



INTERNATIONAL
FOOD POLICY
RESEARCH
INSTITUTE

IFPRI



**CGIAR
POLICY
INNOVATIONS**

IFPRI Discussion Paper 02385

December 2025

Show Me the Money!

Experimental Evidence on Preferences for Cash vs. Digital Payment

Kate Ambler

M. Mehrab Bakhtiar

Jeffrey R. Bloem

Mohammad Riad Uddin

Markets, Trade, and Institutions Unit

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

The International Food Policy Research Institute (IFPRI), a CGIAR Research Center established in 1975, provides research-based policy solutions to sustainably reduce poverty and end hunger and malnutrition. IFPRI's strategic research aims to foster a climate-resilient and sustainable food supply; promote healthy diets and nutrition for all; build inclusive and efficient markets, trade systems, and food industries; transform agricultural and rural economies; and strengthen institutions and governance. Gender is integrated in all the Institute's work. Partnerships, communications, capacity strengthening, and data and knowledge management are essential components to translate IFPRI's research from action to impact. The Institute's regional and country programs play a critical role in responding to demand for food policy research and in delivering holistic support for country-led development. IFPRI collaborates with partners around the world.

AUTHORS

Kate Ambler (k.ambler@cgiar.org) is a Senior Research Fellow in the Markets, Trade, and Institutions (MTI) Unit of the International Food Policy Research Institute (IFPRI), Washington, DC.

M. Mehrab Bakhtiar (m.bakhtiar@cgiar.org) is a Research Fellow in IFPRI's Poverty, Gender, and Inclusion (PGI) Unit, Washington, DC.

Jeffrey R. Bloem (j.r.bloem@cgiar.org) is a Research Fellow in IFPRI's MTI Unit, Washington, DC.

Mohammad Riad Uddin (r.uddin@cgiar.org) is a Research Analyst in IFPRI's MTI Unit, Dhaka, Bangladesh.

Notices

¹IFPRI Discussion Papers contain preliminary material and research results and are circulated in order to stimulate discussion and critical comment. They have not been subject to a formal external review via IFPRI's Publications Review Committee. Any opinions stated herein are those of the author(s) and are not necessarily representative of or endorsed by IFPRI.

²The boundaries and names shown and the designations used on the map(s) herein do not imply official endorsement or acceptance by the International Food Policy Research Institute (IFPRI) or its partners and contributors.

³Copyright remains with the authors. The authors are free to proceed, without further IFPRI permission, to publish this paper, or any revised version of it, in outlets such as journals, books, and other publications.

ABSTRACT

In places such as rural Bangladesh, cash is the dominant medium for payments despite potential benefits of digital payments. We offer survey respondents an incentive-compatible choice for compensation: 200 Taka cash or randomly varied mobile money amounts (200-400 Taka). Only eight percent chose digital payment at parity and respondents exhibit an average willingness-to-pay of 43 percent of the payment value to receive cash payment. This preference persists across demographics, including among mobile money account holders. Within-household analysis reveals that 77 percent of the effect stems from individual-level rather than household-level factors, highlighting the importance of demand-side barriers on digital payments.

Keywords: Mobile money, cash, payment systems, digital finance, willingness-to-pay

ACKNOWLEDGMENTS

Authors are listed in alphabetical order. This work is supported by the CGIAR Science Program on Policy Innovations. We are grateful to all funders who supported this research through their contributions to the CGIAR Trust Fund: <https://www.cgiar.org/funders>. The findings, interpretations, and conclusions expressed in this paper are entirely our own and do not represent the views of the CGIAR or its affiliated organizations. All errors are our own.

1 Introduction

Cash remains the dominant payment medium in many low- and middle-income economies despite expanding digital infrastructure and the potential efficiency gains from digital payments. The World Bank estimates that in low- and middle-income countries, the share of adults that made or received at least one digital payment was 35 percent in 2014 and increased to 61 percent in 2025 (Klapper, Singer, Starita and Norris, 2025). By contrast, in high-income countries and in many urban areas around the world, payments are primarily—and, in some cases, almost exclusively—digital.¹ Governments, companies, and international organizations all tend to agree that shifting existing cash payments to digital payments carries potential to improve the lives of people living in rural areas of low-income countries, especially women (see, e.g., [the Better Than Cash Alliance](#)). In places where physical banking networks are limited and the use of traditional bank accounts, ATMs, and debit/credit cards is low, many view mobile money—one digital payment platform type—as a technology enabling a shift away from cash dependence (Maurer, 2012; Suri, 2017), and a technology that can possibly “leapfrog” the provision of conventional banking services (Aron, 2018). Yet, this optimism assumes people will prefer digital payments made via mobile money once available, an assumption that remains largely untested. If mobile money will succeed in fulfilling its promise as a genuine payment system, users must prefer to transact with mobile money—rather than with cash—when conducting every-day payment activities (Suri et al., 2023).

In this paper, we study preferences for digital payments, made via mobile money, relative to cash payments by embedding an experiment at the end of a multi-module survey in rural Bangladesh. In the experiment, as part of appreciation for completing the survey, we give respondents a choice between a cash payment of 200 Taka or a digital payment of randomly varying amounts between 200 Taka and 400 Taka (i.e., 200, 220, 250, 300, 350, and 400 Taka, representing a parity group and five treatment groups) both dispersed immediately upon completion of the questionnaire. By setting T1 (i.e., a digital payment offer of 220 Taka) as sufficient to cover average travel and transaction costs to cash out the digital payment, this experimental design disentangles payment preferences from travel costs, an important confounding factor in observational comparisons of preferences for cash and digital payments. For respondents within the context of our study, the cash payment offer (i.e., 200 Taka) represents roughly 30-40 percent of the typical harvest-season agricultural day wage. The offered payment, therefore, aims to mimic a typical transaction for respondents in our study. Finally, the sampling of survey respondents includes one male and one female from each household, enabling us to estimate the willingness-to-pay for cash payments among men and women separately.

At parity in the payment amount, only eight percent of respondents choose the digital payment. This large preference for cash persists and varies slightly by gender (6 percent of women and 10 percent of men

¹We consider “digital payments” to be any financial transaction completed electronically, without the *physical* exchange of cash. This definition, therefore, includes a wide range of transaction methods, including online bank transfers, mobile money, mobile wallets, contactless payments, and debit/credit cards. This definition follows guidance developed by the Better Than Cash Alliance: <https://www.betterthancash.org/define-digital-payments>.

choose the digital payment at parity) and mobile money account ownership (12 percent of respondents with a mobile money account and 4 percent of respondents without a mobile money account prefer the digital payment at parity). Our main pre-specified results show that the share of respondents who choose the digital payment monotonically increases as the offered digital payment amount increases. When offered a digital payment that is twice the cash payment, 80 percent of respondents choose the digital payment. We do not observe meaningful heterogeneity in the estimated marginal effects for each digital payment offer amount by gender or mobile money account ownership. These results imply an average willingness-to-pay for cash payments of about 86 Taka, or 43 percent of the cash payment offer. Moreover, supplemental heterogeneity analysis shows that even among respondents who we predict would be most likely to choose the digital payment based on their observable characteristics (using both regression-based and machine learning approaches) approximately 20 percent still choose the cash payment. Finally, our sampling approach allows us to restrict analysis to only consider within-household variation in the randomly assigned digital payment offer by including household fixed effects in a supplemental regression specification. We find that 77 percent of the variation in the marginal effect estimates remains when accounting for factors that vary *between households* (i.e., distance to mobile money agents, reliability of mobile networks, household liquidity constraints, etc.), suggesting most of the preference for cash is explained by factors that vary *between individuals* within households (i.e., mobile phone ownership, knowledge, perception of fraud risk, etc.).

These findings hold immediate policy relevance as governments worldwide aim to promote digital payments and move away from cash-dependence. First, our finding that respondents are, on average, willing to pay 43 percent of the payment offer for the cash payment reveals a strong preference for cash and implies that policies mandating the use of digital payments can generate welfare losses. Second, our finding that over three-quarters of the variation in marginal effect estimates remains when restricting to only within-household variation in treatment assignment highlights the important role of demand-side barriers on the expansion of digital payments. Holding factors that vary between households fixed effectively accounts for important supply-side barriers such as proximity to mobile money agents and the reliability of local mobile networks, allowing for demand-side barriers such as knowledge about the benefits of digital payments and the perception of fraud risk to remain. It is important to note that this does not imply that supply-side barriers are not also important, but that supply-side efforts will likely be ineffective without demand-side interventions. This finding aligns with the work of [Argente, Alvarez, Méndez and Van Patten \(2025\)](#) who demonstrate the efficacy of coordinated efforts on both the supply and demand sides to promote the increased use of digital payment systems in Brazil, Costa Rica, and Mexico. Indeed, while our findings reveal evidence of high barriers on the expansion of digital payments, these barriers are not insurmountable as evidenced by examples of rapid expansion of digital payment systems in low- and middle-income countries (see, e.g., [Argente et al., 2025](#); [Suri, Jack and Stoker, 2012](#)).

We contribute to three related but distinct sets of existing literature. First, our results most directly

complement the literature estimating demand for mobile money (Awel and Yitbarek, 2022; Economides and Jeziorski, 2017; Lee, Morduch, Ravindran and Shonchoy, 2024). Despite the importance of understanding willingness-to-pay for mobile money payments, the existing literature does not estimate demand for mobile money payments in a typical transaction setting.² We contribute to this literature by implementing an incentive-comparable experiment, observing real behavior, and estimating willingness-to-pay for cash payments in an environment that mimics typical payment transactions. Second, our work also contributes to the literature comparing digital transfers made via mobile money with cash transfers (Aker, Boumnijel, McClelland and Tierney, 2016; Muralidharan, Niehaus and Sukhtankar, 2016). While these studies focus on studying the effects of sending one-way transfers digitally relative to distributing physical cash, we focus on a payment that is more similar to situations where a good or service is exchanged for payment. In our study, the payment takes place where both the survey enumerator and the survey respondent are physically in the same location, which allows us to compare preferences for digital and cash payments while removing confounding variation in travel costs associated with digital payments. Finally, we also contribute more generally to the literature studying the adoption and use of mobile money (Abiona and Koppensteiner, 2022; Aggarwal, Brailovskaya and Robinson, 2020; Batista and Vicente, 2020, 2023; Breza, Kanz and Klapper, 2020; Jack, Ray and Suri, 2013; Jack and Suri, 2014; Riley, 2018, 2024; Suri and Jack, 2016). These studies, highlighting the meaningful and wide-ranging benefits of mobile money, contrast with the results of our study. Despite the benefits generated by the adoption and use of mobile money, we observe a strong and persistent preference for cash payments.

2 Experimental Design and Context

Bangladesh represents an instructive context for studying payment preferences. The country has 13 mobile money providers serving nearly 90 million active accounts as of 2024. Cash-out fees average between 1.65 and 1.70 percent for standard transactions, considerably lower than many African markets where fees range from between 2 and 3 percent for larger transactions but can exceed 10 percent for small-value transfers (Annan, Blackmon, Giné, Mwesigwa and Zapanta, 2023). Despite this exceptionally developed mobile money infrastructure—one of the world’s largest deployments—our survey data reveals that 99.9 percent of respondents use cash for food purchases and 95.5 percent receive wages in cash (see Table A.1 in the Appendix), highlighting a striking puzzle between widespread digital payment availability and persistent cash-based transaction behavior.

At the end of a multi-module survey, conducted at endline of a separate evaluation of a credit intervention implemented in rural Bangladesh (Ambler, Bakhtiar and de Brauw, 2024), we implement an

²Note that Economides and Jeziorski (2017) studies remittance-type transactions (i.e., between user X in location A and user Y in location B), self-transportation transactions (i.e., between user X in location A and the same user X in location B), and savings (i.e., between user X at time 1 and the same user X at time 2) but does not study payment transactions (i.e., between user X in location A and user Y in the same location A).

experiment designed to investigate preferences for cash or digital payments.³ As a token of appreciation to the respondent for spending the time answering the questionnaire, it is customary to provide a small monetary or in-kind gift. We offer a choice between a payment of 200 Taka paid in cash or X Taka paid via mobile money, with $X = 200, 220, 250, 300, 350,$ or 400 , randomly assigned at the individual level. Importantly, both the cash and digital payments were dispersed immediately upon completion of the questionnaire. This generates six groups, with approximately 470 respondents per treatment arm, each representing an increasing wedge between the cash and digital payment offer. The following six treatment levels allow us to trace out the demand curve for cash payments, from parity to a 100 percent premium for the digital payment.

- Parity: A choice between a 200 Taka cash payment or a 200 Taka digital payment
- T1: A choice between a 200 Taka cash payment or a 220 Taka digital payment
- T2: A choice between a 200 Taka cash payment or a 250 Taka digital payment
- T3: A choice between a 200 Taka cash payment or a 300 Taka digital payment
- T4: A choice between a 200 Taka cash payment or a 350 Taka digital payment
- T5: A choice between a 200 Taka cash payment or a 400 Taka digital payment

In Bangladesh cash out fees on most mobile money platforms at the time of data collection were about 1.6 percent (Annan et al., 2023). Additionally, in order to cash out, respondents need to physically travel to visit a mobile money agent. So, the digital payment amount offered in T1 is intended to cover both the fee and the associated travel cost required to cash out. The other treatment groups generate an increasing wedge between the cash and digital payment offer of 125 percent, 150 percent, 175 percent, and 200 percent respectively. We stratify the randomization by gender and mobile money account ownership to ensure equal distribution of gender and mobile money account ownership within each treatment group. The measure of mobile money account ownership comes from the midline survey, where respondents indicate if they have a mobile money account.⁴

Our data includes 2,815 respondents, 49.3 percent of whom are male and 50.7 percent are female, living in 1,447 households. As part of the sampling design for the separate (i.e., main) intervention, enumerators were instructed to recruit one male and one female respondent (specifically the male respondent’s wife) from each household. As shown in Table A.2 in the Appendix, treatment assignment is balanced across the respondent’s gender, mobile money account ownership, household demographic variables, bank account ownership, and variables indicating treatment assignment for the separate intervention which this survey is primarily designed to evaluate. The endline survey, which included the survey experiment discussed in this paper, was conducted in November and December of 2024.

³This credit intervention focused on testing different models of credit for livestock fattening, and did not include any digital component that we would expect to affect demand for digital payments. An additional randomization varied the gender of the contract recipient, but take-up and outcomes were similar across these groups. The main results of this study are qualitatively similar when estimated separately by treatment group of the credit intervention.

⁴This midline survey was administered via a phone interview and 119 respondents included in the endline survey were not included in the midline survey. We account for these missing observations in this stratification by randomly distributing these missing observations independently across the treatment groups. In the analysis below, we “dummy out” these missing observations by generating a variable identifying missing observations and replacing missing observations with a zero value.

This endline survey followed both a baseline survey, conducted in May through August of 2023 and a midline survey, conducted in June and July of 2024.

Just over half, 54 percent, of the respondents report that they have a mobile money account in the midline survey. This share of mobile money account ownership is higher than estimates generated by the World Bank’s Findex survey for the general adult population in Bangladesh, which is estimated to be 21 percent in 2024 (Klapper et al., 2025). The share of mobile money account ownership among respondents in our data is comparable to the share in the general adult populations of Botswana (52 percent), Cameroon (55 percent), Cote d’Ivoire (53 percent), and Tanzania (53 percent); higher than in Malawi (47 percent) and Zimbabwe (43 percent); but lower than in Uganda (68 percent), Senegal (67 percent), Ghana (78 percent), and Kenya (87 percent) based on Findex survey data from 2024 (Klapper et al., 2025). Therefore, we view respondents in our data to be similar and, if anything, slightly more likely to have a mobile money account and to use digital payments relative to comparable individuals living in rural areas of most other low- or middle-income countries.

Having a mobile money account does not necessarily imply that the respondent uses the mobile money account. About 55 percent of respondents report using a mobile money account, and despite a strong positive correlation between variables indicating mobile money account ownership and use, 10-15 percent of respondents report either having a mobile money account and not using it or not having a mobile money account and using a (i.e., somebody else’s) mobile money account. For respondents who report using a mobile money account, about 28 percent report ever sending money with mobile money, 48 percent report ever receiving money with mobile money, and only 1 percent report saving with mobile money.⁵

3 Estimation Strategy

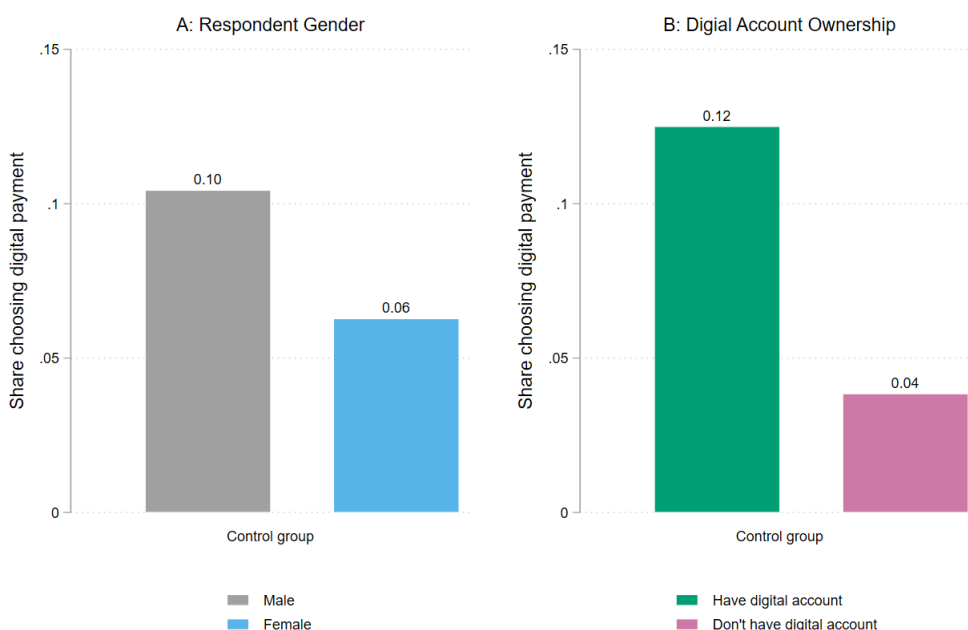
We investigate two main questions about preferences for digital payments relative to cash payments. First, at parity in the payment amount, what is the share of respondents that prefer to receive the payment digitally relative to a cash payment? To answer this question, we simply report the share of respondents who choose to accept the digital payment in the parity group. Second, how much does the preference for digital payments change when we increase the digital payment amount and hold the cash payment amount constant? We answer this question with the following regression specification:

$$y_i = \alpha + \sum_{k=1}^N \beta_k Tk_i + \lambda_i + \epsilon_i \quad (1)$$

In equation (1), the dependent variable y_i is a binary variable indicating if the respondent chooses to accept the digital payment offer. With the excluded group representing the group where the cash and mobile money amounts are equal, β_k where $k = 1, 2, 3, 4$, or 5 are coefficients estimating the

⁵The remaining share of respondents did not indicate a typical use of mobile money despite reporting using mobile money.

Figure 1: Preference for Digital Payment



Notes: This figure reports the share of respondents randomly assigned to the parity group who choose the digital payment disaggregated by gender and pre-existing digital account ownership.

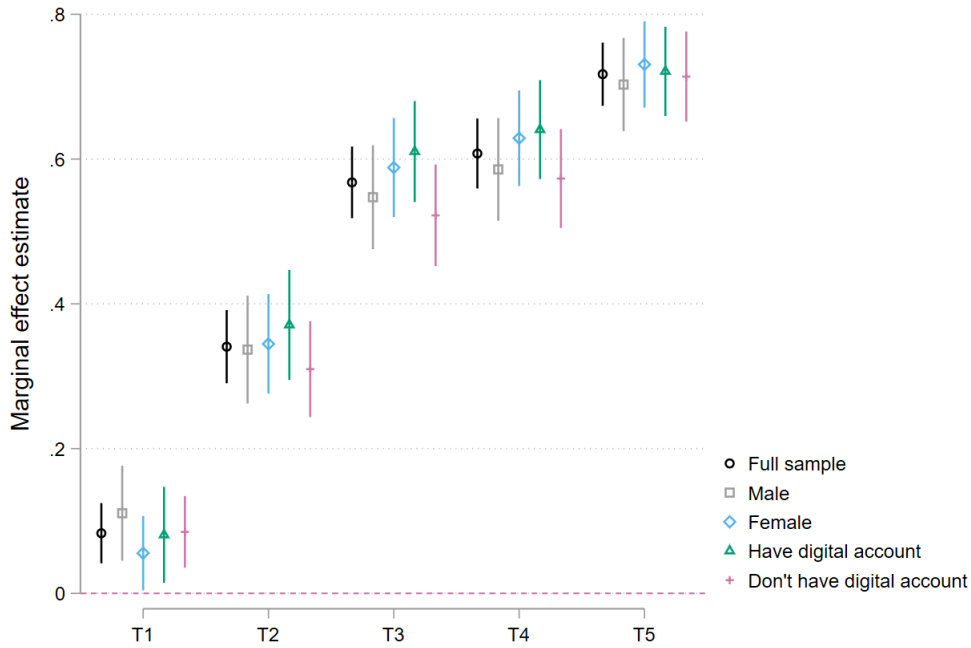
difference in the share of respondents who prefer the digital payment in each treatment group, Tk with $k = 1, 2, 3, 4$, or 5 , respectively. The variable λ_i represents stratification cell fixed effects that account for the respondent's gender and pre-existing mobile money account ownership, α is a constant, and ϵ is the error term. To explore heterogeneity by gender and mobile money account ownership, we also estimate augmented versions of the regression specification above by interacting each of the treatment indicator variables with variables indicating the respondent's gender and pre-existing mobile money account ownership.⁶

4 Results

We begin by answering our first research question: what share of respondents choose the digital payment at parity in the payment amounts? Holding the payment amount equal, the vast majority of respondents prefer to receive the cash payment rather than the digital payment. Figure 1 shows the share of respondents who choose the digital payment in the parity group. Panel A separates the sample by gender and shows that while 10 percent of men prefer the digital payment at parity, only six percent of women prefer the digital payment when the payment amounts are equal. Although this difference is not statistically significant at conventional levels, this disparity could, in part, reflect gender disparities in mobile phone ownership—in Bangladesh while 91 percent of men have a mobile phone only 74 percent

⁶This analysis is pre-registered on the American Economic Association's registry for randomized controlled trials: <https://doi.org/10.1257/rct.15066-1.0>.

Figure 2: Treatment Effect Estimates



Notes: This figure reports coefficient estimates estimated from equation (1). The associated 95 percent confidence intervals are generated using heteroscedasticity robust standard errors. Table A.4 in the Appendix reports these results in tabular form.

of women have a mobile phone (Klapper et al., 2025).⁷ Panel B separates the sample by whether the respondent reports that they have a mobile money account (i.e., Bkash, Rocket, Nagad, or Ucash) and shows that respondents who report that they have a mobile money account are seven percentage points more likely to prefer the digital payment at parity, and this difference is statistically significant.⁸

We next answer the second research question by reporting how much the preference for digital payments changes when we increase the digital payment offer amount relative to the cash offer amount. Figure 2 plots the marginal effects of the probability a respondent chooses the digital payment given their random assignment into one of the five treatment groups relative to the parity group. Adding 20 Taka to the digital payment to account for direct transaction costs associated with the digital payment (i.e., T1) leads to an eight percentage point increase in the probability a respondent chooses the digital payment. Subsequently, adding to the amount offered in the digital transfer monotonically increases the marginal effect estimates. Adding 50 Taka (i.e., T2) leads to a 34 percentage point increase the the probability a respondent chooses the digital payment, adding 100 Taka (i.e., T3) leads to a 57 percentage point increase, adding 150 Taka (i.e., T4) leads to a 60 percentage point increase, and finally, adding 200 (i.e., T5) leads to a 71 percentage point increase. The marginal effect estimates between T1 and T2, T2 and T3, and T4 and T5 are statistically different from each other (p-value = 0.000). The marginal effect estimates between T3 and T4, however, are not statistically different from

⁷This gender disparity in mobile phone ownership persists in our data: 15 percent of men, and 35 percent of women, who report not using mobile money list not having a mobile phone as a reason.

⁸All respondents in the parity group who report not having a mobile money account and prefer the digital payment send the digital payment to either a spouse or someone else in their household.

each other (p-value = 0.190). In terms of levels, the overall probability that a respondent in T1 chooses the digital payment is 16 percent. The probability a respondent chooses the digital payment rises to 42 percent in T2, 65 percent in T3, 68 percent in T4, and 80 percent in T5.

We do not find that these marginal effects vary meaningfully by the respondent’s gender. This can be seen visually in Figure 2 and in the regression results presented in Table A.4 in the Appendix. We do find some small differences based on whether the respondent has a mobile money account. Figure 2 shows that the marginal effects appear slightly smaller among respondents who do not have a mobile money account. Table A.4 in the Appendix, however, shows that these differences are either not statistically significant or only marginally statistically significant at conventional levels and the overall pattern in our results remains qualitatively similar among respondents who report having a mobile money account relative to respondents who report not having a mobile money account.

The results allow us to calculate the willingness-to-pay for cash payments among respondents in our data.⁹ We find that the average willingness-to-pay for cash payments is 85.9 Taka, and ranges from 83.4 Taka for women and 88.8 Taka for men.¹⁰ Relative to the 200 Taka cash payment offer, the estimated average willingness-to-pay for cash payments represents about 43 percent of the cash payment offer. Moreover, even among respondents who have a digital account, the average willingness-to-pay for cash payments is 75.9 Taka, representing 38 percent of the cash payment offer. Among those who do not have a digital account, the average willingness-to-pay for cash payments is 87.0 Taka.

Supplemental Heterogeneity Analysis—We explore additional heterogeneity in our results in several ways. To motivate this analysis, we report on several specific forms of possible heterogeneity that could explain the strong preference for cash observed among respondents in our data. We report these supplemental results in the Appendix as they show qualitatively similar patterns across each of the specified sub-groups in our data. Figure A.1 examines the role of reported challenges experienced by respondents when receiving mobile money transactions. Figure A.2 shows results based on risk aversion measured in our baseline survey with an incentivized survey module. Figure A.3 reports results based on reported attitudes about gender roles within the household. Specifically, both male and female respondents indicated if they somewhat or strongly agreed or disagreed with the following statement: “The important decisions in a family should be made only by the men of the family.” Figure A.4 investigates the role of mobility among women in our sample, based on the frequency in which they report going to their local market (i.e., at least once per month, less than once per month, and never). Figure A.5 shows results for respondents who report using a mobile money account, and if so, if we observe differences based on the reported travel time between the respondent’s home and the closest

⁹We define the average willingness-to-pay as the price associated with the point at which respondents are indifferent between a cash payment or a digital payment (i.e., $pr(\text{cash payment}) = pr(\text{digital payment}) = 0.5$). Based on this definition, we calculate the average willingness-to-pay (WTP) for cash payments based on the experimental results as follows: $WTP_{\text{cash payments}} = \frac{1}{N} \sum_{k=1}^N [P_k \times [1 - |0.5 - pr(\text{cash payment})|]]$ where P_k is the implied price of a cash payment offered to treatment group k and $pr(\text{cash payment})$ is $\alpha + \beta_k$ from equation (1) for treatment group k . In the context of our experimental design, $N = 5$, $P_1 = 20$ Taka, $P_2 = 50$ Taka, $P_3 = 100$ Taka, $P_4 = 150$ Taka, and $P_5 = 200$ Taka.

¹⁰At the time of our data collection 86.2 Taka was about 0.71 USD.

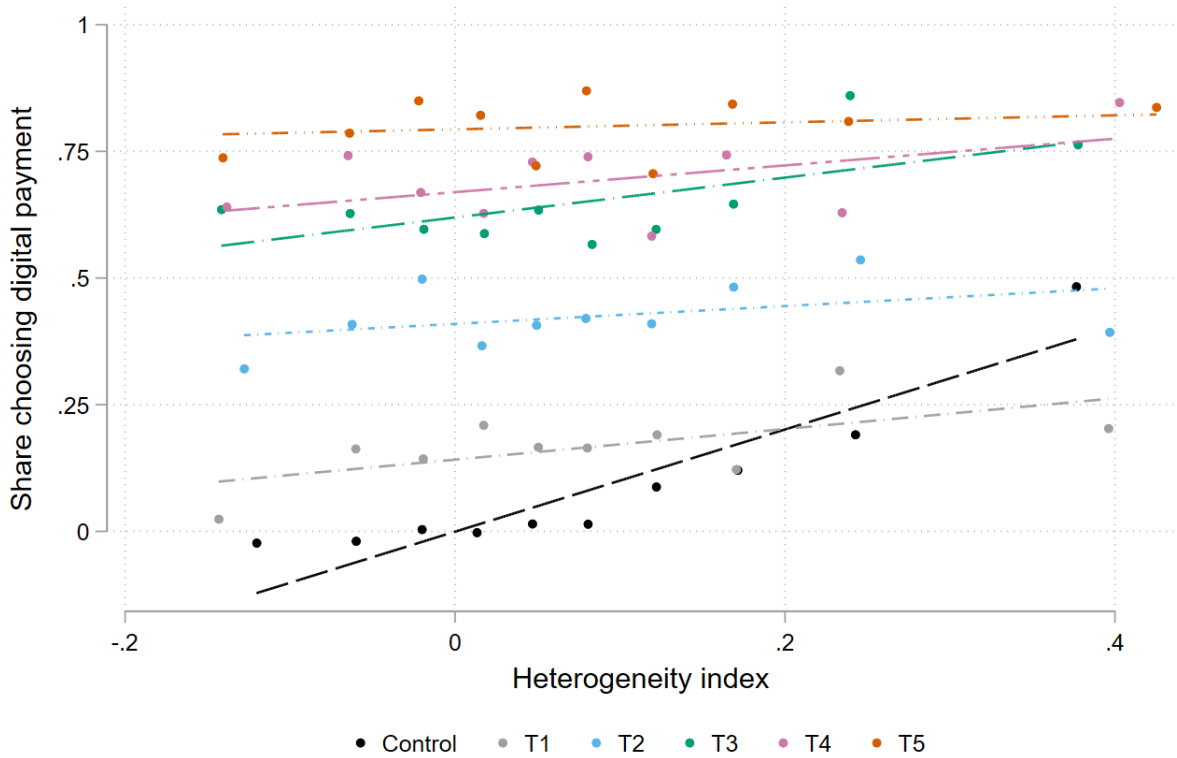
mobile money agent. Figure A.6 examines the role of mobile phone ownership among respondents who report not using mobile money because they do not have a mobile phone. In each of these sets of analysis, even when conducting separate analysis for men and women, we continue to find evidence of a strong preference for cash payments. These results indicate that there is no single measurable factor that meaningfully constrains the preference for digital payments and motivates an approach that aggregates multiple possible constraints together.

We specifically follow the approach of Giné, Goldberg and Yang (2012) to generate an index that incorporates many observable characteristics of respondents that might plausibly influence their preference for digital payments. This approach involves estimating an auxiliary regression of observable characteristics predicting the digital payment choice in the parity group (n=469), and using the estimated coefficients from this regression to generate a “heterogeneity index” for all other respondents. This index, therefore, is independent of treatment assignment by construction. This auxiliary regression is reported in Table A.6. Results in column 1, which only include observable respondent-level characteristics on the right-hand-side indicate that having a mobile money account significantly predicts the choice of accepting the digital payment at parity in the payment amounts. The inclusion of village fixed effects in column 2 raises the R-squared substantially (i.e., 0.042 in column 1 to 0.219 in column 2). The explanatory power of this auxiliary regression is further improved in column 3 (i.e., to an R-squared of 0.277) when we bin the education, expenditure, and age variables to account for non-linear relationships. We take the coefficients estimated in column 3 and predict the probability of choosing a digital payment for the entire sample. As described by Giné et al. (2012), this index is analytically useful as it is a single variable that incorporates many observable characteristics that are correlated with choosing the digital payment.¹¹ Higher scores on this index indicate the respondent is more likely to accept a digital payment, based on their observable characteristics.

We interact this heterogeneity index with each of the treatment assignment indicator variables. Table A.8 reports these results in tabular form and Figure 3 illustrates these results. By construction, the slope of the line defining the relationship between scores on the heterogeneity index and the share of the sample choosing the digital payment is the steepest in the parity group. Among all treatment groups, the relationship between observable characteristics and the share choosing the digital payment is strongest in T3 (p=0.001), as indicated by the slope shown in Figure 3. In T1 (p=0.014), T2 (p=0.117), and T4 (p=0.011) the slopes are positive and either statistically significant or marginally statistically different from zero. In T5, however, the slope is statistically indistinguishable from zero (p=0.466). These details reveal that in T1 and T2, the digital payment offer is not enough to drive most respondents to accept the digital payment. In T3, when the digital payment offer is 50 percent higher than the cash payment, the results suggests the exchange rate is approaching the threshold at which most respondents prefer the digital payment, but this seems to depend on observable characteristics.

¹¹Note that for this approach to generate valid results, this heterogeneity index must be balanced across treatment assignment. Table A.7 shows that this is indeed the case in our data.

Figure 3: Heterogeneity Index Binscatter Plot, by Treatment Status



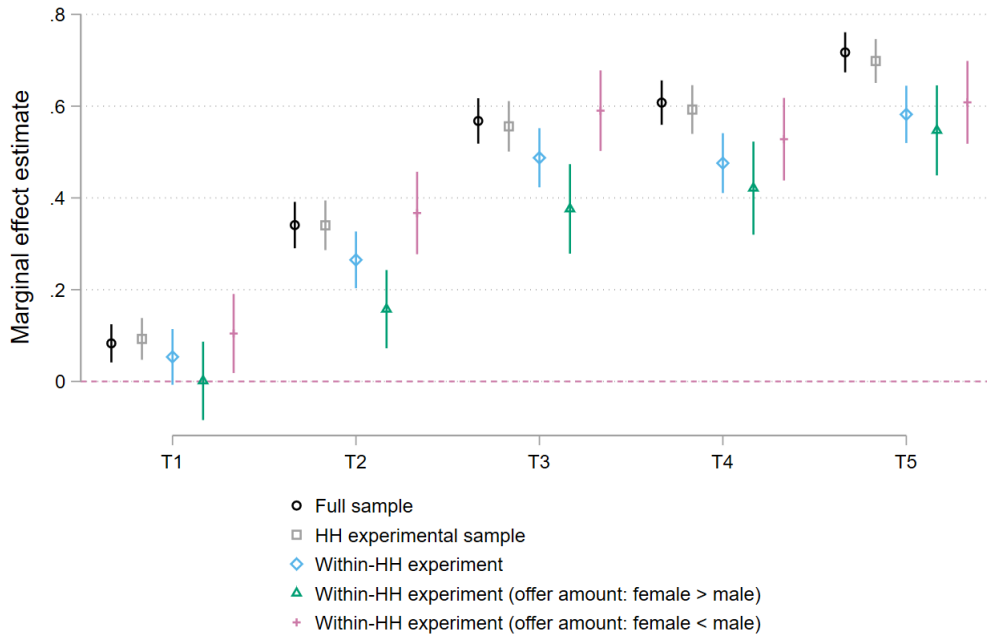
Notes: This figure plots the relationship between the heterogeneity index and our main outcome variable indicating if the respondent chose the digital payment. The estimated relationship is disaggregated by treatment status and includes stratification cell fixed effects accounting for the respondent's gender and pre-existing mobile money account ownership.

In T4 and T5, the digital payment offer is high enough that most (but not all) respondents choose the digital offer. Moreover, in each treatment group, the share choosing the digital payment (i.e., the level rather than the slope) rises. In T5, however, when the digital payment offer is twice the cash payment, the share of respondents choosing the digital payment effectively levels off at 80 percent. That is, even among respondents who we predict would be most likely to choose the digital payment based on their observable characteristics approximately 20 percent still choose the cash payment, effectively reducing their payment by half.¹²

Next, we leverage the fact that multiple individuals—one male and one female—within each household were recruited by enumerators to answer the survey and that the random treatment assignment of the survey experiment varies within the households. This enables us to re-estimate the experimental results while restricting to within-household variation. Comparing these within-household results to results that allow for between-household variation enables us to document the magnitude of the role of household-level factors relative to individual-level factors in explaining the experimental results. These individual-level factors, for example, include: mobile phone ownership, knowledge, and perception of

¹²We find similar results when we use the estimator discussed in Nie and Wager (2021) using the generalized random forest approach proposed by Athey, Tibshirani and Wager (2019) to facilitate the group-based method for heterogeneity analysis discussed by Chernozhukov, Demirer, Duflo and Fernandez-Val (2018). See Figure A.7 in the Supplemental Appendix.

Figure 4: Within-Household Treatment Effect Estimates



Notes: This figure reports coefficient estimates estimated from equation (1). The “full sample” estimates report experimental results using the full sample, the “HH experimental sample” estimates restrict to the sub-sample where the experimental treatment varies within the household but still allows for between-household comparisons, finally the “within-HH experiment” estimates further restrict to only variation in treatment assignment within households. The associated 95 percent confidence intervals are generated using heteroscedasticity robust standard errors. Table A.5 in the Appendix reports these results in tabular form.

fraud risk. We can compare these within-household estimates to estimates that allow for comparisons across households incorporating variation in household-level factors that, for example, include: the distance to mobile money agents, household liquidity constraints, and access to formal financial services. 85 percent of respondents live in households with within-household variation in treatment assignment. Restricting to within-household analysis accounts for nearly half of the variation in the outcome variable (i.e., The R-squared increases from 0.292 in column 2 of Table A.5 in the Appendix to 0.781 in column 3). Additionally, Table A.3 in the Appendix shows that treatment assignment remains balanced even in the sub-sample of households where treatment assignment varies within the household.

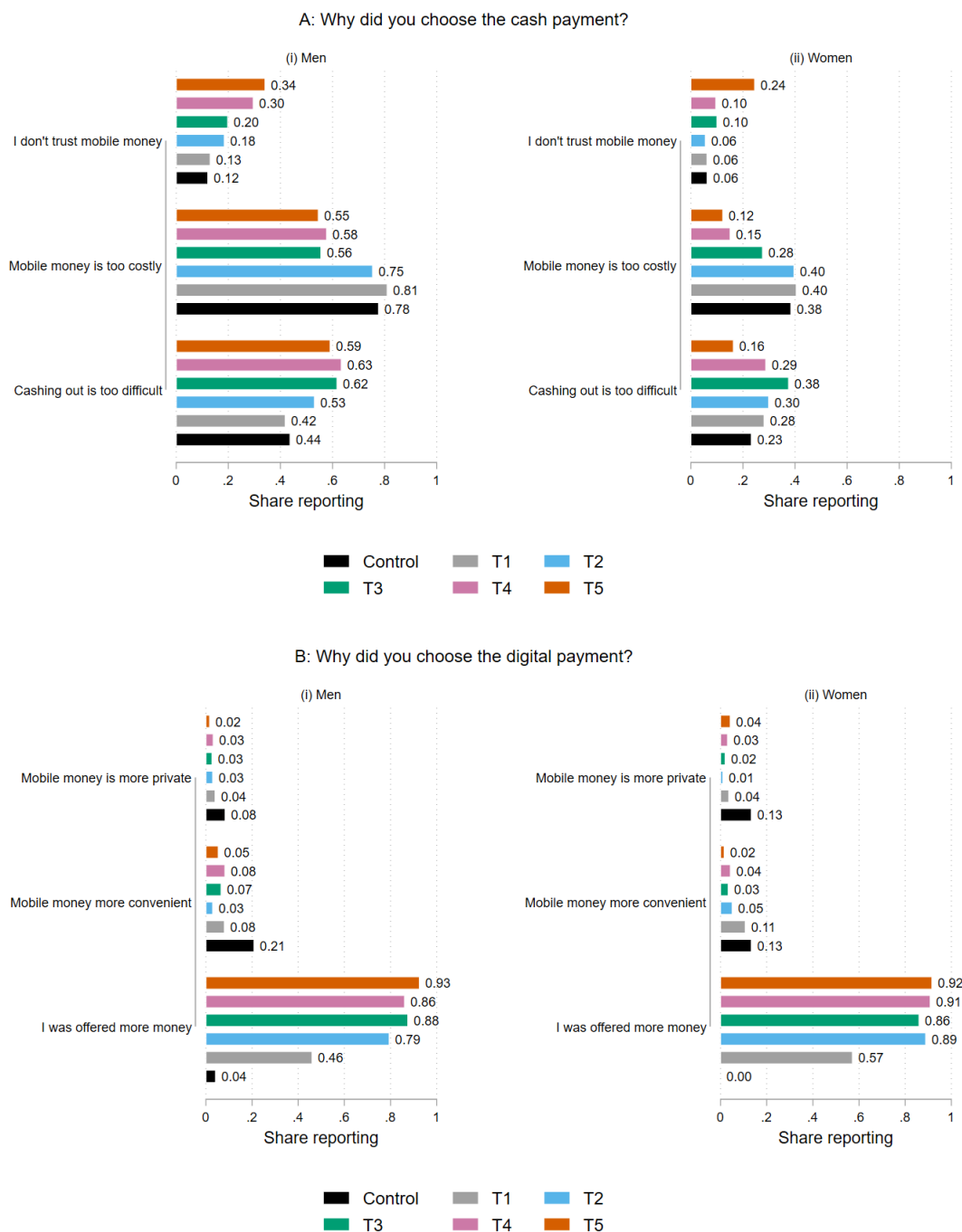
Figure 4 reports results from this within-household analysis. The full sample results mirror the main results already discussed above and serve as a reference point for the within-household analysis. The results using the sub-sample of households where treatment varies within the household demonstrate that the marginal effects estimated with this sub-sample are qualitatively similar to the marginal effects estimated with the full sample when we use the same regression specification. We find different results, however, when we restrict to comparisons within households only. When we apply household fixed effects to the regression specification we estimate marginal effect estimates that are between four and 12 percentage points lower. Taken together, these results imply that 23 percent of the variation in the estimated treatment effects is explained by factors that vary across but not within households.

Meanwhile, the remaining 77 percent of the variation in the estimated treatment effects is explained by factors that vary within households. These results demonstrate that while both household-level and individual-level factors play a role in explaining the preference for cash in our setting, over three-quarters of the effect of increasing the digital payment offer amount on the respondent’s willingness to choose the digital payment is driven by individual-level factors, such as, e.g., mobile phone ownership, knowledge, and perception of fraud risk. Household-level factors, such as, e.g., distance to mobile money agents, household liquidity constraints, and access to formal financial services play a smaller role in explaining the preference for cash.

Although we cannot estimate effects among men and women separately when conducting this within-household analysis, we can explore heterogeneity by gender based on whether the female respondent within the household received an offer of a greater amount than the male respondent and vice versa. We observe meaningful and statistically significant heterogeneity especially when the difference between the cash and digital payment offer is relatively low (i.e., in T1, T2, and T3). In T1, if a female received a larger offer than a male (i.e., the female is in T1 and the male is in the parity group), then the 20 additional Taka included in the digital payment offer does not influence the probability of choosing the digital offer. If a male received a larger offer than a female (i.e., the male is in T1 and the female is in the parity group), however, then the 20 additional Taka leads to an 11 percentage point increase in the probability of choosing the digital offer. Similarly, in T2 and T3, the marginal treatment effect is 21 percentage points lower when a female receives a larger offer than a male compared to when a male receives a larger offer than a female. Meanwhile, these heterogeneous marginal effect estimates do not appear in T4 and T5. These results reveal that when restricting analysis to only consider within-household variation in treatment assignment, women hold a stronger preference for cash than men.

What explains these results? After each respondent made their choice about how they would like to receive their payment, we directly asked why they made their choice. In Panel A of Figure 5, separately for men and women, we present the reported reasons for choosing cash. We see that the share of respondents who report that they chose cash because they “do not trust mobile money” increases as the digital payment offer amount increases. Conversely, the share of respondents who report that they chose cash because “mobile money is too costly” declines as the digital payment offer amount increases. We do not see a clear pattern in the share of respondents indicating that “cashing out mobile money is too difficult” by treatment assignment. These results show that trust, direct financial costs, and indirect transaction costs (i.e., in the form of difficulty cashing out) all play a role in constraining respondents from choosing the digital payment option. Panel B of Figure 5 shows the reported reasons for choosing the digital payment, among respondents who chose the digital payment. We find that a minority of respondents report choosing the digital payment due to privacy or convenience, and these shares nearly vanish as the digital payment offer amount increases. By contrast, the clear most frequently reported reason for choosing the digital payment is because “the digital payment offered more money.”

Figure 5: Reported Reasons for the Choice



Notes: This figure reports stated reasons for respondents choosing either the cash or digital payment. After the respondents made their choice, we asked them why they chose cash or the digital payment. Panel A reports responses for those who chose cash. Panel B reports response for those who chose the digital payment.

5 Conclusion

We present experimental evidence of a strong and persistent preference for cash payments, relative to digital payments made via mobile money, in rural Bangladesh. Eight percent of respondents choose the digital payment when we offer a choice between a cash payment and a digital payment at equal amounts. As the offered digital payment amount increases, the share of respondents who choose the

digital payment monotonically increases, such that 80 percent of respondents choose the digital payment when offered a digital payment that is twice the cash payment amount.

These results raise the question: what are the relevant barriers on the expansion of mobile money as a genuine payment system in a setting such as rural Bangladesh? We asked respondents to report their view of the benefits and challenges associated with cash and digital transactions, and show these responses in Figures A.8 and A.9 in the Appendix. The most frequently reported benefit of cash transactions is that it is easy to use, while frequently reported challenges include risk of theft and the possibility of counterfeit cash. Respondents are much less likely to report any benefits of digital transactions, with less than a quarter of respondents reporting that digital transactions via mobile money are easy to use and secure. Challenges with digital transactions are more frequently reported, with transaction/withdrawal fees, distance to mobile money agents, and risk of fraud reported by between 40 and 50 percent of respondents. Additionally, we also asked respondents who reported not using a mobile money account, why they do not use a mobile money account. The most frequently stated reason for not using a mobile money account is (i) not having a mobile phone (i.e., 29 percent), not being able to use a mobile money account (i.e., 39 percent), and not needing a mobile money account (i.e., 67 percent).

Despite these descriptive reports, we find qualitatively similar patterns in treatment effect estimates and willingness-to-pay for cash transactions among sub-groups of our data that report these challenges with mobile money and reasons for not using mobile money. Thus, the preference for cash transactions among respondents in our study seems to be driven by multiple factors that will require interventions on both the supply and demand side of the payment system market. Moreover, the presence of possible network externalities and coordination problems can generate multiple adoption equilibria that require large-scale interventions to drive increased use at scale (Higgins, 2024; Katz and Shapiro, 1985). Consistent with the descriptive findings of Argente et al. (2025), “big push” initiatives that go beyond only financing infrastructure expansion are likely required to effectively promote the shift from cash-dependence toward the expanded use of digital payment systems in contexts such as rural Bangladesh.

References

- Abiona, Olukorede and Martin Foureaux Koppensteiner (2022) “Financial inclusion, shocks, and poverty: Evidence from the expansion of mobile money in Tanzania,” *Journal of Human Resources*, 57 (2), 435–464.
- Aggarwal, Shilpa, Valentina Brailovskaya, and Jonathan Robinson (2020) “Cashing in (and out): Experimental evidence on the effects of mobile money in Malawi,” in *AEA papers and proceedings*, 110, 599–604, American Economic Association 2014 Broadway, Suite 305, Nashville, TN 37203.
- Aker, Jenny C, Rachid Boumnijel, Amanda McClelland, and Niall Tierney (2016) “Payment mechanisms and antipoverty programs: Evidence from a mobile money cash transfer experiment in Niger,” *Economic Development and Cultural Change*, 65 (1), 1–37.
- Ambler, Kate, Mehrab Bakhtiar, and Alan de Brauw (2024) “Financing livestock raising with profit sharing and insurance: IPSR Innovation Profile.”
- Annan, Francis, William Blackmon, Xavier Giné, Brian Mwesigwa, and Arianna Zapanta (2023) “Transaction Cost Index Year 1 Comparative Report,” *Innovations for Poverty Action (IPA)*, <https://poverty-action.org/transaction-cost-index-year-1-comparative-report>.
- Argente, David, Paula Gonzalez Alvarez, Esteban Méndez, and Diana Van Patten (2025) “Drivers of Digital Payment Adoption: Lessons from Brazil, Costa Rica, and Mexico,” Technical report, National Bureau of Economic Research.
- Aron, Janine (2018) “Mobile money and the economy: A review of the evidence,” *The World Bank Research Observer*, 33 (2), 135–188.
- Athey, Susan, Julie Tibshirani, and Stefan Wager (2019) “Generalized random forests,” *Annals of Statistics*, 47.
- Awel, Yesuf and Eleni Yitbarek (2022) “Mobile money demand in utility bill payments: A WTP estimate from Ethiopia,” *Journal of Development Effectiveness*, 14 (1), 56–75.
- Batista, Catia and Pedro C Vicente (2020) “Improving access to savings through mobile money: Experimental evidence from African smallholder farmers,” *World Development*, 129, 104905.
- (2023) “Is mobile money changing rural Africa? Evidence from a field experiment,” *Review of Economics and Statistics*, 1–29.
- Breza, Emily, Martin Kanz, and Leora F Klapper (2020) “Learning to navigate a new financial technology: Evidence from payroll accounts,” Technical report, National Bureau of Economic Research.

- Chernozhukov, Victor, Mert Demirer, Esther Duflo, and Ivan Fernandez-Val (2018) “Generic machine learning inference on heterogeneous treatment effects in randomized experiments, with an application to immunization in India,” Technical report, National Bureau of Economic Research.
- Economides, Nicholas and Przemyslaw Jeziorski (2017) “Mobile money in Tanzania,” *Marketing Science*, 36 (6), 815–837.
- Giné, Xavier, Jessica Goldberg, and Dean Yang (2012) “Credit market consequences of improved personal identification: Field experimental evidence from Malawi,” *American Economic Review*, 102 (6), 2923–2954.
- Higgins, Sean (2024) “Financial technology adoption: Network externalities of cashless payments in Mexico,” *American Economic Review*, 114 (11), 3469–3512.
- Jack, William, Adam Ray, and Tavneet Suri (2013) “Transaction networks: Evidence from mobile money in Kenya,” *American Economic Review*, 103 (3), 356–361.
- Jack, William and Tavneet Suri (2014) “Risk sharing and transactions costs: Evidence from Kenya’s mobile money revolution,” *American Economic Review*, 104 (1), 183–223.
- Katz, Michael L and Carl Shapiro (1985) “Network externalities, competition, and compatibility,” *The American economic review*, 75 (3), 424–440.
- Klapper, Leora, Dorothe Singer, Laura Starita, and Alexandra Norris (2025) *The Global Findex Database 2025: Connectivity and Financial Inclusion in the Digital Economy*: World Bank Publications.
- Lee, Jean N, Jonathan Morduch, Saravana Ravindran, and Abu S Shonchoy (2024) “The social meaning of mobile money: Earmarking reduces the willingness to spend in migrant households,” *Journal of Economic Behavior & Organization*, 221, 675–688.
- Maurer, Bill (2012) “Mobile money: Communication, consumption and change in the payments space,” *Journal of Development Studies*, 48 (5), 589–604.
- Muralidharan, Karthik, Paul Niehaus, and Sandip Sukhtankar (2016) “Building state capacity: Evidence from biometric smartcards in India,” *American Economic Review*, 106 (10), 2895–2929.
- Nie, Xinkun and Stefan Wager (2021) “Quasi-oracle estimation of heterogeneous treatment effects,” *Biometrika*, 108 (2), 299–319.
- Riley, Emma (2018) “Mobile money and risk sharing against village shocks,” *Journal of Development Economics*, 135, 43–58.
- (2024) “Resisting social pressure in the household using mobile money: Experimental evidence on microenterprise investment in Uganda,” *American Economic Review*, 114 (5), 1415–1447.

Suri, Tavneet (2017) “Mobile money,” *Annual Review of Economics*, 9 (1), 497–520.

Suri, Tavneet, Jenny Aker, Catia Batista et al. (2023) “Mobile money,” *VoxDevLit*, 2 (2), 3.

Suri, Tavneet and William Jack (2016) “The long-run poverty and gender impacts of mobile money,” *Science*, 354 (6317), 1288–1292.

Suri, Tavneet, William Jack, and Thomas M Stoker (2012) “Documenting the birth of a financial economy,” *Proceedings of the National Academy of Sciences*, 109 (26), 10257–10262.

Supplemental Appendix

This Supplemental Appendix includes additional tables and figures that support the analysis and results in the main manuscript.

- Table A.1 reports the stated preference for cash transactions among respondents in our sample.
- Table A.2 shows balance test results for the full analytical sample.
- Table A.3 shows balance test results for the sub-sample used in the within-household experiment analysis.
- Table A.4 reports our main regression results in tabular form.
- Figure A.1 reports heterogeneity by reported challenges when receiving mobile money.
- Figure A.2 reports heterogeneity by measured risk aversion.
- Figure A.3 reports heterogeneity by reported gender attitudes.
- Figure A.4 reports heterogeneity by mobility among women.
- Figure A.5 reports heterogeneity by travel time to the nearest mobile money agent.
- Figure A.6 reports heterogeneity by mobile phone ownership.
- Table A.5 reports within-household regression results in tabular form.
- Table A.6 reports auxiliary regression results used to generate the heterogeneity index.
- Table A.7 reports balance of the heterogeneity index across treatment groups.
- Table A.8 reports regression results based on the heterogeneity index in tabular form.
- Figure A.7 reports results from the generalized random forest machine learning approach to heterogeneity analysis.
- Figure A.8 reports stated benefits and challenges with cash transactions.
- Figure A.9 reports stated benefits and challenges with digital transactions.

Table A.1: The Stated Preference for Cash Transactions

| | (1) | (2) | (3) |
|---|-------------|------|--------|
| | Full sample | Male | Female |
| How do you usually make these payments? | | | |
| Use cash when purchasing food for your family | 99.9 | 99.9 | 100 |
| Use cash when purchasing household items | 99.9 | 99.7 | 100 |
| Use cash when purchasing agricultural inputs ^a | 99.8 | 99.6 | 100 |
| Use cash when giving money to friends or family | 89.3 | 86.9 | 91.7 |
| How would you like to make these payments? | | | |
| Use cash when purchasing food for your family | 98.7 | 98.1 | 99.2 |
| Use cash when purchasing household items ^a | 98.7 | 98.1 | 99.4 |
| Use cash when purchasing agricultural inputs | 98.8 | 98.3 | 99.4 |
| Use cash when giving money to friends or family | 85.4 | 82.4 | 88.4 |
| How do you usually receive these payments? | | | |
| Use cash when selling harvested crops ^a | 99.4 | 99.0 | 99.8 |
| Use cash when paid for wage/salary work ^b | 95.5 | 94.7 | 96.6 |
| Use cash when receiving money from friends or family | 84.4 | 81.9 | 86.9 |
| How would you like to receive these payments? | | | |
| Use cash when selling harvested crops ^a | 98.6 | 97.6 | 99.7 |
| Use cash when paid for wage/salary work ^b | 93.6 | 93.0 | 94.4 |
| Use cash when receiving money from friends or family | 84.8 | 83.4 | 86.2 |

Notes: This table reports the percent of respondents who report using cash (or preferring to use cash) relative to digital services for various types of transactions. ^aStatistics about purchasing agricultural inputs or selling harvested crops are reported conditional on purchasing agricultural inputs or selling harvested crops, respectively. ^bStatistics about wage/salary work payments are conditional on having wage/salary work.

Table A.2: Balance Table - Full Sample

| Variable | (1) Control | | (2) T1 | | (3) T2 | | (4) T3 | | (5) T4 | | (6) T5 | | F-test for balance across all groups | |
|-------------------------------|----------------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|---|----------------|
| | N | Mean/(SE) | N | Mean/(SE) | N | Mean/(SE) | N | Mean/(SE) | N | Mean/(SE) | N | Mean/(SE) | N | F-stat/P-value |
| Female | 469 | 0.510 (0.023) | 472 | 0.504 (0.023) | 475 | 0.512 (0.023) | 463 | 0.497 (0.023) | 466 | 0.509 (0.023) | 470 | 0.509 (0.023) | 2815 | 0.053 0.998 |
| Use mobile money account | 469 | 0.533 (0.023) | 472 | 0.549 (0.023) | 475 | 0.566 (0.023) | 463 | 0.559 (0.023) | 466 | 0.558 (0.023) | 470 | 0.560 (0.023) | 2815 | 0.264 0.933 |
| Have mobile money account | 448 | 0.536 (0.024) | 446 | 0.534 (0.024) | 456 | 0.526 (0.023) | 446 | 0.543 (0.024) | 445 | 0.537 (0.024) | 455 | 0.543 (0.023) | 2696 | 0.069 0.997 |
| Household size | 469 | 4.006 (0.061) | 472 | 4.102 (0.058) | 475 | 3.947 (0.059) | 463 | 4.060 (0.064) | 466 | 3.957 (0.057) | 470 | 4.117 (0.062) | 2815 | 1.454 0.202 |
| Number of children under five | 469 | 0.109 (0.016) | 472 | 0.106 (0.014) | 475 | 0.097 (0.014) | 463 | 0.121 (0.015) | 466 | 0.114 (0.015) | 470 | 0.115 (0.015) | 2815 | 0.314 0.905 |
| Have bank account | 469 | 0.339 (0.022) | 472 | 0.383 (0.022) | 475 | 0.347 (0.022) | 463 | 0.374 (0.023) | 466 | 0.333 (0.022) | 470 | 0.368 (0.022) | 2815 | 0.861 0.507 |
| Main experiment, control | 469 | 0.473 (0.023) | 472 | 0.417 (0.023) | 475 | 0.425 (0.023) | 463 | 0.425 (0.023) | 466 | 0.438 (0.023) | 470 | 0.438 (0.023) | 2815 | 0.754 0.583 |
| Main experiment, T1 | 469 | 0.373 (0.022) | 472 | 0.430 (0.023) | 475 | 0.432 (0.023) | 463 | 0.428 (0.023) | 466 | 0.408 (0.023) | 470 | 0.453 (0.023) | 2815 | 1.442 0.206 |
| Main experiment, T2 | 469 | 0.154 (0.017) | 472 | 0.153 (0.017) | 475 | 0.143 (0.016) | 463 | 0.147 (0.016) | 466 | 0.155 (0.017) | 470 | 0.109 (0.014) | 2815 | 1.178 0.317 |

Notes: This table reports balance tests of our treatment assignment across key variables. The table reports the number of observations within each group, the mean and standard error of a given variable within each group, and results for an F-test of balance across each group.

Table A.3: Balance Table - Within Household Experimental Sample

| Variable | (1) Control | | (2) T1 | | (3) T2 | | (4) T3 | | (5) T4 | | (6) T5 | | F-test for balance across all groups | |
|-------------------------------|----------------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|---|-----------------|
| | N | Mean/(SE) | N | Mean/(SE) | N | Mean/(SE) | N | Mean/(SE) | N | Mean/(SE) | N | Mean/(SE) | N | F-stat/P-value |
| Female | 407 | 0.511 (0.025) | 404 | 0.505 (0.025) | 415 | 0.513 (0.025) | 375 | 0.496 (0.026) | 388 | 0.510 (0.025) | 408 | 0.510 (0.025) | 2397 | 0.061 0.998 |
| Use mobile money account | 407 | 0.518 (0.025) | 404 | 0.545 (0.025) | 415 | 0.576 (0.024) | 375 | 0.557 (0.026) | 388 | 0.564 (0.025) | 408 | 0.547 (0.025) | 2397 | 0.645 0.665 |
| Have mobile money account | 390 | 0.528 (0.025) | 380 | 0.537 (0.026) | 397 | 0.531 (0.025) | 360 | 0.553 (0.026) | 370 | 0.524 (0.026) | 393 | 0.545 (0.025) | 2290 | 0.170 0.974 |
| Household size | 407 | 3.993 (0.066) | 404 | 4.074 (0.063) | 415 | 3.969 (0.061) | 375 | 4.016 (0.071) | 388 | 3.912 (0.062) | 408 | 4.081 (0.061) | 2397 | 1.010 0.410 |
| Number of children under five | 407 | 0.111 (0.016) | 404 | 0.109 (0.016) | 415 | 0.101 (0.015) | 375 | 0.107 (0.016) | 388 | 0.111 (0.016) | 408 | 0.118 (0.017) | 2397 | 0.116 0.989 |
| Have bank account | 407 | 0.332 (0.023) | 404 | 0.384 (0.024) | 415 | 0.340 (0.023) | 375 | 0.360 (0.025) | 388 | 0.327 (0.024) | 408 | 0.368 (0.024) | 2397 | 0.872 0.499 |
| Main experiment, control | 407 | 0.491 (0.025) | 404 | 0.394 (0.024) | 415 | 0.419 (0.024) | 375 | 0.408 (0.025) | 388 | 0.418 (0.025) | 408 | 0.441 (0.025) | 2397 | 1.970* 0.080 |
| Main experiment, T1 | 407 | 0.371 (0.024) | 404 | 0.438 (0.025) | 415 | 0.436 (0.024) | 375 | 0.448 (0.026) | 388 | 0.407 (0.025) | 408 | 0.449 (0.025) | 2397 | 1.519 0.181 |
| Main experiment, T2 | 407 | 0.138 (0.017) | 404 | 0.168 (0.019) | 415 | 0.145 (0.017) | 375 | 0.144 (0.018) | 388 | 0.175 (0.019) | 408 | 0.110 (0.016) | 2397 | 1.737 0.123 |

Notes: This table reports balance tests of our treatment assignment across key variables. The table reports the number of observations within each group, the mean and standard error of a given variable within each group, and results for an F-test of balance across each group.

Table A.4: Main Regression Results

| Dependent var: Accept digital payment offer vs. 200 Taka in cash | (1) | (2) | (3) |
|--|---------------------|---------------------|---------------------|
| T1: 220 offer | 0.083*** (0.021) | 0.111*** (0.033) | 0.085*** (0.025) |
| T2: 250 offer | 0.341*** (0.026) | 0.337*** (0.038) | 0.310*** (0.034) |
| T3: 300 offer | 0.568*** (0.025) | 0.547*** (0.037) | 0.522*** (0.036) |
| T4: 350 offer | 0.608*** (0.025) | 0.586*** (0.036) | 0.573*** (0.035) |
| T5: 400 offer | 0.717*** (0.022) | 0.703*** (0.033) | 0.714*** (0.032) |
| T1: 220 offer × Female | | -0.055 (0.043) | |
| T2: 250 offer × Female | | 0.008 (0.052) | |
| T3: 300 offer × Female | | 0.041 (0.051) | |
| T4: 350 offer × Female | | 0.043 (0.049) | |
| T5: 400 offer × Female | | 0.027 (0.045) | |
| T1: 220 offer × Have digital account | | | -0.004 (0.042) |
| T2: 250 offer × Have digital account | | | 0.061 (0.051) |
| T3: 300 offer × Have digital account | | | 0.089* (0.051) |
| T4: 350 offer × Have digital account | | | 0.068 (0.049) |
| T5: 400 offer × Have digital account | | | 0.007 (0.045) |
| Female (= 1) | 0.006 (0.016) | -0.004 (0.026) | 0.006 (0.016) |
| Have mobile money account (= 1) | 0.124*** (0.017) | 0.124*** (0.017) | 0.087*** (0.026) |
| Missing observation (= 1) | -0.002 (0.042) | -0.002 (0.042) | -0.003 (0.042) |
| Constant | 0.016 (0.018) | 0.022 (0.022) | 0.035** (0.018) |
| Observations | 2,815 | 2,815 | 2,815 |
| R-squared | 0.308 | 0.309 | 0.309 |

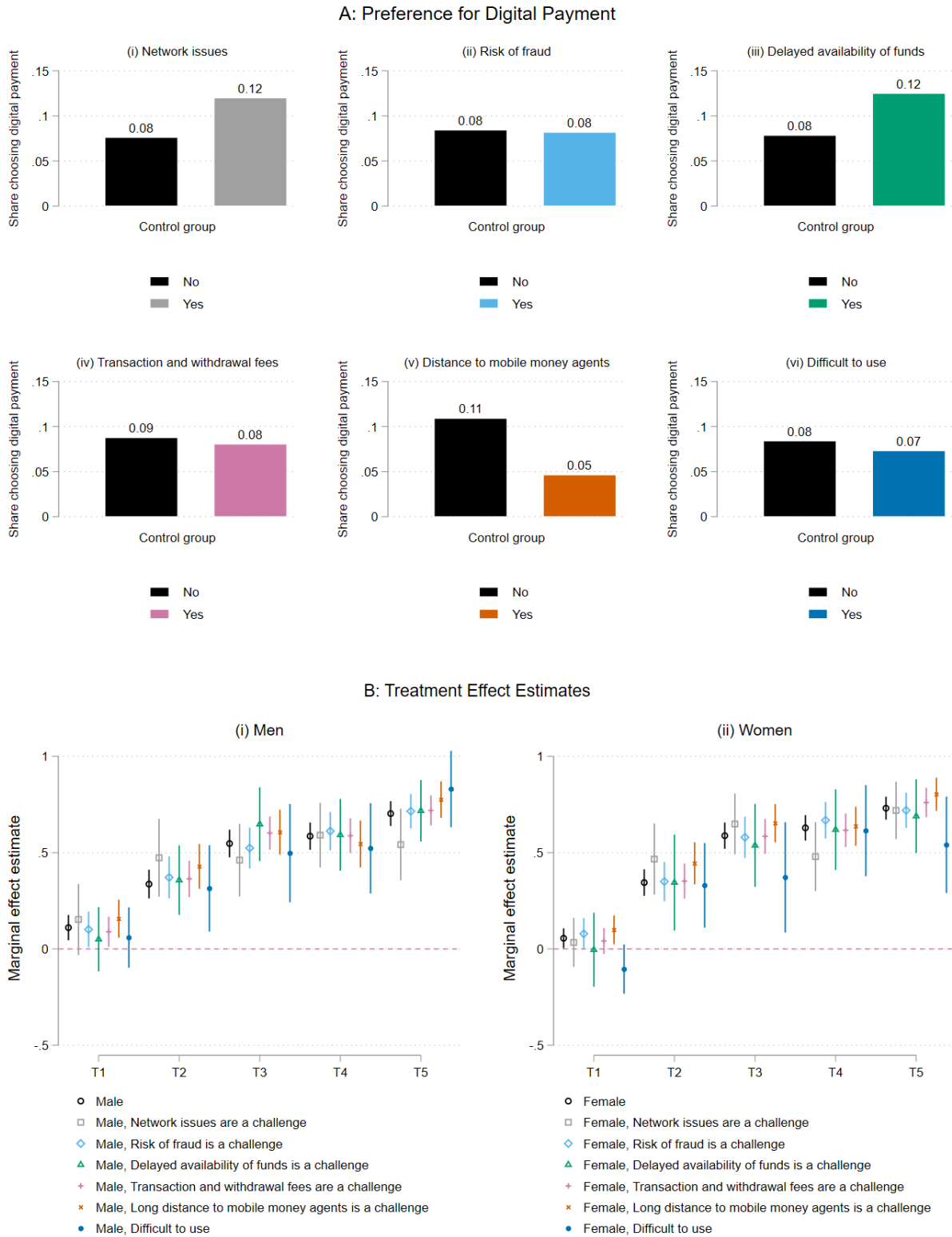
Notes: This table presents regression results based on the regression specified in equation (1) and reports heterogeneity based on gender and pre-existing digital account ownership. We measure pre-existing mobile money account ownership in our midline survey by asking respondents if they have a mobile money account. The midline survey was administered via a phone interview and 119 respondents included in the endline survey were not included in the midline survey. Thus, following our pre-analysis plan, we “dummy out” these missing observations by generating a variable indicating if an observation is missing and setting the value of missing observations to zero. Robust standard errors are reported in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table A.5: Within-Household Regression Results

| Dependent var: Accept digital payment offer vs. 200 Taka in cash | (1) | (2) | (3) | (4) |
|--|---------------------|---------------------|---------------------|-----------------------|
| T1: 220 offer | 0.083*** (0.021) | 0.093*** (0.023) | 0.053* (0.031) | 0.105** (0.044) |
| T2: 250 offer | 0.341*** (0.026) | 0.340*** (0.028) | 0.265*** (0.032) | 0.368*** (0.046) |
| T3: 300 offer | 0.568*** (0.025) | 0.556*** (0.028) | 0.487*** (0.033) | 0.592*** (0.045) |
| T4: 350 offer | 0.608*** (0.025) | 0.593*** (0.027) | 0.476*** (0.033) | 0.530*** (0.045) |
| T5: 400 offer | 0.717*** (0.022) | 0.698*** (0.024) | 0.582*** (0.032) | 0.610*** (0.045) |
| T1: 220 offer × female offer > male offer | | | | -0.104* (0.0616) |
| T2: 250 offer × female offer > male offer | | | | -0.209*** (0.0631) |
| T3: 300 offer × female offer > male offer | | | | -0.214*** (0.0666) |
| T4: 350 offer × female offer > male offer | | | | -0.107 (0.0689) |
| T5: 400 offer × female offer > male offer | | | | -0.061 (0.0678) |
| Have mobile money account (= 1) | 0.122*** (0.016) | 0.126*** (0.018) | 0.074*** (0.021) | 0.068*** (0.023) |
| Missing observation (= 1) | -0.002 (0.042) | -0.019 (0.045) | -0.009 (0.083) | -0.016 (0.085) |
| Constant | 0.021 (0.015) | 0.020 (0.015) | 0.116*** (0.025) | 0.120*** (0.025) |
| Observations | 2,815 | 2,397 | 2,397 | 2,397 |
| R-squared | 0.308 | 0.292 | 0.781 | 0.784 |
| Household fixed effects | No | No | Yes | Yes |
| Sample | Full | Sub-sample | Sub-sample | Sub-sample |

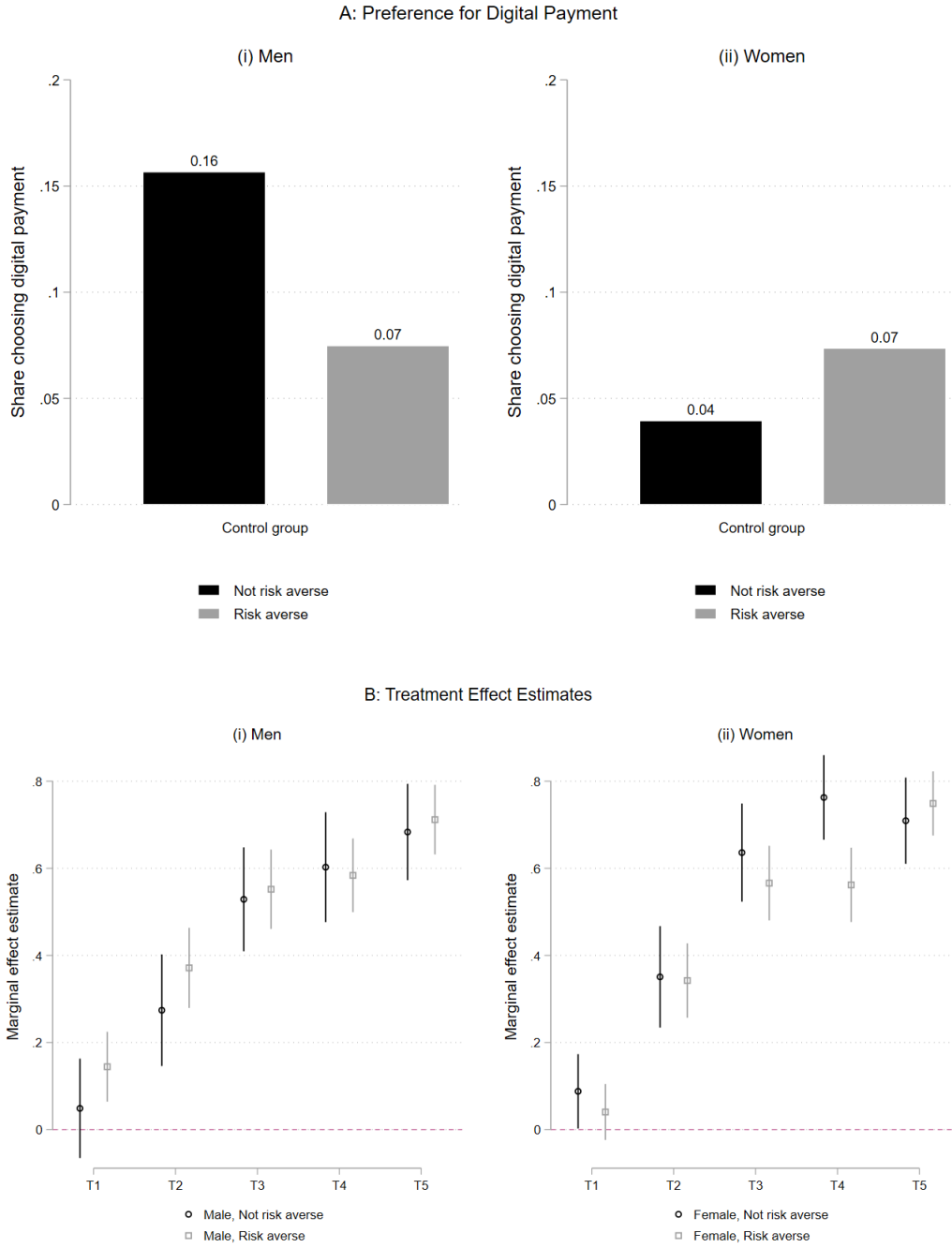
Notes: This table presents regression results based on the regression specified in equation (1). Column (1) shows results using the full sample for reference. Column (2) shows results using the sub-sample of households where the treatment varies within the household. Column (3) shows results using that same sub-sample and includes household fixed effects in the regression specification. Column (4) shows heterogeneous results based on whether the female within the household received a larger digital payment offer than the male. We measure pre-existing mobile money account ownership in our midline survey by asking respondents if they have a mobile money account. The midline survey was administered via a phone interview and 119 respondents included in the endline survey were not included in the midline survey. Thus, following our pre-analysis plan, we “dummy out” these missing observations by generating a variable indicating if an observation is missing and setting the value of missing observations to zero. Robust standard errors are reported in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Figure A.1: Heterogeneity by Reported Challenges when Receiving Mobile Money Transactions



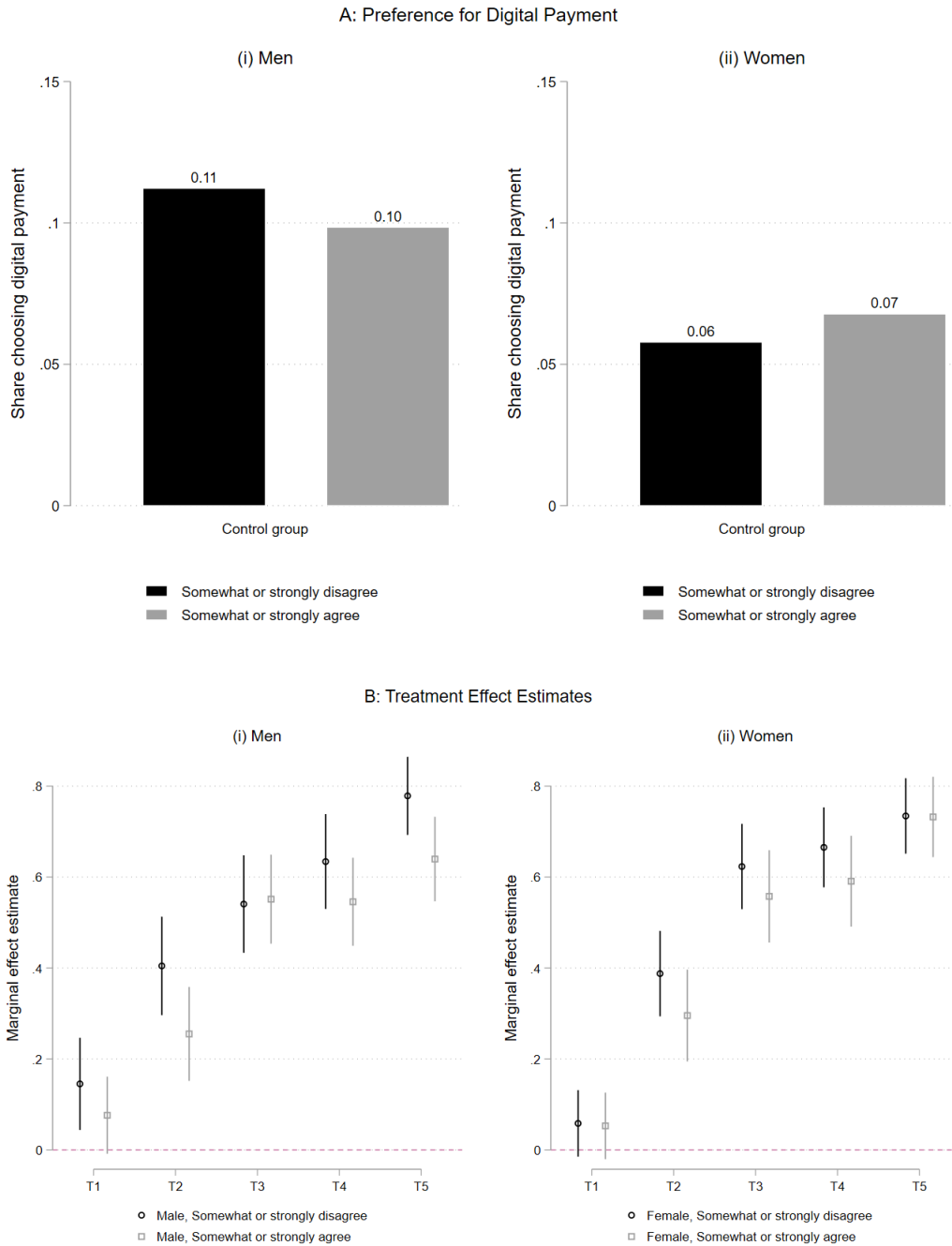
Notes: This figure reports heterogeneity by reported challenges experienced when receiving mobile money transactions. Panel A reports the share choosing the digital payment by group. Panel B reports marginal effect estimates by group and again separately for men and women.

Figure A.2: Heterogeneity by Risk Aversion



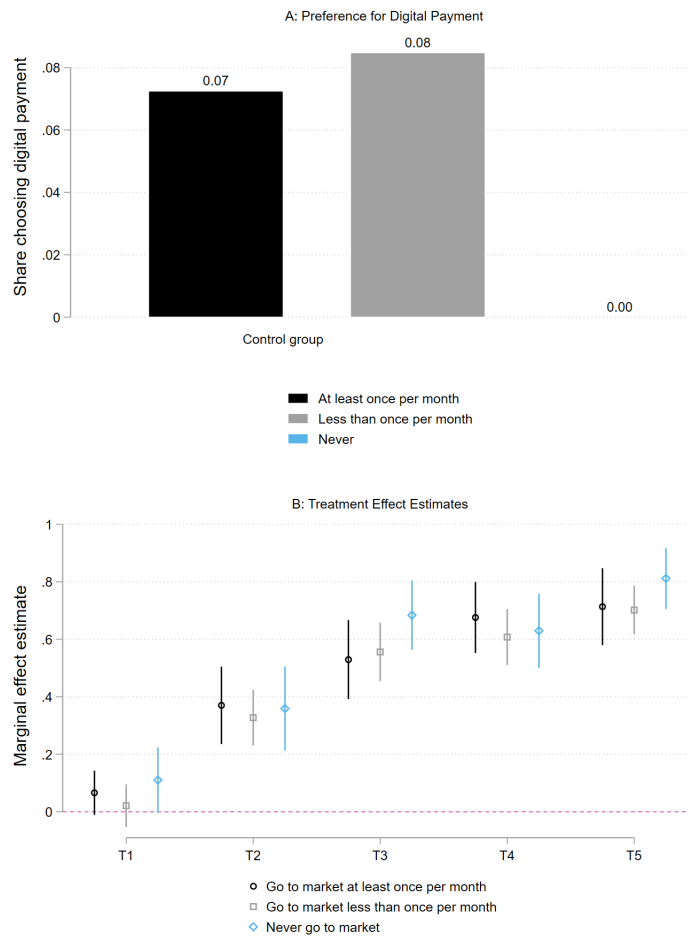
Notes: This figure reports heterogeneity by measured risk aversion. Risk aversion was measured in our baseline survey with an incentivized risk aversion module. Panel A reports the share choosing the digital payment by group separately for men and women. Panel B reports marginal effect estimates by group and again separately for men and women.

Figure A.3: Heterogeneity by Gender Role Attitudes



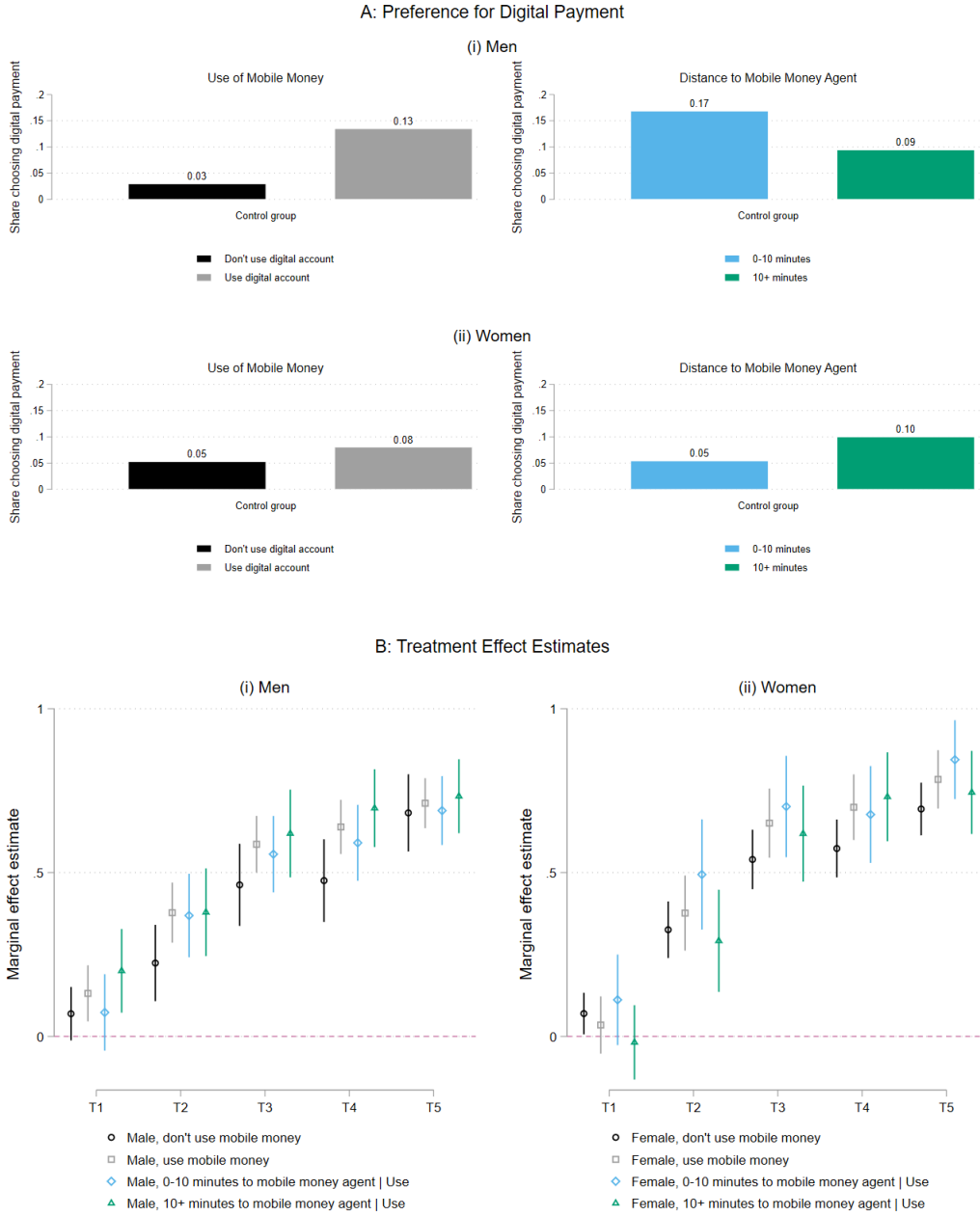
Notes: This figure reports heterogeneity by reported gender role attitudes. Respondents were asked if they somewhat or strongly agreed or disagreed with the following statement: “**The important decisions in a family should be made only by the men of the family.**” Panel A reports the share choosing the digital payment by group separately for men and women. Panel B reports marginal effect estimates by group and again separately for men and women.

Figure A.4: Heterogeneity by Mobility (Among Women)



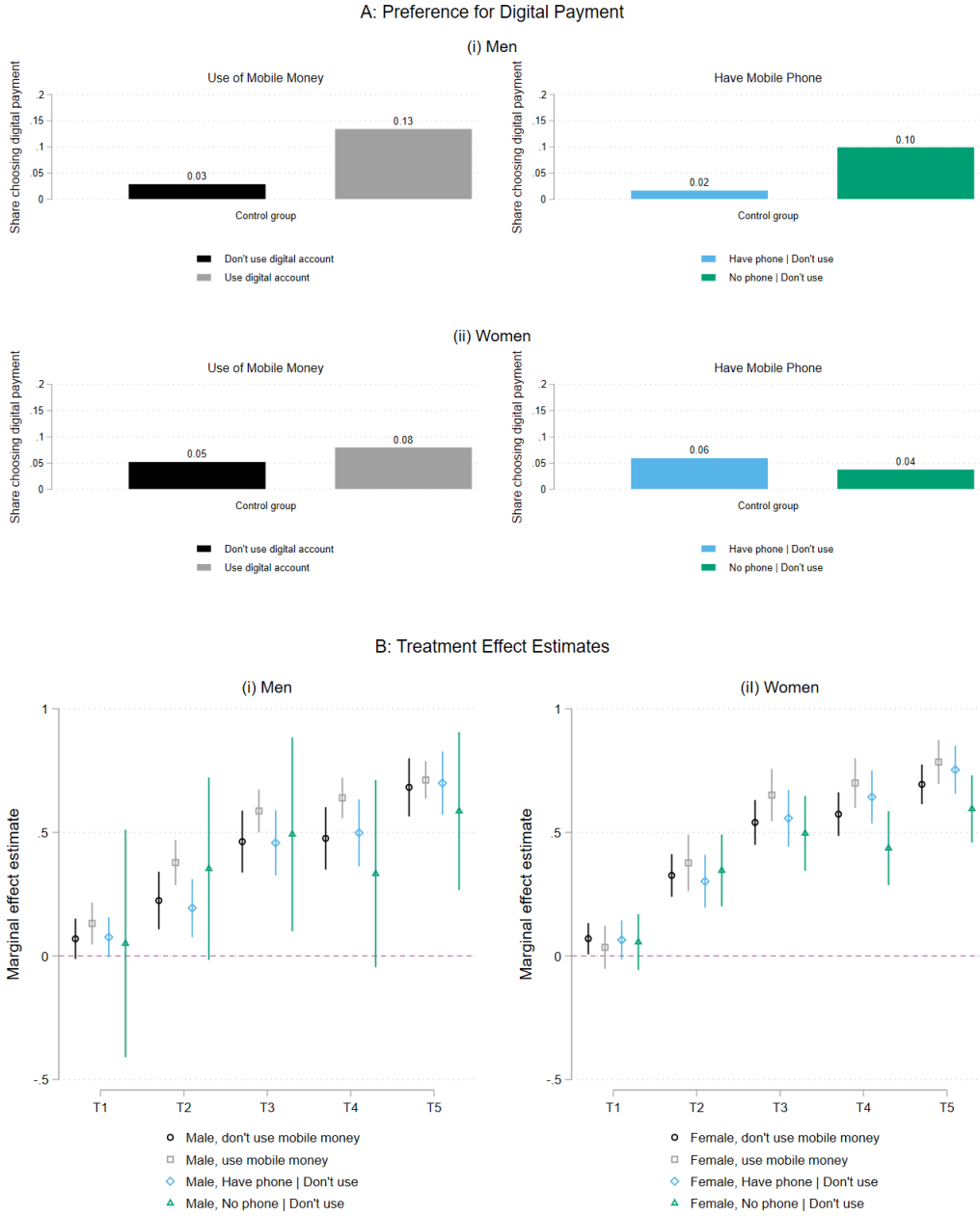
Notes: This figure reports heterogeneity by reported mobility among women. Respondents were asked how often they went to the market. Panel A reports the share choosing the digital payment. Panel B reports marginal effect estimates.

Figure A.5: Heterogeneity by Travel Time to Mobile Money Agent



Notes: This figure reports heterogeneity by the reported travel time between a respondent's home and the nearest mobile money agent. Only respondents who report using mobile money were asked to report the travel time to the nearest mobile money agent. Panel A reports the share choosing the digital payment by group separately for men and women. Panel B reports marginal effect estimates by group and again separately for men and women.

Figure A.6: Heterogeneity by Mobile Phone Ownership



Notes: This figure reports heterogeneity by if the respondent reports mobile phone ownership as a reason why they don't use a mobile money account. Only respondents who report not using mobile money were asked to report the reason why they don't use a mobile money account. Panel A reports the share choosing the digital payment by group separately for men and women. Panel B reports marginal effect estimates by group and again separately for men and women.

Table A.6: Auxiliary Regression Results

| Dependent var: Accept digital payment offer vs. 200 Taka in cash | (1) | (2) | (3) |
|--|--------------------|-------------------|-------------------|
| Female (= 1) | -0.014 (0.033) | -0.004 (0.037) | 0.004 (0.039) |
| Have mobile money account (= 1) | 0.066** (0.031) | 0.068* (0.038) | 0.068* (0.040) |
| Missing observation (= 1) | 0.000 (0.050) | 0.002 (0.061) | -0.044 (0.068) |
| Use mobile money account (= 1) | 0.052 (0.042) | 0.039 (0.049) | 0.046 (0.051) |
| Risk averse (= 1) | -0.023 (0.029) | -0.049 (0.037) | -0.051 (0.040) |
| Household size | 0.010 (0.015) | 0.003 (0.019) | 0.007 (0.018) |
| Number of children under five | -0.032 (0.032) | -0.036 (0.040) | -0.027 (0.044) |
| Have bank account (= 1) | -0.026 (0.029) | -0.014 (0.036) | -0.010 (0.039) |
| Main experiment, T1 | -0.042 (0.030) | -0.312 (0.314) | -0.288 (0.301) |
| Main experiment, T2 | 0.031 (0.030) | -0.251 (0.313) | -0.232 (0.307) |
| Travel time to nearest mobile money agent | -0.001 (0.003) | 0.000 (0.003) | 0.000 (0.003) |
| Education attainment | 0.001 (0.003) | 0.003 (0.004) | |
| Ln of education, health, and household maintenance expenditures | 0.001 (0.011) | 0.002 (0.012) | |
| Ln of food expenditures | -0.017 (0.068) | -0.002 (0.080) | |
| Ln of non-food expenditures | 0.011 (0.027) | 0.000 (0.033) | |
| Age | -0.000 (0.001) | -0.001 (0.002) | |
| Constant | 0.068 (0.404) | 0.294 (0.587) | 0.238 (0.324) |
| Observations | 469 | 469 | 469 |
| R-squared | 0.042 | 0.219 | 0.277 |
| Village fixed effects | No | Yes | Yes |
| Education decile bins | No | No | Yes |
| Expenditure decile bins | No | No | Yes |
| Age quintile bins | No | No | Yes |

Notes: This table presents auxiliary regression results of baseline predictors of a respondent accepting the digital payment within the parity group. Column (1) does not include village fixed effects. Column (2) adds village fixed effects. Column (3) allows for non-linear relationships for the education, expenditure, and age variables. We measure pre-existing mobile money account ownership in our midline survey by asking respondents if they have a mobile money account. The midline survey was administered via a phone interview and 119 respondents included in the endline survey were not included in the midline survey. Thus, following our pre-analysis plan, we “dummy out” these missing observations by generating a variable indicating if an observation is missing and setting the value of missing observations to zero. Robust standard errors are reported in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.7: Heterogeneity Index Balance on Treatment Assignment

| Heterogeneity index | (1) |
|---------------------|-------------------|
| T1: 220 offer | 0.001 (0.010) |
| T2: 250 offer | -0.000 (0.010) |
| T3: 300 offer | -0.003 (0.009) |
| T4: 350 offer | -0.001 (0.010) |
| T5: 400 offer | 0.015 (0.010) |
| Observations | 2,815 |
| R-squared | 0.104 |

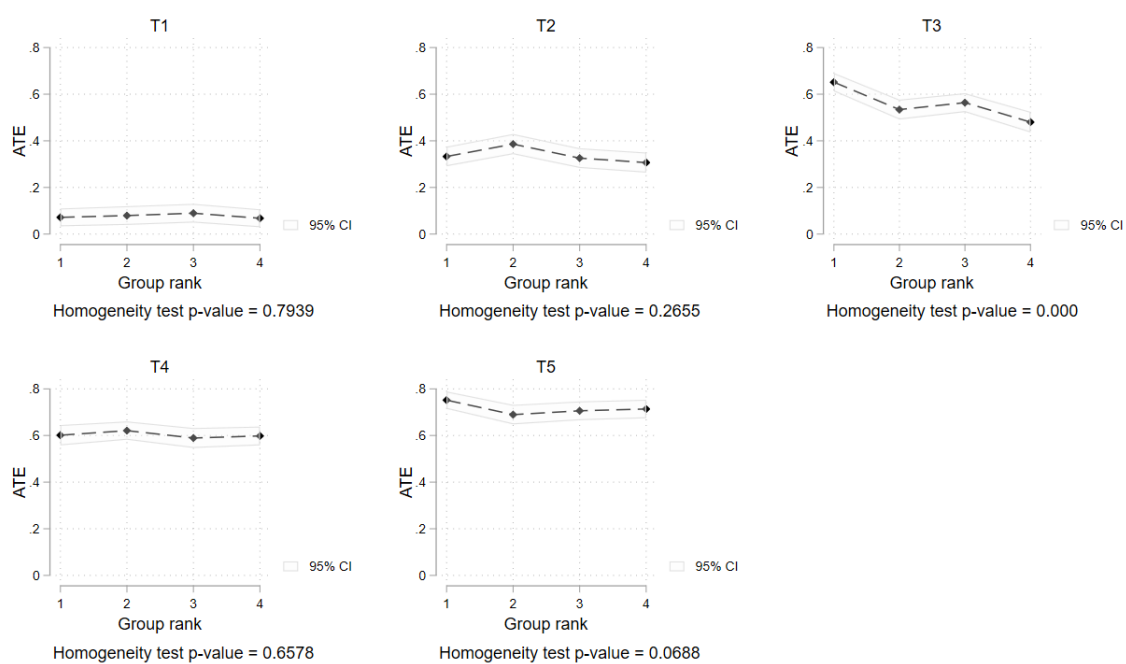
Notes: Robust standard errors are reported in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table A.8: Heterogeneity Index Regression Results

| Dependent var: Accept digital payment offer vs. 200 Taka in cash | (1) | (2) | (3) |
|--|---------------------|----------------------|----------------------|
| T1: 220 offer | 0.083*** (0.021) | 0.136*** (0.019) | 0.136*** (0.019) |
| T2: 250 offer | 0.341*** (0.026) | 0.399*** (0.026) | 0.399*** (0.026) |
| T3: 300 offer | 0.568*** (0.025) | 0.609*** (0.026) | 0.609*** (0.026) |
| T4: 350 offer | 0.608*** (0.025) | 0.658*** (0.026) | 0.658*** (0.026) |
| T5: 400 offer | 0.717*** (0.022) | 0.786*** (0.023) | 0.786*** (0.023) |
| T1: 220 offer × Index | | -0.644*** (0.164) | 0.270** (0.110) |
| T2: 250 offer × Index | | -0.695*** (0.185) | 0.219 (0.140) |
| T3: 300 offer × Index | | -0.482*** (0.179) | 0.432*** (0.133) |
| T4: 350 offer × Index | | -0.605*** (0.172) | 0.309** (0.122) |
| T5: 400 offer × Index | | -0.840*** (0.158) | 0.074 (0.102) |
| Index | | 0.914*** (0.123) | |
| C: 200 offer × Index | | | 0.914*** (0.123) |
| Have mobile money account (= 1) | 0.124*** (0.017) | 0.090*** (0.017) | 0.090*** (0.017) |
| Missing observation (= 1) | -0.002 (0.042) | 0.001 (0.042) | 0.001 (0.042) |
| Female (= 1) | 0.006 (0.016) | 0.010 (0.016) | 0.010 (0.016) |
| Constant | 0.016 (0.018) | -0.044*** (0.015) | -0.044*** (0.015) |
| Observations | 2,815 | 2,815 | 2,815 |
| R-squared | 0.308 | 0.325 | 0.325 |

Notes: This table reports analysis using the heterogeneity index. Robust standard errors are reported in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

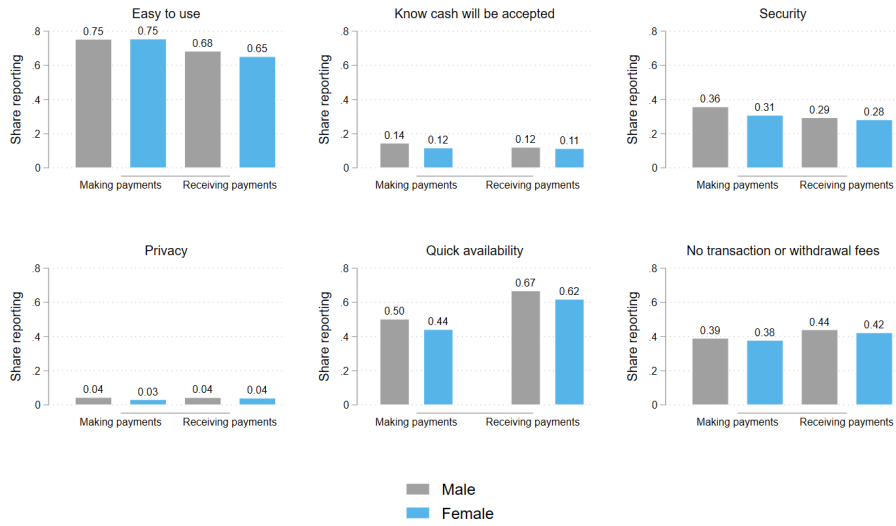
Figure A.7: Generalized Random Forest Machine Learning Heterogeneity Analysis



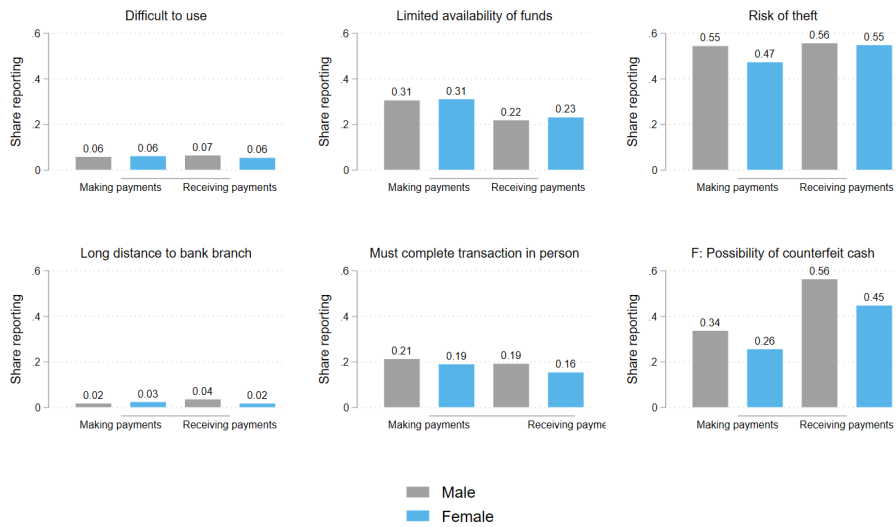
Notes: This figure visualizes analysis of treatment effect heterogeneity using the generalized random forest machine learning approach of [Athey et al. \(2019\)](#). Each sub-figure plots the group-based average treatment effect (ATE) estimates ranked by quantiles. A test of homogeneity across groups is reported below each sub-figure. In T3 only do we find evidence for heterogeneity across groups.

Figure A.8: The Benefits and Challenges of Cash Transactions

(A) Reported Benefits



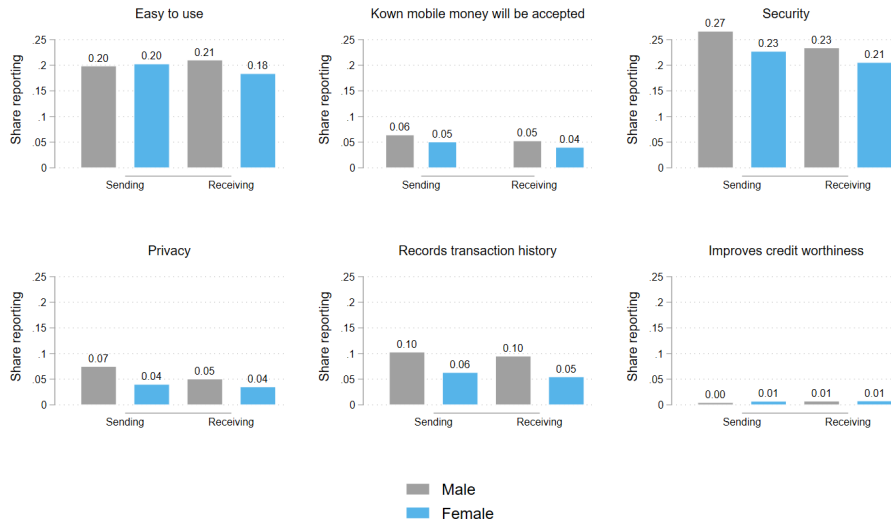
(B) Reported Challenges



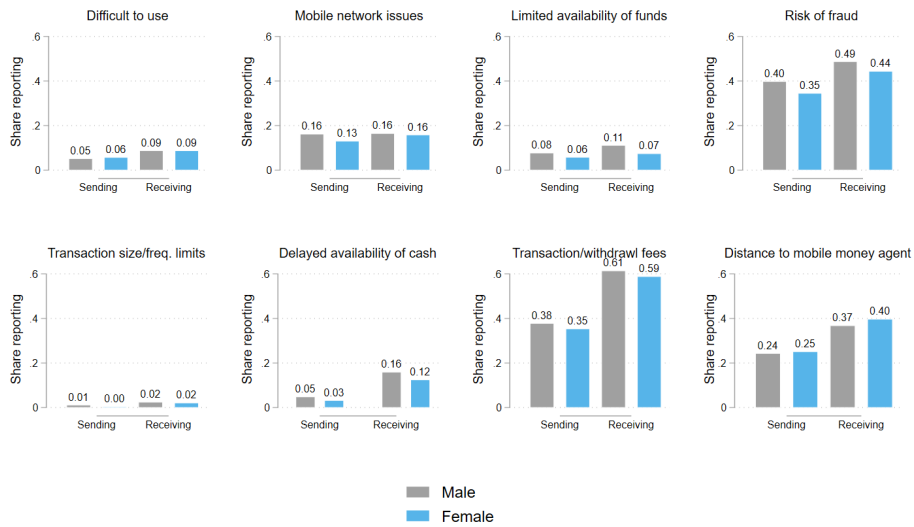
Notes: This figure reports stated benefits and challenges using cash when either making payments or receiving payments disaggregated by gender.

Figure A.9: The Benefits and Challenges of Digital Transactions

(A) Reported Benefits



(B) Reported Challenges



Notes: This figure reports stated benefits and challenges digital payments when either sending or receiving disaggregated by gender.

ALL IFPRI DISCUSSION PAPERS

All discussion papers are available [here](#)

They can be downloaded free of charge

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

www.ifpri.org

IFPRI HEADQUARTERS

1201 Eye Street, NW
Washington, DC 20005 USA
Tel.: +1-202-862-5600
Fax: +1-202-862-5606
Email: ifpri@cgiar.org