WORKING PAPERS

N° 22

2024

"Two-Sided Financial Technology Underadoption: Experimental Evidence from Jordan"

Sabrine Bair, Josepa Miquel-Florensa & Hakan Ozyilmaz

FIT IN Initiative

Two-Sided Financial Technology Underadoption: Experimental Evidence from Jordan *

Sabrine Bair
TSE

Josepa Miquel-Florensa
TSE

Hakan Ozyilmaz
Stanford

October 2, 2024

Abstract

This study examines the underadoption of digital wallets as network goods through a field experiment conducted in Jordan. We elicit consumers' and merchants' willingness-to-pay (WTP) for interoperable mobile wallets using an incentive-compatible mechanism and measure their expectations regarding cross-market adoption. Our findings indicate a low demand for digital wallets across both sides of the market, with consumers and merchants willing to pay approximately 35% and 40% of the market price, respectively. While consumers' aggregate expectations of merchant adoption are accurate, they exhibit considerable individual heterogeneity. Crucially, consumers' sensitivity to cross-network effects is limited: a 1 p.p. increase in cross-side adoption expectations translates into a 0.013 USD increase in WTP. Meanwhile, merchants significantly underestimate consumer adoption and demonstrate approximately half the sensitivity of consumers to cross-side network effects. These results hold significant implications for designing interventions that exploit network effects in order to increase digital wallet adoption.

Keywords: financial inclusion, network effects, digital wallet, digital financial literacy

*We thank Milo Bianchi, Alex Guembel, Daniela Puzzello and workshop participants at the Toulouse School of Economics for useful comments. We are grateful to Maha Bahou and her excellent team at JoPACC for their support throughout this project. We also want to thank our partner community-based organization and the digital wallet provider for providing logistical support. Bair: sabrine.bair@tse-fr.eu. Miquel-Florensa pepita.miquel@tse-fr.eu. Ozyilmaz: ozyilmaz@stanford.edu. This work was supported by the FIT IN Initiative through the TSE Partnership Research Foundation. The study was approved by TSE IRB. The project is pre-registered at AEA RCT Registry with the ID number AEARCTR-0013193. Correspondence: Hakan Ozyilmaz: ozyilmaz@stanford.edu.

1 Introduction

Digitizing financial transactions is high on government agendas in the developing world due its high potential to increase financial inclusion. Low operating costs linked with digitization increasingly allow financial service providers to profitably reach and provide services to the "unbanked" population around the world. One of the most significant financial technology innovations has been *mobile money*, enabling users to deposit, transfer, and withdraw funds in a digital account connected to their mobile phone number without needing to own a bank account (Aron (2017)). Mobile money has been a key driver of financial inclusion in the developing world. Evidence has shown that mobile money helps users to smooth health and income risks in the short term (Jack and Suri (2014), Riley (2018)) and lift themselves out of poverty in the long term (Suri and Jack (2016)). Similarly, the adoption of mobile money has shown to improve financial outcomes for small businesses (Nyaga (2013)). Despite the potential benefits, the adoption of mobile money by both consumers and small businesses has been low in some developing regions.

This paper studies the underadoption of digital wallets as network goods by jointly studying consumers' and merchants' willingness-to-pay (WTP) for these digital financial products. In particular, we ask, what is the consumers' and merchants' WTP for digital wallet services? How accurate are consumers' beliefs on cross-side and same-side adoption?[1] And, how sensitive are consumers' and merchants' WTP to their cross-market adoption beliefs? In theory, the lack of adoption on each side of the market should reduce the perceived value of adopting mobile money as a network good. Therefore, understanding how consumers and small businesses value digital wallets, how accurate their network beliefs are, and how sensitive their valuations are to network effects is crucial for developing effective and innovative financial inclusion policies.

We conduct a field experiment in Jordan. To do so, we partner with a local payment system operator and a financial technology company that provides digital wallets. We create a digital financial product that is tailored to each side of the market, for both consumers and merchants. The digital financial products have a clear market value (5 Jordanian Dinars (JD) or 7.06 USD), and

[1] We use the terms "cross-side beliefs" and "same-side beliefs" consistently with the two-sided platform literature (Jullien, Pavan and Rysman, 2021) i.e., a consumer digital financial package is subject to cross-side network effects as the value of the package increases in the number of merchants accepting digital payments; similarly, the digital financial package is subject to same-side network effects as the value of the package increases in the number of consumers owning digital wallets, and vice versa.

are directly tied to the cross-side of the market. On the consumer side, we offer a digital financial package that includes a digital wallet and a debit card that is attached to the digital wallet. Indeed, this is a common practice in the Jordanian digital payment landscape to increase the scope for cross-side network effects. On the merchants' side, we offer participants a digital financial package that includes a merchant wallet and a wallet credit that covers the cost of accepting wallet payments up to a specified amount.[2] There are three main outcome measures of interest to us: the WTP for digital financial packages, subjective network beliefs on the cross-side of the market, and subjective beliefs on the same-side of the market. To this end, we recruit participants from a set of target neighborhoods through a partner community-based organization (CBO) and invite them to a physical experimental location at the headquarters of the CBO in Jordan. In the experiment, we elicit consumers' and merchants' valuations of the digital financial packages using the incentive-compatible BDM mechanism (Becker, DeGroot and Marschak, 1964). Similarly, we elicit consumers' and merchants' subjective beliefs on both the cross-side and the same side of the market.

We provide clear evidence on the valuation of digital financial packages by consumers and merchants, as well as their subjective network beliefs. First, we find that WTP for digital financial packages is significantly below their market prices. Consumers are, on average, willing to pay 35% of the market price, whereas merchants' WTP stands at 42% of the market price. In terms of correlates of WTP, household heads have a significantly higher WTP compared to non-household heads, suggesting that financial account ownership is considered a substitute across household members. On the merchant side, a noteworthy fact is that merchants who have a personal bank account have a substantially lower WTP compared to merchants who do not have a personal bank account. This suggests that merchants, on average, use their personal bank account to meet the basic digital financial needs of their businesses. Second, we find that consumers have inaccurate beliefs about the adoption of digital payment methods by the merchants in their neighborhoods: more than 80% of consumers have inaccurate cross-side expectations, with more consumers overestimating cross-market adoption. Interestingly, consumers' aggregate cross-side expectations are well-calibrated. Third, we find that merchants' cross-side expectations are not much better. More than 70% of mer-

[2]Bank accounts and mobile money wallets are fully interoperable in Jordan through CliQ. Mobile money users can make payments at POS terminals through the issued debit cards. Similarly, merchants who use merchant wallets can accept payments from both mobile money users and bank account owners through QR codes and transfers.

chants have inaccurate cross-side expectations, with more merchants underestimating the cross-side ownership of financial accounts in their neighborhood. Unlike consumers, merchants' aggregate expectations are significantly lower than the true adoption rate in their neighborhood. Finally, we identify a positive association between WTP and cross-side expectations for both consumers and merchants. Consumers who have a 1 p.p. higher cross-side expectation are associated with a 0.01 JD increase in WTP, whereas the increase in WTP is 0.03 JD for merchants.

After establishing the baseline WTP of our participants, we conduct two experimental treatments to measure, first, how sensitive their WTP is to cross-side network effects, and second, whether basic digital wallet training influences their WTP. In the first treatment, **Information Provision**, we give participants market-level cross-side adoption information, gathered through pre-experiment surveys.[3] Consumers receive information on the percentage of merchants who accept digital payments in their neighborhood, while merchants are informed about the percentage of consumers who own financial accounts in their neighborhood. Before providing participants with cross-side adoption information, we elicit both their prior adoption expectations and their WTP. Measuring participants' WTP after providing cross-market information allows us to identify the causal effect of cross-side adoption expectations on WTP (i.e., the cross-side network sensitivity of WTP). The second treatment, **Training**, uses a digital wallet training program developed in collaboration with the local payment system operator and the service provider. The training consists of two components. The first involves educating participants on the types of financial services available through digital wallets, the benefits of these services, and how to protect themselves from potential risks, such as fraud, theft, and data security issues, as well as information on complaint channels. The second component is "hands-on", where participants practice making transfers and payments using a mock application provided by the partner service provider. By measuring participants' WTP before and after the training, we can identify the causal effect of this basic digital wallet training on their WTP.

We find that consumers exhibit sensitivity to updates on cross-side adoption information, though this sensitivity is relatively modest. Estimating a simple structural model of network sensitivity, we identify that a 1 p.p. increase in cross-side adoption expectation generates a 0.009 JOD increase in WTP. The average WTP among consumers who initially underestimate the extent of cross-network adoption in their neighborhood increases from 1.5 JD to 1.7 JD after being informed of the true

[3]We define a market as the neighborhood in which participants live or conduct business.

cross-side adoption rate. Conversely, for those who overestimate the adoption rate, the average WTP decreases from 2.1 JOD to 1.9 JOD following the cross-side information provision. A back-of-the-envelope calculation shows that consumers' WTP would increase from 40% to 59% of the market price if consumers were to expect every merchant in their neighborhood to accept digital payments. In contrast to consumers, merchants do not appear to be responsive to cross-side network effects. We detect no significant change in the average WTP among merchants who initially underestimate the cross-side wallet adoption in their neighborhood, and only a marginal decrease from 2.2 JOD to 2.1 JOD among those who overestimate. Our structural estimates show that a 1 p.p. increase in cross-side adoption expectation generates a 0.005 JD increase in WTP. Regarding the effect of digital wallet training, we observe a marginal increase in consumers' WTP, from 1.7 JOD to 1.9 JOD. In contrast, merchants show a slight decrease in their WTP, from 2 JOD to 1.7 JOD after receiving a digital wallet training.

This paper is, to the best of our knowledge, the first to experimentally measure WTP for digital financial services of financially excluded consumers and merchants. Additionally, we are not aware of any previous empirical paper that studies subjective beliefs on the network size of a digital financial technology. Using experimental treatments jointly with network beliefs, we are able to gain insights on the reasons behind the low adoption of this financial technology. We are able to study the accuracy of network beliefs, the sensitivity to cross-network effects, and the lack of digital wallet training as potential explanations for the low adoption rate on both sides of the market. In particular, quantifying WTP allows us to put a monetary value on the benefits of interventions that aim to increase adoption, and provides crucial insights for policymakers. While acknowledging the usual caveats of field experiments, we believe that each of these aspects is an important contribution to better understanding the mechanisms driving low adoption of digital wallets.

We contribute to several strands of the literature on mobile money, technology underadoption, and network effects in developing economies. A large literature in development economics discusses why consumers and firms do not appear to adopt beneficial technologies across various domains (Kremer, Rao and Schilbach, 2019; Gertler et al., n.d.). We contribute to this literature by quantifying the extent of the underadoption of mobile money wallets *simultaneously*, for both consumers and firms within the same experimental paradigm. While previous literature on mobile money points out the lack of physical infrastructure (Mothobi and Grzybowski, 2017), the lack of mobile money agents (Maurer, Nelms and Rea, 2013; Suri, 2017; Hernandez et al., 2020), the lack

of interoperability (Bianchi et al., 2023; Brunnermeier, Limodio and Spadavecchia, 2023), high transaction costs (Chogo and Sedoyeka, 2014), awareness (Uwamariya, Loebbecke and Cremer, 2021), digital financial literacy (Prasad, Meghwal and Dayama, 2018; Lyons, Kass-Hanna and Liu, 2021), and trust (Abdul-Hamid et al., 2019; Zareen, Chaddha et al., 2021) as potential sources of underadoption, we focus on incorrect network beliefs and the lack of sensitivity to network effects as potential drivers of underadoption. Finally, there is a large theoretical literature on two-sided payment platforms and network effects (Katz and Shapiro, 1986; Rochet and Tirole, 2003; Jullien, Pavan and Rysman, 2021), and the empirical literature on the extent of these effects in the developing world is growing (Crouzet, Gupta and Mezzanotti, 2020; Higgins, 2024). We contribute to this literature by providing the first experimental evidence on the extent of cross-side network effects in a developing country context.

A number of important policy insights emerge from our results. First, the differing levels of responsiveness to cross-side network effects between consumers and merchants indicate that a one-size-fits-all approach may not be effective. Policymakers should consider differentiated strategies that cater to the specific needs and behaviors of each group. On the consumer side, initiatives that aim to increase consumers' awareness of merchants' acceptance of digital wallets could have a positive impact on consumer adoption, as consumers appreciate cross-side network effects. These interventions could be as simple as visibly displaying merchant acceptance of digital payments on storefronts to counter the underestimation of cross-side adoption. On the merchant side, providing direct incentives for merchants to adopt digital wallets appears to be essential for broader adoption. Reducing merchant discount rates or providing subsidies would not only increase merchant adoption, but would also increase consumer adoption through cross-side network effects. Relatedly, policymakers could focus on strategies that create stronger network externalities, such as establishing local or regional initiatives where a critical mass of merchants adopt digital wallets simultaneously. This could create a positive feedback loop, where increased merchant adoption further boosts consumers' WTP.

The rest of the paper is organized as follows. Section 2 describes the Jordanian mobile money market. Section 3 details the experimental design and presents the descriptive statistics on our sample. Section 4 presents the results for consumers and merchants separately, and Section 5 provides a brief discussion of our results. Section 6 concludes.

2 Jordanian Mobile Money Market

Jordan offers a unique laboratory in which to study the underadoption of financial technologies, as it is free from some of the important barriers to adoption that are present in other countries.

The country does not face any issues with the quality of its telecom infrastructure, which is exceptionally high: 99% of the population has access to 4G and network performance is considered among the highest in Middle East and African countries.[4] Moreover, much of the population have mobile phones and internet access (JoPACC (2021)). In addition, the Central Bank of Jordan actively encourages the development of the agent network by placing no restrictions on the type of business that can serve as an agent or on the type of activity they can conduct. Using ATMs and post offices as cash-in, cash-out (CICO) points further extends the coverage for individuals who have access to mobile money agents. Indeed, Jordan's regulatory environment for the growth of agent networks is considered perfectly enabling by GSMA, which is rated identically to countries such as Kenya and Ghana that have exceptional agent networks and very high adoption rates (Andersson-Manjang (2021)).[5] The wallet-to-agent ratio in Jordan is 294:1, which is comparable to Kenya.[6] Regarding transaction costs for mobile money services, the fees are remarkably low. Although there are differences across operators, remittance and cash-in operations are free of charge for all major service providers.[7] Jordan also ranks highly in terms of the affordability of mobile connectivity (handset and data prices) according to GSMA's mobile connectivity index. Despite the lack of these barriers to adoption, Jordan's mobile money penetration rate stands at 47% as of 2021.[8]

The Jordanian mobile money market is relatively competitive. The market comprises seven mobile money providers offering a large set of services with little variation across providers. Crucially, each provider offers CICO money transfers, and payment by QR code. The cost of these services varies marginally from one provider to another, with cash-in generally free-of-charge and cash-out between 0.75 JOD and 0.94 JOD, depending on the provider. The cost of transfers depends on

[4]GSMA's Mobile Connectvity Index: https://www.mobileconnectivityindex.com/

[5]The density of the agent network in Kenya and Ghana stands at 795 and 1,657 active agents per 100,000 adults (i.e., the adult penetration rate). Moreover, the ratio of active accounts to adult population is 0.98 and 0.86, respectively. GSMA is an international organization representing the interests of telecom operators worldwide. https://www.gsma.com/mobilemoneymetrics/regulatory-index

[6]https://www.centerforfinancialinclusion.org/mobile-money-in-times-of-crisis-an-unlikely-hero

[7]The fee schedule disincentivizes cashing out and lack of activity: on average across providers, the agent cash-out fee is 0.5 JOD for any amount less than 50 JOD (1%), and there is a 2 JOD monthly frozen account fee.

[8]JoPACC and Jordan Department of Statistics.

whether they are on- or off-network.

2.1 Experimental Setting

We conduct our experiment in Zarqa, a large city on the outskirts of Amman, Jordan's capital city. Zarqa has a relatively low adoption rate of financial technologies and a lower income than the other governorates. Regarding other critical characteristics, it closely tracks the Kingdom's averages. We identify three neighborhoods in central Zarqa: Al Ghwariyah, Maasom, and Ramzi (a map in Figure 1 that shows the location of the districts). We target neighborhoods with an existing mobile money agent within their borders to ensure that our participants have access to critical mobile money infrastructure in the case of adoption. Table 1 shows that the three districts are quite similar in terms of population and number of active businesses, while they differ in the number of agents within the district.

For an estimation of digital wallet adoption on the consumer and merchant sides of the market, we conducted a street survey some weeks prior to running the experimental sessions in order to quantify both merchants' adoption of digital payment methods and consumers' adoption of financial accounts.[9] Table 2 reports that, among the merchants interviewed in the three neighborhoods, the acceptance of digital payments is around 37% in AlGhwariyah, Maasom, and Ramzi. On the other side of the market, financial account ownership varied across the three neighborhoods, with 53%, 70%, and 21% in AlGhwariyah, Maasom, and Ramzi, respectively.

3 Experimental Design

The aim of this experiment is four-fold. First, we want to understand how much consumers and merchants are willing to pay for a digital financial package and, in particular, how far off their WTP is from market prices. Second, we want to measure both consumers' and merchants' cross-side adoption expectations, and how the changes in these expectations affect their WTP. Third, we want to identify the causal effect of cross-side adoption expectations updates on the WTP. And

[9]Throughout the paper, we use the term "digital payments" to refer to mobile money payments and card payments and "financial accounts" to refer to mobile money accounts and bank accounts.

fourth, we want to measure whether or not consumers and merchants who receive hands-on digital wallet training are willing to pay more for the digital financial package.

To achieve these goals, we create an experimental design to clearly measure our main outcomes of interest (WTP) and the cross-side adoption expectations for participants on each side of the digital wallet market: consumers and merchants. Identifying our participants' baseline WTP and cross-side expectations allows us to measure how each of these outcome measures change when participants receive either information on cross-side adoption or hands-on digital wallet training. While within-participant differences in our main outcome measures yield our desired causal estimates, between-participant estimates allow us to understand the interaction between cross-side network sensitivity and digital wallet training.

3.1 Recruitment of Participants

We partner with a local community-based organization (CBO) that, using their database for initial contacts, recruit 191 consumers and 87 small businesses from three neighborhoods in Zarqa. We target an equal number of participants from each neighborhood for each side of the market as each neighborhood is similar in population size and number of businesses that operate in these districts. Specifically, we target 60 consumers and 30 merchants from each neighborhood. Our final sample is consistent with the target samples with small differences.[10] We restrict the eligibility of all participants (consumers and merchants) to individuals who are over 18 years old, and who have a valid ID, a personal smartphone, and a phone number. For consumers, we further require that individuals do not have a financial account. For merchants, we also require them to have a valid business license and to not currently accept digital payments. Individuals who register to participate in the experiment received a session invitation for a specific day and time. All experimental participants were recruited in April 2024, a few days before their scheduled session dates.

3.2 Digital Financial Package

In partnership with one of the main mobile money service providers in Jordan, participants are offered a digital financial package tailored to their own side of the market. For each participant,

[10] In one of the neighborhoods, we conducted an additional consumer session with 15 participants to reach our total consumer target size of 180.

irrespective of their side, the package has the value of 5 JOD.[11] The package offered to consumers consisted of a digital wallet and a debit card that has a 5 JOD market price. It is common for digital wallet service providers to offer debit cards associated with digital wallets in Jordan. The three main mobile money service providers all offer debit cards that allow users to make purchases at stores accepting POS payments, online purchases and that benefit from the ATM network for cash-out transactions.[12] Since our goal is to study participants' WTP for digital wallet services and understand how sensitive they are to cross-side network effects, offering a package that includes a debit card helps us to achieve both of these goals. Through this package, we create a digital financial product that has a clear and simple market price and that is obviously tied to the cross-side of the market. At the beginning of each session, we clearly inform each participant about the content of the package and its market price. Both digital wallets and debit cards are issued on-site at the end of the experimental session for participants who wished to open a wallet through the BDM mechanism during the experiment.

For merchants, the package offered consists of a merchant wallet and 5 JOD of credit in the wallet to cover the cost of accepting 500 JOD on digital payments. Again, through offering a digital financial package rather than a digital wallet alone, we create a digital financial product that has a simple and clear market value and that is obviously tied to the cross-side of the market. Unlike consumer wallets, merchant wallets cannot be issued on-site due to the more complex nature of the merchant wallet issuance process, which involves further documentation than the consumer wallets. As per their business-as-usual, our partner provider schedules an appointment with merchant participants who wished to open a wallet through the BDM mechanism during the experiment. [13]

[11] The Jordanian Dinar (JOD) has been pegged to the US Dollar since 1995 at the rate of 0.7090 JOD per USD.

[12] While opening a digital wallet alone is free-of-charge, debit cards are typically issued for a fee. Several digital service providers in the market charge no fee for opening digital wallets and charge 5 JOD for issuing debit cards.

[13] The fees for merchant wallets vary based on the transaction type, transaction size, and the size of the merchants. The service fees for various transactions are as follows: the merchant discount rate (the cost of accepting digital payments) ranges between 1% to 1.5% of the received amount in JOD. The upper limit for the merchant discount rate is set by the Central Bank of Jordan. Sending money within the same network costs between 0.1 to 0.5 JOD. Transferring money to other digital wallets has a fee ranging from 0.35 to 0.5 JOD. Lastly, sending money to bank accounts is subject to a flat fee of 1 JOD. Our partner provider agreed to fix the merchant discount rate at 1% for all merchant wallets issued as part of our experiment.

3.3 Experimental Treatments

The experiment consists of two treatments. In our treatment **Information Provision**, we provide each participant with market-level cross-side adoption information that is collected through pre-experiment street surveys. We define a market as the neighborhood where participants reside or conduct business. Thus, we provide consumers with information on what percentage of businesses in their neighborhood accept digital payments. For merchants, we provide them with information on what percentage of consumers own financial accounts in their neighborhoods. Before providing participants with cross-side adoption information, we elicit both their prior adoption expectations and their WTP. Measuring participants' WTP after providing cross-market information allows us to identify the causal effect of cross-side adoption expectations on WTP (i.e., the cross-side network sensitivity of WTP).

In our **Training** treatment, we provide participants with digital wallet training that is created in collaboration with the local payment system operator and the service provider. The training has two components. In the first component, the field officers provide information about what type of financial services they can conduct using digital wallets, how they can benefit from these services and how they can protect themselves from potential risks (i.e., fraud, theft, data security, complaint channels, etc.). The training also includes a hands-on component, where participants practice making transfers and payments through the partner provider's mock application. Measuring participants' WTP and comparing it before and after the training allows us to identify the causal effect of the provision of digital wallet training.

Each participant receives both treatments. We vary the treatment assignment order at the session level. Each participant is assigned to one of the two orders. Tables A1 and A2 show that the samples are balanced and similar across the two orders in observable characteristics. In Order A, participants first receive cross-side information, and then basic digital wallet training, while Order B is the inverse.

Figure 2 shows the structure of the WTP experiment. The experiment is divided into three main rounds and starts with a practice round where the participants are introduced to the BDM mechanism. Between each round, participants receive one of the treatments. In each round, participants' WTP for the digital financial package is elicited. Additionally, in the round before cross-side information provision, participants' cross-side and same-side beliefs are elicited. Only same-side

beliefs are elicited in the round after the cross-side information provision. In the outcome round, participants learn which round counts as their final WTP, which is chosen randomly, whether or not they receive a voucher for the digital financial package and at what price.

3.4 Experimental Protocol

All experimental sessions were conducted at the premises of partner CBO in April 2024. Each experimental session had only consumers or merchants. Consumers (merchants) received a participation fee of 5 JOD (10 JOD) to compensate for their time and potential travel cost. Merchants sessions occurred in the late afternoon after usual business hours, and their higher participation compensation was to compensate for higher transport costs at rush hour.[14]

Upon arrival at the CBO premises, participants were randomly allocated a sticker with a code to match them with an experimental assistant.[15] The assistant walked the participant to one of the two experimental rooms and installed him/her at a desk matching the participant's code. On the desk, the participant had a white and a brown carton cup with small pieces of paper inside; the experimental assistant had a pen, the experimental forms, plus a tablet for the post-experimental survey. Within each experimental room, the desks were organized such that all participants could see the screen for projection and the experiment director, while ensuring as much as possible privacy for the participant to make their decisions.

After each participant had settled at their desks, the experiment director read aloud the consent form, collected the signed consent forms and gave a brief introduction of the digital financial packages offered to the participants. The participants then watched a short video on digital wallets and their use (transcript in the Protocol appendix). The scientific nature of the study was clearly emphasized and the participants were reminded that the research team did not benefit from the adoption of digital financial packages. The participants were then told that the experimental assistants would

[14]The experiment lasted for approximately two hours, and participants were compensated for participating in this study with a fixed amount of 5 JOD for consumers and 10 JOD for merchants. These amounts were paid in cash at the end of the experiment. The compensatory fixed amount exceeded the minimum wage in Jordan (the minimum monthly wage in Jordan was set at 260 JOD and dividing the monthly minimum wage of 260 JOD by 208 hours gives us an approximate hourly rate of 1.25 JOD).

[15]The CBO confirmed whether the participant was invited for that session and whether the eligibility conditions were satisfied. For consumers, they could check on their own phone whether that phone line had any digital wallet registered.

introduce them to a method to determine their willingness to pay, while emphasizing that they are never required to pay more than they are willing to pay using this method.

Once the experimental assistants finished implementing the protocol, they used tablets to complete a post-experiment survey. Participants who received the pen through the BDM mechanism, and wished to do so, made their payments for the pen. Participants who received a voucher for the digital financial package, and wished to do so, went to the partner digital wallet provider station and received their digital wallets and made their payments. Participants received their participation payments before leaving the CBO premises, and were offered refreshments.

3.5 Eliciting Willingness-to-Pay

We elicit WTP using the Becker-DeGroot-Marschak mechanism (Becker, DeGroot and Marschak (1964)). The mechanism is simple and has strong incentive compatible properties. Participants state a WTP amount and randomly draw a price. The participants pay their drawn price and receive the package only when their WTP is weakly greater than the drawn price. The mechanism, therefore, operates as a second price auction, and truthful reporting is a weakly dominant strategy for expected utility maximizers, irrespective of their risk aversion. The BDM mechanism has other useful properties that are crucial for our design. In contrast to the take-it-or-leave-it (TIOLI) method, which only provides a bound on WTP, the BDM method yields an exact WTP measure. Having a more exact WTP measure increases our ability to detect changes in WTP in response to our treatments and it thus plays a crucial role in providing tighter causal estimates. Additionally, BDM introduces random variations in both purchase status and the price paid, conditional on WTP. Consequently, BDM can extract richer information than that which is typically available in other WTP data (Berry, Fischer and Guiteras (2020)).

While being the gold standard among WTP measurement tools in experimental economics, the mechanism can be difficult to understand for participants if they have not received detailed instructions and feedback (Cason and Plott (2014)). To address these challenges, we follow the implementation method developed by Berry, Fischer and Guiteras (2020) and Berkouwer and Dean (2022). First, the field officers provide detailed instructions on how the method works, go through a practice round with the participants using a pen, and test their understanding of the mechanism by asking simple questions. Second, the field officers conduct a binary search over the BDM price

range by asking multiple questions rather than asking participants to choose a WTP amount from a continuous scale in a single question. This eliminates the need for contingent reasoning and provides concreteness (Berkouwer and Dean (2022)). In particular, the field officer asks, "If the price was 2.5 JOD, would you want to get the digital finance package?" Depending on the participant's answer, the field officer asks the same question using a different price. This procedure involves five questions that yields a final WTP amount.[16] The field officer confirms that the WTP amount reached at the end of this process is indeed the participant's maximum WTP. Third, we use a transparent randomization process to determine the BDM price: the participants themselves draw a price by randomly choosing a paper slip from a cup. This aims to increase the participants' trust in the randomization process. In terms of the parametrization, we use a discrete uniform price distribution and set the upper range of the BDM prices to the market price of the digital financial packages on offer. To minimize potential anchoring effects on the properties of the price distribution, we do not inform the participant of the actual distribution (Bohm, Lindén and Sonnegård, 1997). Burchardi et al. (2021) shows that the comprehension of the BDM mechanism is over 90% in rural Uganda and does not depend on the participant's knowledge of the exact distribution of the BDM prices. We can arguably believe that is also the case in peri-urban Jordan.

3.6 Eliciting Adoption Beliefs

We elicit participants' cross-side adoption beliefs with two goals in mind. First, we want to understand whether or not participants are well-calibrated. Underestimating cross-side adoption could be an important reason why individuals have a low WTP for digital wallets. Second, we want to measure how sensitive participants' WTP is to cross-side network effects.

We define a market as the neighborhood in which participants reside or conduct business. As we validate in our experimental data, consumers make a significant portion of their payments in their own neighborhoods, and merchants generate a significant amount of their revenue through sales to consumers residing in their neighborhood. Thus, in our context, cross-side network effects mainly operate locally at the neighborhood level, and we measure the sensitivity of WTP to these local cross-side network effects.

[16] The field officers use a decision tree that allows them to record the participant's answers. See Figure A1. Instruction details are available in the Appendix.

For cross-side belief elicitation, we ask consumers to state their expectations about merchants adopting digital wallets or debit cards within their neighborhood. The relevant cross-side adoption for consumers includes merchants who accept debit cards, in addition to merchants who accept digital wallets, since the digital financial package we offer consumers involves a debit card. Conversely, we ask the merchants to state their expectations about consumer adoption of digital wallets or bank accounts, as the digital wallets we offer the merchants allows them to receive digital payments from any consumer who has a financial account.[17]

We use visual aids to help participants conceptualize their cross-side adoption expectations (Delavande, Giné and McKenzie, 2011; Delavande, 2014).[18] Importantly, we do not incentivize participants to state their beliefs in order to limit the complexity of our experiment.[19] Un-incentivized belief elicitation is common in information provision experiments (Haaland, Roth and Wohlfart, 2023).

Providing cross-side adoption information can lead participants to update their same-side adoption expectations, potentially confounding our estimates on the sensitivity of WTP to cross-side network effects. To capture such an indirect effect of information provision on same-side beliefs, we ask consumers to state their adoption expectations at the country level and merchants to state their expectations at the neighborhood level.[20] We elicit participants' same-side beliefs both before

[17]CLIQ in Jordan allows instant and interoperable transfers between bank accounts and digital wallets free-of-charge to their customers. Similarly, JoMoPay allows instant and interoperable merchant payments across different digital wallet providers free-of-charge.

[18]See Figures A2 and A3 for the visual belief elicitation sheets. The field officers show each participant the relevant belief sheet. Each belief sheet features eleven columns. Each column represents a percentage level of adoption within their neighborhood from 0% to 100%. The field officers explain what each percentage would mean in terms of cross-side adoption (i.e., while eliciting consumers' cross-side beliefs: a percentage of 0% would mean no business in their neighborhood accepts digital payments, whereas 50% would mean half of the businesses in their neighborhood accept digital payments). After explaining what each percentage would mean in terms of adoption, the field officer explains that the research team has interviewed a specific number of businesses in their neighborhood and asks the participant to choose a column that best represents their neighborhood's level of adoption based on the interview's result. The field officer then tells the participants how many businesses this would correspond to and asks them to verify their choice again.

[19]Eliciting beliefs in an incentive-compatible way in addition to WTP would have further increased the complexity of our experiment and increased the cognitive load on the participants, potentially increasing the noise in our estimates (Danz, Vesterlund and Wilson, 2022).

[20]The reason we choose the country level for consumer expectations is because person-to-person transfers are more likely to occur over long distances at the country level rather than the neighborhood level. We do not elicit the merchant's same-side beliefs at the country level because digital wallets are a way of accepting payments rather than making transfers for the merchants, as many of them have personal bank accounts. Thus, for merchants, eliciting same-side

and after receiving cross-side information.

3.7 Sample Descriptive Statistics

This section describes the data collected during the post-experimental survey for participants in the experiment. Tables A1 and A2 include a range of characteristics of consumers and merchants, respectively, regarding their knowledge and degree of trust in mobile money services. We also collect information on their transactions, payment methods, and use of financial products. Additionally, we assess participants' financial knowledge and attitudes, along with standard demographic information and details about merchants' business characteristics.

Columns 1 and 2 report the average value and standard deviation for all consumers in our sample, regardless of the assignment order. Columns 3 and 4 report the average value and standard deviation for consumers assigned randomly to order A treatment, and in columns 5 and 6 to order B. In columns 7 and 8, we run a t-test to assess the differences in characteristics between the two treatment orders.

In table A1, the total sample consists of 203 consumers; where 109 are assigned randomly to order A and 94 are assigned to order B. The majority of consumers are women (87%), with an average age of 37 years old. Among them, 56% are housewives, and 56% are married. A total of 80% have achieved at least a secondary level of education. The average income of participants is 165 JOD, with a maximum of 550 JOD. Further, 33% have no monthly income, and 28% earn less than 160 JOD per month. The percentage of consumers who are aware of mobile money services is 36%, while 60% of them attended a mobile money event, and 86% also attended a financial inclusion event. To measure trust in mobile money services, we asked participants if they had a personal mobile wallet and 1,000 JOD (in the wallet), and how much money they would feel comfortable keeping in their mobile wallet. On average, consumers are willing to keep 641 JOD in their personal wallets. We also collected information on participants' internet access, transactions and remittances, and financial literacy, using an indicator set to 1 if the consumer answered at least one out of five financial literacy questions correctly. The sample composition aligns with the profile of individuals without financial accounts, as reported in the 2021 market study on the adoption of digital financial services by Jopacc (JoPACC (2021)).

beliefs allows us to control for potential competitive effects rather than direct network effects.

Table A2 of merchant characteristics follows the same structure as for consumers: in columns 1 and 2, we report the average value and standard deviation for all merchants in our sample, regardless of the order of assignment. In columns 3 and 4, we report the average value and standard deviation for merchants assigned randomly to order A treatment, and in columns 5 and 6 to order B. In columns 7 and 8, we run a t-test to assess the differences in characteristics between the two treatment orders.

The total sample consists of 90 merchants; 46 are assigned randomly to order A, and 44 are assigned to order B. In the total sample, merchants are mostly men (70%). Their average age is 37 years old, and 59% of them are married. A total of 87% have completed at least a secondary education. The average duration of business operations since creation is 15 years, with a median of 5 years. Further, 59% of the merchant's work is in the wholesale and retail trade, with 32% in personal services, such as private courses, beauty, repairs and laundry services. The number of merchants who have annual revenue of less than 5000 JOD is 85%, and their activities in the neighborhood generate 44% of their income. We also collect data on payments to suppliers, plus their bills and taxes. Regarding their use of financial services and products, 32% of merchants have a personal bank account, and 21% have an account for their businesses. To measure their trust in financial services, we also asked participants if they had a personal mobile wallet and 1,000 JOD (in the wallet), and how much of this money they would feel comfortable keeping in their mobile wallet. We asked the same question regarding their bank account: on average, merchants are willing to keep less in their mobile wallets (554 JOD) than in their bank accounts (672 JOD). We also asked them how willing they would be to receive a payment of 100 JOD through their merchant wallet (assuming they had one). On average, they would be willing to accept 95 JOD through their merchant wallet. More than half of the merchant sample is aware of mobile money services, and nearly half of those who are aware use these services already. Additionally, 17% of the sample have a personal mobile wallet.

4 Results

4.1 A First Look at the Main Outcomes

Two striking facts become evident from the experimental data. First, the WTP for digital wallets is low; for example, 76% of consumers and 61% of merchants are willing to pay less than half of

the market price of the package. Second, individuals do not have accurate beliefs on cross-side or same-side adoption; for example, 75% of consumers and 65% of merchants have cross-side adoption beliefs that fall outside of the 25% error margin of the true adoption rate. Similarly more than 75% of consumers and merchants same-side adoption beliefs that fall outside of the 25% error margin of the true adoption rate. Table 3 presents the descriptives of these main outcome variables. Panel A shows that for consumers, the average WTP is 1.74 JOD, which corresponds to 35% of the market price, and the average cross and same-side beliefs are, respectively, 42.8% and 59.1%. Panel B shows that for merchants, the average WTP is 2.13 JOD, which corresponds to 42% of the market value, and the average cross and same-side beliefs are, respectively, 43.7% and 42%.

A reasonable question to ask at this point is how WTP relates to adoption beliefs. In particular, do participants who state higher cross- or same-side adoption beliefs also state a higher WTP? Figure 3 documents how elicited WTP meaningfully relates to elicited beliefs. Figure 3a shows that the average WTP for consumers (merchants) in the first cross-belief quartile stands at 1.6 JOD (1.6 JOD) and increases to 2 JOD (3 JOD) in the fourth quartile. Similarly, Figure 3b shows that the average WTP for consumers (merchants) increases from 1.8 JOD (1.3 JOD) at the lowest quartile to 2.3 JOD (3.2 JOD) at the highest quartile. This demonstrates that our design indeed captures the fundamental relationship between WTP and network beliefs, and our experimental data shows that network externalities are appreciated by both consumers and merchants.[21]

Next, using experimental treatments, we explore how providing cross-side adoption information and digital wallet training affects consumers' and merchants' WTP for digital financial packages. As an overview of these results (presented later in the paper in detail), we find that consumers are sensitive to cross-side information provision, although this sensitivity is quite low. Figure 4a shows that the average WTP among those who underestimate the extent of cross-network adoption in their neighborhood increases from 1.5 JOD to 1.7 JOD upon providing the true cross-network adoption rate ($p = 0.02$). On the other hand, the average WTP among those who overestimate decreases from 2.1 JOD to 1.9 JOD after receiving the true cross-network adoption rate ($p = 0.03$). In contrast to consumers, Figure 4b shows that merchants do not appear to be sensitive to cross-market network effects. We do not detect a change in the average WTP among those who underestimate the cross-network wallet adoption in their neighborhood ($p = 0.608$) and the average WTP among those who

[21] We also identify a positive association between cross-side and same-side beliefs. Figure A4 in the Appendix shows that participants who state higher cross-side adoption beliefs also state higher same-side adoption beliefs.

overestimate this figure marginally decreases from 2.2 JOD to 2.1 JOD ($p = 0.49$). In terms of the effect of digital wallet training, we find that consumers marginally increase their WTP from 1.7 JOD to 1.9 JOD ($p = 0.069$), and in contrast, merchants marginally decrease their WTP from 2 JOD to 1.7 JOD ($p = 0.058$). For the remainder of this section, we discuss these and additional results in detail for consumers and merchants. Unless stated otherwise, we cluster our standard errors at the session level, which is the unit of randomization (Abadie et al., 2023), and report p-values generated through t-tests in relevant regressions.

4.2 Consumers

In this subsection, we present the results for consumers. We start by focusing on the pattern of demand that is elicited through BDM mechanism and the correlates of the WTP. We then describe the elicited cross-network and same-network beliefs and their relation to the elicited WTP measure at the cross-section of our participants. Next, we discuss how consumers respond to information provision on cross-network adoption and estimate consumer's network sensitivity using within-participant variation in cross-network beliefs. The section concludes with the effect of the digital wallet training on our WTP measure and cross-side beliefs.

4.2.1 Willingness-to-Pay for Digital Financial Package

Figure 5a shows the inverse demand curve generated through the first round choices of all consumer participants before receiving any treatment. There are several aspects of the demand curve that are worth noting. The WTP is positive for 82% of the participants, suggesting that most consumers appreciate the value of the package. However, demand for the package is relatively low. The median WTP is 1.2 JOD, which corresponds to 24% of the market price of the package, while the average WTP corresponds to 34% of the market price.[22]

Figure 5b shows the price elasticity of demand. The absolute price elasticity increases in price. The demand is elastic at the market price (-4), suggesting that reducing the price could be revenue increasing. Conversely, the demand is relatively inelastic (-0.46) at the median WTP and becomes

[22]One concern about the elicited WTP for digital wallets is whether participants' decisions are influenced by the outcome of the practice round. In Table A3, we test and show that the outcome of the practice round does not significantly influence the WTP.

elastic (-1.22) at the average WTP.

Understanding the relationship between individual characteristics and WTP for digital wallets can provide valuable insights for developing pricing strategies that target different groups (Berry, Fischer and Guiteras, 2020). Table A3 documents how the demand for digital wallets elicited in the first round, before any intervention, is associated with individual characteristics. A crucial finding is that household heads who do not have any financial accounts are willing to pay 0.79 JOD more for digital wallets compared to other household members ($p < 0.01$), which corresponds to 45% of the average WTP.

This fact, along with lower WTP for digital wallets in households that already have a digital wallet, suggests that digital wallet ownership across household members is considered as a substitute. We do not find any other demographic characteristic, such as gender, age, education, and marital status, that has such a significant impact.[23] Does mobile money related household financial behavior help to explain WTP? Among a large set of observables, we find that receiving payments matters. Individuals who indicate receiving a monetary transfer have a 0.67 JOD lower WTP compared to those who do not indicate receiving transfers. Regarding attitudes towards mobile money, commonly discussed factors, such as awareness, trust and digital financial literacy, do not seem to acutely affect the WTP .

Result 1 *The average WTP for the digital financial package is low and corresponds to 34% of the market price. The demand is highly elastic at the market price; that is, a 1% decrease in market price increases demand by 4%. Household heads are willing to pay significantly more compared to non-household heads, whereas consumers who have received transfers from others in the previous year are willing to pay less.*

4.2.2 Subjective Network Beliefs

In this subsection, we answer a crucial question: how accurate are consumers' subjective beliefs on cross-side adoption? The answer is particularly important because subjective cross-side

[23] We include session fixed effects to capture the variation in individuals' WTP that arises due to differences in time of the day, experiment director, and neighborhoods. Experiment assistants can also influence participants' WTP since we use the same set of experiment assistants across sessions. We find that our estimates are similar when we include both session and experiment assistants' fixed effects. See Table A3.

beliefs not only influence WTP for a digital financial package, but they also play a key role in how consumers change their WTP after learning the true adoption rate.

Figure 6 depicts the distribution of cross-side belief wedges for consumers. We define this wedge as the difference between a participant's subjective cross-side adoption expectation in the sample collected in their neighborhood and the objective (true) adoption rate in the collected sample. A consumer with a negative cross-side belief wedge underestimates the cross-side adoption in their neighborhood, whereas a positive cross-side belief wedge describes a participant who overestimates the cross-side adoption. Figure 6 provides three insights. First, more than 80% of consumers have cross-side adoption expectations that fall outside of a 10 p.p. error margin of the true adoption rate in their neighborhood. We classify these participants as having incorrect expectations. Clearly, the percentage of participants with incorrect expectations increases under tighter restrictions. Second, the distribution of the cross-belief wedge is bimodal, with 27% of consumers underestimating more than 10 p.p. relative to the true adoption rate, and 41% overestimating more than 5 p.p. Conditional on underestimation, the size of the wedge is 20 p.p., whereas the size of the wedge conditional on overestimation is 22 p.p. Third, the digital wallet training positively shifts participants' cross-market adoption expectations. We find that participants whose prior beliefs are elicited *after* the digital wallet training have higher cross-side adoption expectations than participants whose prior beliefs are elicited *before* the digital wallet training.

In fact, Figure 7a shows that in the aggregate, consumers have well-calibrated cross-side adoption expectations when their beliefs are elicited *before* the digital wallet training. Consumers expect the cross-market adoption rate to be 39% in the aggregate, where the true adoption rate stands at 37%. However, consumers from the same neighborhoods whose beliefs are elicited after the digital wallet training have an aggregate adoption expectation that is 8 p.p. greater than the expectations of those whose beliefs are elicited before the training ($p < 0.01$). Table A4 shows that the effect of digital wallet training on cross-side adoption expectations is robust to including neighborhood fixed effects and demographic information.

Result 2 *Consumers are well-calibrated in their cross-market adoption expectations at the aggregate yet exhibit large individual heterogeneity. More than 80% of consumers have inaccurate cross-side adoption expectations with more consumers overestimating cross-market adoption. Basic digital wallet training increases participants' cross-market adoption beliefs.*

4.2.3 Response to Cross-Side Information Provision

If consumers have inaccurate cross-side adoption expectations, how does their WTP change when provided with true cross-side adoption information? The theory of two-sided markets makes opposing predictions, depending on consumers' adoption expectations. Those who underestimate the cross-side adoption should increase their WTP, whereas those who overestimate should decrease their WTP upon information provision.

Figure 8 shows that consumers are responsive to cross-side adoption information. The average WTP among those who underestimate the extent of cross-network adoption in their neighborhood increases by 0.25 JOD from 1.46 JOD (a 17% increase) upon learning the true cross-side adoption rate ($p = 0.02$). On the other hand, the average WTP among those who overestimate decreases by 0.18 JOD from 2.1 JOD (a 8.7% decrease) after learning the true cross-side adoption information ($p = 0.03$).

Can we attribute the change in WTP to changes in cross-side beliefs? An important caveat to our identification is that consumers who learn the true cross-side adoption information may also update their same-side beliefs if they understand the complementarities between merchant and consumer adoption in two-sided markets. Consumers who appreciate that merchant adoption increases in consumer adoption of digital wallets or debit cards may increase their expectations as to how many consumers use digital wallets or bank accounts in Jordan. We find that some consumers indeed update their same-side beliefs as a result of cross-side information provision. Figure 8b shows that consumers who underestimate the cross-side adoption increase their same-side beliefs by 5.6 p.p. (11.4%) ($p = 0.013$), while consumers who overestimate the cross-market adoption do not exhibit a significant change in their same-side adoption beliefs ($p = 0.225$). This provides suggestive evidence that while the majority of consumers do not update their same-side beliefs, some consumers engage in a type of equilibrium reasoning: consumers can make inferences about same-side adoption levels based on information about cross-side adoption levels, appreciating the complementarities across sides in a two-sided market. However, the significant effect of cross-side adoption information provision on WTP remains robust even after accounting for changes in the same-side beliefs. See Table 4.

How does digital wallet training influence responsiveness to cross-side information? If participants lack attention, digital financial literacy, or trust, digital wallet training may increase their

responsiveness to cross-side information, as we would expect these factors to show complementarities with indirect network effects. We find that the responsiveness to cross-side information provision is substantially lower among consumers who receive digital wallet training. Table 4 presents these results.

Result 3 *Upon receiving cross-side adoption information, consumers who underestimate merchant adoption of digital payments increase their WTP by 17%, whereas consumers who overestimate merchant adoption decrease their WTP by 8.7%. Some consumers update their same-side adoption beliefs when provided with information on cross-side market adoption, revealing that they appreciate the complementarities in consumer and merchant adoption.*

4.2.4 Cross-Side Network Sensitivity of Willingness-to-Pay

We estimate the sensitivity to cross-side network effects using a simple structural model. An individual i in round r has the WTP:

$$WTP_{i,r} = v_i + \gamma_c q_{i,r}^{cross} + \omega_c q_{i,r}^{same} + u_{i,r} \tag{4.1}$$

where v_i is the individual fixed effect capturing the individual's valuation of unobserved characteristics of the wallet, $q_{i,r}^{cross}$ ($q_{i,r}^{same}$) individual i's cross-side (same-side) adoption expectation in round r and γ_c (ω_c) capturing the cross-side (same-side) sensitivity of WTP for consumers. We estimate our main parameter of interest γ_c using a fixed effects regression.

Table 5 documents the cross-side network sensitivity of WTP. Panel A reports the estimation results for consumers who underestimate the merchant adoption of digital payments within their neighborhood. In Column 1 of Panel A, we show that a 1 p.p. increase in cross-side adoption beliefs generates a 0.01 JOD increase in WTP for consumers who underestimate the merchant's adoption of digital payments ($p < 0.05$). In Column 2 of Panel A, we account for changes in same-side beliefs and identify a similar effect size for cross-network sensitivity of WTP. In Column 3 of Panel A, we find that the cross-side network sensitivity of WTP is larger: 0.015 JOD, among consumers who do not receive digital wallet training. Panel B reports the estimation results for consumers who overestimate the merchant adoption of digital payments within their neighborhood. Column 1 of Panel B shows that the cross-side network sensitivity is substantially lower compared to underestimating consumers: a 1 p.p. increase in cross-side adoption beliefs generates a 0.001 JOD increase

in WTP ($p = 0.66$). While the effect size increases when accounting for same-side adoption beliefs and allowing for interactions with the digital wallet training, the estimated parameters are insignificant. Panel C reports the results for all consumers either under- or overestimating the merchant adoption of digital payments. In Column 1 of Panel C, we find that the network sensitivity is low. Reflecting the changes in the two previous panels, the effect size increases when we account for same-side beliefs and the interactive effect of digital wallet training. In particular, Column 3 shows that a 1 p.p. increase in cross-side adoption expectation generates a 0.009 JOD increase in WTP among consumers who do not receive digital wallet training, while receiving training generates an additional 0.009 JOD decrease in cross-network sensitivity by the same amount and completely eliminates network sensitivity.

A simple counterfactual analysis shows that increasing consumers' cross-side adoption expectations from the current 39 p.p. to 100 p.p. would increase the average WTP somewhere between 0.08 JOD to 1.03 JOD, bringing the average WTP from 1.93 JOD to somewhere between 2.01 JOD to 2.96 JOD. Note that this suggests that consumers' WTP would remain around 40% to 59% of the market prices, even when consumers expect every merchant to accept digital payments in their neighborhood.

Result 4 *Consumers' WTP exhibits low sensitivity to cross-side network expectations: a 1 p.p. increase in cross-side adoption expectation generates a 0.009 JOD increase in WTP. Consumers' WTP would increase from 40% to 59% of the market price when consumers expect every merchant to accept digital payments in their neighborhood.*

4.2.5 Effect of Digital Wallet Training

How does basic digital wallet training influence consumers' WTP for the digital financial package? If consumers lack the digital financial literacy skills to effectively benefit from a digital wallet, they may be willing to pay less than they would otherwise. Figure 9 shows that WTP marginally increases by 0.2 JOD from 1.7 JOD to 1.9 JOD after receiving a basic digital wallet training ($p = 0.07$) and the demand curve marginally shifts outwards after the training (Wilcoxon signed-rank test, $p = 0.04$).

Result 5 *Consumers' average willingness to pay increases marginally from 1.7 JOD to 1.9 JOD after receiving basic digital wallet training.*

4.3 Merchants

In this subsection, we discuss the results for merchants in detail. The structure of the results is identical to our discussion of results for consumers. We begin by examining the demand patterns and the factors associated with WTP. Following this, we outline the cross-network and same-network beliefs that were elicited, and how these relate to the WTP measure across our participants. We then analyze merchant responses to information about cross-network adoption and assess their sensitivity to networks using variations in cross-network beliefs within participants. The section concludes by exploring the impact of digital wallet training on both the WTP measure and cross-side beliefs.

4.3.1 Willingness-to-Pay for Digital Financial Package

Figure 10a shows the inverse demand curve generated through the first round choices of all merchant participants before receiving any treatment. Similar to consumers, WTP is positive for 79% of the participants, suggesting that most merchants appreciate the value of the package. However, the demand for the package is relatively low. The median WTP is 1.6 JOD which corresponds to 32% of the value of the package, while the average WTP corresponds to 41.8% of the value.[24] Figure 10b shows the price elasticity of demand. The absolute price elasticity increases in price. The demand is elastic at the market price (-3), suggesting that reducing the price could be revenue increasing. On the other hand, the demand is relatively inelastic at the median WTP (-0.48) and the average WTP (-0.91).

Table A5 documents how demand for the digital financial package elicited in the first round before any intervention is associated with merchant characteristics. It is clear that merchants consider their own personal bank accounts to be largely substitutable with merchant wallets: merchants who have a personal bank account are willing to pay between 0.5 to 2 JOD less for merchant wallets. Interestingly, we identify that merchants who make online sales are willing to pay more for merchant wallets. We also find a relatively strong positive association between financial literacy and the WTP.

[24] One concern about the elicited WTP for digital wallets is whether or not participants' decisions are influenced by the outcome of the practice round. In Table A5, we test and show that the outcome of the practice round does not significantly influence the WTP.

Result 6 *The average WTP for the digital financial package is low and corresponds to 42% of the market price. The demand is highly elastic at the market price; that is, a 1% decrease in market price increases demand by 3%. We provide suggestive evidence that merchants consider their personal bank accounts as substitutes for merchant wallets. Merchants who conduct online sales and those with high financial literacy are willing to pay significantly more for the wallets.*

4.3.2 Subjective Network Beliefs

Figure 11 shows the distribution of cross-side belief wedges for merchants. Similar to consumer cross-side belief wedges, we define this wedge as the difference between a participant's subjective cross-side adoption expectation on the percentage of consumers owning financial accounts and the true adoption rate using the collected sample as a reference. A merchant with a negative cross-side belief wedge underestimates the cross-side adoption in their neighborhood, whereas a positive cross-side belief wedge describes a participant who overestimates the cross-side adoption. Figure 11 provides three insights. First, more than 70% of merchants have cross-side adoption expectations that fall outside of a 10 p.p. error margin around the true adoption rate in their neighborhood. We classify these participants as having incorrect expectations. The percentage of participants with incorrect expectations goes up under tighter restrictions. Second, the distribution of the cross-belief wedge is bimodal. In contrast to consumers, the majority of merchants underestimate the cross-market adoption: 53% of merchants underestimate more than 10 p.p. relative to the true adoption rate, whereas 18% of merchants overestimate more than 10 p.p. Conditional on underestimation, the size of the wedge is 20.45 p.p., whereas the size of the wedge conditional on overestimation is 23 p.p. Third, unlike consumers, basic digital wallet training does not seem to shift participants' cross-market adoption expectations.

Figure 12a shows that merchants' cross-side adoption expectations are virtually identical across participants irrespective of their digital wallet training status, at around 43%, and are lower than the true average cross-market adoption rate across the neighborhoods, which is 51.4%. Figure 12b shows that merchants' same-side beliefs also do not change depending on the training status and stand around 40%. Table A6 shows that these results are robust to including neighborhood fixed effects and demographic information.

Result 7 *More than 70% of merchants have inaccurate cross-side adoption expectations, with more*

merchants underestimating cross-market adoption. The digital wallet training does not influence participants' cross-market adoption beliefs.

4.3.3 Response to Cross-Side Information Provision

If merchants have inaccurate cross-side adoption expectations, how does their WTP change when provided with true cross-side adoption information? Figure 13 shows that merchants do not respond to cross-side adoption information. The average WTP among those who underestimate the extent of cross-network adoption remains around 1.92 JOD upon learning the true cross-side adoption rate ($p = 0.61$). Similarly, the average WTP among those who overestimate the cross-side adoption decreases by 0.1 JOD from 2.2 JOD (a 4.5% decrease) after learning the true cross-side adoption information ($p = 0.49$).

We find that some merchants update their same-side beliefs as a result of cross-side information provision. Figure 13b shows that merchants who underestimate the cross-side adoption increase their same-side beliefs by 8.8 p.p. (22.6%) ($p = 0.007$), while merchants who overestimate the cross-market adoption do not exhibit a significant change in their same-side adoption beliefs ($p = 0.299$). However, the null effect of cross-side adoption information on WTP remains robust after accounting for changes in the same-side beliefs. Furthermore, we do not detect a significant change in responsiveness to information provision when participants receive the digital wallet training. See Table 6 for results.

Result 8 *Upon receiving cross-market adoption information, merchants who underestimate consumer adoption of financial accounts exhibit virtually no change in their WTP, whereas merchants who overestimate merchant adoption decrease their WTP by 4.5%. Some merchants update their same-side adoption beliefs when provided with information on cross-side market adoption revealing that they appreciate the complementarities in consumer and merchant adoption.*

4.3.4 Cross-Side Network Sensitivity of Willingness-to-Pay

We estimate the sensitivity of WTP to cross-side network effects using the simple model:

$$WTP_{i,r} = v_i + \gamma_m q_{i,r}^{cross} + \omega_m q_{i,r}^{same} + u_{i,r} \tag{4.2}$$

where v_i is the individual fixed effect capturing the individual's valuation of unobserved characteristics of the wallet, $q_{i,r}^{cross}$ ($q_{i,r}^{same}$) individual i's cross-side (same-side) adoption expectation in round r and γ_m (ω_m) capturing the cross-side (same-side) sensitivity of WTP for merchants. We estimate our main parameter of interest γ_m using a fixed effects regression.

Table 7 documents the cross-side network sensitivity of WTP. Panel A reports the estimation results for merchants who underestimate consumer adoption of financial accounts within their neighborhood. In Column 1 of Panel A, we show that a 1 p.p. increase in cross-side adoption beliefs generates a 0.007 JOD increase in WTP for merchants who underestimate the consumers' adoption of financial accounts, yet this effect is insignificant at conventional levels ($p = 0.19$). In Columns 2 and 3 of Panel A, we show that the results are robust to accounting for changes in same-side beliefs and the digital wallet training status. Panel B reports the estimation results for merchants who overestimate the merchant adoption of financial accounts within their neighborhood. Column 1 of Panel B shows that the cross-side network sensitivity is substantially lower compared to underestimating merchants: a 1 p.p. increase in cross-side adoption beliefs generates a 0.001 JOD increase in WTP ($p = 0.48$). While the effect size decreases when accounting for same-side adoption beliefs and allowing for interactions with the digital wallet training, the estimated parameters are insignificant. Panel C reports the results for all merchants either under- or overestimating the consumer adoption of financial accounts. In Column 1 of Panel C, we find that the network sensitivity is low: a 1 p.p. increase in cross-side adoption beliefs generates a 0.005 JOD increase in WTP ($p = 0.17$), which is half the effect size identified for consumers. Column 3 of Panel C shows that a 1 p.p. increase in cross-side adoption expectation generates a 0.0046 JOD increase in WTP among merchants who do not receive digital wallet training, while receiving training generates an additional 0.0058 JOD decrease in cross-network sensitivity and completely eliminates network sensitivity.

Result 9 *Merchants' WTP exhibit a lower sensitivity to cross-side network effects than consumers' willingness to pay: a 1 p.p. increase in cross-side adoption expectation generates a 0.005 JOD increase in WTP.*

4.3.5 Effect of Digital Wallet Training

How does basic digital wallet training influence merchants' WTP for the digital financial package? Figure 14 shows that WTP marginally decreases by 0.3 JOD from 2 JOD to 1.7 JOD after

receiving basic digital wallet training ($p = 0.06$) and the demand curve marginally shifts inwards after the training (Wilcoxon signed-rank test, $p = 0.10$).

Result 10 *Merchants' average WTP decreases marginally from 2 JOD to 1.7 JOD after receiving basic digital wallet training.*

4.4 Take-up of Digital Financial Packages

Table 8 shows that the percentage of participants who are issued a voucher to receive a digital financial package as a result of the BDM outcome is around 38% and 46.4%, respectively.[25] The relatively low issuance of vouchers based on the BDM outcome reflects the participants' low WTP for the digital financial package. When we look at the actual take-up rate, we find that this rate is 23.6% for consumers and 25.6% for merchants. This shows that some participants did not show up at the partner service provider's workstation *within* the same experimental location so as to redeem their vouchers for the financial packages. Conditional on voucher issuance, we find that only 60% of consumers and 56.4% of merchants have showed up at the partner provider's workstation to redeem their vouchers. While the majority of participants who are issued vouchers show up at the workstation, it is important to understand why some participants did not redeem their vouchers. First, we repeatedly reminded the participants that the mechanism ensures that they are not going to be paying for the package more than they would like to. We also advised them to state an amount that they are willing to pay at the end of the experiment, and we did not mention the possibility of not getting the package in the main part of the experiment, in order to retain incentive compatibility.[26] However, we do not force or nudge the participants to redeem their vouchers after the experiment. Second, we look at how WTP in the selected round is associated with the actual take-up rate; that is, redeeming the vouchers. Figure 15 shows that the take-up rate is increasing in WTP for both consumers and merchants; specifically, a significant majority of participants who do not redeem their vouchers are those with lower WTP. This suggests that the lack of redemption of vouchers is partly attributable to the cost of additional time spent at the experimental location dominating the

[25] The distibution of BDM prices and WTP in the selected round are provided in the Appendix separately for consumers (Table A5) and merchants (Table A6).

[26] Our implementation is identical to Berry, Fischer and Guiteras (2020) and Berkouwer and Dean (2022) in this regard.

benefits associated with obtaining a digital wallet. To conclude, we find that the actual take-up rate of wallets is low as a result of the low WTP for digital wallets. Furthermore, while the significant majority of participants who receive a voucher do redeem their vouchers, those who have lower WTP are less likely to redeem their vouchers at the experimental site.[27]

5 Discussion

The goal of this experiment setting is to analyze how we can increase the adoption of digital wallets for merchants and consumers, and we focus on consumers who are financially excluded and formal merchants who are eligible to subscribe a merchant wallet. The overall finding indicates a low WTP from both sides of the market; that is, both consumers and merchants. On the one hand, consumers with higher financial literacy are less willing to pay, possibly because they can find alternative solutions to meet their financial needs. Conversely, the merchants in this sample are not entirely financially excluded, with 32% having a personal bank account and 21% with a business account. However, employed consumers and those with greater household responsibilities show a higher WTP. Additionally, both sides of the market (i.e., consumers and merchants) hold inaccurate perceptions about the usage of digital wallets. Consumers tend to overestimate how many merchants accept digital payments, while merchants tend to underestimate how many consumers use digital wallets. We also report a higher Cross-Side Network Sensitivity of Willingness-to-Pay for consumers than merchants. Providing consumers with up-to-date cross-market information, particularly on the number of merchants accepting digital payments, positively impacts the WTP of those who originally underestimated this aspect. Consequently, enhancing consumers' awareness of merchants' adoption of digital wallets promotes greater consumer adoption of personal wallets. In contrast, the updated information provided to merchants has a limited impact on their WTP, reflecting their low sensitivity to such updates. This could be due to their partial financial inclusion, since we observe a strong negative association between having a personal bank account and their WTP for a merchant financial package.

Correcting cross-side market information can only enhance same-side beliefs for participants, whether they are consumers or merchants. It positively impacts the beliefs of those who initially

[27] Participants are only allowed to redeem their vouchers on the experimental site. They cannot redeem the vouchers elsewhere, such as at the partner provider's branches.

underestimate the cross-side usage but does not affect those who overestimate it.

Regarding digital financial literacy, we provided basic hands-on digital training to provide participants with more knowledge about digital wallets and to introduce them to their use. The impact of the hands-on digital training remains limited for consumers and even negative for merchants. This outcome can be attributed to the information provided during the training, which not only covered the product, its advantages, and the enrollment process but also included warnings about potential risks, such as hacking and scams. Additionally, the lengthy process for merchants to obtain a merchant wallet, which involves acquiring several business licenses, plus their existing ability to meet financial needs through bank accounts or other means, may have further contributed to the negative impact.

6 Conclusion

In conclusion, we study the underadoption of digital wallets as network goods in Jordan. We show that interventions that aim to exploit network effects hold promise for generating adoption on each side of the market. Our findings indicate that consumers exhibit sensitivity to cross-side network effects, whereas merchants show no significant responsiveness. Additionally, we find that basic hands-on digital wallet training marginally increases consumers' willingness-to-pay (WTP), while slightly reducing merchants' WTP. A critical insight from our analysis is that a one-size-fits-all approach may be suboptimal for designing pro-adoption policies. Policymakers should consider differentiated strategies tailored to the distinct needs and behaviors of each group. For consumers, information provision regarding merchant acceptance plus educational campaigns are essential, while for merchants, more direct financial incentives and coordinated adoption initiatives may be necessary to stimulate uptake. Although our focus in this study has been on understanding underadoption through the lens of cross-side network effects, future research that explores same-side network effects could yield additional valuable insights for the development of more effective financial inclusion strategies.

References

Abadie, Alberto, Susan Athey, Guido W Imbens, and Jeffrey M Wooldridge. 2023. "When should you adjust standard errors for clustering?" *The Quarterly Journal of Economics*, 138(1): 1–35.

Abdul-Hamid, Ibn Kailan, Aijaz A Shaikh, Henry Boateng, and Robert E Hinson. 2019. "Customers' Perceived Risk and Trust in Using Mobile Money Services—an Empirical Study of Ghana." *International Journal of E-Business Research (IJEBR)*, 15(1): 1–19.

Andersson-Manjang, Simon K. 2021. "The Mobile Money Prevalence Index (MMPI): A Country-Level Indicator for Assessing the Adoption, Activity and Accessibility of Mobile Money." *Activity and Accessibility of Mobile Money (September 20, 2021)*.

Aron, Janine. 2017. "Leapfrogging': A survey of the nature and economic implications of mobile money."

Becker, Gordon M, Morris H DeGroot, and Jacob Marschak. 1964. "Measuring utility by a single-response sequential method." *Behavioral science*, 9(3): 226–232.

Berkouwer, Susanna B, and Joshua T Dean. 2022. "Credit, attention, and externalities in the adoption of energy efficient technologies by low-income households." *American Economic Review*, 112(10): 3291–3330.

Berry, James, Greg Fischer, and Raymond Guiteras. 2020. "Eliciting and utilizing willingness to pay: Evidence from field trials in Northern Ghana." *Journal of Political Economy*, 128(4): 1436–1473.

Bianchi, Milo, Matthieu Bouvard, Renato Gomes, Andrew Rhodes, and Vatsala Shreeti. 2023. "Mobile payments and interoperability: Insights from the academic literature." *Information Economics and Policy*, 65: 101068.

Bohm, Peter, Johan Lindén, and Joakim Sonnegård. 1997. "Eliciting reservation prices: Becker–DeGroot–Marschak mechanisms vs. markets." *The Economic Journal*, 107(443): 1079–1089.

Brunnermeier, Markus K, Nicola Limodio, and Lorenzo Spadavecchia. 2023. "Mobile money, interoperability, and financial inclusion." National Bureau of Economic Research.

Burchardi, Konrad B, Jonathan De Quidt, Selim Gulesci, Benedetta Lerva, and Stefano Tripodi. 2021. "Testing willingness to pay elicitation mechanisms in the field: Evidence from Uganda." *Journal of Development Economics*, 152: 102701.

Cason, Timothy N, and Charles R Plott. 2014. "Misconceptions and game form recognition: Challenges to theories of revealed preference and framing." *Journal of Political Economy*, 122(6): 1235–1270.

Chogo, Pamela John, and Eliamani Sedoyeka. 2014. "Exploring Factors Affecting Mobile Money Adoption in Tanzania." *International Journal of Computing & ICT Research*, 8(2).

Crouzet, Nicolas, Apoorv Gupta, and Filippo Mezzanotti. 2020. "Shocks and technology adoption: Evidence from electronic payment systems." *Techn. rep., Northwestern University Working Paper*.

Danz, David, Lise Vesterlund, and Alistair J Wilson. 2022. "Belief elicitation and behavioral incentive compatibility." *American Economic Review*, 112(9): 2851–2883.

Delavande, Adeline. 2014. "Probabilistic expectations in developing countries." *Annu. Rev. Econ.*, 6(1): 1–20.

Delavande, Adeline, Xavier Giné, and David McKenzie. 2011. "Measuring subjective expectations in developing countries: A critical review and new evidence." *Journal of development economics*, 94(2): 151–163.

Gertler, Paul, Sean Higgins, Ulrike Malmendier, and Waldo Ojeda. n.d.. "Why Small Firms Fail to Adopt Profitable Opportunities."

Haaland, Ingar, Christopher Roth, and Johannes Wohlfart. 2023. "Designing information provision experiments." *Journal of economic literature*, 61(1): 3–40.

Hernandez, Emilio, Christopher Blackburn, Anand Raman, and Paul Reynolds. 2020. "Agent Network Journeys Toward the Last Mile."

Higgins, Sean. 2024. "Financial Technology Adoption: Network Externalities of Cashless Payments in Mexico." *American Economic Review*, 114(11).

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.

JoPACC. 2021. "A Market Study on the Adoption of Digital Financial Services."

Jullien, Bruno, Alessandro Pavan, and Marc Rysman. 2021. "Two-sided markets, pricing, and network effects." In *Handbook of Industrial Organization*. Vol. 4, 485–592. Elsevier.

Katz, Michael L, and Carl Shapiro. 1986. "Technology adoption in the presence of network externalities." *Journal of political economy*, 94(4): 822–841.

Kremer, Michael, Gautam Rao, and Frank Schilbach. 2019. "Behavioral development economics." In *Handbook of behavioral economics: applications and foundations 1*. Vol. 2, 345–458. Elsevier.

Lyons, Angela, Josephine Kass-Hanna, and Fan Liu. 2021. "Building financial resilience through financial and digital literacy in South Asia and Sub-Saharan Africa." *Available at SSRN 3496562*.

Maurer, Bill, Taylor C Nelms, and Stephen C Rea. 2013. "'Bridges to cash': Channelling agency in mobile money." *Journal of the Royal Anthropological Institute*, 19(1): 52–74.

Mothobi, Onkokame, and Lukasz Grzybowski. 2017. "Infrastructure deficiencies and adoption of mobile money in Sub-Saharan Africa." *Information Economics and Policy*, 40: 71–79.

Nyaga, Kenneth M. 2013. "The impact of mobile money services on the performance of small and medium enterprises in an urban town in Ke." PhD diss.

Prasad, Hanuman, Devendra Meghwal, and Vijay Dayama. 2018. "Digital financial literacy: a study of households of Udaipur." *Journal of Business and Management*, 5: 23–32.

Riley, Emma. 2018. "Mobile money and risk sharing against village shocks." *Journal of Development Economics*, 135: 43–58.

Rochet, Jean-Charles, and Jean Tirole. 2003. "Platform competition in two-sided markets." *Journal of the european economic association*, 1(4): 990–1029.

Suri, Tavneet. 2017. "Mobile money." *Annual Review of Economics*, 9: 497–520.

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

Uwamariya, Marthe, Claudia Loebbecke, and Stefan Cremer. 2021. "Mobile money adoption in rural Rwanda: A domestication perspective." *Africa Journal of Management*, 7(2): 314–337.

Zareen, Arshi, Priyanka Chaddha, et al. 2021. "Awareness and Use of Mobile Money Among College Students in University."

Table 1: Target Neighborhood Characteristics

Name	Al Ghwariyah	Masom	Ramzi
Number of Businesses	70	80	80
Population	38,825	37,318	45,869
Number of Partner Provider Agents	3	3	3
Merchant Adoption	37%	37%	37%
Consumer Adoption	53%	70%	37%

Sources: The number of businesses is calculated from Google Maps accessed 20/06/2023 "https://www.google.fr/maps/search/Zarqa+business+/@32.0670965,36.0810452,12z/data=!3m1!4b1?entry=ttu" and the population information is collected from the Jordanian Department of Statistics for the year 2022. The number of digital wallet provider agents is reported from our partner digital wallet provider.

Table 2: Pre-Experiment Survey Results

	Panel A: Consumer Account Ownership		Panel B: Merchant Payment Acceptance	
	Ownership (%)	Observations	Acceptance (%)	Observations
AlGhwariyah	53.01	83	37.03	54
Maasom	69.86	219	36.67	60
Ramzi	20.97	62	37.03	54

Notes: The table results from the pre-experiment survey. Panel A describes the percentage of consumers who own a digital wallet or bank account in each neighborhood and the number of observations from each neighborhood. Panel B describes the percentage of merchants accepting wallet or debit card payments in each neighborhood and the number of observations from each neighborhood.

Table 3: Descriptive Statistics for Main Outcome Variables

	Panel A: Consumers				Panel B: Merchants			
	Mean	SD	p25	p75	Mean	SD	p25	p75
Willingness to Pay	1.74	1.58	0.40	2.50	2.13	1.87	0.40	3.80
Cross-Side Belief	42.81	25.42	20.00	60.00	43.70	21.36	30.00	60.00
Same-Side Belief	59.18	23.09	50.00	80.00	41.98	24.82	20.00	60.00
Observations	185				81			

Notes: Willingness to pay is elicited through BDM mechanism before any intervention and ranges between 0 to 5 Jordanian Dinars. Cross-side belief and same-side belief are elicited before cross-side information provision and take a value between 0 and 100. Cross-side belief for consumers: the percentage of merchants accepting wallet or card payments in the sample collected from their neighborhood. Cross-side belief for merchants: the percentage of consumers owning wallets or bank accounts in the sample collected from their neighborhood. Same-side belief for consumers: the percentage of people who own wallets or bank accounts in Jordan. Same-side belief for merchants: the percentage of merchants who accept wallet or card payments in the sample collected from their neighborhood.

Table 4: Consumers - The Effect of Cross-Side Information Provision On WTP

	WTP (in JD)								
	Panel A: Wedge≤0			Panel B: Wedge>0			Panel C: Aggregate		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Information	0.248**	0.250**	0.405***	-0.176**	-0.188**	-0.349**	-0.0135	-0.0128	0.00225
	(0.103)	(0.104)	(0.109)	(0.0777)	(0.0768)	(0.139)	(0.0523)	(0.0559)	(0.0950)
Same-Side Belief		0.000221	-0.0000530		-0.00570	-0.00468		-0.00102	-0.00112
		(0.00704)	(0.00706)		(0.00906)	(0.00898)		(0.00662)	(0.00686)
Information × Training			-0.412*			0.295			-0.0309
			(0.214)			(0.174)			(0.120)
Constant	1.456***	1.431***	1.444***	2.060***	2.432***	2.365***	1.828***	1.885***	1.891***
	(0.0516)	(0.362)	(0.359)	(0.0388)	(0.582)	(0.573)	(0.0261)	(0.379)	(0.393)
Observations	142	140	140	228	228	228	370	368	368
R^2	0.067	0.068	0.111	0.025	0.034	0.051	0.000	0.000	0.001

Notes: Each column reports the coefficients of a fixed effect regression of the form: $WTP_{i,r} = v_i + \beta_1 Information_{i,r} + \beta_2 SameSideBelief_{i,r} + \beta_3\ Information_{i,r} \times Training_{i,r} + u_{i,r}$ where v_i is the individual fixed effect capturing the individual's valuation of unobserved characteristics of the financial package, $Information_{i,r}$ is a dummy variable takes the value 1 when an individual i receives the true cross-side adoption information for their neighborhood in round r, $SameSideBelief_{i,r}$ is an integer from the set {0,10,20,...,100} that represents the individual's same-side belief in round r, and $Training_{i,r}$ is a dummy variable that takes the value 1 if the individual recieved training in round r. Panel A reports the coefficients for consumers whose cross-network beliefs are non-positive before receiving cross-network information, Panel B reports the coefficients for consumers whose cross-network beliefs are positive. Panel C aggregates the observations from Panel A and B. The coefficient of the variable *Information* captures the effect of cross-side information provision on the consumer's willingness to pay. The coefficient of the $SameSideBelief$ captures the effect of subjective same-network beliefs on individual's willingness to pay. The coefficient $Information \times Training$ captures the additional impact of training on the effect of cross-side information provision on willingness to pay. Errors are clustered at the session level. Significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Consumers - Cross-Side Network Sensitivity of Willingness-To-Pay

	WTP (in JD)								
	Panel A: Wedge≤0			Panel B: Wedge>0			Panel C: Aggregate		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
γ_c	0.0102**	0.0106**	0.0144**	0.00101	0.00130	0.00543	0.00379	0.00408	0.00902**
	(0.00451)	(0.00466)	(0.00582)	(0.00224)	(0.00228)	(0.00460)	(0.00229)	(0.00239)	(0.00383)
ω_c		-0.0000224	-0.000212		-0.00468	-0.00455		-0.00205	-0.00220
		(0.00680)	(0.00681)		(0.00967)	(0.00947)		(0.00652)	(0.00629)
$\gamma_c \times Training$			-0.0110			-0.00740			-0.00996**
			(0.0103)			(0.00518)			(0.00449)
Constant	1.305***	1.282***	1.303***	1.923***	2.210***	2.200***	1.670***	1.776***	1.791***
	(0.121)	(0.353)	(0.343)	(0.108)	(0.616)	(0.619)	(0.0913)	(0.374)	(0.369)
Observations	142	140	140	228	228	228	370	368	368
R^2	0.061	0.063	0.078	0.001	0.006	0.015	0.009	0.010	0.025
Adjusted R^2	0.054	0.049	0.058	-0.004	-0.002	0.002	0.006	0.005	0.017
Participant FE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: Each column reports the coefficients of fixed effect regression described in Equation 1 for all consumers across session orders where the dependent variable is willingness to pay and the unit of observation is individual x round. Specifically, each regression corresponds to a balanced panel where we observe each participant's willingness to pay both before and after providing cross-network information. Panel A reports the coefficients for consumers whose cross-network beliefs are non-positive before receiving cross-network information whereas Panel B reports the coefficients for consumers whose cross-network beliefs are positive. Panel C aggregates the observations from Panel A and B. The coefficient γ_c captures the effect of subjective cross-network beliefs on individual's willingness to pay. The coefficient ω_c captures the effect of subjective same-network beliefs on individual's willingness to pay. The coefficient $\omega_c \times Training$ captures the additional impact of training on the effect of the subjective cross-network beliefs on willingness to pay. Errors are clustered at the session level. Significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Merchants - The Effect of Cross-Side Information Provision On WTP

	WTP (in JD)								
	Panel A: Wedge≤0			Panel B: Wedge>0			Panel C: Aggregate		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Information	-0.0483	-0.172	-0.279	-0.0913	-0.0590	-0.128	-0.0605	-0.105	-0.191*
	(0.0915)	(0.132)	(0.187)	(0.127)	(0.124)	(0.0826)	(0.0740)	(0.0838)	(0.105)
Same-Side Belief		0.0141	0.0141		0.00530	0.00489		0.00967	0.00943
		(0.0119)	(0.0124)		(0.00557)	(0.00526)		(0.00677)	(0.00682)
Information × Training			0.212			0.153			0.181
			(0.181)			(0.242)			(0.144)
Constant	1.926***	1.377**	1.375**	2.230***	1.968***	1.988***	2.012***	1.607***	1.616***
	(0.0457)	(0.473)	(0.499)	(0.0634)	(0.267)	(0.262)	(0.0370)	(0.286)	(0.295)
Observations	116	116	116	46	46	46	162	162	162
R^2	0.002	0.041	0.049	0.026	0.070	0.088	0.003	0.036	0.043

Notes: Each column reports the coefficients of a fixed effect regression of the form: $WTP_{i,r} = v_i + \beta_1 Information_{i,r} + \beta_2 SameSideBelief_{i,r} + \beta_3\ Information_{i,r} \times Training_{i,r} + u_{i,r}$ where v_i is the individual fixed effect capturing the individual's valuation of unobserved characteristics of the financial package, $Information_{i,r}$ is a dummy variable takes the value 1 when an individual i receives the true cross-side adoption information for their neighborhood in round r, $SameSideBelief_{i,r}$ is an integer from the set {0,10,20,...,100} that represents the individual's same-side belief in round r, and $Training_{i,r}$ is a dummy variable that takes the value 1 if the individual recieved training in round r. Panel A reports the coefficients for merchants whose cross-network beliefs are non-positive before receiving cross-network information, Panel B reports the coefficients for merchants whose cross-network beliefs are positive. Panel C aggregates the observations from Panel A and B. The coefficient of the variable *Information* captures the effect of cross-side information provision on the merchants' willingness to pay. The coefficient of the $SameSideBelief$ captures the effect of subjective same-network beliefs on the individuals' willingness to pay. The coefficient $Information \times Training$ captures the additional impact of training on the effect of cross-side information provision on willingness to pay. Errors are clustered at the session level. Errors are clustered at the session level. Significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Merchants - Cross-Side Network Sensitivity of Willingness-To-Pay

	WTP (in JD)								
	Panel A: Wedge≤0			Panel B: Wedge>0			Panel C: Aggregate		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
γ_m	0.00671	0.00295	0.00655	0.00153	-0.000211	0.000810	0.00508	0.00196	0.00466
	(0.00484)	(0.00762)	(0.0101)	(0.00207)	(0.00261)	(0.00171)	(0.00346)	(0.00421)	(0.00611)
ω_m		0.00752	0.00744		0.00605	0.00601		0.00721	0.00714
		(0.0143)	(0.0141)		(0.00651)	(0.00660)		(0.00802)	(0.00799)
$\gamma_s \times Training$			-0.00753			-0.00228			-0.00578
			(0.00837)			(0.00445)			(0.00607)
Constant	1.599***	1.443***	1.459***	2.103***	1.915***	1.915***	1.741***	1.570***	1.578***
	(0.218)	(0.405)	(0.382)	(0.111)	(0.261)	(0.236)	(0.164)	(0.274)	(0.252)
Observations	116	116	116	46	46	46	162	162	162
R^2	0.019	0.028	0.034	0.005	0.060	0.063	0.015	0.028	0.033
Adjusted R^2	0.011	0.010	0.008	-0.017	0.016	-0.004	0.009	0.016	0.015
Participant FE	✓	✓	✓	✓	✓	✓	✓	✓	✓

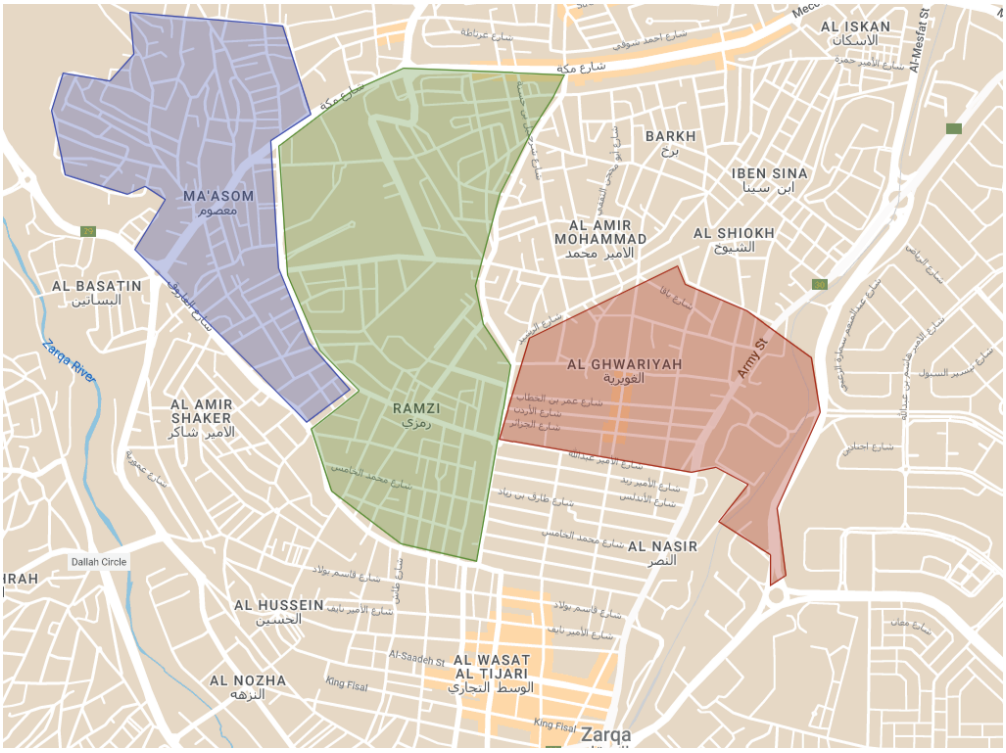
Notes: Each column reports the coefficients of fixed effect regression described in Equation 1 for all merchants across session orders where the dependent variable is willingness to pay and the unit of observation is individual x round. Specifically, each regression corresponds to a balanced panel where we observe each participant's willingness to pay both before and after providing cross-network information. Panel A reports the coefficients for merchants whose cross-network beliefs are non-positive before receiving cross-network information whereas Panel B reports the coefficients for merchants whose cross-network beliefs are positive. Panel C aggregates the observations from Panel A and B. The coefficient γ_m captures the effect of subjective cross-network beliefs on individual's willingness to pay. The coefficient ω_m captures the effect of subjective same-network beliefs on individual's willingness to pay. The coefficient $\omega_m \times Training$ captures the additional impact of training on the effect of the subjective cross-network beliefs on willingness to pay. Errors are clustered at the session level. Significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Take-Up of Digital Financial Package

	Panel A: Consumers		Panel B: Merchants	
	Take-Up (%)	Observations	Take-Up (%)	Observations
Vouchers Issued (BDM Outcome)	38%	72	46.4%	39
Actual Take-Up	23.6%	46	25.6%	23
Take-Up Conditional on Voucher	60%	72	56.4%	39

Notes: Each panel shows consumers' and merchants' respective take-up of digital financial packages. Vouchers Issued (BDM outcome) refers to the percentage of participants who are provided with a voucher for the digital financial package that they can redeem at the experimental site as a result of the BDM outcome. Actual take-up refers to the participants who redeemed the vouchers at the experimental site to initiate the wallet issuance process among the whole sample. Take-up conditional on vouchers refers to the percentage of participants who redeemed the voucher among those who have a voucher. Please note that it was not possible for merchants to issue a merchant wallet on the experimental site due to the complex nature of the merchant wallet issuance process. What we mean by take-up for merchants is that merchants started the wallet issuance process by scheduling an appointment to provide the required documentation to the partner provider.

Figure 1: Map of Target Neighborhoods



Notes: The map shows the three target neighborhoods we collect our sample from in the city center of Zarqa. The map is sourced from Google Maps.

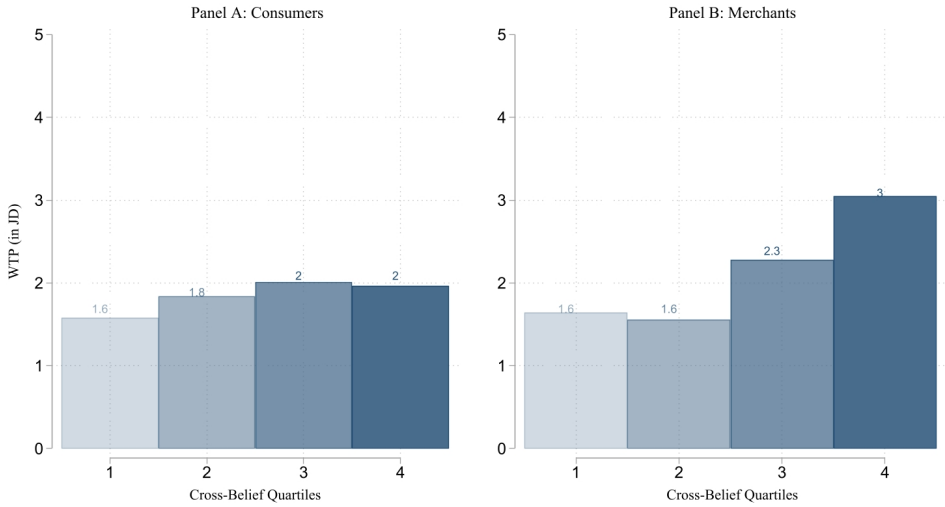
Figure 2: Structure of the Experiment

	Order A	**Order B**
Practice Round	WTP for Pen	WTP for Pen
Round 1	Cross-belief WTP1 Same-belief	WTP1
		Digital Wallet Training
Round 2	Provide cross-belief info WTP2 Same-belief	Cross-belief WTP2 Same-belief
	Digital Wallet Training	
Round 3	WTP3	Provide cross-belief info WTP3 Same-belief
Outcome Round	Learn if the participant gets the wallet	Learn if the participant gets the wallet

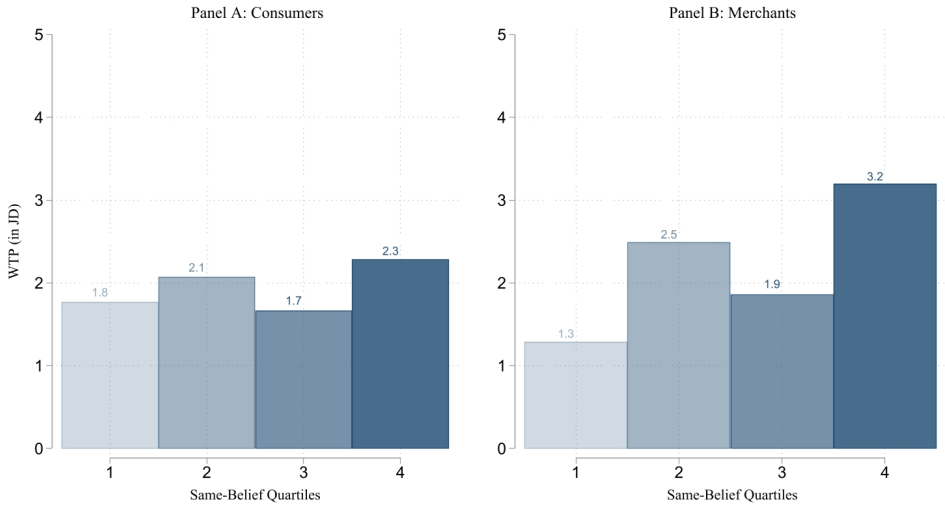
Notes: The figure presents the structure of the experimental sessions, each of the columns presenting the different orders in which treatments were proposed. The visual materials shown to the participants in each round are in the Appendix. On the outcome round, the round that would be paid was randomly chosen by the participant, and the random price was picked from the paper cup. In the case that the WTP was higher than the drawn price, the participant would receive a voucher to get the Digital Financial Package at this price, and would decide whether to redeem the voucher at the partner digital wallet provider's workstation.

Figure 3: Willingness to Pay and Adoption Beliefs

(a) WTP and Cross-Side Beliefs



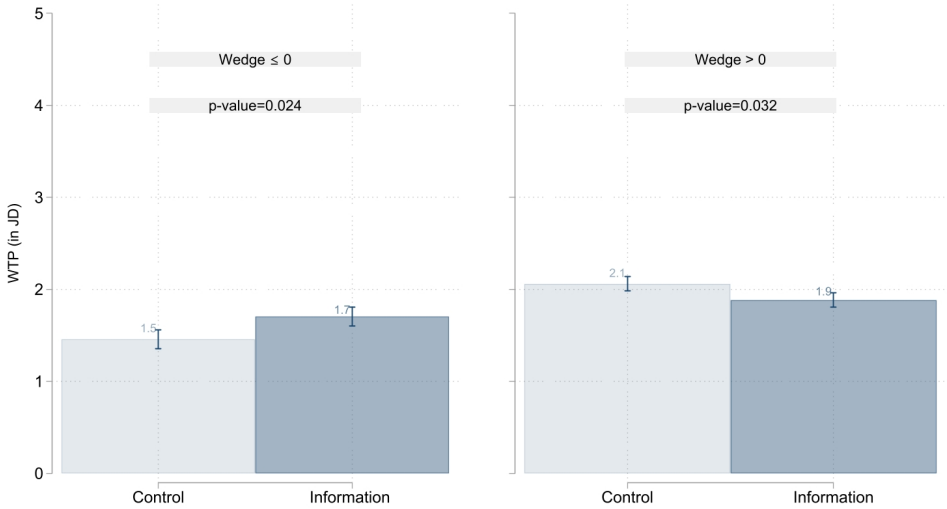
(b) WTP and Same-Side Beliefs



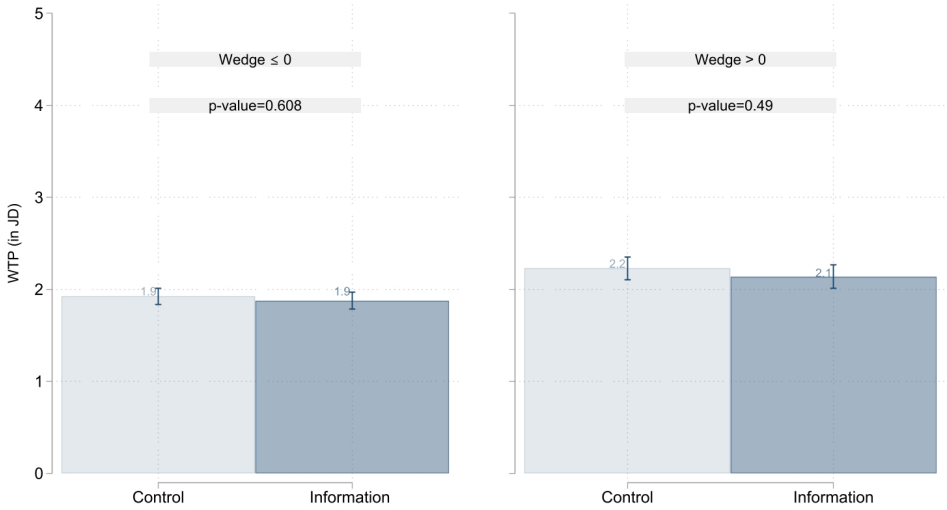
Notes: (a) Panel A shows the average WTP in Jordanian dinars for each cross-side belief quartile among consumers. Panel B shows the average WTP for each cross-side belief quartile among merchants. (b) Panel A shows the average WTP in Jordanian dinars for each same-side belief quartile among consumers. Panel B shows the average WTP for each same-side belief quartile among merchants.

Figure 4: Causal Effect of Cross-Side Adoption Expectations on WTP

(a) Consumers



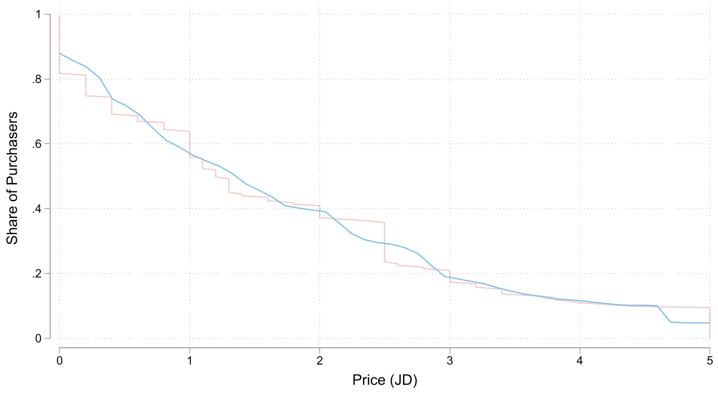
(b) Merchants



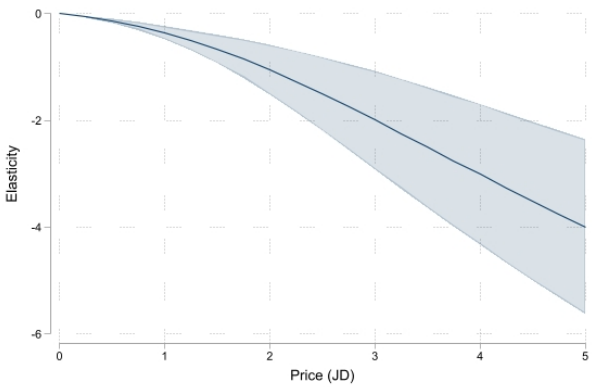
Notes: (a) A comparison of average willingness to pay in the local currency (Jordanian Dinars) for the digital financial package before and after cross-side information provision for all consumers across both session orders. *Control* refers to the WTP elicited before providing cross-side information, whereas *Information* refers to the WTP elicited after cross-side information provision for the same set of participants. (b) A comparison of average WTP in the local currency (Jordanian Dinars) for the digital financial package before and after cross-side information provision for all merchants across both session orders. *Control* refers to the WTP elicited before providing cross-side information, whereas *Information* refers to the WTP elicited after cross-side information provision for the same set of participants.

Figure 5: Consumers - Inverse Demand Curve and Price Elasticity of Demand

(a) Inverse Demand Curve

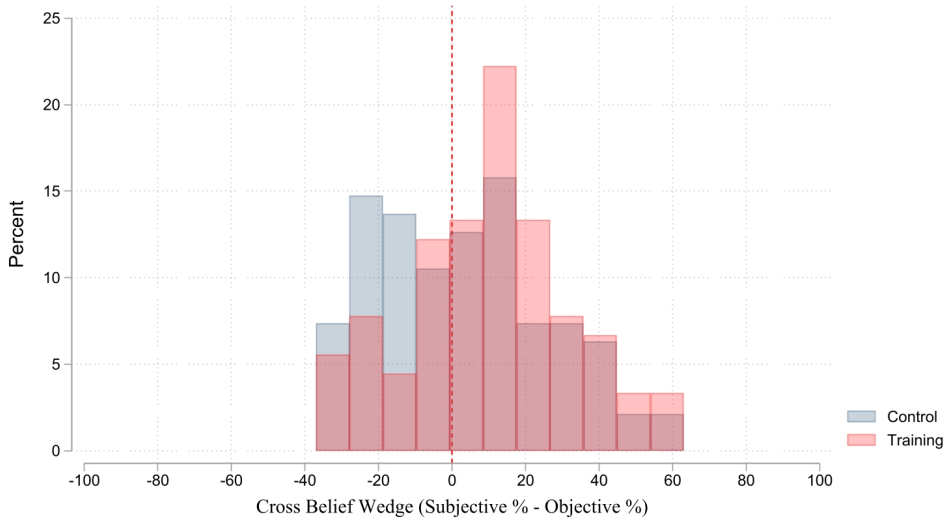


(b) Price Elasticity of Demand



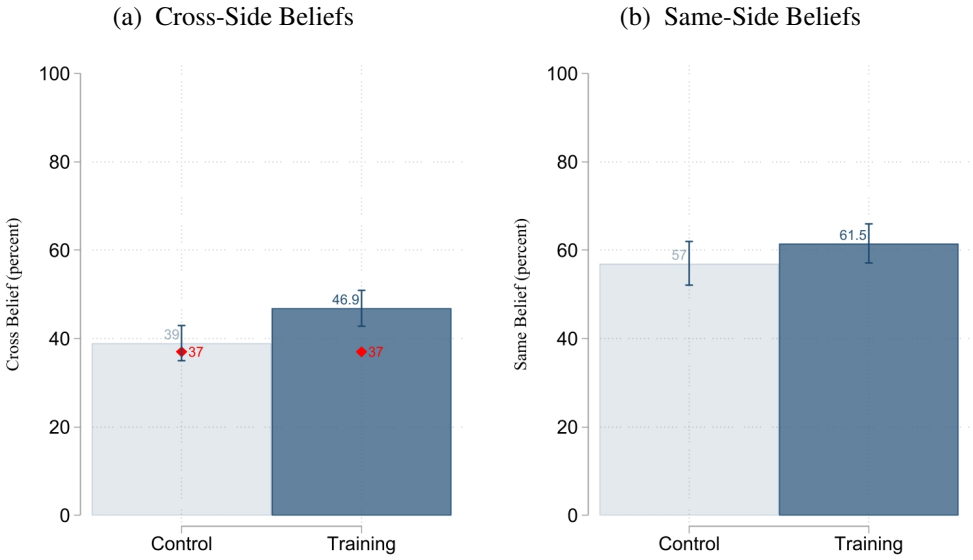
Notes: (a) The red curve shows the inverse demand curve generated through elicited WTP in the first round for each consumer across both orders. The WTP of 3 participants who did not want to buy the package for free is set to 0. The blue curve is calculated by a local polynomial regression of share of purchasers on elicited WTP, using a smoothed Epanechnikov kernel. (b) Panel B shows the price elasticity of demand at each price, which is calculated by running a logistic regression of the purchase outcomes on BDM prices. The light blue dashed lines indicate 95% confidence intervals.

Figure 6: Consumers - Distribution of Cross-Side Belief Wedge



Notes: Figure documents the cross-belief wedge of consumers, defined as the difference between subjective cross-side belief and the objective cross-adoption rate for the neighborhood that the consumer resides in. *Control* refers to the group whose beliefs are elicited before digital wallet training, i.e. round 1 beliefs of Order A participants. *Training* refers to the group whose beliefs are elicited after digital wallet training i.e. round 2 beliefs of Order B participants.

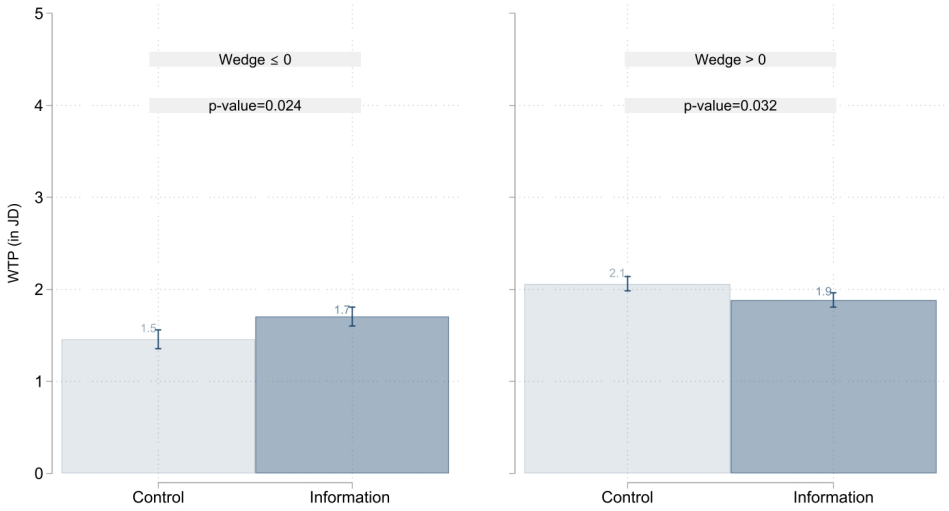
Figure 7: Consumers - Cross and Same-Side Network Beliefs of Consumers Before Cross-Market Information Provision



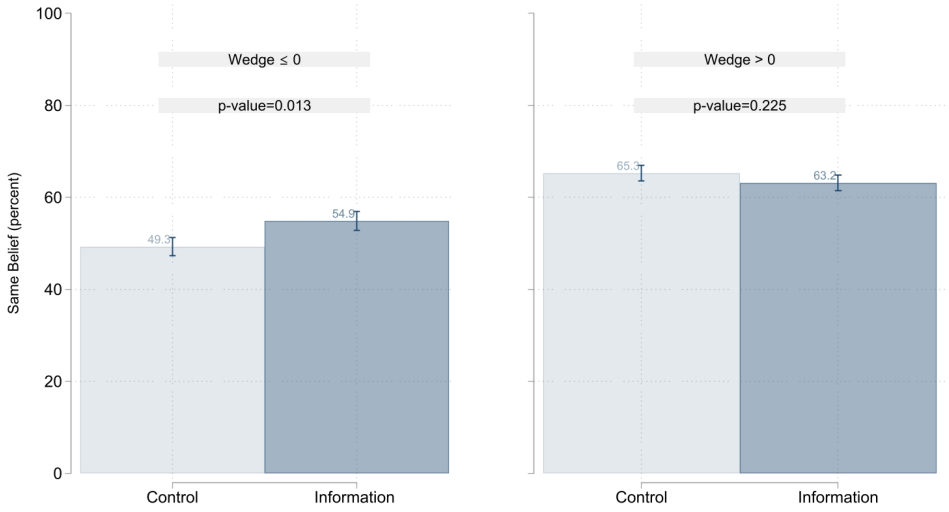
Notes: Each panel describes the beliefs of two groups of consumers before cross-market information provision separately, i.e., round 1 beliefs for Order A and round 2 beliefs for Order B. Control refers to the group whose beliefs are elicited before digital wallet training, i.e. round 1 beliefs of Order A participants. Training refers to the group whose beliefs are elicited after digital wallet training i.e. round 2 beliefs of Order B participants. The whiskers indicate 95% confidence intervals. (a) Panel A documents the cross-belief averages of consumers. (b) Panel B documents the same-side belief averages of consumers.

Figure 8: Consumers - Effect of Cross-Network Information Provision Across Cross Belief Wedges

(a) On Willingness-To-Pay for the Digital Financial Package



(b) On Same-Side Beliefs

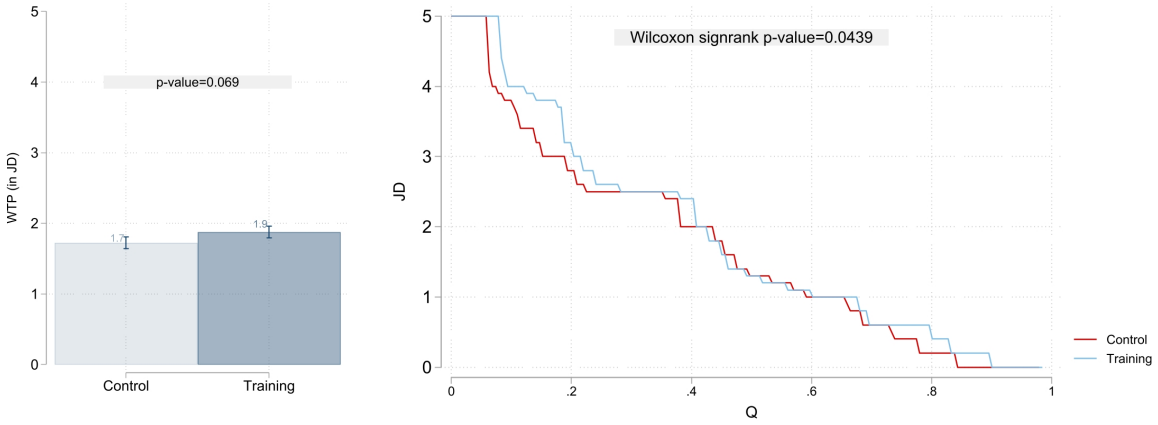


Notes: (a) A comparison of average willingness to pay in the local currency (Jordanian Dinars) for the digital financial package before and after the cross-market information provision for all consumers who underestimate the cross-network adoption (Wedge≤0) and who overestimate the cross-network adoption (Wedge>0) across both session orders. *Control* refers to the WTP elicited before information provision whereas *Information* refers to the WTP elicited after the provision. (b) A comparison of average same-side beliefs, beliefs on the adoption of wallets and bank accounts in Jordan, before and after the cross-market information provision for all consumers who underestimate the cross-side adoption (Wedge≤0) and who overestimate the cross-side adoption (Wedge>0) across both session orders.

Figure 9: Consumers - Effect of Digital Wallet Training on WTP

(a) Average WTP

(b) Demand Curves and the Digital Wallet Training

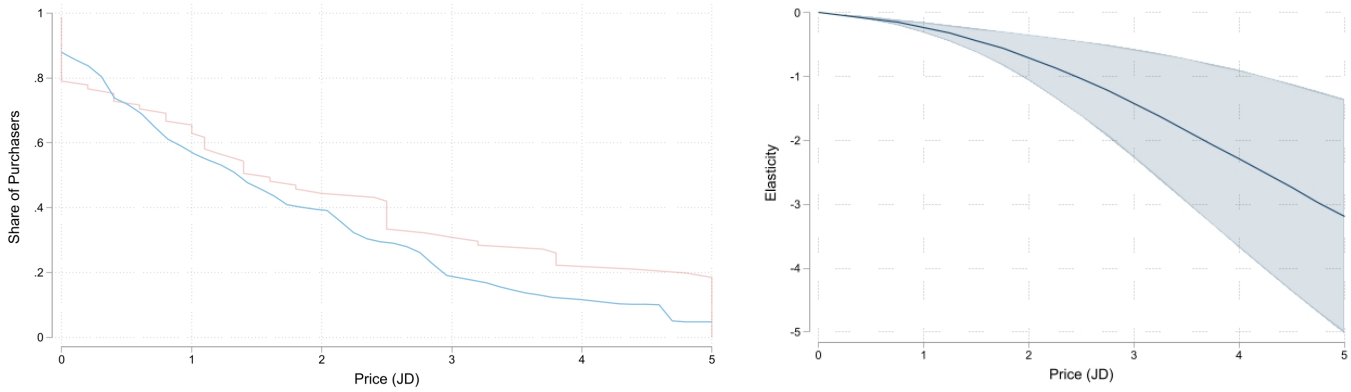


Notes: (a) A comparison of average willingness to pay in the local currency (Jordanian Dinars) for the digital financial package before and after the digital wallet training for all consumers across both session orders. *Control* refers to the WTP elicited before digital wallet training whereas *Training* refers to the WTP elicited after the wallet training for the same set of participants. (b) Demand curves for the same set of participants before and after the digital wallet training.

Figure 10: Merchants - Inverse Demand Curve and Price Elasticity of Demand

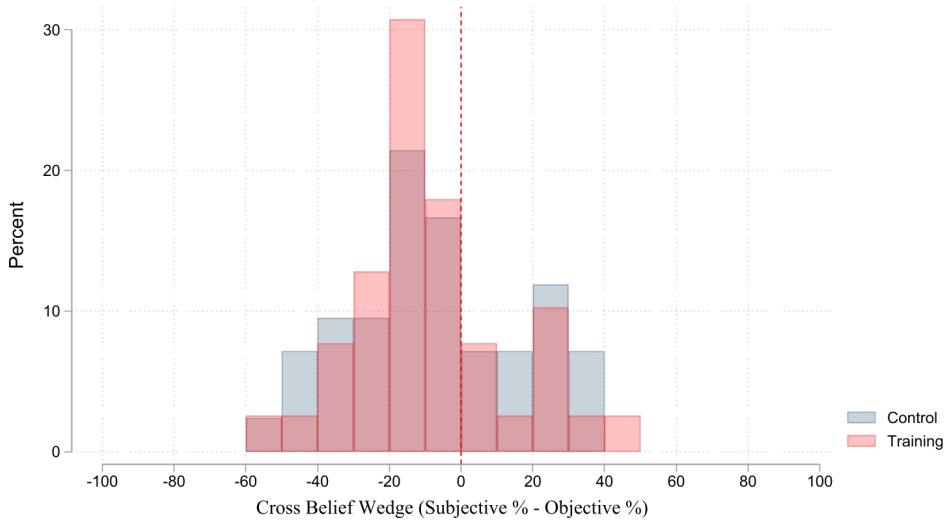
(a) Inverse Demand Curve

(b) Price Elasticity of Demand



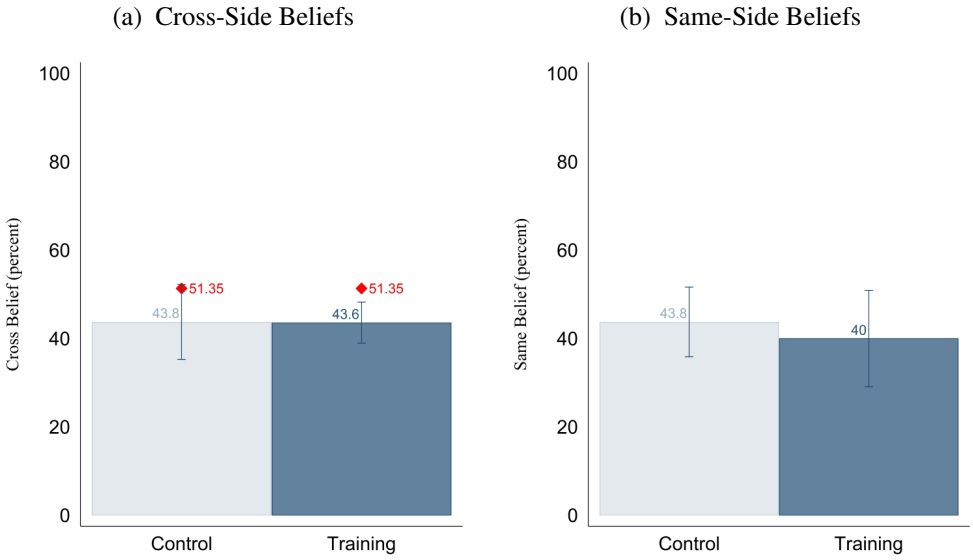
Notes: (a) The red curve shows the inverse demand curve generated through elicited WTP in the first round for each merchant across both orders. The WTP of 3 participants who did not want to buy the package for free is set to 0. The blue curve is calculated by a local polynomial regression of share of purchasers on elicited WTP, using a smoothed Epanechnikov kernel. (b) Panel B shows the price elasticity of demand at each price, which is calculated by running a logistic regression of the purchase outcomes on BDM prices. The light blue dashed lines indicate 95% confidence intervals.

Figure 11: Merchants - Distribution of Cross-Side Belief Wedge



Notes: Figure documents the cross-belief wedge of merchants, which is defined as the difference between subjective cross-side belief and the objective cross-adoption rate for the neighborhood that the merchant conducts business resides in. *Control* refers to the group whose beliefs are elicited before digital wallet training, i.e. round 1 beliefs of Order A participants. *Training* refers to the group whose beliefs are elicited after digital wallet training i.e. round 2 beliefs of Order B participants.

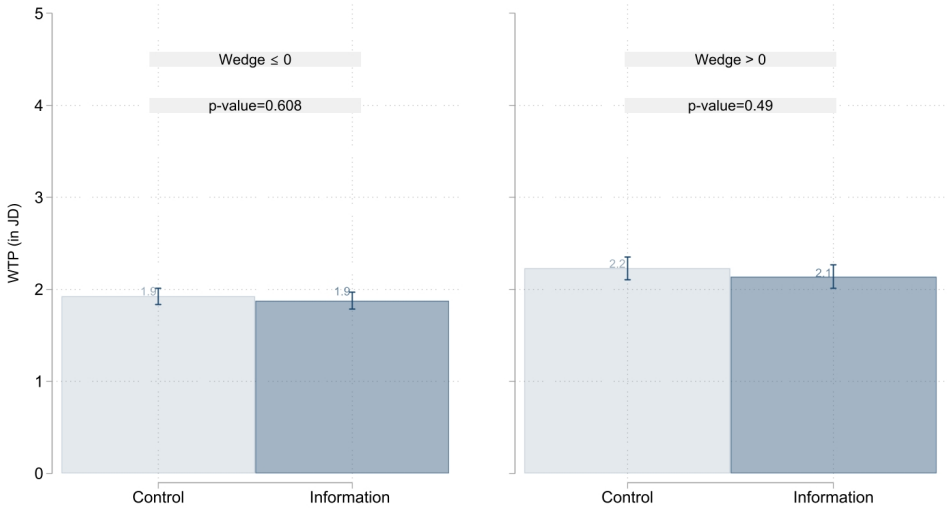
Figure 12: Merchants - Cross and Same-Side Network Beliefs of Consumers Before Cross-Market Information Provision



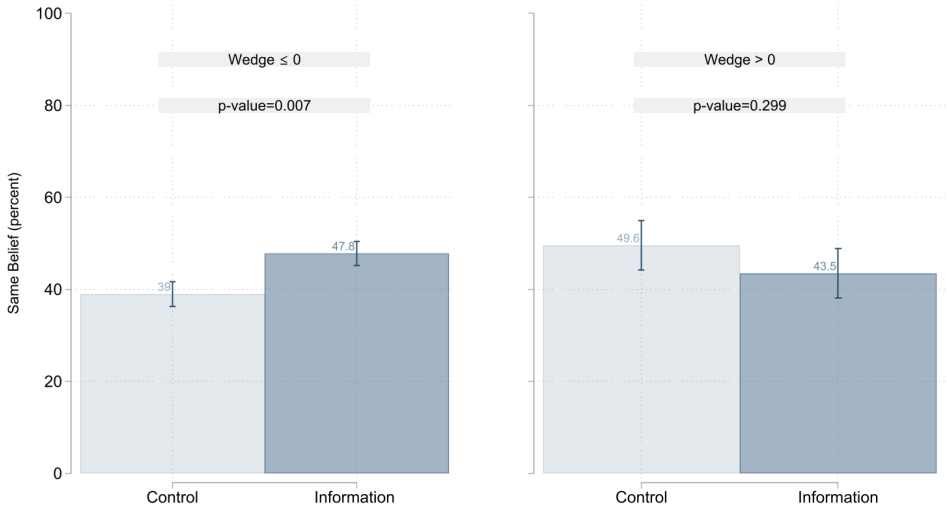
Notes: Each panel describes the beliefs of two groups of merchants before cross-market information provision separately, i.e., round 1 beliefs for Order A and round 2 beliefs for Order B. Control refers to the group whose beliefs are elicited before digital wallet training, i.e. round 1 beliefs of Order A participants. Training refers to the group whose beliefs are elicited after digital wallet training i.e. round 2 beliefs of Order B participants. The whiskers indicate 95% confidence intervals. (a) Panel A documents the cross-belief averages of merchants. (b) Panel B documents the same-side belief averages of merchants.

Figure 13: Merchants - Effect of Cross-Network Information Provision Across Cross Belief Wedges

(a) On Willingness-To-Pay for the Digital Financial Package



(b) On Same-Side Beliefs

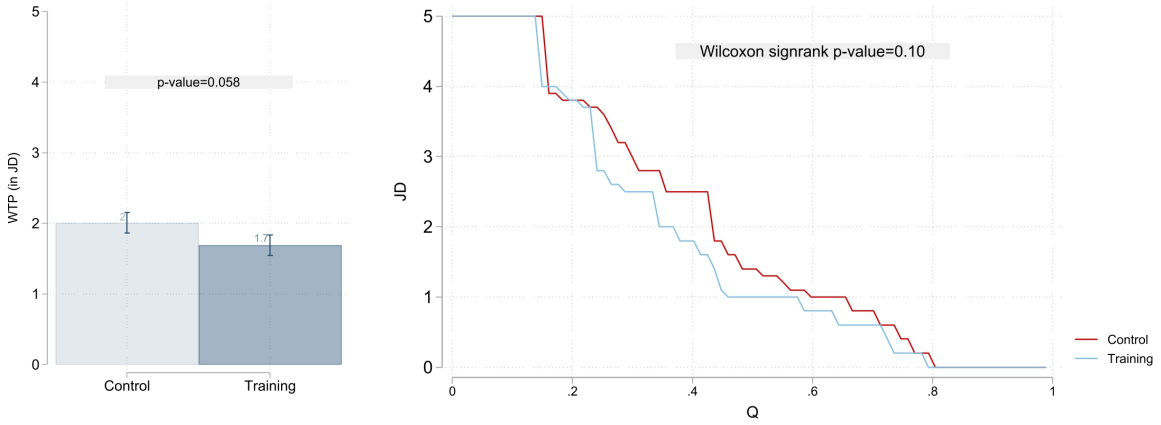


Notes: (a) A comparison of willingness to pay in the local currency (Jordanian Dinars) for the digital financial package before and after the cross-market information provision for all merchants who underestimate the cross-network adoption (Wedge≤0) and who overestimate the cross-network adoption (Wedge>0) across both session orders. *Control* refers to the WTP elicited before information provision whereas *Information* refers to the WTP elicited after the provision. (b) A comparison of same-side beliefs, beliefs on the acceptance of wallets and cards in their neighborhood, before and after the cross-market information provision for all merchants who underestimate the cross-side adoption (Wedge≤0) and who overestimate the cross-side adoption (Wedge>0) across both session orders.

Figure 14: Merchants - Effect of Digital Wallet Training on WTP

(a) Average WTP

(b) Demand Curves and the Digital Wallet Training

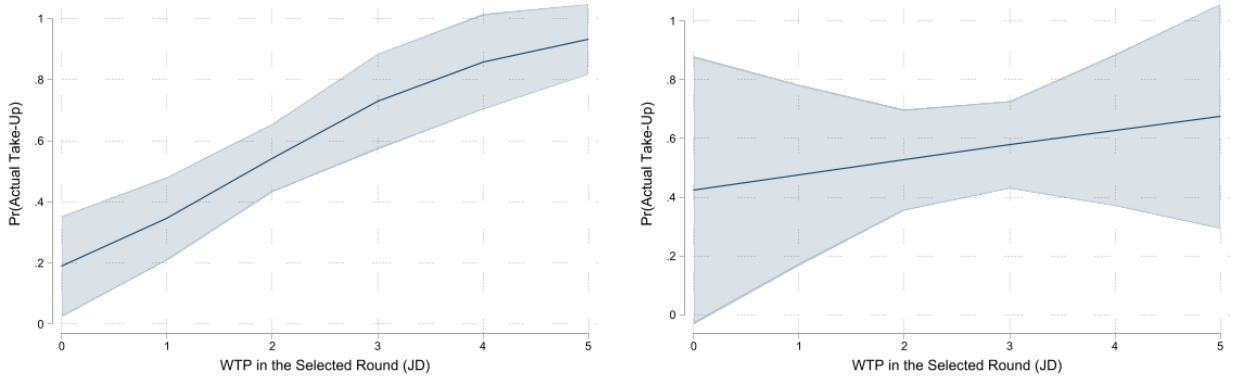


Notes: (a) A comparison of average willingness to pay in the local currency (Jordanian Dinars) for the digital financial package before and after the digital wallet training for all merchants across both session orders. *Control* refers to the WTP elicited before digital wallet training whereas *Training* refers to the WTP elicited after the wallet training for the same set of participants. (b) Demand curves for the same set of participants before and after the digital wallet training.

Figure 15: Take-Up of Digital Financial Package and Willingness-to-Pay

(a) Consumers

(b) Merchants



Notes: (a) The figure shows the predicted probability of take-up of digital financial package at each WTP amount, which is calculated by running a logistic regression of take-up on WTP in the selected round among consumers who are issued vouchers as a result of the BDM outcome. The light blue dashed lines indicate 95% confidence intervals. (b) The figure shows the predicted probability of take-up of digital financial package at each WTP amount, which is calculated by running a logistic regression of take-up on WTP in the selected round among merchants who are issued vouchers as a result of the BDM outcome. The light blue dashed lines indicate 95% confidence intervals.

Appendix A Additional Tables and Figures

Table A1: Descriptive Statistics Consumers

	Total Sample		Order A		Order B		Difference	
	(1) Mean	(2) SD	(3) Mean	(4) SD	(5) Mean	(6) SD	(7) Mean	(8) t
Demographic statistics								
Gender, Female (dummy)	0.87	0.34	0.89	0.31	0.84	0.37	0.05	(1.02)
Head of Household (dummy)	0.43	0.50	0.42	0.50	0.45	0.50	-0.02	(-0.35)
Age (continuous)	37.24	13.50	38.02	12.87	36.39	14.18	1.63	(0.80)
Marital Status (dummy)	0.56	0.50	0.62	0.49	0.48	0.50	0.15*	(2.08)
Education (categorical)	2.31	0.99	2.33	1.01	2.29	0.97	0.04	(0.29)
Employment Status (categorical)	4.10	1.37	4.23	1.30	3.94	1.43	0.28	(1.43)
Monthly Personal Income (continuous)	165.64	148.18	180.21	156.30	148.33	137.03	31.87	(1.33)
Expenses Monthly (continuous)	188.19	198.76	192.44	127.60	183.54	255.84	8.90	(0.27)
Financial Resilience (categorical)	1.76	0.66	1.84	0.68	1.66	0.62	0.18	(1.93)
Mobile money								
Events in Mobile Money (dummy)	0.17	0.37	0.12	0.33	0.22	0.42	-0.10	(-1.95)
Trust Mobile Money (continuous variable) (JOD)	641.47	759.00	613.41	998.84	673.40	315.95	-59.99	(-0.59)
Awareness (dummy)	0.36	0.48	0.43	0.50	0.29	0.45	0.14*	(2.12)
Access to Internet								
Internet via WiFi (dummy)	0.83	0.38	0.80	0.40	0.86	0.35	-0.06	(-1.21)
Internet via Mobile Phone (dummy)	0.84	0.37	0.80	0.40	0.89	0.31	-0.10	(-1.90)
Transactions and Remittances								
Online shopping (dummy)	0.41	0.49	0.41	0.49	0.41	0.50	-0.00	(-0.03)
Sent remittances last year (dummy)	0.21	0.41	0.25	0.43	0.17	0.38	0.08	(1.36)
Received remittances last year (dummy)	0.28	0.45	0.29	0.46	0.27	0.44	0.03	(0.44)
Borrowing and Savings								
Need to Borrow (dummy)	0.37	0.48	0.39	0.49	0.34	0.48	0.05	(0.74)
Savings (dummy)	0.34	0.48	0.39	0.49	0.30	0.46	0.09	(1.31)
Bank Account Ownership and Financial Literacy								
Events in Financial Inclusion (dummy)	0.15	0.36	0.13	0.34	0.17	0.38	-0.04	(-0.83)
Household Bank Account (dummy)	0.46	0.50	0.48	0.50	0.43	0.50	0.05	(0.74)
Financial Literacy Indicator (dummy)	0.28	0.45	0.31	0.47	0.23	0.43	0.08	(1.24)
Observations	203		109		94		203	

Notes: The variables included in the table are measured as follows. *Gender*, *Head of Household*, and *Marital Status* are represented as dummy variables, where a value of 1 indicates that the respondent is female, the head of their household, or married, respectively. *Age*, *Monthly Personal Income*, and *Monthly Expenses* are continuous variables that reflect the respondent's exact age, monthly income, and monthly expenses, measured in Jordanian dinars (JOD). *Education* is categorized into five distinct levels: primary, secondary, intermediate diploma, bachelor's degree, and higher education. *Financial Resilience* is a categorical variable measuring the respondent's ability to access 150 JOD within 30 days. *Event in Mobile Money* captures whether the respondent attended a mobile money-related event prior to the experiment, and *Awareness* indicates whether they had prior knowledge of mobile money services. *Trust in mobile money* is measured as a continuous variable that asks respondents how much of a hypothetical 1,000 JOD they would feel comfortable storing in a mobile wallet. *Internet access* is captured through two dummy variables: *Internet via Wi-Fi* and *Internet via Mobile*, with values of 1 indicating that the respondent has access to the internet through Wi-Fi or mobile data, respectively. *Online Shopping* is a dummy variable coded as 1 if the respondent has made purchases online. *Sent remittances last year* and *Received remittances last year* are dummy variables with a value of 1 indicating that the respondent either sent or received remittances within the previous 12 months. *Need to borrow* is a dummy variable that captures whether the respondent had to borrow money in the last 12 months, while *Saving* is a dummy variable indicating whether they managed to save any money during that period. *Events in financial inclusion* is a dummy variable that takes the value of 1 if the respondent attended a financial literacy event prior to the experiment. This variable reflects the respondent's exposure to financial education initiatives. *Household Bank Account* is another dummy variable, coded as 1 if at least one member of the respondent's household has a bank account. This variable indicates the household's access to formal banking services. *Financial Literacy* is coded as 1 if the respondent answered at least one out of five financial knowledge questions correctly.

Table A2: Descriptive Statistics Merchants

	Total Sample		Order A		Order B		Difference	
	(1) Mean	(2) SD	(3) Mean	(4) SD	(5) Mean	(6) SD	(7) Mean	(8) t
Demographic Characteristics								
Gender: Male (dummy)	0.70	0.46	0.65	0.48	0.72	0.45	-0.07	(-0.69)
Age (continuous)	36.63	12.58	38.27	12.92	34.55	12.27	3.73	(1.37)
Marital Status (dummy)	0.59	0.50	0.63	0.49	0.55	0.50	0.08	(0.81)
Highest Education (dummy)	0.37	0.49	0.36	0.48	0.40	0.49	-0.04	(-0.38)
Mobile Money								
Awareness (dummy)	0.57	0.50	0.53	0.50	0.57	0.50	-0.03	(-0.33)
Trust (continuous) JOD	554.20	364.58	494.32	354.74	626.75	369.86	-132.43	(-1.67)
Use (dummy)	0.45	0.50	0.39	0.50	0.56	0.51	-0.17	(-1.16)
Difficulty to use merchant wallet (categorical)	12.36	0.62	2.33	0.65	2.36	0.60	-0.03	(-0.20)
Event in mobile money (dummy)	0.16	0.37	0.09	0.28	0.26	0.44	-0.17*	(-2.13)
Business Characteristics								
Business start per year (continuous)	15.05	41.79	13.14	34.55	19.19	55.64	-6.05	(-0.45)
Sector (categorical)	1.99	1.08	2.26	1.09	1.81	1.04	0.45	(1.88)
Annual Revenue (categorical)	1.45	1.57	1.44	1.97	1.50	1.17	-0.06	(-0.15)
Annual revenue shared within neighborhood	3.82	1.78	3.97	1.84	3.65	1.76	0.33	(0.78)
Amount supplier cost monthly (continuous) (JOD)	783.72	1816.90	732.02	2270.59	906.95	1218.81	-174.92	(-0.44)
Amount bill payment (continuous) (JOD)	789.69	2103.42	261.97	227.74	1262.75	2895.73	-1000.78*	(-2.18)
Amount merchant tax (continuous) (JOD)	238.07	997.49	85.80	210.31	376.46	1354.10	-290.66	(-1.32)
Bank Account								
Owner Personal (dummy)	0.32	0.47	0.29	0.46	0.33	0.47	-0.04	(-0.37)
Owner Business (dummy)	0.21	0.41	0.16	0.37	0.25	0.44	-0.09	(-1.02)
Trust (continuous) (JOD)	672.41	355.68	588.33	376.85	787.04	290.75	-198.70*	(-2.24)
Financial Literacy								
Financial Events (dummy)	0.15	0.36	0.04	0.21	0.28	0.45	-0.24**	(-3.12)
Financial Literacy Indicator (dummy)	0.44	0.50	0.46	0.50	0.41	0.50	0.05	(0.45)
Digital Uses								
Online Advertisement (dummy)	0.40	0.49	0.36	0.48	0.44	0.50	-0.09	(-0.82)
Online Sales (dummy)	0.27	0.45	0.28	0.46	0.26	0.45	0.02	(0.22)
Digital Sales share total	16.85	74.40	5.73	28.83	31.26	107.22	-25.54	(-1.09)
Trust in Transfer(100 JOD)	95.59	90.91	91.62	94.99	95.29	78.37	-3.68	(-0.18)
Trust in Transfer (10 JOD)	9.73	10.66	10.82	15.18	8.79	3.03	2.03	(0.81)
Observations	90		46		44		90	

Notes: *Gender*, *Marital Status*, and *Highest Education* are dummy variables that take a value of 1 if the merchant is male, married, or has at least an intermediate diploma, respectively. *Age* is a continuous variable that reports the merchant's age. *Awareness* is a dummy variable that takes a value of 1 if the merchant was aware of mobile money before the experiment. *Trust* is a continuous variable, measured by asking merchants how much of a hypothetical 1,000 JOD they would feel comfortable keeping in their mobile wallet if they had one. *Use* is a dummy variable that takes a value of 1 if the merchant used mobile money before the experiment. *Difficulty in using a merchant wallet* is an ordinal variable that measures the level of difficulty faced by the merchant in using the wallet, with responses ranging from "very difficult" to "not difficult." *Event in mobile money* is a dummy variable that takes a value of 1 if the merchant attended a mobile money-related event before the experiment. *Business start per year* is a continuous variable that measures how many years the business has been operating. *Sector* is a categorical variable that reports the business sector. *Annual revenue* is a categorical variable capturing the business's annual revenue. *Annual revenue shared within neighborhood* reports the percentage of annual revenue generated from sales to customers living in the neighborhood. *Amount supplier costs monthly* is a continuous variable that reports the monthly amount spent on business suppliers. *Amount bill payment* reports the monthly amount the merchant spends on bills. *Amount merchant tax* reports the annual amount of taxes paid by the merchant. *Owner personal* and *Owner business* are dummy variables that take a value of 1 if the merchant has a personal bank account or a business bank account, respectively. *Trust* is a continuous variable, measured by asking how much of a hypothetical 1,000 JOD the merchant would feel comfortable keeping in their bank account if they had one. *Financial event* is a dummy variable that takes a value of 1 if the merchant attended a financial literacy event before the experiment. *Financial Literacy* is a dummy variable that takes a value of 1 if the merchant answered at least one out of three financial knowledge questions correctly. *Online advertisement* and *Online sales* are dummy variables that take a value of 1 if the merchant has a website or uses social media networks to advertise products, or if they sell products online, respectively. *Digital sales share total* is a continuous variable that reports the percentage of the merchant's sales that customers in the neighborhood would pay digitally if the merchant opened a mobile money account. *Trust in transfer (100 JOD)* measures how much of a hypothetical payment of 100 JOD the merchant would feel comfortable receiving through their merchant wallet if they had one. *Trust in transfer (10 JOD)* measures how much of a hypothetical payment of 10 JOD the merchant would feel comfortable receiving through their merchant wallet if they had one.

Table A3: Consumers - The Correlates of Willingness-to-Pay in the First Round

	WTP					
	(1)	(2)	(3)	(4)	(5)	(6)
Gender	-0.0139	-0.102	-0.121	0.0930	0.0975	-0.0719
	(0.428)	(0.282)	(0.384)	(0.382)	(0.234)	(0.386)
Household Head	0.680**	0.810**	0.792**	0.384	0.494*	0.513
	(0.274)	(0.311)	(0.303)	(0.277)	(0.281)	(0.313)
Age	-0.0134	-0.0137	-0.0183	-0.00605	-0.00282	-0.00933
	(0.0156)	(0.0145)	(0.0159)	(0.0143)	(0.0128)	(0.0149)
Marital Status	0.320	0.222	0.348	0.327	0.266	0.358
	(0.378)	(0.326)	(0.386)	(0.388)	(0.311)	(0.396)
Education Level	0.159	0.0137	0.160	0.110	0.0110	0.154
	(0.178)	(0.156)	(0.164)	(0.143)	(0.125)	(0.145)
Employment Status	0.692	0.421	0.394	0.931**	0.844*	0.714
	(0.408)	(0.444)	(0.509)	(0.425)	(0.418)	(0.458)
Sent Money Last Year	0.435	0.256	0.509	0.550	0.496	0.598
	(0.434)	(0.405)	(0.463)	(0.417)	(0.406)	(0.451)
Received Money Last Year	-0.415	-0.527*	-0.670**	-0.545	-0.669**	-0.740**
	(0.344)	(0.293)	(0.276)	(0.333)	(0.293)	(0.273)
Saved Money	-0.0118	-0.107	0.293	0.200	0.0612	0.366
	(0.271)	(0.306)	(0.293)	(0.260)	(0.260)	(0.274)
Household Has a Bank Account	0.277	0.423	0.424	0.283	0.338	0.391
	(0.337)	(0.340)	(0.333)	(0.281)	(0.276)	(0.276)
Online Shopping	0.186	0.356	0.152	0.0252	0.157	-0.0289
	(0.336)	(0.327)	(0.380)	(0.291)	(0.288)	(0.337)
Household Has a MM Account	-0.182	-0.180	0.128	-0.428	-0.373	-0.200
	(0.368)	(0.307)	(0.365)	(0.306)	(0.264)	(0.357)
Financial Resilience	0.258	0.367	0.167	0.144	0.136	0.0261
	(0.487)	(0.398)	(0.534)	(0.539)	(0.422)	(0.591)
Internet Access via Mobile	-0.163	-0.155	-0.310	-0.148	-0.0762	-0.269
	(0.416)	(0.366)	(0.401)	(0.428)	(0.334)	(0.414)
Financial Literacy	-0.314**	-0.0187	-0.158	-0.231**	-0.0840	-0.177
	(0.129)	(0.179)	(0.183)	(0.0938)	(0.168)	(0.176)
Mobile Money Awareness	-0.0124	0.0638	-0.0666	0.0244	0.0744	-0.111
	(0.294)	(0.297)	(0.291)	(0.259)	(0.265)	(0.277)
Trust in Mobile Money	0.345	0.473	0.571	0.283	0.357	0.463
	(0.368)	(0.355)	(0.425)	(0.316)	(0.306)	(0.370)
Digital Financial Literacy	0.0188	-0.264	-0.137	0.0576	-0.108	-0.101
	(0.192)	(0.222)	(0.297)	(0.203)	(0.203)	(0.269)
WTP for Pen				0.0736***	0.0794***	0.0667***
				(0.0191)	(0.0177)	(0.0208)
Got Pen				-0.151	-0.481	-0.209
				(0.408)	(0.322)	(0.387)
Constant	1.691**	1.544*	1.489*	0.473	0.340	0.611
	(0.738)	(0.798)	(0.755)	(0.713)	(0.631)	(0.640)
Observations	162	162	162	162	162	162
R^2	0.278	0.277	0.408	0.406	0.397	0.482
Session FE	✓	✗	✓	✓	✗	✓
Experiment Assistant FE	✗	✓	✓	✗	✓	✓

Notes: The dependent variable is the willingness-to-pay in the first round across all consumer participants. Errors are clustered at the session level. Significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A4: Consumers - The Effect of Training On Network Beliefs

	Panel A: Cross-Side Belief			Panel B: Same-Side Belief		
	(1)	(2)	(3)	(1)	(2)	(3)
Training	7.886***	7.609**	6.079	4.513	5.352*	4.493
	(2.735)	(3.057)	(4.061)	(3.223)	(2.797)	(3.105)
Gender		3.660	2.343		11.35***	10.18**
		(4.852)	(5.522)		(4.071)	(4.612)
Household Head		0.550	-0.0436		1.634	1.198
		(4.727)	(5.170)		(4.078)	(4.532)
Age		0.0764	0.0733		0.0442	0.0461
		(0.220)	(0.204)		(0.231)	(0.230)
Marital Status		-1.560	-0.000634		-8.329	-7.825
		(4.946)	(5.145)		(5.782)	(5.963)
Education Level		0.610	1.039		0.936	1.062
		(2.901)	(2.872)		(2.390)	(2.325)
Employment Status		4.062	4.980		4.469	3.012
		(8.229)	(8.333)		(5.494)	(5.505)
Financial Literacy			-2.425			0.889
			(1.886)			(1.739)
Mobile Money Awareness			-6.371			-4.496
			(4.395)			(3.628)
Trust in Mobile Money			-0.595			3.268
			(4.208)			(4.738)
Digital Financial Literacy			6.288			1.261
			(5.298)			(3.083)
Constant	38.97***	32.91**	37.72***	57.00***	46.44***	44.62***
	(1.933)	(13.94)	(12.70)	(2.401)	(12.43)	(11.74)
Observations	185	169	168	184	168	167
R^2	0.044	0.050	0.087	0.020	0.084	0.094
Adjusted R^2	0.028	-0.003	0.010	0.004	0.032	0.017
Neighborhood FE	✓	✓	✓	✓	✓	✓

Notes: The dependent variable in Panel A is the first cross-side belief elicited for each group, round 1 belief of Order A and Round 2 belief of Order B. The dependent variable in Panel B is the first same-side belief elicited for each group, round 1 belief for Order A and Round 2 belief for Order B. Column (1) in each panel is the result of an OLS regression of the dependent variable on Training. Training is a dummy variable that takes the value 1 for beliefs that are elicited after receiving the digital wallet training i.e. equals 1 for Round 2 beliefs of Order B and equals 0 for Round 1 beliefs of Order A. Column (2) in each panel further includes basic demographic variables. Column (3) in each panel includes additional variables that are frequently cited as reasons for the lack of adoption of digital financial technologies. Errors are clustered at the session level. Significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A5: Merchants - The Correlates of Willingness-to-Pay in the First Round

	WTP					
	(1)	(2)	(3)	(4)	(5)	(6)
Gender	-0.534	-0.131	0.485	-0.276	0.0799	0.431
	(0.496)	(0.432)	(0.559)	(0.350)	(0.452)	(0.626)
Age	0.00251	0.00334	0.0317	0.0264	0.0281	0.0394
	(0.0255)	(0.0269)	(0.0350)	(0.0242)	(0.0208)	(0.0272)
Highest Education	0.0759	0.378	0.688	0.130	0.313	0.516
	(0.252)	(0.288)	(0.492)	(0.214)	(0.261)	(0.365)
Owner's Personal Bank Account	-0.544	-1.234*	-2.098**	0.190	-0.509	-0.979
	(0.358)	(0.644)	(0.787)	(0.497)	(0.517)	(0.601)
Online Advertisement	0.210	-1.030*	-1.432	0.502	-0.261	-0.654
	(0.845)	(0.573)	(0.839)	(0.591)	(0.508)	(0.715)
Online Sales	-0.0264	1.800*	2.109*	-0.201	0.841	1.004
	(1.005)	(0.916)	(1.013)	(0.735)	(0.676)	(0.987)
Financial Literacy	0.245	0.740	1.169**	0.109	0.669	0.887*
	(0.408)	(0.463)	(0.491)	(0.255)	(0.399)	(0.417)
Mobile Money Awareness	-0.247	-0.401	-0.522	-0.496	-0.405	-0.664
	(0.769)	(0.635)	(0.739)	(0.657)	(0.772)	(0.880)
Trust in Mobile Money	0.783	0.465	-0.0805	0.996**	0.542	0.104
	(0.444)	(0.586)	(0.549)	(0.364)	(0.494)	(0.484)
WTP for Pen				0.145***	0.132***	0.105***
				(0.0358)	(0.0294)	(0.0306)
Got Pen				-0.860	-0.676	-0.575
				(0.569)	(0.774)	(0.782)
Constant	1.692	0.704	-1.040	-1.414	-2.068*	-2.327
	(1.316)	(1.560)	(2.088)	(1.329)	(1.130)	(1.528)
Observations	60	61	60	60	61	60
R^2	0.324	0.491	0.672	0.579	0.682	0.753
Session FE	✓	✗	✓	✓	✗	✓
Experiment Assistant FE	✗	✓	✓	✗	✓	✓

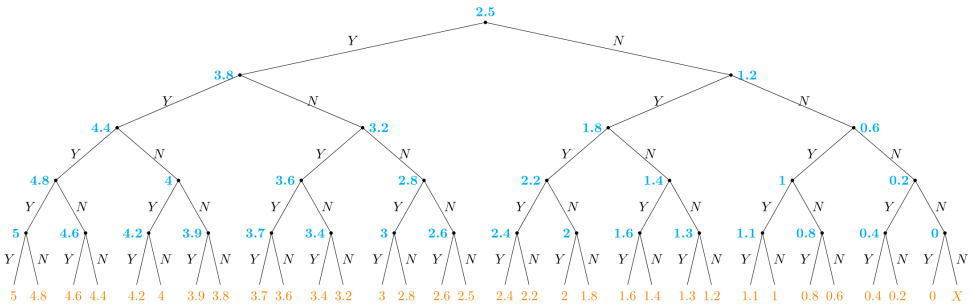
Notes: The dependent variable is the willingness-to-pay in the first round across all merchant participants. Errors are clustered at the session level. Significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A6: Merchants - The Effect of Training On Network Beliefs

	Panel A: Cross-Side Belief			Panel B: Same-Side Belief		
	(1)	(2)	(3)	(1)	(2)	(3)
Training	-0.147	-0.395	-1.341	-3.713	-3.342	-5.976
	(4.351)	(3.837)	(2.621)	(6.066)	(7.013)	(6.244)
Gender		-2.532	-4.512		-14.69*	-16.48**
		(5.778)	(6.029)		(6.901)	(7.045)
Age		0.0815	0.0717		0.110	0.0323
		(0.327)	(0.315)		(0.360)	(0.324)
Highest Education		-5.142**	-5.306**		1.772	1.941
		(2.168)	(2.310)		(3.253)	(3.447)
Financial Literacy			-1.608			-7.176
			(2.802)			(4.696)
Mobile Money Awareness			4.771			7.126
			(3.894)			(7.395)
Trust in Mobile Money			7.306			5.944
			(7.100)			(5.043)
Constant	43.77***	55.34***	52.09***	43.76***	43.41**	46.58***
	(3.881)	(12.68)	(13.13)	(3.566)	(15.03)	(14.79)
Observations	81	64	64	81	64	64
R^2	0.028	0.119	0.159	0.033	0.099	0.177
Adjusted R^2	-0.010	0.026	0.019	-0.005	0.004	0.040
Neighborhood FE	✓	✓	✓	✓	✓	✓

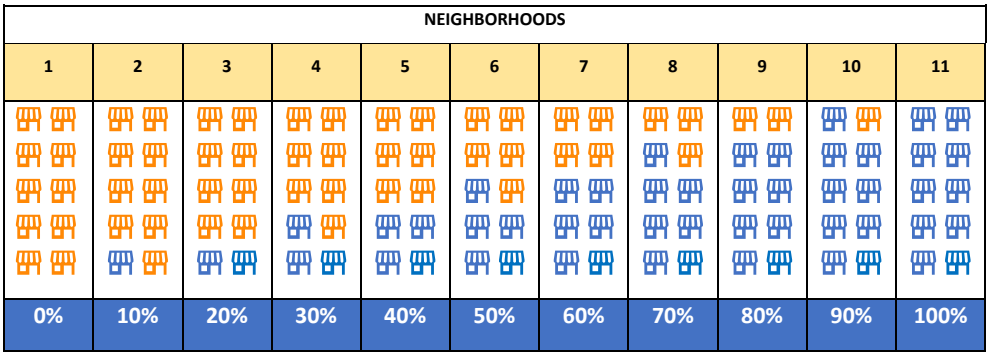
Notes: The dependent variable in Panel A is the first cross-side belief elicited for each group, round 1 belief of Order A and Round 2 belief of Order B. The dependent variable in Panel B is the first same-side belief elicited for each group, round 1 belief for Order A and Round 2 belief for Order B. Column (1) in each panel is the result of an OLS regression of the dependent variable on Training. Training is a dummy variable that takes the value 1 for beliefs that are elicited after receiving the digital wallet training i.e. equals 1 for Round 2 beliefs of Order B and equals 0 for Round 1 beliefs of Order A. Column (2) in each panel further includes basic demographic variables. Column (3) in each panel includes additional variables that are frequently cited as reasons for the lack of adoption of digital financial technologies. Errors are clustered at the session level. Significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure A1: Elicitation of Willingness to pay



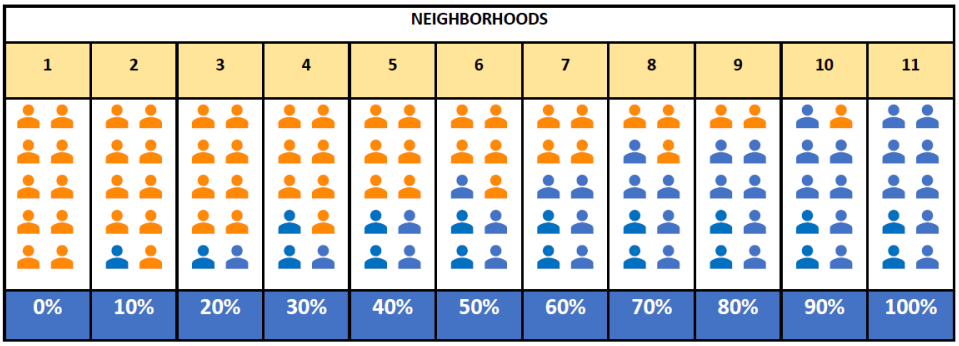
Notes: The figure presents the decision tree that is used by the field officers while eliciting willingness to pay decisions in each round.

Figure A2: Cross-Side Belief Elicitation for Consumers



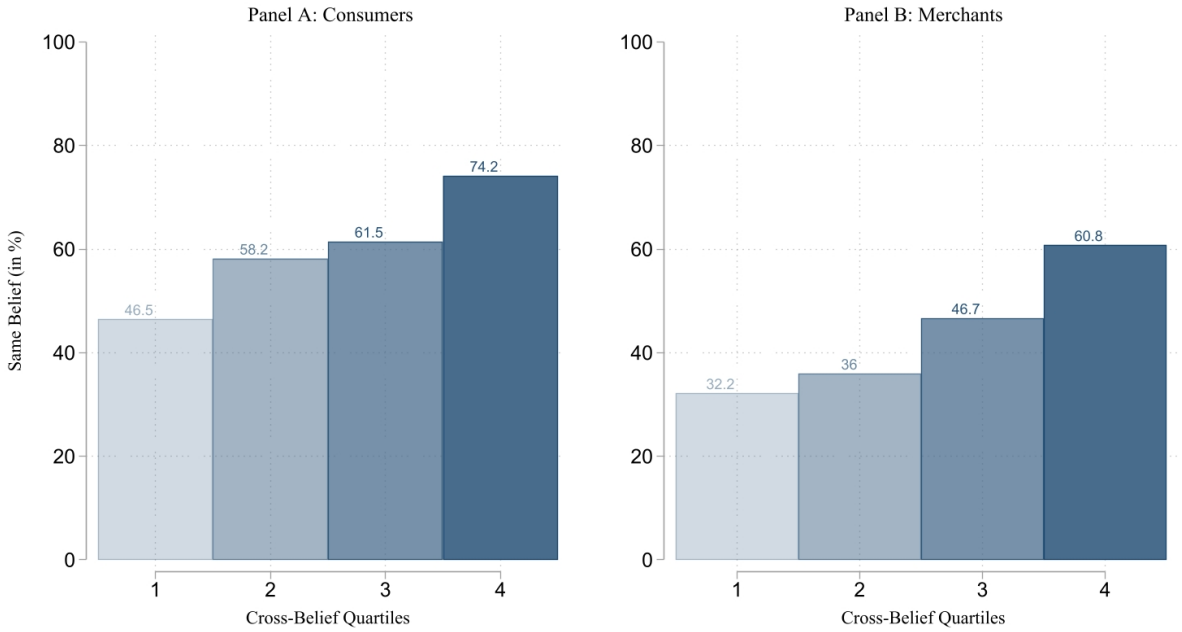
Notes: The figure presents the visual aids that are presented to consumers while eliciting their cross-side adoption expectations. The field officer describes this picture as representing 11 distinct hypothetical neighborhoods with different adoption rates and asks the consumer to choose the neighborhood that is most similar to their own neighborhood in terms of merchant adoption of digital wallets or debit cards.

Figure A3: Cross-Side Belief Elicitation for Merchants



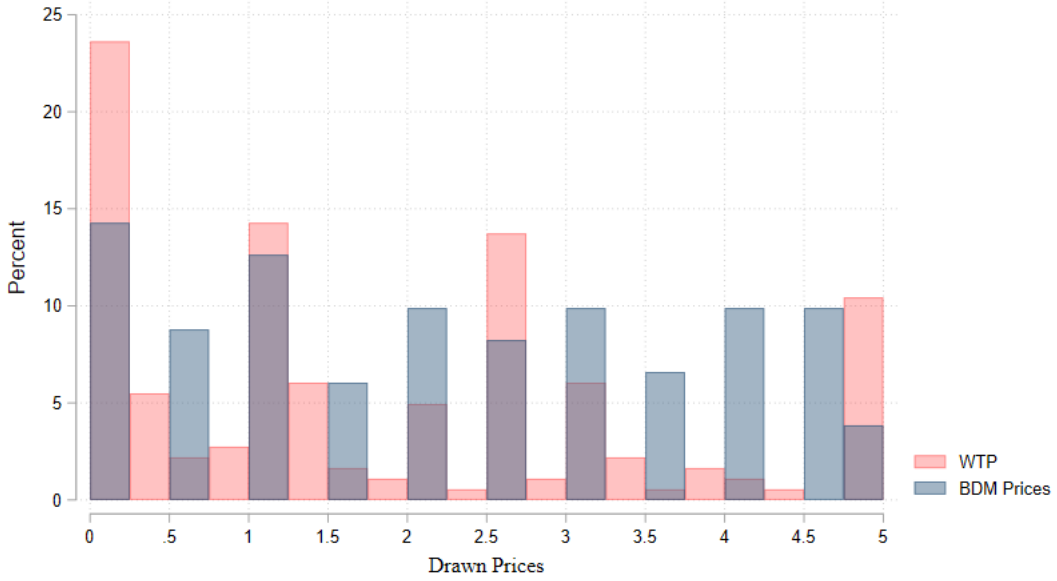
Notes: The figure presents the visual aids that are presented to merchants while eliciting their cross-side adoption expectations. The field officer describes this picture as representing 11 distinct neighborhoods with different adoption rates and asks the merchant to choose the neighborhood that is most similar to their own neighborhood in terms of consumer adoption of digital wallets or bank accounts.

Figure A4: Cross-Side and Same-Side Adoption Beliefs



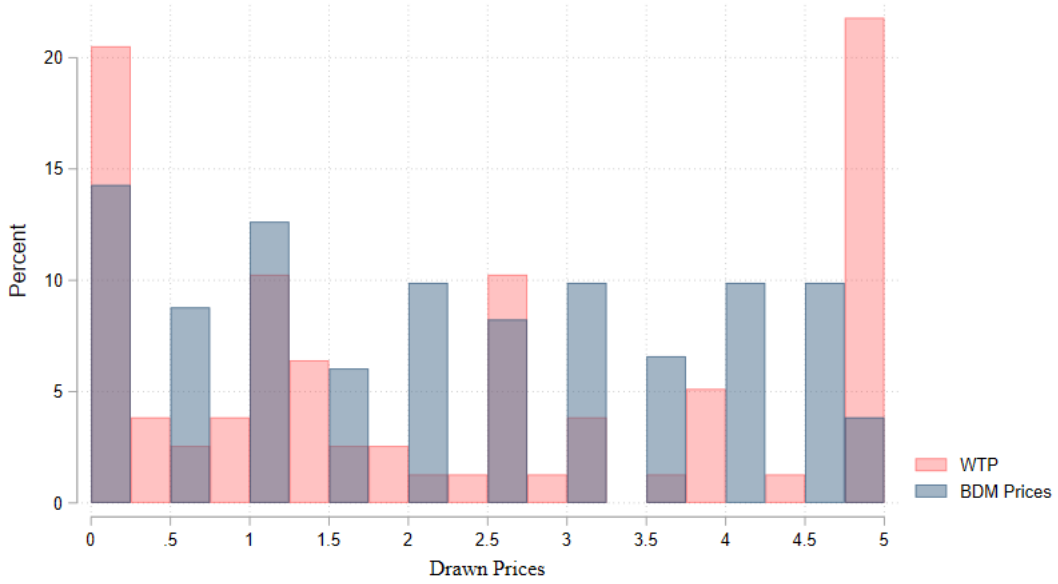
Notes: Each panel shows the positive association between cross-side belief quartiles and same-side beliefs elicited before cross-side information provision.

Figure A5: Consumers: Distribution of BDM Prices



Notes: The graph shows the histogram of consumers' willingness to pay in the selected round and the realized BDM prices.

Figure A6: Merchants: Distribution of BDM Prices



Notes: The graph shows the histogram of merchants' willingness to pay in the selected round and the realized BDM prices.