variables, Women Respondents, no regression adjustments, SHARPE Evaluation, Jijiga, Ethiopia, 2022

	(1)	(2)
Financial Access?	0.094	0.094
	(0.035)	(0.035)
	0.008	*0.008*
Financial Access?	0.123	0.123
Definition 2	(0.040)	(0.040)
	0.003	*0.002*
Self-Employment Income?	0.140	0.140
	(0.068)	(0.066)
	0.042	*0.034*
Self-Employment Income	1578	1587
	(1257)	(1210)
	0.210	*0.190*
Per Capita Income	1840	1842
	(960)	(955)
	0.056	*0.054*
Enough Income?	0.057	0.058
	(0.048)	(0.046)
	0.233	*0.211*
Income Declined	-0.107	-0.108
	(0.048)	(0.048)
	0.025	*0.024*
FIES (raw)	-0.289	-0.290
	(0.250)	(0.250)
	0.247	*0.247*

Notes: Standard errors accounting for survey design in parentheses, and p-values below them in italics. Each cell represents a separate regression. Regressions in column (1) include no additional regressors; column (2) includes a location indicator for Dollo Ado. 435 observations in all regressions.
Source: Quantitative Endline Data

The second table in the section repeats the social index analysis (Table B.8.2).

Table B.8.2. Associations between HelloCash Use and Social Indices, Women Respondents, no regression adjustments, SHARPE Evaluation, Jijiga, Ethiopia, 2022

	(1)	(2)
Financial Access?	0.146	0.153
	(0.290)	(0.239)
	0.616	*0.525*
Financial Access?	0.102	0.102
Definition 2	(0.234)	(0.232)
	0.663	*0.662*

Notes: Standard errors accounting for survey design in parentheses, and p-values below them in italics. Each cell represents a separate regression. Regressions in column (1) include no additional regressors; column (2) includes a location indicator for Dollo Ado. Sample size is 219 observations in row 1 and 216 observations in row 2.

B.9. Alternative Estimators, Final Endline Outcomes

In the following tables, we present four alternative estimators for the main endline results. In column (1), we use nearest neighbour matching, using two matches; in column (2), we use the same technique with the four best matches. In columns (3) and (4), we use kernel propensity score matching, with the Epanechnikov kernel in column (3) and a uniform kernel in column (4). We use the same variables that come from the LASSO procedure in each, and reuse those variables for a bias adjustment in columns (1) and (2) required for multiple matches in nearest neighbour matching. Moreover, we only use the common support for columns (3) and (4).

Table B.9.1. Associations between HelloCash Use and Final Outcome Variables, SHARPE Evaluation, Jijiga, Ethiopia, 2022, using alternative estimators

	(1)	(2)	(3)	(4)
Financial Access?	0.101	0.088	0.110	0.108
	(0.031)	(0.029)	(0.028)	(0.028)
	3.256	*2.996*	*3.903*	*3.817*
Financial Access?	0.153	0.129	0.143	0.142
Definition 2	(0.035)	(0.034)	(0.037)	(0.037)
	4.349	*3.820*	*3.861*	*3.819*
Self-Employment Income?	0.105	0.096	0.117	0.115
	(0.053)	(0.048)	(0.050)	(0.050)
	1.992	*1.998*	*2.350*	*2.306*
Self-Employment Income	747	384	970	933
	(816)	(842)	(841)	(852)
	0.916	*0.457*	*1.153*	*1.096*
Per Capita Income	149	99	794	798
	(810)	(796)	(976)	(982)
	0.183	*0.124*	*0.813*	*0.812*
Enough Income?	0.066	0.080	0.029	0.036
	(0.034)	(0.033)	(0.040)	(0.039)
	1.912	*2.417*	*0.745*	*0.907*
Income Declined	-0.027	-0.018	-0.018	-0.024
	(0.041)	(0.038)	(0.039)	(0.039)
	-0.669	*-0.484*	*-0.448*	*-0.607*
FIES (raw)	-0.342	-0.414	-0.172	-0.219
	(0.190)	(0.177)	(0.221)	(0.221)
	-1.802	*-2.335*	*-0.778*	*-0.988*

Notes: Standard errors accounting for survey design in parentheses, and t-statistics below them in italics. Each cell represents a separate matching exercise. In columns (1) and (2), matching is to the 2 and 4 nearest neighbors, respectively; in column (3), kernel propensity score matching is used, with a trim to common support; and column (4) repeats column (3) with a uniform kernel. Sample size is 865 observations in columns (1) and (2) and 855 observations in columns (3) and (4).
Source: Quantitative Endline Survey Data.

Table B.9.2. Associations between HelloCash Use and Final Outcome Variables, SHARPE Evaluation, Women Only, Jijiga, Ethiopia, 2022, using alternative estimators

	(1)	(2)	(3)	(4)
Financial Access?	0.090	0.086	0.094	0.096
	(0.039)	(0.036)	(0.040)	(0.039)
	2.317	*2.396*	*2.361*	*2.461*
Financial Access?	0.100	0.101	0.104	0.104
Definition 2	(0.045)	(0.042)	(0.046)	(0.045)
	2.229	*2.405*	*2.267*	*2.304*
Self-Employment Income?	0.086	0.089	0.116	0.127
	(0.073)	(0.067)	(0.078)	(0.076)
	1.181	*1.336*	*1.489*	*1.676*
Self-Employment Income	1360	859	1610	1685
	(1367)	(1268)	(1309)	(1276)
	0.995	*0.678*	*1.230*	*1.320*
Per Capita Income	763	898	1307	1304
	(1053)	(969)	(1100)	(1076)
	0.725	*0.927*	*1.189*	*1.212*
Enough Income?	0.059	0.075	0.063	0.059
	(0.048)	(0.045)	(0.053)	(0.052)
	1.224	*1.696*	*1.177*	*1.117*
Income Declined	-0.087	-0.109	-0.117	-0.107
	(0.050)	(0.048)	(0.052)	(0.052)
	-1.737	*-2.250*	*-2.229*	*-2.065*
FIES (raw)	-0.224	-0.279	-0.384	-0.354
	(0.250)	(0.234)	(0.278)	(0.275)
	-0.895	*-1.193*	*-1.380*	*-1.286*

Notes: Standard errors accounting for survey design in parentheses, and t-statistics below them in italics. Each cell represents a separate matching exercise. In columns (1) and (2), matching is to the 2 and 4 nearest neighbors, respectively; in column (3), kernel propensity score matching is used, with a trim to common support; and column (4) repeats column (3) with a uniform kernel. Sample size is 865 observations in columns (1) and (2) and 855 observations in columns (3) and (4).
Source: Quantitative Endline Survey Data.

Table B.9.3. Associations between HelloCash Use and Final Outcome Variables, SHARPE Evaluation, Men Only, Jijiga, Ethiopia, 2022, using alternative estimators

	(1)	(2)	(3)	(4)
Financial Access?	0.054	0.074	0.072	0.071
	(0.055)	(0.050)	(0.056)	(0.056)
	0.980	*1.495*	*1.280*	*1.276*
Financial Access?	0.116	0.129	0.185	0.182
Definition 2	(0.057)	(0.052)	(0.059)	(0.058)
	2.053	*2.462*	*3.144*	*3.111*
Self-Employment Income?	0.117	0.098	-0.054	-0.051
	(0.068)	(0.061)	(0.099)	(0.099)
	1.711	*1.604*	*-0.540*	*-0.519*
Self-Employment Income	917	470	-210	-97
	(1002)	(964)	(992)	(966)
	0.915	*0.488*	*-0.211*	*-0.100*
Per Capita Income	-1835	-964	122	140
	(2306)	(1720)	(1730)	(1728)
	-0.796	*-0.561*	*0.070*	*0.081*
Enough Income?	0.075	0.094	0.006	0.009
	(0.050)	(0.046)	(0.064)	(0.063)
	1.483	*2.053*	*0.088*	*0.141*
Income Declined	-0.001	0.027	0.087	0.076
	(0.058)	(0.055)	(0.063)	(0.063)
	-0.024	*0.479*	*1.372*	*1.209*
FIES (raw)	-0.892	-0.761	-0.366	-0.364
	(0.261)	(0.237)	(0.344)	(0.343)
	-3.418	*-3.216*	*-1.067*	*-1.062*

Notes: Standard errors accounting for survey design in parentheses, and t-statistics below them in italics. Each cell represents a separate matching exercise. In columns (1) and (2), matching is to the 2 and 4 nearest neighbors, respectively; in column (3), kernel propensity score matching is used, with a trim to common support; and column (4) repeats column (3) with a uniform kernel. Sample size is 865 observations in columns (1) and (2) and 855 observations in columns (3) and (4).
Source: Quantitative Endline Survey Data.

Table B.9.4. Associations between HelloCash Use and Final Outcome Variables, SHARPE Evaluation, Men Only, Jijiga, Ethiopia, 2022, using alternative estimators

	(1)	(2)	(3)	(4)
Financial Access?	0.070	0.077	0.073	0.073
	(0.036)	(0.035)	(0.035)	(0.035)
	1.925	*2.224*	*2.123*	*2.121*
Financial Access?	0.123	0.125	0.138	0.139
Definition 2	(0.050)	(0.047)	(0.042)	(0.042)
	2.471	*2.674*	*3.292*	*3.322*
Self-Employment Income?	-0.029	-0.009	-0.022	-0.023
	(0.069)	(0.066)	(0.063)	(0.063)
	-0.423	*-0.143*	*-0.349*	*-0.360*
Self-Employment Income	1436	1203	440	406
	(1145)	(1088)	(1180)	(1181)
	1.255	*1.106*	*0.373*	*0.344*
Per Capita Income	-267	574	306	324
	(1023)	(934)	(1056)	(1041)
	-0.261	*0.614*	*0.290*	*0.311*
Enough Income?	-0.028	0.015	0.008	0.012
	(0.056)	(0.051)	(0.050)	(0.050)
	-0.508	*0.282*	*0.159*	*0.239*
Income Declined	-0.052	-0.023	-0.012	-0.009
	(0.055)	(0.053)	(0.050)	(0.050)
	-0.943	*-0.442*	*-0.246*	*-0.181*
FIES (raw)	-0.306	-0.391	-0.372	-0.371
	(0.281)	(0.266)	(0.261)	(0.259)
	-1.087	*-1.467*	*-1.425*	*-1.430*

Notes: Standard errors accounting for survey design in parentheses, and t-statistics below them in italics. Each cell represents a separate matching exercise. In columns (1) and (2), matching is to the 2 and 4 nearest neighbors, respectively; in column (3), kernel propensity score matching is used, with a trim to common support; and column (4) repeats column (3) with a uniform kernel. Sample size is 865 observations in columns (1) and (2) and 855 observations in columns (3) and (4).
Source: Quantitative Endline Survey Data.

Table B.9.5. Associations between HelloCash Use and Final Outcome Variables, SHARPE Evaluation, Host Community Only, Jijiga, Ethiopia, 2022, using alternative estimators

	(1)	(2)	(3)	(4)
Financial Access?	0.089	0.073	0.135	0.134
	(0.052)	(0.051)	(0.046)	(0.046)
	1.720	*1.437*	*2.923*	*2.903*
Financial Access?	0.115	0.102	0.186	0.190
Definition 2	(0.057)	(0.055)	(0.053)	(0.052)
	2.003	*1.837*	*3.496*	*3.628*
Self-Employment Income?	0.309	0.225	0.170	0.157
	(0.082)	(0.078)	(0.126)	(0.125)
	3.783	*2.894*	*1.352*	*1.254*
Self-Employment Income	748	1287	320	261
	(1773)	(1490)	(1674)	(1675)
	0.422	*0.864*	*0.191*	*0.156*
Per Capita Income	2231	2180	915	864
	(1431)	(1287)	(1442)	(1444)
	1.559	*1.694*	*0.634*	*0.599*
Enough Income?	0.117	0.131	0.097	0.107
	(0.051)	(0.049)	(0.065)	(0.064)
	2.308	*2.665*	*1.506*	*1.671*
Income Declined	0.030	-0.005	-0.030	-0.031
	(0.053)	(0.053)	(0.066)	(0.065)
	0.561	*-0.092*	*-0.463*	*-0.475*
FIES (raw)	-0.430	-0.344	-0.200	-0.215
	(0.293)	(0.278)	(0.360)	(0.358)
	-1.469	*-1.236*	*-0.556*	*-0.602*

Notes: Standard errors accounting for survey design in parentheses, and t-statistics below them in italics. Each cell represents a separate matching exercise. In columns (1) and (2), matching is to the 2 and 4 nearest neighbors, respectively; in column (3), kernel propensity score matching is used, with a trim to common support; and column (4) repeats column (3) with a uniform kernel. Sample size is 865 observations in columns (1) and (2) and 855 observations in columns (3) and (4).
Source: Quantitative Endline Survey Data.

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