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Assessing the factors that promote adoption and use of a CBDC wallet: evidence from Peru

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Abstract

This paper examines the determinants of Central Bank Digital Currency (CBDC) wallet usage and evaluates the impact of a retail CBDC pilot implemented by the Central Reserve Bank of Peru (BCRP) in regions with low levels of financial inclusion. As of August 2025, the pilot reached approximately 117 thousand active users and 60 thousand participating merchants, while the outstanding balance of CBDC in circulation amounted to about PEN 7.5 million. Focusing on districts with low levels of financial inclusion, the first part of the paper investigates the individual-level determinants of CBDC wallet usage. Survey-based evidence indicates that awareness of the central bank's involvement, satisfaction with the wallet, and the use of other digital wallets are strongly associated with active usage. In contrast, self-employment is negatively correlated with wallet activity, likely reflecting the closed-loop design of the pilot. In the second part of the paper, we exploit a quasi-experimental setting created by differentiated advertising campaigns across treated and control districts to estimate the effects of the intervention. The results show that the campaign significantly increased merchant adoption. Instrumental-variable estimates further identify merchant participation as a key mechanism driving wallet usage. Overall, the findings highlight the features and policy levers that are critical for the adoption of a retail CBDC, including merchant network expansion, well-targeted advertising campaigns, clear communication about the central bank's involvement and financial incentives.

Keywords: retail CBDC, digital payments, quasi-experimental design.

JEL: E42, E58, C26

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1 INTRODUCTION

The rapid digitalization of payment systems has become a central issue in monetary economics and financial policy. Across both advanced and emerging economies, policymakers are increasingly exploring the potential role of Central Bank Digital Currencies (CBDC) as instruments to modernize payment infrastructures, enhance financial inclusion, expand the use of digital payments, and strengthen the resilience of national payment systems. These debates are particularly relevant in economies where a large share of the population still relies on cash and where access to digital financial services remains uneven. In such contexts, retail CBDCs have been proposed as a mechanism to complement existing payment instruments while potentially lowering barriers to participation in the formal financial system (Auer et al., 2022).

Peru provides a particularly interesting setting within this global discussion. Despite the exponential growth of digital payments in recent years, a large share of adults in Peru remains unbanked and therefore continues to rely heavily on cash for everyday transactions. At the same time, the rapid diffusion of mobile technology and wallets has created new opportunities to expand access to digital payments. Understanding the determinants of digital payment adoption and usage is therefore essential for designing policies aimed at promoting a more efficient and inclusive payments ecosystem.

In 2021, the Central Reserve Bank of Peru (BCRP) began assessing the feasibility of issuing a CBDC by conducting research with technical assistance from the International Monetary Fund (IMF). The results were published in a document titled *CBDC: Promoting digital payments in Peru* that concluded that a potential CBDC could: (i) complement existing payment instruments, including cash, thereby contributing to a more efficient, inclusive, and secure national payments system; (ii) improve financial inclusion for the unbanked, most of whom lack access to digital payments and rely on cash for peer-to-peer (P2P) and peer-to-business (P2B) transactions; and (iii) reach populations in areas with limited connectivity.

In response to these findings, the BCRP introduced the Regulation of CBDC Innovation Pilots in April 2024 [1]. This regulation established a framework enabling the central bank to issue a retail CBDC using a hybrid architecture, as described by Auer and Bohme (2020), where private firms handle user-facing services while the BCRP oversees issuance, governance, and monitoring of the CBDC. The pilot began in October 2024, with a Telco company (Viettel) as participant that issued a CBDC wallet, and by August of that year, it had reached 3,5 million users, with around 117 thousand actively engaging in payments or transactions.

This study pursues two complementary but distinct objectives. First, it examines how individual-level characteristics and perceptions are associated with active CBDC wallet usage. To this end, the analysis relies on logit regressions using survey data and focuses on the role of sociodemographic characteristics, institutional awareness, and familiarity with digital payment instruments. In particular, we assess how factors such as knowledge of CBDC functionalities, satisfaction with the digital wallet, awareness of the BCRP and its role in the pilot, prior use of other digital wallets, and affiliation with the CBDC distributor are related to the probability of being an active user.

Second, the study evaluates the causal impact of the CBDC pilot on adoption and usage outcomes at the district level in regions with low levels of financial inclusion. This analysis exploits the quasi-experimental design implemented by the BCRP, in which randomly selected districts were exposed to differentiated advertising campaigns. Using first-difference specifications that compare changes between February and August 2025 across treated and control districts, the analysis first

[1] Circular N°0011-2024-BCRP: "Pilotos de Innovación de Dinero Digital"

estimates the direct effect of the intervention on key outcomes, including the growth in the number of wallet users, the expansion of the CBDC distribution network—measured by merchant adoption—and transactional activity. The analysis then examines the mechanism through which the pilot affected CBDC usage. In particular, it evaluates whether the expansion of the merchant network translated into higher levels of transactional activity. To address this question, the empirical strategy employs an instrumental variables approach that uses randomized exposure to differentiated advertising as a source of exogenous variation in merchant adoption, allowing us to estimate the causal effect of merchant availability on CBDC usage.

The analysis draws on two main data sources: individual-level survey data collected in the fourth quarter of 2025, and district-level transactional data generated by the CBDC pilot. Regarding the first objective, the results indicate that awareness of the BCRP and its role in the pilot, knowledge of CBDC functionalities, higher satisfaction with the CBDC, prior use of digital wallets, and being a Viettel client are all associated with a higher probability of being an active CBDC user, whereas self-employment is associated with a lower likelihood of active usage.

With respect to the second objective, the findings show that the pilot intervention had statistically and economically significant effects on both adoption and usage. Adoption increased through a pronounced expansion of the merchant network as well as growth in total and active users, while usage rose through higher bill payment activity. The instrumental variables estimates further demonstrate that merchant adoption is a key transmission channel: increases in merchant availability causally contributed to the growth of active users and to higher volumes of bill payments paid through the CBDC wallet.

While certain studies have evaluated various aspects of retail CBDC, such as their potential to complement cash, improve payment system efficiency, or foster financial inclusion (Agur et al., 2022; Auer et al., 2020), this study distinguishes itself by focusing specifically on evidence derived from a quasi-experimental design, rather than relying solely on theoretical or model-based analysis.

More broadly, the paper contributes to the international debate on the role of CBDC as an instrument to promote inclusion, with lessons that may be relevant not only for Peru but also for other emerging markets exploring retail CBDC design and implementation. While some researchers highlight their potential to complement cash and improve system efficiency (Auer et al., 2020; Bindseil, 2020), others emphasize that outcomes will depend on adoption incentives, trust-building, and interaction with private payment providers (Kuhmhof and Noone, 2021). In this context, the BCRP's pilot represents a pioneering case, as it provides quasi-experimental, micro-level evidence from an economy with low levels of financial inclusion across its population.

The remainder of this document is structured as follows. Section 2 presents the theoretical framework, describing the current structure of Peru's National Payments System and reviewing the related literature on digital payment usage and CBDCs. Section 3 discusses the motivation behind the BCRP's initiative and outlines the main features of the CBDC pilot. Section 4 introduces the hypotheses and describes the quasi-experimental design. Section 5 presents descriptive statistics, outlines the identification strategy, and reports the results for the first research question. Section 6 follows the same structure for the second research question. Finally, Section 7 discusses the policy implications of the findings and provides concluding remarks.

2 THEORETICAL FRAMEWORK

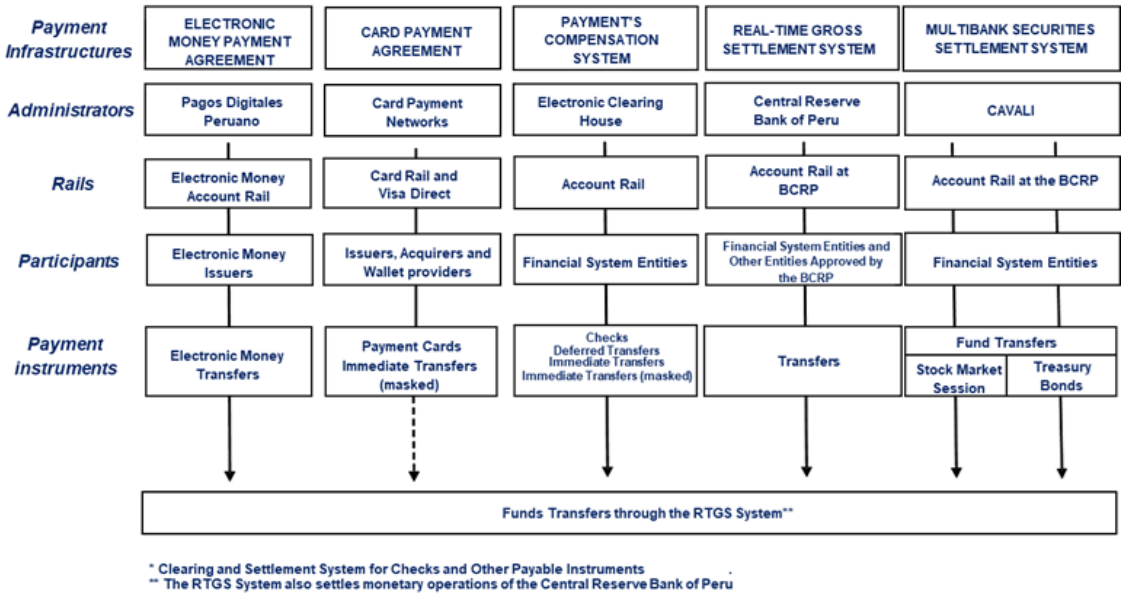
2.1 The Peruvian National Payments System

The Peruvian national payment system encompasses a comprehensive array of institutional arrangements and technological infrastructures designed to facilitate the seamless transfer of funds between financial entities, consumers, private enterprises, and the public sector.

This ecosystem supports a wide range of economic activities, from the purchase of goods and services to the execution of complex financial investments and the settlement of legal obligations. At the core of this architecture is the Real-Time Gross Settlement (RTGS) system. Operated by the BCRP, the RTGS serves as the backbone of the financial system, specializing in the processing of high-value, time-critical transactions. Beyond its primary role in interbank settlements, the RTGS also acts as the ultimate settlement layer for various retail payment systems and agreements, including the automated clearinghouse (ACH) for cheques and low-value direct and immediate transfers and broader card payment networks.

A significant regulatory milestone was achieved in 2022, when the BCRP issued the Regulation of Interoperability of Payment Services provided by Providers, Agreements, and Payment Systems[2]. This policy was designed to mandate the progressive implementation of interoperability across payment platforms. The initial phase focused on two of the country's largest digital wallets, Yape and Plin, which had previously operated as closed-loop, or "walled garden" schemes, and enabled immediate cross-platform fund transfers between them. Subsequent regulatory phases have sought to deepen this integration by incorporating financial institutions operating through the ACH and by integrating electronic money accounts provided by specialized issuers. This regulatory framework has been instrumental in fostering a more competitive and inclusive digital financial environment.

Figure 1: Perú: National Payment System



Source: BCRP.

[2]Circular N° 0024-2022-BCRP.

Central to this digital transformation has been the ubiquitous adoption of digital wallets. These instruments have ascended to the forefront of the Peruvian payment system due to their frictionless user interfaces, the absence of transaction fees for consumers, and their rapid penetration into the micro and small enterprise sectors.

2.2 Digital Payment Usage

In Peru, numerous studies have examined the factors influencing the use of digital payments. For example, Andia et al. (2025b) provided a comprehensive analysis of determinants of digital wallet adoption and usage from a supply perspective through both qualitative and quantitative methodologies. Their qualitative assessment considers enablers such as connectivity coverage and innovations in payment systems; catalysts including the COVID-19 pandemic, which accelerated adoption due to social distancing measures and subsidy disbursements; and design features like cost-free access, interoperability, and user-friendliness. Moreover, their quantitative evaluation finds that lower payer fees, immediate availability of funds and the ability to pay with a QR code or at POS terminals are related to an increase in demand for digital payment instruments.

Additionally, Aurazo and Vega (2021) utilized data from the Peruvian National Household Survey to examine if sociodemographic factors were related to digital payment usage. Their research indicated that individuals aged 25-40, those with formal employment, urban residency, and higher education levels are most inclined to utilize debit cards, credit cards, and mobile banking services. In other contexts, such as Vietnam, studies have shown that cost, trust, perceived usefulness, and financial literacy all positively influence mobile money adoption, while concerns regarding cybercrime-related risks negatively affect usage.

In a different study, Ancalle and García (2024) investigated whether the introduction of interoperable payment services in Peru through central bank mandated policy led to greater digital payment usage and a decline in cash transactions. Their research shows that interoperability indeed boosted digital payment adoption, particularly benefiting younger individuals, those with higher financial inclusion, and self-employed residents. They also observed that being younger, possessing digital wallets, and living in regions with higher financial inclusion increased the likelihood of reducing cash usage after interoperability was introduced.

2.3 Central Bank Digital Currency

A Central Bank Digital Currency (CBDC) is commonly defined as a central bank liability in digital form that differs from balances maintained in traditional reserve or settlement accounts and serves as both a medium of exchange and a store of value (BIS, 2018). CBDCs are tipically classified into two principal use cases: retail CBDCs, which are broadly accessible and primarily intended for general-purpose payments, and wholesale CBDCs, which are restricted to selected financial institutions for settlement purposes. In addition, a CBDC may be designed as account-based or token-based, depending on how ownership and transfers are verified.

The specific features of a retail CBDC depend on the objectives and policy choices of the issuing central bank. As discussed by BIS (2018), several design dimensions are particularly relevant in distinguishing a retail CBDC from other forms of money. These include:

- **Availability:** whether the system operates continuously (e.g., 24/7) or during specific time windows.

- **Anonymity and privacy:** the degree of user privacy embedded in the design, which may range from limited traceability to stronger privacy protections, subject to legal and regulatory constraints.
- **Transfer mechanism:** whether transactions are executed peer-to-peer or intermediated by the central bank or private entities.
- **Limits or caps:** whether quantitative restrictions are imposed on holdings or transactions to mitigate potential financial stability risks.

Auer and Bohme (2020) describe three broad distribution architectures for retail CBDCs. In the indirect model, intermediaries (sometimes referred to as CBDC banks) manage customer-facing services and fully back retail CBDC liabilities with reserves at the central bank. Consumers' claims are recorded by intermediaries, while the central bank maintains wholesale records. Under this structure, the central bank relies on intermediaries for retail customer information, which may introduce legal and operational dependencies if an intermediary encounters difficulties.

In contrast, a direct model assigns retail account management and payment processing responsibilities to the central bank itself, eliminating intermediaries in the distribution layer. While this configuration may simplify certain aspects of the system's architecture, it also implies a significantly expanded operational role for the central bank, including client management, compliance, and risk mitigation.

A hybrid model combines elements of both approaches. Retail users hold direct claims on the central bank, while private intermediaries provide customer-facing services and payment processing. In this arrangement, CBDC holdings are legally segregated from intermediaries' balance sheets, and technical arrangements may allow for portability of customer accounts in the event of intermediary failure. Compared with the indirect model, the hybrid approach may enhance resilience, while avoiding the full operational burden associated with a direct model. Illes et al. (2025), using data from the BIS 2024 survey on CBDCs and cryptoassets, find that two-thirds of central banks worldwide are considering a retail CBDC distributed to end users via commercial banks, and about half will or are likely to use non-bank payment service providers for distribution.

Beyond design considerations, CBDCs are often discussed in relation to broader policy objectives. For example, they may contribute to financial inclusion by facilitating access to digital payments and potentially encouraging formal financial participation (Tan, 2024). They may also affect monetary policy transmission and the structure of the payments ecosystem, including the participation of non-bank actors such as fintech firms, bigtech companies, or mobile network operators (Das, 2023; Auer et al., 2022).

CBDCs can enhance payment system resilience by offering a public, always-available alternative rail, but they also expand the central bank's operational and cybersecurity responsibilities, introducing novel operational and information-security risks that require more complex governance and risk-management structures (Aurazo et al., 2024). Depending on the specific design features, CBDC may have privacy-related implications. Existing AML/CFT frameworks rely on customer screening procedures as well as transaction monitoring and reporting, which necessarily imply the collection and processing of user data. As a result, central banks face trade-offs between user privacy, AML/CFT controls, and social acceptability (ECB, 2023; Minto et al., 2026).

CBDCs also have implications for competition and the broader payments ecosystem. Aurazo et al. (2024) show that some jurisdictions view CBDCs as a way to increase competition by opening the market to additional payment service providers and reducing incumbents' market power. In contexts where large segments of the population remain unbanked, CBDCs (especially those with offline

capabilities or simplified onboarding) may support financial inclusion, though evidence indicates that complementary policies remain necessary for meaningful inclusion gains (IMF, 2024).

CBDCs also interact with cross-border payments, where their long-term potential is recognized, but in the short term interlinked fast payment systems appear a more effective and immediate solution; central banks emphasize that cross-border CBDC interoperability is promising but still nascent from a technical and institutional standpoint (World Bank, 2024).

The extent of these effects, however, depends on specific design features and the surrounding institutional framework. Insights from Aurazo et al. (2024) reinforce this view: the report highlights that the core distinction between retail CBDCs and fast payment systems (FPS) lies in the type of liability transferred (central bank money versus private money) and that several jurisdictions see both instruments as complements rather than substitutes, particularly when CBDCs offer functionalities such as programmability or offline payments that FPS may not yet replicate.

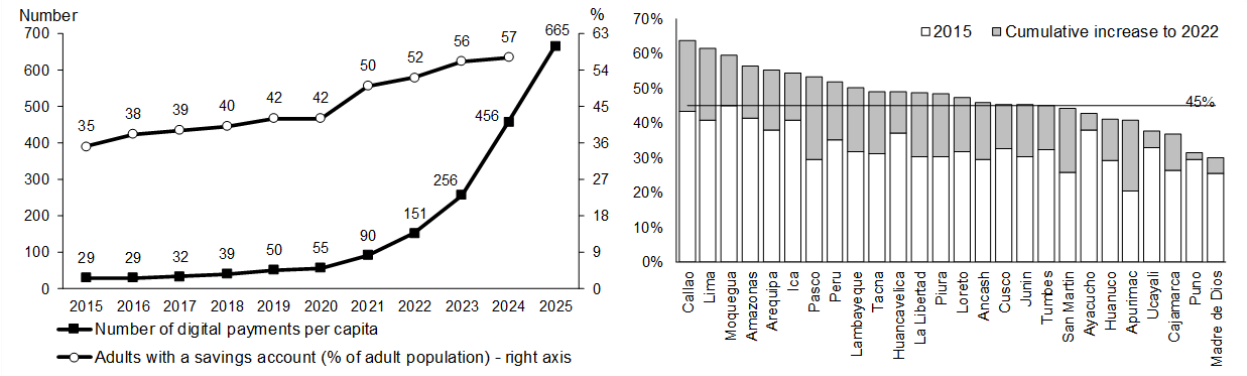
At the same time, CBDCs may introduce risks. One commonly discussed concern is financial disintermediation, whereby shifts from commercial bank deposits into CBDC could affect banks' funding structures and lending capacity. In addition, because CBDC transactions generate digital records, their implementation raises important questions regarding data governance, privacy, and cybersecurity (BIS, 2023). The relevance and magnitude of these risks depend critically on the chosen design and regulatory safeguards.

3 MOTIVATION AND KEY FEAUTURES OF THE CBDC PILOT

3.1 Motivation

As documented by Andia et al. (2025a), Peru has experienced a rapid surge in digital payments over the past decade (see Figure 2). This expansion has been primarily driven by the growing use of digital wallets, which have become the preferred channel for transactions among banked individuals. Importantly, in Peru, most digital payment instruments require users to hold a bank account, thereby making access to these services conditional on prior financial inclusion through the formal financial system. As a result, those without a bank account remain outside the reach of most digital payment services and thus continue to rely predominantly on cash for their day-to-day transactions.

Figure 2: Digital Payment Adoption in Peru



Source: BCRP.

Conversely, the share of adult population with a savings account in the financial system has grown at a slower pace. According to the National Household Survey (ENAHO), only 52% of Peruvian adults held such account in 2022. However, this percentage is significantly heterogeneous between regions. ENAHO data show that while Lima and Callao reported financial inclusion rates exceeding 60% in 2022, eight regions (hereafter referred as low financial inclusion regions) had ratios below 45%. Regional disparities are also dynamic. Between 2015 and 2022, the fastest growth in financial inclusion occurred in regions that already had relatively high base level. By contrast, regions with low starting points registered only modest improvements, suggesting an absence of convergence and the persistence of structural barriers.

The ongoing disparities underscore why it is crucial to implement policies that enhance both access to and the effective use of digital payments. Considering this, the BCRP began studying the possibility of introducing a CBDC to promote digital payments adoption and usage inside the regions with low financial inclusion levels and growth rates. With technical support from the IMF, their research concluded that a CBDC could serve as a complement to current payment tools, including cash, aiming to foster an efficient, inclusive, and secure payment system (BCRP, 2023). Figure 3 shows the locations of this eight low financial inclusion regions in the country.

Figure 3: Low financial inclusion regions in Peru

Source: Authors' elaboration.

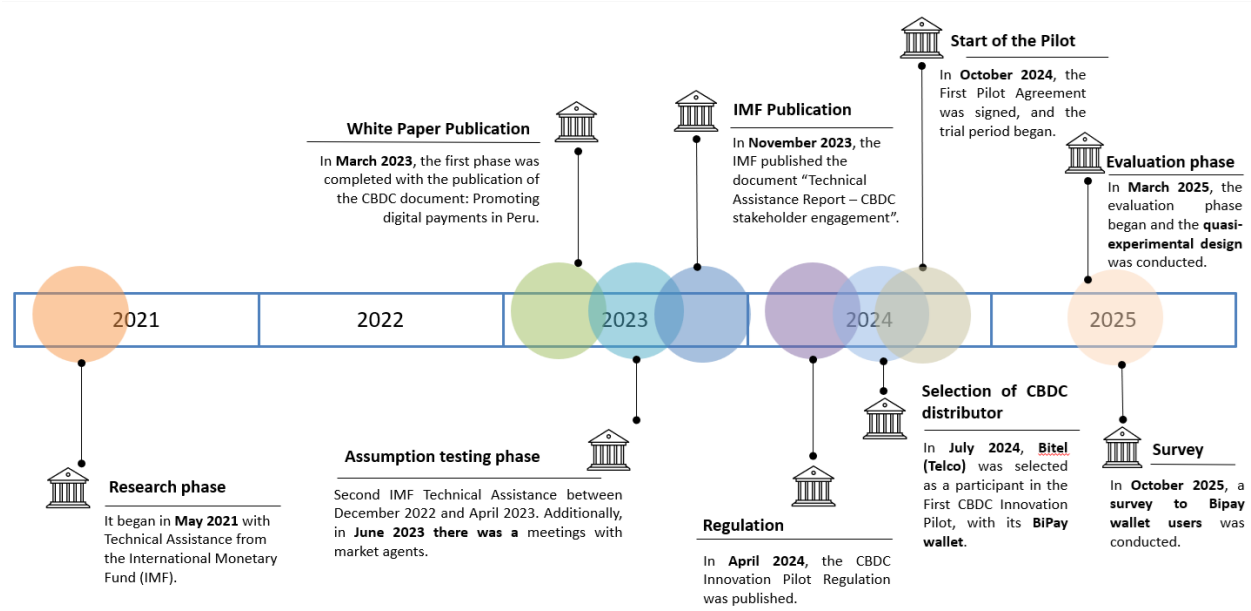
With these results in mind, the CBDC pilot was designed to focus on these low financial inclusion regions. By enabling secure and instantaneous transfers while reducing reliance on cash, the BCRP's CBDC pilot had the potential to generate substantial welfare gains particularly for unbanked populations in these territories (Andia et al., 2025a). This initiative also aimed to stimulate competition between payment service providers by allowing new participants' entry into the ecosystem.

3.2 Key Features of the CBDC pilot

In April 2024, the BCRP issued the Regulation of CBDC Innovation Pilots. This document established the regulatory framework for pilot projects to test BCRP's CBDC with the objective of

improving access to digital payments, especially in the low financial inclusion regions. Additionally, it defines the main characteristics of the digital currency as sovereign money (PEN) in digital form, which constitutes a liability of the BCRP and is held in non-interest-bearing accounts at the Central Bank.

Figure 4: CBDC Project Timeline



Source: BCRP.

The distribution model follows the hybrid framework, in which the Central Bank is responsible for issuing the CBDC and setting the regulatory and governance framework, while private companies handle direct interaction with users. Their responsibilities include distribution, account opening, identity verification (KYC), digital wallet integration, and related services. This approach allowed the BCRP to reduce operational costs and risks compared to a fully direct issuance model, since customer-facing operations remain in the hands of private participants.

Participating entities were required to submit detailed proposals describing how their pilot initiatives contributed to expanding access to digital payments, while adhering to requirements related to operational efficiency, security, and risk management. Following a thorough evaluation process, Viettel Perú S.A.C. (Bitel), a telecommunications provider, was selected as the inaugural participant for the pilot program. To distribute CBDC and interact directly with end-users, Bitel leveraged on their own digital wallet, BiPay.

The pilot was launched in October 2024 and was scheduled to run through March 2026, with the possibility of a one-year extension subject to the results of the evaluation phase. It was structured in two stages. The first stage (October 2024–February 2025) consisted of an initial operational period during which key components were developed and refined, including the architecture for transmitting transactional and balance information between the participating entity and the BCRP. The second stage, beginning in March 2025, corresponds to the formal evaluation phase, during which the pilot operates at scale and its performance is systematically assessed.

The CBDC is accessible nationwide through the BiPay app for both individuals and merchants,

regardless of their telecommunications provider. While the wallet does not yet support interoperability with other digital payment applications—such as those offered by private financial institutions including Yape or Plin—resulting in a closed-loop digital ecosystem, users can convert cash into CBDC at par, allowing integration with physical currency.

CBDC balances operate under a prefunding model: Bitel places deposits within the BCRP, which issues an equivalent amount of CBDC. Regulatory requirements stipulate that participants may distribute CBDC only up to the value of their total deposits at the BCRP, thereby containing liquidity risk. Consequently, as the number of CBDC wallets increased during the pilot phase, Bitel was required to provide additional deposits.

All transactions are free of charge and exempt from taxation, a feature that reduces frictions for adoption in lower-income segments, consistent with prior evidence that zero-cost transactions can accelerate digital financial inclusion (Khiaonarong and Humphrey, 2019).

Table 1: Comparison of CBDC with other payment methods

	CBDC	Cash	Yape/Plin	Payment cards
Alias-based (phone number) payments	✓		✓	
Fees for payer or payee			✓	✓
Immediate availability of funds	✓	✓	✓	
QR-based payments	✓		✓	✓
Cash withdrawals	✓			✓
Interoperability			✓	✓

Table 1 presents a comparison between the CBDC and the alternative payment methods currently available in the market while Figure 5 shows the opening and home screen of the CBDC wallet.

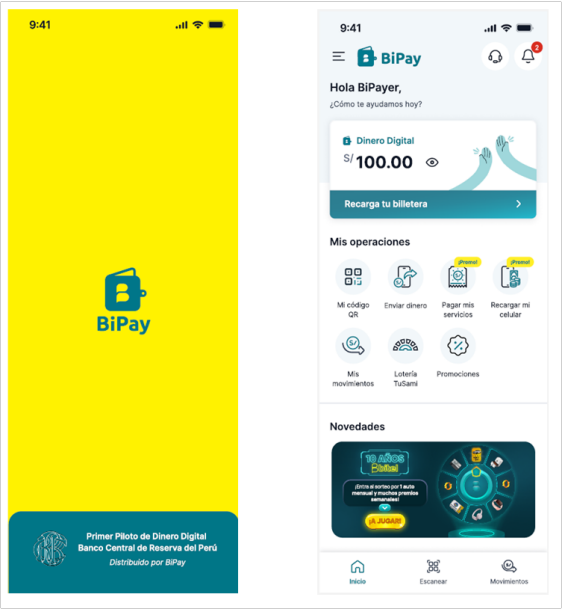
As of August 2025, the pilot had around 117 thousand active users and 60 thousand participating merchants. The outstanding balance of CBDC in circulation is approximately PEN 7,5 million, with roughly 1,4 million transactions recorded and an average transaction value of PEN 24 (approximately 7 USD).

4 METHODOLOGY

4.1 Research Questions

As noted above, this study pursues two complementary but distinct research objectives, corresponding to the individual- and aggregate-level effects of the CBDC pilot. The first objective relies on individual-level survey data and examines the determinants of active CBDC wallet use at the user level. In particular, we study how CBDC wallet usage relates to individual characteristics and perceptions, focusing on two dimensions. First, we analyze the role of sociodemographic characteristics, including age, education, and employment status. Second, we assess how perceptions and institutional factors (such as knowledge of CBDC functionalities, satisfaction with the CBDC, awareness of the BCRP and its role in the pilot, prior use of digital wallets, and affiliation with the CBDC provider) are associated with the probability of being an active CBDC user. This analysis sheds light on the demand-side factors and trust-related channels that shape individual adoption and usage decisions.

Figure 5: CBDC wallet interface



Source: BCRP.

The second objective leverages district-level transactional data to evaluate the causal impact of the CBDC pilot on adoption and usage outcomes, exploiting the quasi-experimental design implemented by the BCRP. This objective is itself twofold. First, we assess whether exposure to the pilot—through differentiated advertising—generated differential changes between treated and control districts in key CBDC outcomes, including the growth in the number of users and the expansion of the CBDC distributional network, measured by merchant adoption. Second, we examine whether the expansion of the distributional network translated into higher CBDC usage, as reflected in transactional activity, particularly bill payments.

To address these questions, we conduct the analysis in first differences, focusing on changes in outcomes between February and August 2025, and employ an instrumental variables approach. Specifically, we exploit the randomized assignment of differentiated advertising across districts as a source of exogenous variation in merchant adoption, allowing us to identify the causal effect of an increase in merchant availability on CBDC usage. This strategy isolates the role of the distributional network as a key mechanism linking the pilot intervention to observed usage outcomes.

4.2 Data sources

This study relies on two primary data sources. The first is an individual-level survey conducted by an independent survey agency contracted by the BCRP, between October 9 and November 5, 2025. Data was collected through both remote and in-person interviews, covering a sample of 1,114 respondents with a sampling error of 3% and a 95% confidence level. The survey targeted individual person BiPay users (users who have downloaded the application and have completed the enrollment process) from regions with low levels of financial inclusion. The survey, therefore, covers active and non active BiPay users and excludes BiPay users such as small businesses or merchants and agents.

A large share of respondents were contacted through messages sent via the BiPay app itself. As a

result, the users who participated in the survey are more likely to exhibit a higher predisposition toward CBDC usage than the average user. This bias would disappear if the results were analyzed over time. For this reason, the BCRP plans to conduct a second survey after the conclusion of the annual phase of the pilot, during the second term of 2026. Additional details on the sampling strategy and composition are provided in Annex A. This dataset is used to examine the correlational patterns relevant to the first objective's research questions.

The second data source consists of monthly district-level transactional records provided by Bitel to the BCRP. These records contain information on the volume and number of transfers, payments, and top-ups, as well as the total and active user base—where active users are defined as those conducting at least one transaction within a given month. The BCRP also receives monthly data on the number of merchants operating with BiPay. This dataset is used to identify the causal effects associated with the second objective's research questions.

4.3 Quasi-experimental Design

To measure how the introduction of the CBDC pilot affected different outcomes, an experimental setup was created to ensure the results could be interpreted as causal in variables directly associated with the pilot's objectives, such as digital payment adoption. This involved randomly assigning districts to receive an intervention. Bitel carried out distinct advertising campaigns in a randomly chosen group of districts over four months to encourage CBDC adoption and usage for both individuals and merchants. As a result, there were two groups: one set of districts received specialized advertising (the treatment group), while others did not (the control group).

Among several available methodologies for random assignment between groups, the design relied on pairwise randomization (PR). As highlighted by Bruhn and McKenzie (2009), PR is particularly efficient in small samples because it guarantees improved balance across multiple covariates simultaneously, relative to stratification methods which typically rely on a single variable. Its primary goal is to ensure that both groups are similar in observable pre-treatment characteristics, so that any differences in outcomes after treatment can be more confidently attributed to the intervention itself rather than to preexisting disparities. The method has three steps:

- Select key variables likely to influence outcomes, such as income, mobile penetration, or digital payment usage.
- Match treatment and control units using a distance metric.
- Randomly assign one district in each pair to treatment and the other to control.

For the pilot, eligible districts included those in low financial inclusion regions where Bitel had a minimum of 100 clients. A total of 201 districts were selected to receive differentiated advertising.

This quasi-experimental approach follows recent trends in assessing digital financial projects. Research using experimental and quasi-experimental methods indicates that specific nudges and marketing can boost the use of digital financial services (Jack and Suri, 2014; Batista and Vicente, 2020). Although studies directly addressing CBDC are still scarce, related research on digital payments and mobile money points to possible positive effects on financial inclusion and a move away from cash (Arner et al., 2020; Auer et al., 2022; IMF, 2020). By applying randomization techniques suitable for small groups, the CBDC pilot stands out as one of Latin America's earliest organized efforts to measure the actual effects of central bank digital currency programs.

For the implementation of the pairwise randomization algorithm, the following district-level variables

were considered: (i) the adult population size; (ii) the fraction of Bitel users categorized as residents of rural areas; (iii) the share of individuals aged 18–29 years with Bitel mobile phone ownership; (iv) the fraction of individuals registered with other digital wallets—a variable capturing the penetration of alternative digital wallets; (v) the proportion of adults with access to consumer credit; and (vi) the aggregate outstanding balance of consumer loans in the district.

The balance analysis between treated and untreated districts indicates that there were no statistically significant differences in the means of the key stratification variables, confirming that the randomization process achieved its objective. Moreover, balance tests on covariates not directly employed in the matching procedure, such as total population, financial inclusion rates or informality, also showed no meaningful discrepancies. This strengthens the internal validity of the experimental design and ensures that observed treatment effects can be more confidently attributed to the differentiated advertising intervention rather than pre-existing structural differences across districts (Bruhn and McKenzie, 2009; Banerjee and Duflo, 2017).

4.4 Differentiated advertising scheme

The differentiated advertising scheme incorporated a set of layered incentives designed to promote adoption and usage of CBDC. These actions were aimed at two previously planned objectives: increasing the total number of individual users (expanding BiPay app enrollment); and enlarging the CBDC distribution network through the enrollment of new merchants (small businesses that accept payments with BiPay).

The differentiated advertising campaigns were composed of the following components: (i) the provision of a one-time bonus of 20 GB of mobile data for Bitel subscribers enrolling in the system for the first time; (ii) eligibility to participate in weekly raffles offering monetary prizes, conditional on meeting a minimum transaction threshold; (iii) in-person advertising campaigns; (iv) targeted social media messaging regarding the pilot; (v) the dissemination of printed promotional materials. Such multifaceted incentive packages are consistent with evidence showing that both financial and non-financial nudges can increase the uptake of digital financial services, particularly in underbanked populations.

In-person campaigns constituted one of the most significant component of the treatment, comprising the following activities:

- Business and agent outreach: visiting BiPay-affiliated merchants and agents to activate or encourage wallet usage.
- Capacity-building: training BiPay sales channels and local businesses on the wallet's functionalities, benefits, transaction limits, and commission structure.
- User awareness campaigns: educating end-users on the benefits and functionalities of the wallet.
- Agent and merchant onboarding.
- Municipal engagement: meeting with local authorities to present the digital wallet, secure permits for field activations, and promote specific use cases.
- Local "activations": carrying out community events in town squares, local fairs, markets, municipal offices, and universities.

Pictures related to these campaigns can be found in Annex E

5 DETERMINANTS OF CBDC WALLET USAGE AT THE INDIVIDUAL LEVEL

This section addresses the first objective of the study, which focuses on individual-level information to examine the factors associated with active CBDC use. Using survey data, we analyze how the likelihood of being CBDC user relates to individual-level characteristics.

5.1 Data

5.1.1 Socioeconomic characteristics

Survey results show that 75% of CBDC users reside in urban areas and 25% in rural ones. Men represent 67% of respondents, and women 33%. Most users are working-age adults: 33% are 18–25 years old, 49% are 26–42, 15% are 43–59, and 2% are 60 or older. Educational levels are evenly split between basic (51%) and higher education (49%). The demographic characteristics of the sample are shown in Annex A, where some characteristics of the total adult population of the regions of interest are also presented, rather than those of the total number of BiPay users (as this information is not available). As mentioned previously, a significant proportion of respondents were contacted through messages sent directly via the BiPay wallet; therefore, individuals who completed the survey may exhibit a greater inclination to use the CBDC than the average user.

Self-employment is the most common occupation (44%) among CBDC users, followed by dependent employment (33%), with one-third of respondents reporting a business activity as either a primary or secondary source of income. Employment formality is also balanced, with 41% formally employed, 41% informal workers, and 18% not reporting current employment. In terms of bancarization, 68% declared themselves a client in the financial system. Among banked users, 5% are customers of Banco de la Nación, Peru's public bank, which, in relative terms, has a stronger presence in remote and rural areas of the country.

Regarding connectivity, 69% of respondents reported owning a smartphone, while the remainder use a basic or feature cellphone. Most CBDC users have mobile internet access (87%), and Bitel is the dominant telecommunications provider, serving 91% of them, which demostrates that there is a fraction of CBDC users who clients of other telecommunications providers.

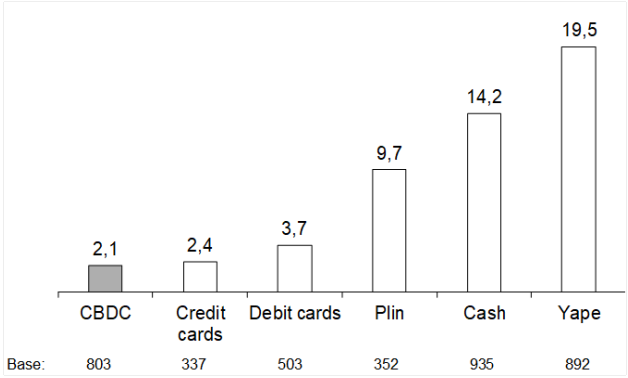
5.1.2 CBDC adoption and usage

Survey results indicate that cash and other interoperable digital wallets in the Peruvian market—are the most frequently used payment methods among individual person CBDC users. In contrast, CBDC is used, on average, about two times per month (Figure 6)[3]. This relatively low frequency aligns with the CBDC's primary use case: utility bill payments, which are typically monthly transactions.

The survey results suggest that the main motivations for adoption are associated with monetary incentives. When asked why they downloaded the CBDC application, a majority of users (54%) cited the cashback offered for bill payments. This incentive was implemented uniformly at the national level and was available to all users, rather than being part of geographically differentiated promotional campaigns. This suggests that early onboarding was driven largely by broad-based financial incentives rather than localized advertising efforts. Additionally, 30% downloaded the app out of curiosity to understand how it worked, and 20% did so following recommendations from friends or family. Reasons for continued use show a similar pattern. About 51% report that they

[3]Base refers to the number of people who responded to a particular survey question.

Figure 6: Average number of payments per month

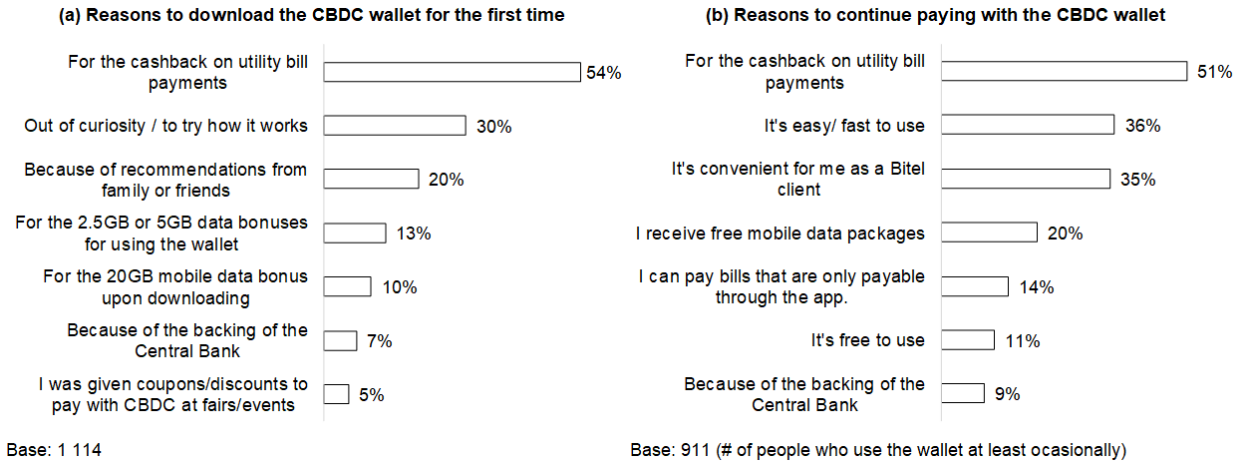


Source: Authors' calculations based on survey data.

keep using the CBDC because of the cashback, indicating persistence of incentive-driven behavior. At the same time, 36% state that they continue using it because they consider the application easy or fast to use (Figure 7).

Regarding knowledge of CBDC functionalities, awareness is highest for bill payments (80%), followed by P2P transfers (56%), P2M transactions (49%), and loan or credit repayments (24%). In terms of usage, bill payments are the most commonly used functionality, with around half of users reporting regular use. By contrast, the use of P2P and P2M transactions remains limited: only 14% and 12% of users, respectively, report using these features, despite relatively higher levels of awareness. This suggests that for everyday transfers and merchant payments, users may still prefer more established alternatives such as other interoperable digital wallets, likely due to greater familiarity and its large acceptance network. The pilot ecosystem is a closed, non-interoperable loop: a BiPay user cannot transfer money to users of other wallets, and they can make payments to small businesses or merchants that are also BiPay users.

Figure 7: Motivation for adoption and usage (multiple-choice question)

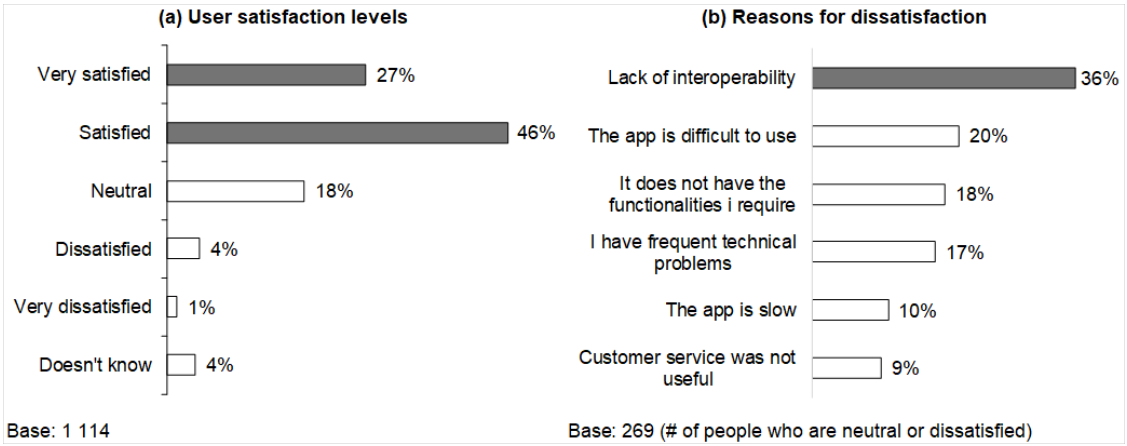


Source: Authors' calculations based on survey data.

5.1.3 User experience

User experience indicators show positive results: 72% of users report being satisfied with the CBDC. However, 18% remain neutral and 6% express dissatisfaction. Among those who are neutral or dissatisfied, the most frequently cited reason (36%) is the lack of interoperability, which refers to the inability to send or receive money to and from other applications (Figure 8).

Figure 8: User satisfaction



Source: Authors' calculations based on survey data.

Among users who use the CBDC wallet occasionally or never use it, the most common reason is a preference for more widely adopted payment methods, such as interoperable digital wallets like Yape or Plin (28%). Interoperability also plays a central role in limited usage: 19% report infrequent use because few merchants accept the CBDC as a payment method, and an additional 12% indicate that they cannot transfer funds to other digital wallets, raising the share of interoperability-related constraints to 31% (Figure 9). Furthermore, 22% of respondents report being unable to deposit funds to recharge the CBDC app. This constraint is more frequently cited by the unbanked (61%) than by the banked (59%).

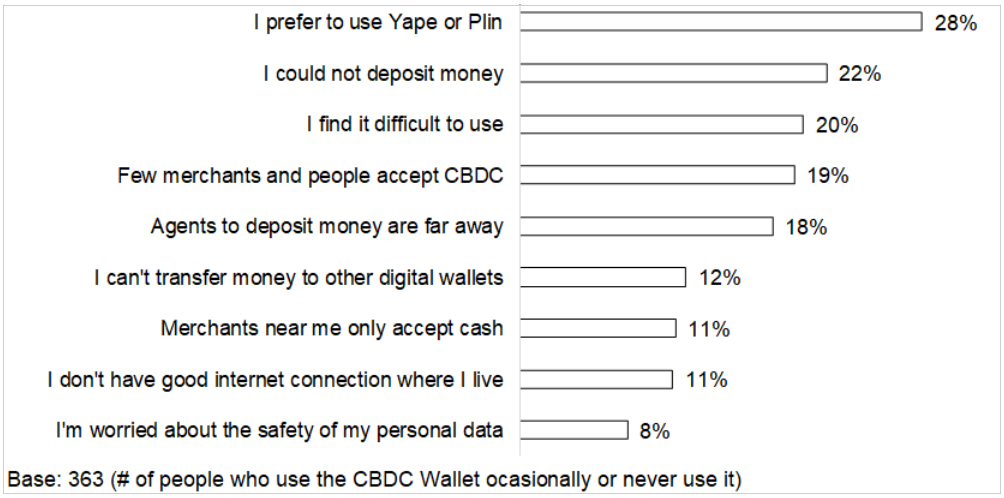
Regarding the CBDC's effect on cash usage, most users report clear benefits: 74% state that it saves them time and 75% indicate that it reduces their transaction costs compared with cash. In addition, 59% of users report withdrawing cash less frequently since they began using the CBDC.

5.1.4 Awareness of the Central Bank's role in the CBDC pilot

Awareness of the BCRP and its economic role is high (85%). This level of knowledge varies by financial inclusion status, being lower among unbanked users (78%) and higher among banked users (90%). In contrast, only 24% of users knew that the money used in the wallet is CBDC issued by the BCRP (Figure 10). This knowledge gap is more pronounced across groups: 27% of banked users reported being aware of the BCRP's role in the pilot, compared with only 15% among the unbanked.

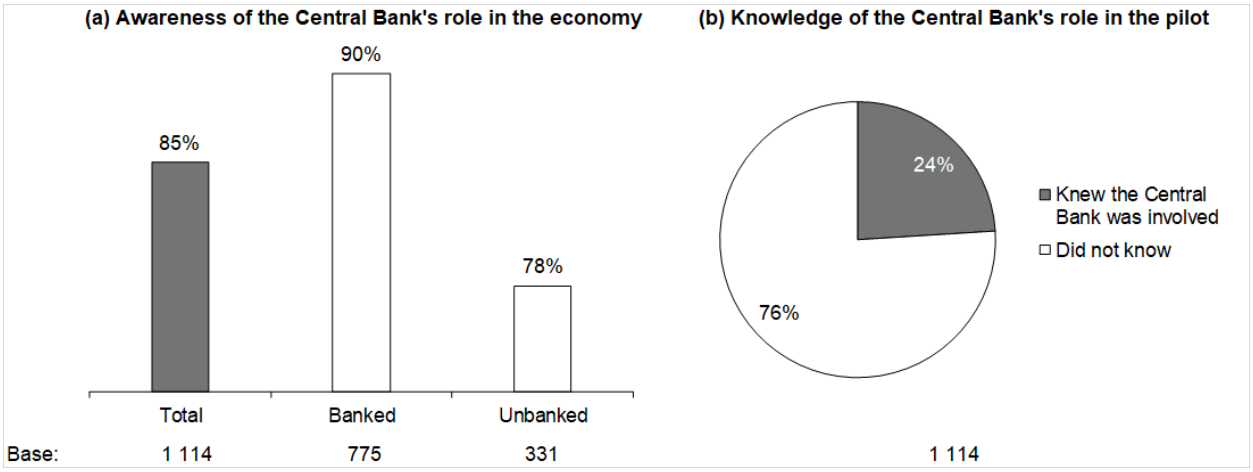
Nevertheless, 78% of users stated that their trust in BiPay increased after learning about its participation in the pilot as a CBDC distributor, with a stronger effect among banked users (81%) compared with unbanked users (73%). These results indicate that awareness of the BCRP's participation in the pilot, although limited, could have a positive effect on the adoption and use of a CBDC.

Figure 9: Reasons for occasional or non-use of the CBDC Wallet (multiple-choice question)



Source: Authors' calculations based on survey data.

Figure 10: Awareness of the BCRP and knowledge of its role in the pilot



Source: Authors' calculations based on survey data.

5.1.5 Offline payments functionality

The survey results reveal that a large number of users are unaware of the offline functionality. This would be consistent with the high percentage of users who reported owning smartphones: 88% were unaware of its existence, and only 5% reported having used it. Among this small group of users, 78% considered their experience positive. For those who knew about the feature but had not used it, 59% indicated that they did not need it because they always have internet access in the places they frequent. When users are informed about the feature, interest rises substantially: 87% report that they would be likely or very likely to use it in the future. This represents a clear opportunity to activate a distinctive and highly relevant functionality.

5.2 Empirical specification

The survey was addressed to all BiPay users, whether active or not. Therefore, the information collected can be used to estimate the probability that a BiPay user actively uses the CBDC. In that regard, $ActiveCBDC_i$ is a dummy variable that is equal to one if an individual uses CBDC at least once a month. To understand the relationship between individual-level characteristics and being an active CBDC user, we estimated the following logit regression model:

$$\Pr(\text{ActiveCBDC}_i = 1) = F\Big(\alpha + \mathbf{X}_i'\boldsymbol{\beta} + \mathbf{G}_p'\boldsymbol{\gamma}\Big) \tag{1}$$

where $\mathbf{X}_i$ denotes a vector of individual-level characteristics which can be interpreted as determinants of active CBDC usage, including:

- $CentralBank_i$: awareness of the Central Bank and its role in the CBDC pilot;
- Age_i: age of the individual;
- Age_i^2: age squared;
- $Male_i$: dummy variable equal to one if the individual is male;
- $Bitel_i$: dummy variable equal to one if the individual is a Bitel client;
- $EmploymentStatus_i$: set of dummy variables capturing the individual's employment status. The indicators include $SelfEmployed_i$, $Employer_i$, and $Unemployed_i$, which equal one if the individual is self-employed, an employer, or unemployed, respectively. Wage workers constitute the omitted (reference) category, and all coefficients are interpreted relative to this group.
- $Banked_i$: dummy variable equal to one if the individual has a bank account;
- $CBDCKnowledge_i$: indicator of knowledge of digital wallet BiPay functionalities;
- $CBDCSatisfaction_i$: indicator of satisfaction with the digital wallet BiPay;
- $DigitalWallet_i$: dummy variable equal to one if the individual uses other digital wallets.

The variable $CentralBank_i$, which captures awareness of the central bank's participation in the pilot, is constructed as the interaction of two dummy variables: the first captures awareness of the central bank's role in the economy, while the second captures awareness of the central bank's participation in the CBDC pilot. The variable $CBDCKnowledge_i$ is a count variable capturing the number of BiPay functionalities known to the respondent, taking values between 0 and 7. Meanwhile, $CBDCSatisfaction_i$ is defined as an indicator equal to one for individuals who reported being either very satisfied or somewhat satisfied with their use of the digital wallet BiPay.

Regarding $\mathbf{G}_p$, this vector denotes a set of province-level geographic controls for the individual, including characteristics commonly identified in the economic literature as determinants of digital payment usage. In particular, prior studies (e.g., Aurazo and Vega (2021)) highlight the role of geographic location (with rural residence negatively associated and urban residence positively associated with digital payment use), higher levels of education (positive), and younger age (positive) as key explanatory factors.

- $RuralPop_p$: share of the province's population residing in rural areas;
- $Pop18\text{-}24_p$: share of the province's population aged 18–24;

- $Pop25\text{-}40_p$: share of the province's population aged 25–40;
- $PrimaryEdu_p$: share of the province's population with primary education;
- $SecondaryEdu_p$: share of the province's population with secondary education.

Some alternative specifications incorporating different sets of control variables are presented. However, in all cases, we estimate the probability that a CBDC user makes at least one transaction—either a bill payment or a P2P/P2B transfer. With this analysis, we examine which socioeconomic variables and wallet-specific factors explain the decision to use the CBDC.

5.3 Results

As shown in Table 2, we estimate six alternative logit specifications that progressively incorporate a richer set of control variables. A robust finding across all specifications is that the variable $CentralBank_i$, which captures espondents' awareness of the Central Bank and its role in the CBDC pilot, remains positive and statistically significant. Although the magnitude of the coefficient declines and its statistical significance weakens slightly in specifications (5) and (6) as additional controls are included, the estimated effect remains statistically significant.

To facilitate interpretation, we also compute average marginal effects. These estimates indicate that individuals who report knowing about the BCRP and its participation in the pilot program are approximately 9 to 19 percentage points more likely to be active CBDC users compared to otherwise comparable individuals (See Table 10 in the appendix). In the preferred specifications that include the full set of controls, the effect stabilizes at roughly 9 percentage points, suggesting that institutional awareness has an important association with CBDC usage.

The statistical significance of knowledge about the BCRP in the pilot supports the argument that the CBDC, can effectively contribute to the promotion of digital payments among populations with low levels of financial inclusion. This result suggests that institutional familiarity and awareness of the central bank play a key role in shaping individuals' usage decisions of digital payments. In particular, the positive effect of BCRP knowledge indicates that users perceive an added value associated with the CBDC, which is likely linked to trust in the the institution backing the CBDC, perceived security, and legitimacy of the instrument. For populations traditionally excluded from the formal financial system, such trust-related factors may compensate for limited experience with digital financial products, thereby lowering adoption barriers and encouraging the use of the CBDC as a payment method.

Another variable that remains statistically significant across specifications is $Bitel_i$ (being a Bitel telecom client). This finding is consistent with the institutional design of the pilot program. Both the distribution and promotion of the CBDC relied heavily on Bitel's network and infrastructure, which likely facilitated awareness, onboarding, and usage among its customers. The estimated average marginal effects reinforce this interpretation. Individuals who report being Bitel clients are approximately 26 percentage points more likely to be active CBDC users than non-clients (see Table 10 in the Appendix). Given the strong role played by this variable, we also estimate an alternative specification excluding $Bitel_i$ from the set of covariates. The results, reported in Table 9, in the appendix, remain quantitatively and qualitatively very similar to the baseline estimates, suggesting that the main findings are not driven by the inclusion of this control.

Regarding employment status, the variable $SelfEmployed_i$ is statistically significant in all specifications in which it is included. The estimates indicate that self-employed individuals are less likely

Table 2: Logit regression: determinants of active CBDC use

	$\Pr(\text{ActiveCBDC}_i = 1)$					
	(1)	(2)	(3)	(4)	(5)	(6)
Individual-level characteristics						
$CentralBank_i$	0.919***	0.842***	0.764***	0.581**	0.526**	0.522**
	(0.000)	(0.000)	(0.001)	(0.017)	(0.026)	(0.032)
Age_i	-0.020	-0.050	-0.058	-0.062	-0.069*	-0.069*
	(0.603)	(0.213)	(0.135)	(0.146)	(0.098)	(0.090)
Age_i^2	0.000	0.001	0.001*	0.001*	0.001**	0.001**
	(0.352)	(0.094)	(0.056)	(0.065)	(0.042)	(0.035)
$Male_i$	-0.229	-0.213	-0.221	-0.176	-0.189	-0.253
	(0.166)	(0.214)	(0.197)	(0.330)	(0.297)	(0.134)
$Bitel_i$	1.311***	1.384***	1.361***	1.384***	1.367***	1.447***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Province-level geographic controls						
$RuralPop_p$	-0.705	-0.808*	-0.769*	-0.882*	-0.860*	-0.999**
	(0.146)	(0.079)	(0.093)	(0.088)	(0.094)	(0.043)
$Pop18\text{-}24_p$	0.835	1.034	0.999	0.513	0.514	-0.116
	(0.372)	(0.267)	(0.276)	(0.596)	(0.589)	(0.911)
$Pop25\text{-}40_p$	-0.371	-0.343	-0.433	-0.316	-0.398	-0.804
	(0.605)	(0.631)	(0.559)	(0.664)	(0.598)	(0.305)
$PrimaryEdu_p$	1.376	1.569	1.480	1.485	1.416	1.348
	(0.337)	(0.253)	(0.284)	(0.302)	(0.326)	(0.313)
$SecondaryEdu_p$	0.880	1.047	1.060	0.841	0.816	0.399
	(0.683)	(0.627)	(0.624)	(0.705)	(0.714)	(0.851)
Employment status						
Self-employed		-0.498**	-0.453**	-0.505***	-0.468***	-0.414**
		(0.011)	(0.019)	(0.007)	(0.010)	(0.027)
Employer		0.263	0.288	0.305	0.325	0.248
		(0.502)	(0.472)	(0.427)	(0.408)	(0.518)
Unemployed		-0.354	-0.286	-0.186	-0.145	-0.104
		(0.157)	(0.276)	(0.476)	(0.583)	(0.693)
Additional controls						
$Banked_i$			0.400*		0.294	0.173
			(0.031)		(0.160)	(0.393)
$CBDCKnowledge_i$				0.166***	0.164***	0.163***
				(0.000)	(0.000)	(0.000)
$CBDCSatisfaction_i$				1.110***	1.085***	1.077***
				(0.000)	(0.000)	(0.000)
$DigitalWallet_i$						1.053***
						(0.000)
Constant	-0.908	-0.646	-0.634	-0.916	-0.863	-0.994
	(0.497)	(0.650)	(0.666)	(0.520)	(0.553)	(0.471)
Observations	1114	1114	1114	1114	1114	1114

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$.

Standard errors clustered at the province level.

to be active CBDC users than wage workers, who constitute the reference category. This result is particularly relevant in the Peruvian context, where a large share of self-employed individuals operate as micro-merchants. A plausible explanation relates to the current design of the CBDC pilot and its limited interoperability with other payment systems. Many self-employed individuals who accept digital payments typically receive funds directly into their bank accounts through existing payment solutions. In contrast, the CBDC currently operates as a relatively closed system. Users cannot transfer CBDC balances directly into their bank accounts unless they first withdraw the funds in cash and subsequently deposit them into the banking system. This process introduces additional transaction costs and operational frictions. From a policy perspective, this result highlights the importance of making the CBDC interoperable with other payment instruments and digital wallets.

Additionally, both $CBDCKnowledge_i$[4] and $CBDCSatisfaction_i$ are statistically significant across several specifications and are positively associated with the probability of active CBDC use. This result is intuitive. Greater awareness of the functionalities associated with the CBDC likely reduces informational frictions and uncertainty regarding its use, while higher levels of user satisfaction reflect a positive experience with the system that encourages continued and more frequent usage.

Moreover, the variable $Banked_i$ initially appears to be positively associated with CBDC usage. However, its statistical significance disappears once additional controls are included, particularly $DigitalWallet_i$, which remains positive and statistically significant. This pattern is consistent with the high correlation between both variables and suggests that familiarity with digital payment technologies, rather than bank account ownership per se, is what primarily drives CBDC adoption. The estimated marginal effects indicate that individuals who report using other digital wallets are approximately 19 percentage points more likely to be active CBDC users than non-users.

Finally, we conduct several robustness exercises. First, we consider an alternative definition of an active user ($ActiveCBDC_i$), defining active usage as using the CBDC at least once every 15 days (see Table 10). Under this definition, the magnitude of the coefficient associated with central bank awareness increases relative to the baseline specification. The corresponding average marginal effects indicate that individuals who report knowing about the BCRP and its participation in the pilot program are approximately 15 to 23 percentage points more likely to be active CBDC users compared to otherwise similar individuals. This result suggests that awareness of the central bank plays an even stronger role in explaining more frequent and consistent use of the CBDC, rather than occasional usage.

Second, we consider an alternative definition of central bank awareness ($CentralBank_i$). In this specification, the variable captures only respondents' awareness of the BCRP's participation in the CBDC pilot, excluding broader knowledge of the BCRP's role in the economy (see Table 11). The results remain quantitatively very similar to those obtained in the baseline specification, indicating that the findings are not driven by the broader definition of institutional awareness.

Third, we replicate the baseline analysis using alternative estimation methods, including a probit model and a linear probability model (see Tables 12 and 13 in the Appendix). The results remain qualitatively similar across these alternative specifications. Taken together, these robustness exercises confirm that the main findings are not driven by specific variable definitions or estimation choices.

[4]This variable captures the number of CBDC functionalities known by the respondent. It takes values from 0 to 7.

6 IMPACT OF THE PILOT'S ADVERTISING SCHEME ON CBDC ADOPTION AND USAGE

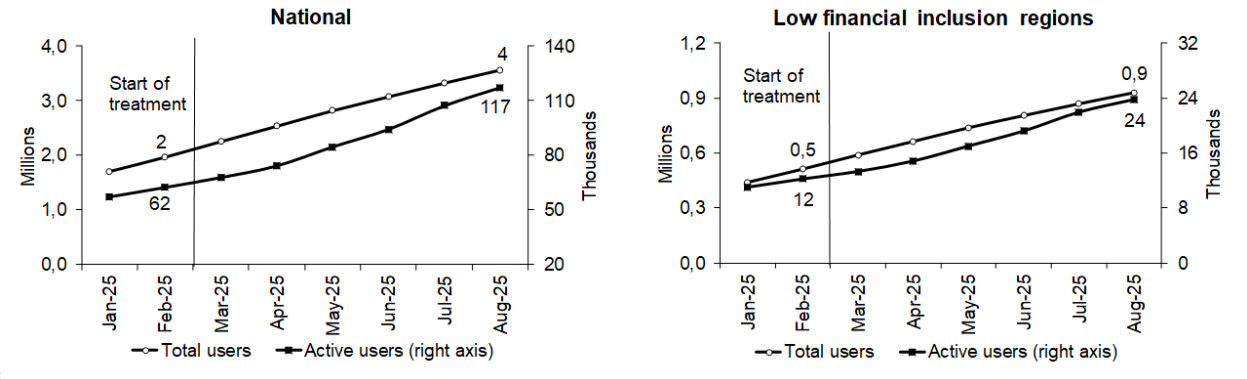
This section addresses the second objective of the study, which is twofold. First, we evaluate the direct causal impact of the CBDC pilot—specifically the differentiated advertising intervention—on the evolution of outcomes at the district level, exploiting the randomized assignment of treatment across municipalities. In this stage, we assess whether treated and control districts exhibit differential trends in CBDC-related outcomes, focusing in particular on the increase in the number of active users and the expansion of the CBDC distribution network, measured by the number of merchants enabled to transact using the CBDC.

Second, we examine the mechanism through which the pilot affected CBDC usage, by assessing whether the expansion of the distribution network translated into higher transactional activity. In this stage, we focus on the relationship between merchant adoption and the number of CBDC transactions, and implement an instrumental variables strategy to address potential endogeneity concerns. Specifically, we exploit the exogenous variation in merchant expansion induced by the randomized pilot intervention in treated municipalities to identify the causal effect of the distribution network on CBDC usage.

6.1 Data and trends

The number of total users has grown at a rapid pace at the national level, with even faster growth observed in eight regions with low levels of financial inclusion. In February 2025, the month prior to the start of the annual evaluation period of the pilot (the pilot began in March, along with the treatment applied to the selected districts), 2.0 million users of CBDC were reported. As of August 31, 2025, the number of CBDC users had reached 3.6 million, implying a cumulative increase of 80%. In regions with low financial inclusion, this number increased from 0.5 million in February 2025 to 0.9 million by August 2025, reflecting a 80% increase since the beginning of the pilot.

Figure 11: Total Users and Active Users

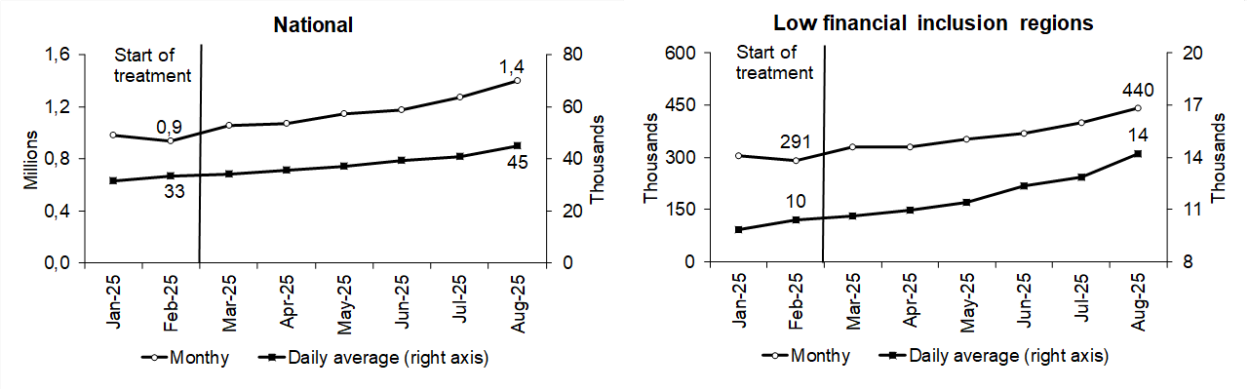


Source: BCRP.

Regarding active users—defined as those who performed a service payment or initiated a fund transfer within a one-month period—their number increased from 62 thousand in February 2025 to 117 thousand in August 2025, representing growth of 88%. In the eight regions, active users rose by 100% over the same period. When assessing growth since the beginning of the evaluation phase,

both total and active users show a larger cumulative increase in the low financial inclusion regions.

Figure 12: Number of CBDC transactions

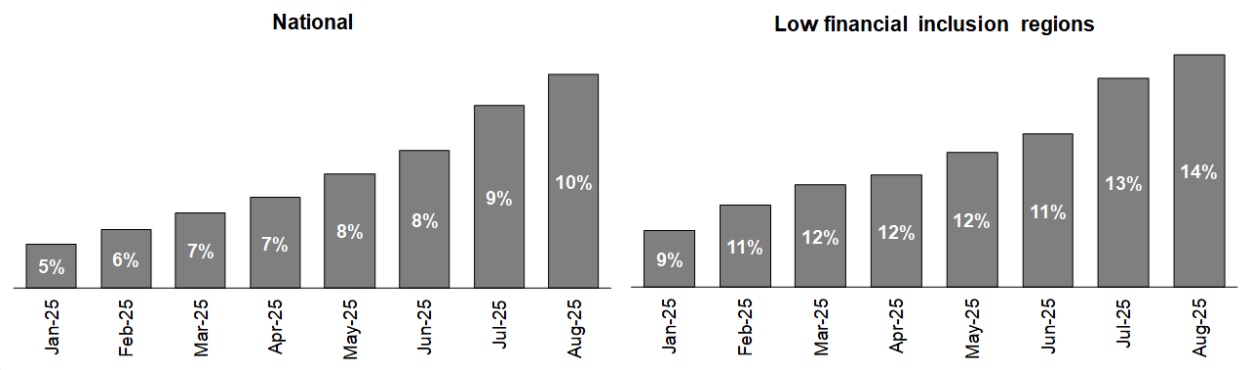


Source: BCRP.

At the national level, approximately 1.4 million CBDC transactions were registered by August 2025. Nationwide, the average daily number of transactions increased from 33 thousand in February 2025, prior to the treatment, to 45 thousand in August 2025, representing a 35%. In the eight low-financial-inclusion regions, transaction growth was even stronger, rising from 10 thousand to 14 thousand transactions per day over the same period, an increase of 37%. This evidence indicates that CBDC transaction activity has been growing faster in regions with lower levels of financial inclusion.

The growth in transactional activity and the expansion of the system's active-user base have been accompanied by low average transaction values. Nationwide, the average value of all digital-money transactions is PEN 25 (around USD 7.4) in August 2025. In the low financial inclusion regions, the average ticket is PEN 22 (around US 6.5). Due to the composition of BiPay transactions, these values primarily reflect the average value of service-payment transactions. Regarding person-to-person transfers, the national average transaction value is PEN 34 (around USD 10.1); meanwhile, in the low financial inclusion regions, it is PEN 32 (around USD 9.5).

Figure 13: Share of CBDC cash deposits



Source: BCRP.

With respect to substitution between CBDC and cash, end users have increasingly funded BiPay

digital wallets through cash deposits rather than bank account transfers. At the beginning of the testing pilot, the share of cash-deposit transactions was below 10% at both the national level and in low financial inclusion regions. However, by August 2025, cash deposits accounted for 10% of total CBDC deposits (via bank accounts or cash) nationwide and 14% in the eight regions with low financial inclusion.

This pattern indicates that the number of individuals recharging their CBDC wallets with cash has been increasing, suggesting that the pilot has been incorporating unbanked individuals who rely exclusively on cash. In practice, this points that the pilot may be promoting a gradual substitution of cash for certain users.

6.1.1 Quasi-experimental Scheme

The advertising scheme is evaluated by analyzing the cumulative percentage variation between February and August 2025 across a selected sample of district pairs. While the intervention was designed as a differentiated advertising scheme, some of the incentives were not allocated proportionally to district size, as measured by the adult population. In particular, per capita spending on in-person campaigns and the distribution of physical advertising materials were substantially lower in larger treated districts.

To address this heterogeneity in treatment intensity, the analysis applies two sample restrictions. First, we exclude district pairs in which the treated district has an adult population exceeding 100,000. These very large districts received a comparatively small intervention, making it unlikely that the pilot could generate measurable effects.

Second, we exclude district pairs for which, as of December 2024, the number of service payments in the treated district was already large relative to its adult population. Specifically, district pairs are removed when the ratio of service payments to adult population exceeds 20 percent. This criterion eliminates municipalities that were already highly exposed to the payment platform prior to the intervention, for which a marginal and small-scale treatment would not be expected to materially affect transactional outcomes.

After applying these two restrictions, the final analytical sample consists of 187 treated and control district pairs. All subsequent analyses, including the regressions that use transactional data from the pilot, are conducted on this restricted sample to ensure greater homogeneity in treatment intensity and pre-treatment conditions. February was selected as the baseline month because it marked the beginning of the differentiated advertising campaing.

The exploratory evaluation of the total number of CBDC users across both groups shows that the treated districts did not experience a significantly higher cumulative percentage growth by August 2025. Specifically, in February 2025, the total number of CBDC users in the treatment districts amounted to 126,556, reaching 223,107 by the end of August, which represents an accumulated growth rate of 76%. In the control districts, the user base increased from 130,545 in February to 232,952 in August, similarly reflecting a cumulative growth of 78%.

Regarding active CBDC users, those who carried out at least one transaction (bill payment or money transfer, whether P2P, P2B, or B2B) within a given month, the figure rose from 2,495 in February 2025 to 4,740 in August 2025 in the treatment group, which is equivalent to a 90% increase. By contrast, in the control districts, the number of active users grew from 2,418 to 4,610 over the same period, corresponding to a relatively higher cumulative growth rate of 91%.

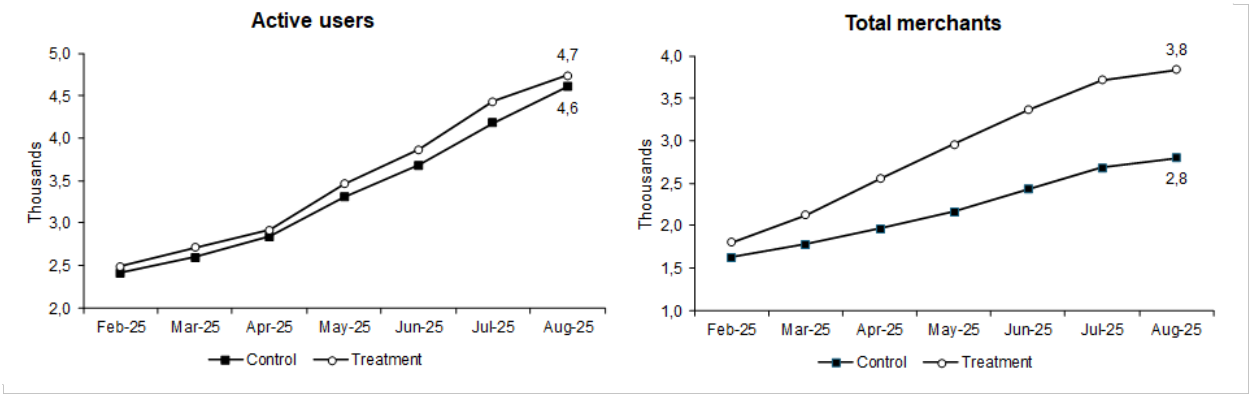
In contrast, the number of merchants accepting CBDC payments increased more significantly in the treated districts following the launch of the differentiated advertising campaign. This relative expansion is particularly relevant for the scalability of a non-interoperable payment system, as merchant network density is a critical determinant of user adoption. A broader acceptance infrastructure reduces transaction frictions and enhances the perceived utility of the digital wallet. Consequently, merchants expanded by 113% between February and August in treated districts while the growth rate in the control group was 72%.

Within the implementation of the differentiated advertising strategy, Bitel set internal enrollment targets for both individual users and for merchants and agents. These targets implied that, in relative terms, merchant enrollment was expected to grow more strongly in treated districts.

In addition, merchants—particularly small businesses and entrepreneurs—display a higher predisposition to adopt new financial services, as illustrated in Figure 14. This pattern can be partly attributed to their more intensive exposure to digital tools and frequent transactional interactions, which tend to foster higher levels of digital and financial literacy relative to the average individual user within a given locality.

Beyond literacy, merchants face stronger economic incentives to experiment with new payment instruments, as potential gains in efficiency, cost reduction, and customer reach are more immediate and tangible in their daily operations. Consequently, differentiated and targeted advertising strategies are likely to be especially effective among this group, amplifying awareness and lowering adoption frictions. This combination of higher readiness and stronger incentives helps explain the higher observed growth rates among merchants, reinforcing their role as early adopters and potential diffusion nodes for the broader ecosystem.

Figure 14: Active user and merchant evolution between groups

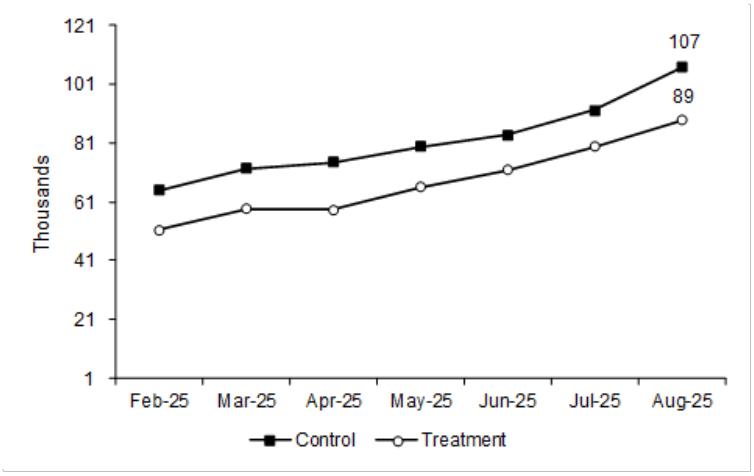


Source: Authors' calculations based on transactional data.

As for the use of the BCRP's digital currency, transactional activity increased more markedly in the treated districts. Figure 15 shows that between February and August 2025, the total number of transactions rose by 72% in the treatment group, compared to 66% in the control group. Transactionality—measured as the monthly number of bill payment and transfer operations—thus expanded in both groups, reflecting a generalized upward trend in digital payments. However, the larger increase observed in treated districts suggests an additional effect attributable to the intervention, beyond the baseline growth in digital transaction usage. This differential points to a higher intensity of adoption and use of the CBDC in areas exposed to the pilot, potentially driven

by greater user familiarity, network effects, and increased acceptance among merchants and service providers.

Figure 15: Transactionality evolution between groups



Source: Authors' calculations based on transactional data.

Finally, between March and August 2025, the number of users performing at least one cash-in operation increased by 133% in the treated districts, compared to 165% in the control group. The reported differences in percentage growth may be explained by the effects of differentiated advertising, but also by the evolution of other observable and unobservable variables. The econometric analysis presented in the following sections will seek to isolate the effects of differentiated advertising alone, while controlling for the effects generated by these other variables.

6.2 Impact of the advertisement in Access and Use of CBDC Wallet

To evaluate the impact of the differentiated advertisement campaing on CBDC related outcomes, we estimate the following specification:

$$\Delta Y_d = \alpha_0 + \alpha_1 Treatment_d + \mathbf{X}_p' \boldsymbol{\alpha}_2 + \mu_r + \varepsilon_d, \tag{2}$$

where $\Delta Y_d = Y_{d,\text{Aug}} - Y_{d,\text{Feb}}$ denotes the change in CBDC-related outcomes in district d between February and August 2025. The dependent variable includes, among others, the change in the (relative[5]) number of total users, active users, merchants, and transactions between February and August.

The vector $\mathbf{X}p$ includes pre-treatment province-level covariates for province p, where district d is located. These controls capture demographic, educational, and financial characteristics measured prior to the launch of the pilot program, including age composition, educational attainment, cellphone ownership, digital wallet usage, and bank account ownership. Additionally, $\mathbf{X}p$ includes the district's adult population and an indicator for rural municipalities ($Rural_d$), defined as a dummy variable equal to one if the district's total population is below 5,000 inhabitants. Regional fixed effects (μ_r) control for time-invariant heterogeneity across macro-regions, while ε_d denotes the error term.

[5]All variables are normalized by the adult population in each municipality.

Given the exogenous assignment of the treatment, the parameter α_1 captures the causal effect of the advertising campaign on changes in CBDC-related outcomes.

First, we evaluate the impact of the advertising campaign on the change in the total number of CBDC users. The total number of users can be interpreted as a measure of CBDC adoption prior to active usage, capturing the extensive margin of participation rather than transaction intensity. In this sense, changes in the number of registered users reflect initial enrollment into the system, which may precede regular transactional activity.

Table 3: OLS regression: Impact on Δ Total Users

	Results (OLS)					
	(1)	(2)	(3)	(4)	(5)	(6)
Variable of interest						
$Treatment_d$	0.914*	0.870**	0.924	0.802*	1.050*	0.755*
	(0.059)	(0.050)	(0.118)	(0.090)	(0.064)	(0.060)
Territorial and demographic characteristics						
$Rural_d$		-2.788	-6.212	-5.355	-6.297	-1.076
		(0.482)	(0.162)	(0.223)	(0.138)	(0.164)
(log) $AdultPop_d$			1.988**	1.455*	1.569**	-0.756
			(0.014)	(0.061)	(0.042)	(0.210)
Financial access indicators						
(log) $BankedPop_p$			-8.195		-4.089	-0.930
			(0.366)		(0.410)	(0.284)
(log) $DigitalWallet_p$			2.488		5.523	1.643**
			(0.479)		(0.246)	(0.045)
(log) $CellphonePop_p$			-1.913		-8.639	-2.038
			(0.951)		(0.746)	(0.686)
Population structure and education						
$Pop18\text{-}24_p$				5.372	3.830	0.045
				(0.133)	(0.155)	(0.980)
$Pop25\text{-}40_p$				1.373	1.393	1.254
				(0.747)	(0.726)	(0.363)
$PrimaryEdu_p$				4.425	9.836	2.492
				(0.141)	(0.134)	(0.136)
$SecondaryEdu_p$				-0.499	-0.978	-0.548
				(0.870)	(0.648)	(0.382)
Time controls						
$Pre\text{-}trend(Dec - Feb)_d$						3.019***
						(0.005)
Constant	11.702***	13.725***	-3.056	8.925	20.979	12.689**
	(0.000)	(0.001)	(0.629)	(0.381)	(0.268)	(0.045)
Observations	374	374	374	374	374	374
R^2	0.058	0.069	0.108	0.097	0.141	0.772

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$.

Standard errors clustered at the province level.

Table 3 presents the estimated reduced-form impact of the treatment (the differentiated advertising campaign) on the change in $TotalUsers_d$ between February and August 2025. The results indicate that the treatment has a positive and statistically significant effect on user adoption at the 10 percent level. Importantly, this effect remains stable across all model specifications, which progressively incorporate additional sets of control variables to account for observable district-level characteristics and potential confounding factors.

These findings suggest that differentiated outreach and targeted communication strategies can increase awareness and willingness to register for a new digital payment instrument, even if this initial adoption does not immediately translate into higher transaction volumes. In this sense, the advertising campaign appears to have encouraged early-stage enrollment into the CBDC system, which may constitute a necessary precondition for subsequent usage and transactional activity.

To address the possibility that the results may be driven by differential adoption trends between treated and control municipalities prior to the intervention, the most demanding specification (column 6) additionally controls for pre-treatment dynamics. Specifically, we include a pre-trend measure capturing the change in total users between December 2024 and February 2025, before the implementation of the advertising campaign. The estimated treatment effect remains positive and statistically significant after accounting for these pre-treatment trends, suggesting that the observed impact of the campaign is unlikely to reflect differential baseline growth across municipalities.

Table 4: OLS regression: Impact on Δ Active users

	Results (OLS)					
	(1)	(2)	(3)	(4)	(5)	(6)
Variable of interest						
$Treatment_d$	0.028**	0.028**	0.027**	0.028**	0.028**	0.028**
	(0.021)	(0.018)	(0.016)	(0.035)	(0.019)	(0.017)
Territorial and demographic characteristics						
$Rural_d$		0.013	-0.067	-0.053	-0.061	-0.062
		(0.698)	(0.205)	(0.289)	(0.215)	(0.209)
(log) $AdultPop_d$			0.047**	0.048*	0.047*	0.048*
			(0.040)	(0.062)	(0.067)	(0.058)
Financial access indicators						
(log) $BankedPop_p$			0.019		0.037	0.038
			(0.765)		(0.457)	(0.441)
(log) $DigitalWallet_p$			0.018		0.028	0.026
			(0.205)		(0.157)	(0.130)
(log) $CellphonePop_p$			0.321		0.250	0.263
			(0.277)		(0.342)	(0.295)
Population structure and education						
$Pop18\text{-}24_p$				0.103	0.097	0.095
				(0.207)	(0.233)	(0.232)
$Pop25\text{-}40_p$				-0.074	-0.070	-0.069
				(0.315)	(0.328)	(0.343)
$PrimaryEdu_p$				-0.022	0.030	0.030
				(0.356)	(0.274)	(0.297)
$SecondaryEdu_p$				-0.014	0.004	0.004
				(0.835)	(0.930)	(0.927)
Time controls						
$Pre\text{-}trend(Dec - Feb)_d$						-0.112
						(0.671)
Constant	0.181***	0.172***	-0.081	-0.191	-0.008	-0.014
	(0.000)	(0.000)	(0.589)	(0.249)	(0.968)	(0.942)
Observations	374	374	374	374	374	374
R^2	0.042	0.042	0.083	0.082	0.091	0.093

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$.

Standard errors clustered at the province level.

To assess the economic magnitude of the effect, consider the point estimate reported in column (6). The results indicate that treated municipalities experienced an increase of approximately 75 basis points in the share of total CBDC users relative to control municipalities. This effect is economically meaningful when compared to the overall evolution of adoption during the pilot period. On average, the share of adults affiliated with the digital wallet increased from 8.0 percent in February to 14.8 percent in August, representing a total increase of 6.8 percentage points in the 8 regions under study. Accordingly, the estimated treatment effect accounts for roughly 12 percent of the observed increase in CBDC adoption over this period. This magnitude highlights the relevance of the advertising intervention as a driver of aggregate adoption dynamics, beyond the underlying trend toward greater use of digital payment instruments.

On the same line, Table 4 reports the corresponding reduced-form estimates for the impact of the

treatment on the change in the number of active users ($ActiveUsers_{dt}$) between February 2025 and August 2025. This variable serves as a proxy for effective CBDC usage, capturing the intensive margin of adoption. The estimated treatment effect is positive and statistically significant at the 5 percent level across all specifications. The stability of the coefficient across alternative model specifications reinforces the robustness of the estimated impact.

To assess the economic importance of the estimated effect on active usage, we compare the point estimate against the observed evolution of the outcome variable. Based on the estimates reported in Table 4, treated municipalities experienced an increase in the share of active CBDC users of approximately 2.8 basis points relative to control municipalities. While this magnitude may appear modest in absolute terms, it is sizable when evaluated against the baseline level of active usage. On average, the share of adults actively using the digital wallet increased from 0.15 percent in February 2025 to 0.29 percent in August 2025, corresponding to a total increase of 14 basis points over the pilot period. Accordingly, the estimated treatment effect explains approximately one quarter of the observed variation in active CBDC usage between February and August in our sample.

Importantly, the relative magnitude of this effect is larger than the corresponding impact of the treatment on the total number of users. While the advertising campaign generated only a modest increase in overall enrollment, its effect on active usage is considerably stronger. This pattern suggests that the intervention did not merely encourage individuals to download or register for the CBDC wallet, but also played a meaningful role in stimulating actual transactional engagement.

These findings indicate that the advertising intervention operates along two margins. On the one hand, it increases the extensive margin by encouraging individuals to adopt the CBDC wallet. On the other hand (and more strongly) it affects the intensive margin by increasing the likelihood that enrolled users actively engage in transactions. From an economic perspective, this result suggests that targeted communication strategies may help reduce frictions not only at the adoption stage but also in the transition from registration to effective use of the digital payment instrument.

Next, we evaluate the impact of the treatment on transaction activity. Table 5 presents the estimated effects on the change in the number of bill payments through the wallet ($BillPaymentVolume_{dt}$), which, according to the pilot's transactional data, represents the most common type of transaction. The estimated treatment coefficient is positive and statistically significant at the 10 percent level across specifications (1)–(5). When the pre-trend control is introduced in column (6), the magnitude of the estimated effect remains broadly unchanged and its statistical significance strengthens to the 5 percent level. Importantly, the coefficient associated with the pre-treatment trend is not statistically significant, suggesting that differential adoption dynamics prior to the intervention are unlikely to explain the observed post-treatment changes in bill payment activity.

Overall, these results indicate that the advertising campaign contributed to an increase in transactional usage of the CBDC, particularly in the form of bill payments, which constitute the primary transaction category within the pilot.

Finally, Table 6 reports the impact of the treatment on the change in the number of merchants accepting CBDC payments ($CBDCMerchants_{dt}$). The estimates indicate a positive and statistically significant effect at the 5 percent level across all specifications. These results suggest that the intervention was particularly effective in expanding the acceptance side of the CBDC ecosystem. Merchant adoption represents a key supply-side component of digital currency diffusion, as the availability of acceptance points directly affects users' ability and incentives to transact. In other words, a broader merchant network increases the practical usefulness of the CBDC and strengthens incentives for consumers to adopt and use the digital payment instrument.

Table 5: OLS regression: Impact on Δ Number of bill payments

	Results (OLS)					
	(1)	(2)	(3)	(4)	(5)	(6)
Variable of interest						
$Treatment_d$	0.594*	0.599*	0.557*	0.581*	0.594*	0.599**
	(0.064)	(0.060)	(0.097)	(0.060)	(0.053)	(0.017)
Territorial and demographic characteristics						
$Rural_d$		0.328	-0.645	-0.521	-0.660	-0.663
		(0.726)	(0.525)	(0.564)	(0.526)	(0.525)
(log) $AdultPop_d$			0.571	0.560	0.522	0.522
			(0.129)	(0.131)	(0.164)	(0.168)
Financial access indicators						
(log) $BankedPop_p$			0.850		2.506	2.499
			(0.703)		(0.340)	(0.342)
(log) $DigitalWallet_p$			-0.144		0.475	0.481
			(0.855)		(0.714)	(0.699)
(log) $CellphonePop_p$			8.639		6.449	6.422
			(0.433)		(0.563)	(0.569)
Population structure and education						
$Pop18\text{-}24_p$				0.777	0.832	0.847
				(0.670)	(0.665)	(0.692)
$Pop25\text{-}40_p$				-0.001	0.101	0.099
				(1.000)	(0.951)	(0.952)
$PrimaryEdu_p$				0.670**	2.166	2.175
				(0.040)	(0.262)	(0.242)
$SecondaryEdu_p$				2.554	3.535*	3.517**
				(0.142)	(0.066)	(0.045)
Time controls						
$Pre\text{-}trend(Dec - Feb)_d$						-0.016
						(0.956)
Constant	2.124***	1.887**	-1.047	0.850	7.372	7.375
	(0.000)	(0.012)	(0.764)	(0.707)	(0.360)	(0.360)
Observations	374	374	374	374	374	374
R^2	0.038	0.039	0.050	0.052	0.063	0.063

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$.

Standard errors clustered at the province level.

Due to data limitations, pre-treatment trends for merchant adoption cannot be constructed. Nevertheless, the stability of the estimated treatment effect across alternative specifications provides supporting evidence that the advertising campaign contributed to increasing merchant participation in the CBDC ecosystem. The robustness of the results to the inclusion of different control variables strengthens the interpretation that differentiated outreach or communication strategies encouraged merchants and small businesses to adopt CBDC payments. From an economic perspective, this finding is consistent with the idea that the intervention helped reduce informational, coordination, or perceived cost barriers faced by merchants when deciding whether to accept the CBDC as a payment method.

Importantly, the magnitude of the estimated effect is economically large. The point estimates imply that treated municipalities experienced an increase of approximately 0.83 CBDC merchants per 1,000 adults relative to control municipalities. This effect is sizable when compared to baseline levels: on average, there was roughly 1 merchant per 1,000 adults in February in the eight regions under study, and this figure increased to 2 merchants per 1,000 adults by August, implying a total increase of about 1 merchant per 1,000 adults during the pilot period. Accordingly, the estimated treatment effect accounts for more than 80 percent of the observed variation in merchant adoption between February and August.

Table 6: OLS regression: Impact on Δ Merchants accepting CBDC payments

	Results (OLS)				
	(1)	(2)	(3)	(4)	(5)
Variable of interest					
$Treatment_d$	0.084**	0.084***	0.082**	0.083**	0.083**
	(0.011)	(0.010)	(0.015)	(0.013)	(0.015)
Territorial and demographic characteristics					
$Rural_d$		-0.042	-0.093*	-0.086	-0.093*
		(0.488)	(0.094)	(0.108)	(0.077)
(log) $AdultPop_d$			0.032***	0.025**	0.026**
			(0.004)	(0.014)	(0.011)
Financial access indicators					
(log) $BankedPop_p$			-0.034		-0.038
			(0.575)		(0.518)
(log) $DigitalWallet_p$			0.002		0.012
			(0.942)		(0.756)
(log) $CellphonePop_p$			0.185		0.189
			(0.585)		(0.545)
Population structure and education					
$Pop18\text{-}24_p$				0.074	0.065
				(0.349)	(0.411)
$Pop25\text{-}40_p$				0.020	0.024
				(0.417)	(0.349)
$PrimaryEdu_p$				0.022	0.032
				(0.333)	(0.593)
$SecondaryEdu_p$				-0.088*	-0.101
				(0.098)	(0.139)
Constant	0.156***	0.187***	-0.048	-0.024	-0.035
	(0.000)	(0.002)	(0.642)	(0.817)	(0.875)
Observations	374	374	374	374	374
R^2	0.163	0.172	0.188	0.195	0.199

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$.

Standard errors clustered at the province level.

Notably, this represents the largest treatment effect among all the outcomes considered in the analysis. While the advertising campaign generated only modest changes in the total number of registered users, its impact on merchant adoption is substantially larger. This pattern suggests that the intervention primarily affected the supply side of the CBDC ecosystem rather than user enrollment alone.

From an economic perspective, this result is particularly relevant given the two-sided nature of payment systems, where user adoption and merchant acceptance tend to reinforce each other through network effects. In this context, the expansion of the merchant network likely increased the opportunities for users to transact using the CBDC. As such, the effect on merchant adoption may represent an important channel through which the treatment translated into higher levels of CBDC usage beyond initial wallet registration.

To further assess whether the impacts reported in the previous exercises can be interpreted as causal, we conduct a set of placebo tests. Specifically, we estimate the same specifications as before but redefine the dependent variables as the change between December 2024 and February 2025, a period that precedes the implementation of the advertising campaign. Since the treatment took place between March and June 2025, the estimated treatment effect during this pre-treatment period should not be statistically different from zero. If significant effects were detected, this would suggest that part of the estimated impact could be driven by pre-existing trends across municipalities rather

than by the advertising intervention itself.

The results of these placebo exercises, reported in the Appendix (Tables 15 and 16), show that the coefficient associated with the treatment variable is not statistically different from zero across all specifications. This finding provides reassuring evidence that the main results are unlikely to be driven by differential pre-treatment dynamics and supports the interpretation of the estimated effects as causal. Taken together, the regression results indicate that the differentiated advertising treatment has positive and statistically significant effects across several key outcomes. In particular, the intervention increases the total number of users (CBDC adoption), although the magnitude of this effect is relatively modest compared to other outcomes. The treatment also increases the number of active users, the volume of bill payments conducted using the CBDC, and, most strongly, the number of merchants accepting CBDC payments.

From a conceptual standpoint, the pilot was expected to affect active CBDC usage through two potential channels. First, by increasing the number of wallet downloads, which expands the total number of users and therefore the potential demand for CBDC transactions. Second, by expanding the network of merchants accepting CBDC payments, which increases the availability of acceptance points and strengthens users' incentives to transact using the digital wallet. The magnitude of the estimated effects suggests that the advertising campaign had a particularly strong impact on the second channel, namely the expansion of the merchant acceptance network. This expansion of acceptance points is likely to play a central role in supporting sustained CBDC usage by end users.

6.3 Impact of the increase in the distribution network

We are interested in evaluating how the expansion of the network of merchants accepting CBDC payments affects transactional usage of the digital wallet. In particular, we examine whether a larger merchant acceptance network translates into greater CBDC activity, measured through the number of active users and bill payment transactions. A key challenge in identifying the causal impact of this relationship arises from potential endogeneity between merchant adoption and usage patterns. Districts experiencing faster expansion of the merchant network may differ systematically from others along unobserved dimensions (such as preferences for digital payments, financial literacy, or transaction needs) that are also correlated with CBDC usage outcomes. As a result, simple correlations between merchant availability and transaction activity may be biased and cannot be interpreted causally.

To address this concern, our empirical strategy exploits the quasi-experimental design implemented by the Central Bank and relies on an instrumental variables (IV) approach. The validity of this strategy rests on two key conditions: relevance and exclusion. First, the relevance condition requires that the instrument be strongly correlated with the endogenous explanatory variable, namely the expansion of the merchant network. In our setting, this condition is satisfied. As shown in the reduced-form estimates presented earlier, exposure to the advertising treatment significantly increased the number of merchants accepting CBDC payments in treated municipalities, providing a strong first-stage relationship between the instrument and merchant adoption.

Second, the exclusion restriction requires that the instrument affect CBDC usage outcomes only through its impact on the endogenous variable, in this case, the availability of merchants accepting CBDC payments. In principle, the advertising campaign could influence usage through two channels. First, it could increase the number of wallet downloads, thereby expanding the pool of registered users and the potential demand for CBDC transactions. Second, it could expand the network of merchants accepting CBDC payments, increasing the availability of acceptance points and strengthening users'

incentives to transact using the digital wallet.

The empirical evidence presented in the previous section suggests that the second channel plays the dominant role. While the treatment generated modest increases in the number of registered users, its largest effect was observed in the expansion of the merchant acceptance network. Moreover, the aggregate differences in total users between treated and control municipalities remain relatively smal. This pattern indicates that the advertising campaign primarily affected the supply side of the CBDC ecosystem rather than user enrollment alone. In addition, in some specifications we explicitly control for changes in the total number of users in order to account for the possibility that wallet downloads constitute an alternative pathway through which the advertising campaign could affect intensive usage of the digital wallet.

This approach is consistent with a growing literature that exploits experimental or quasi-experimental variation to evaluate the impact of financial innovations in developing economies. For instance, Dupas and Robinson (2013) use randomized savings interventions to study household financial behavior, while Batista and Vicente (2020) exploit randomized access to mobile money savings accounts. Similarly, Jack and Suri (2014) document how the expansion of mobile money networks in Kenya causally reduced transaction costs and increased welfare. More broadly, our strategy follows established practices in applied econometrics that rely on IVs derived from experimental variation to address self-selection concerns (Angrist et al., 1996; Banerjee and Duflo, 2017).

6.3.1 Empirical specification

We estimate a two-stage least squares (2SLS) specification using district-level data expressed in per capita terms, normalized by the adult population. Given the relatively short duration of the pilot and our focus on medium-run adoption dynamics, the analysis is conducted in first differences, measuring changes in outcomes between February and August 2025. This approach allows us to capture the cumulative effects of the pilot while abstracting from pre-existing level differences across municipalities.

In the first stage, we estimate the effect of the advertising intervention on changes in the CBDC acceptance network using the same specification introduced in the previous section:

$$\Delta Y_d = \alpha_0 + \alpha_1 Treatment_d + \mathbf{X}_p'\boldsymbol{\alpha}_2 + \mu_r + \varepsilon_d, \tag{3}$$

where $\Delta Y_d = Y_{d,\text{Aug}} - Y_{d,\text{Feb}}$ denotes the change in CBDC-related outcomes in district d between February and August 2025. In this context, Y_d corresponds specifically to the number of CBDC merchants per capita, so that ΔY_d captures the change in the merchant acceptance network in each municipality over the pilot period. The remaining terms are defined as in the previous section.

In the second stage, we relate changes in CBDC usage to the instrumented change in the acceptance network according to:

$$\Delta Usage_d = \beta_0 + \beta_1 \Delta\widehat{Merchants}_d + \mathbf{W}_p'\boldsymbol{\beta}_2 + \mu_r + u_d, \tag{4}$$

where $\Delta Usage_d \in \Delta BillPaymentVolume_d, \Delta ActiveUsers_d$ denotes the change in district-level CBDC usage between February and August 2025. The variable $\Delta\widehat{Merchants}_d$ represents the predicted change in the number of CBDC merchants per capita obtained from the first-stage

regression, isolating the exogenous variation in merchant adoption induced by the randomized advertising intervention.

The vector $\mathbf{W}p$ includes the same set of pre-treatment covariates used in the first stage, with the addition of the change in the number of total users ($\Delta TotalUsersd$) to control for changes in the overall user base that may be mechanically correlated with usage outcomes. Under this specification, the coefficient β_1 identifies the causal effect of an expansion in the merchant acceptance network on changes in CBDC usage, exploiting the exogenous variation generated by the randomized advertising campaign.

6.3.2 Results

We now turn to the instrumental variables analysis to assess the impact of merchant adoption on CBDC usage. The reduced-form estimates presented earlier show that the advertising treatment led to a statistically significant increase in the number of merchants in treated districts, thereby generating a strong source of exogenous variation in merchant adoption. Exploiting this variation, we estimate the causal effect of an increase in the number of merchants per capita at the municipal level on CBDC usage outcomes, focusing primarily on active users and bill payment activity.

Table 7 reports the second-stage IV estimates for the effect of merchant availability on the number of bill payments using CBDC ($BillPaymentVolume_d$). The results indicate that an increase in the number of merchants per capita leads to a statistically significant rise in the volume of bill payments conducted through the CBDC, with the estimated effect remaining significant at the 5 percent level across specifications. These findings provide evidence that merchant acceptance plays a central role in enabling transactional use of the CBDC. In particular, the results suggest that expanding the merchant network facilitates routine payment activities (such as utility and service payments) by increasing the number of locations where users can effectively transact using the digital wallet.

To put the estimated IV coefficient into perspective, it is useful to consider its economic magnitude. The estimates indicate that an increase in the merchant network of 0.10 (equivalent to one additional CBDC merchant per 1,000 adults between February and August at the municipal level, which corresponds to the average variation observed in the sample) is associated with an increase of approximately 0.63 bill payments per 100 adults.

This effect is economically meaningful when compared against the observed evolution of bill payment activity during the pilot period. On average, the number of CBDC bill payments increased from 2.6 per 100 adults in February to 5.2 per 100 adults in August, corresponding to a total increase of 2.6 payments per 100 adults. Accordingly, the IV estimates imply that the mentioned expansion of the merchant network accounts for roughly one quarter of the observed increase in CBDC bill payment activity over the pilot period. This magnitude highlights the economic relevance of merchant availability as a key transmission channel through which the CBDC pilot translated into higher transactional usage.

It is also important to emphasize that this effect reflects exogenous variation in merchant adoption induced by the randomized advertising treatment. Other factors that may have encouraged bill payments (such as cashback incentives offered within the CBDC ecosystem) were implemented nationwide during the pilot period, meaning that both treated and control municipalities were equally exposed to these incentives. Therefore, the estimated IV coefficient isolates the causal contribution of merchant network expansion rather than broader policy incentives affecting all users.

At the same time, the advertising intervention could in principle affect CBDC usage through an

Table 7: IV regression: Impact of an increase of merchants accepting CBDC payments on the number of bill payments

	Results (OLS)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variable of interest							
(log) $CBDCMerchants_d$	7.031**	7.150**	6.778*	6.979**	7.148**	7.166***	6.338**
	(0.039)	(0.041)	(0.051)	(0.031)	(0.022)	(0.003)	(0.013)
Territorial and demographic characteristics							
$Rural_d$		0.627	-0.018	0.081	0.005	0.005	0.824*
		(0.311)	(0.981)	(0.907)	(0.995)	(0.995)	(0.050)
(log) $AdultPop_d$			0.356	0.389	0.338	0.337	0.125
			(0.359)	(0.235)	(0.306)	(0.283)	(0.676)
Financial access indicators							
(log) $BankedPop_p$			1.079		2.780	2.779	3.242**
			(0.555)		(0.167)	(0.167)	(0.042)
(log) $DigitalWallet_p$			-0.158		0.392	0.394	-0.328
			(0.770)		(0.672)	(0.649)	(0.664)
(log) $CellphonePop_p$			7.388		5.098	5.087	6.070
			(0.402)		(0.561)	(0.569)	(0.478)
Population structure and education							
$Pop18\text{-}24_p$				0.259	0.367	0.370	0.097
				(0.882)	(0.840)	(0.849)	(0.953)
$Pop25\text{-}40_p$				-0.143	-0.070	-0.071	-0.304
				(0.923)	(0.963)	(0.962)	(0.817)
$PrimaryEdu_p$				0.514***	1.940	1.942*	0.636
				(0.002)	(0.118)	(0.099)	(0.609)
$SecondaryEdu_p$				3.169***	4.253***	4.250***	3.994***
				(0.002)	(0.000)	(0.000)	(0.000)
Time controls							
$Pre\text{-}trend(Dec - Feb)_d$						-0.005	-0.289
						(0.985)	(0.349)
$\Delta TotalUsers(Feb - Aug)_d$							0.152**
							(0.002)
Constant	1.025	0.552	-0.723	1.021	7.620	7.622	4.463
	(0.129)	(0.476)	(0.813)	(0.610)	(0.181)	(0.177)	(0.349)
Observations	374	374	374	374	374	374	374
R^2	0.043	0.045	0.054	0.057	0.067	0.067	0.163
F-stat	11.659	12.013	10.330	11.033	10.319	9.027	7.849

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$.

Standard errors clustered at the province level.

additional channel, namely by increasing the number of wallet downloads and therefore the total number of registered users. To account for this possibility, the most demanding specification (column 7) additionally controls for contemporaneous changes in the total number of users. Including this control allows the analysis to account for the possibility that wallet downloads represent an alternative pathway through which the treatment could affect bill payment activity. In addition, the specification includes a control for pre-treatment trends in the dependent variable to address the concern that differential pre-existing trends in bill payment activity across treated and control municipalities could partly explain the estimated effects.

The stability and statistical significance of the estimated merchant coefficient under this specification indicate that the results are not driven by differential pre-existing trends or by changes in the size of the user base. Instead, the findings suggest that expanding merchant acceptance directly reduces transaction frictions and increases opportunities for CBDC-based payments, reinforcing the importance of merchant-side adoption as a key mechanism for sustaining and deepening CBDC usage.

Table 8 presents the corresponding IV estimates for the impact on the number of active users ($ActiveUsers_d$), capturing the effect of merchant adoption on active CBDC usage. The results reveal

a positive and highly statistically significant effect of merchant availability on active usage, with significance at the 1 percent level across specifications. This finding underscores the importance of the acceptance network in driving not only nominal adoption but also sustained and effective use of the CBDC. By expanding the set of merchants that accept CBDC payments, the system increases the range of feasible transactions, thereby strengthening users' incentives to remain active.

Table 8: IV regression: Impact of an increase of merchants accepting CBDC payments on active users

	Results (OLS)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variable of interest							
$CBDCMerchants_d$	0.333***	0.338***	0.334***	0.331***	0.340***	0.334***	0.261***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.000)	(0.001)
Territorial and demographic characteristics							
$Rural_d$		0.027*	-0.036	-0.024	-0.030	-0.032	-0.002
		(0.089)	(0.367)	(0.529)	(0.431)	(0.399)	(0.944)
(log) $AdultPop_d$			0.036*	0.039*	0.039*	0.040*	0.033*
			(0.036)	(0.037)	(0.043)	(0.035)	(0.043)
Financial access indicators							
(log) $BankedPop_p$			0.030		0.050	0.051	0.072***
			(0.492)		(0.121)	(0.105)	(0.000)
(log) $DigitalWallet_p$			0.017		0.024*	0.020	-0.011
			(0.109)		(0.080)	(0.108)	(0.601)
(log)$CellphonePop_p$			0.259		0.186	0.209	0.274
			(0.186)		(0.312)	(0.247)	(0.127)
Population structure and education							
$Pop18\text{-}24_p$				0.079	0.075	0.072	0.054
				(0.297)	(0.331)	(0.328)	(0.415)
$Pop25\text{-}40_p$				-0.081	-0.078	-0.077	-0.083*
				(0.163)	(0.167)	(0.186)	(0.070)
$PrimaryEdu_p$				-0.029	0.020*	0.019*	-0.035**
				(0.172)	(0.051)	(0.054)	(0.028)
$SecondaryEdu_p$				0.015	0.038	0.038	0.037
				(0.771)	(0.306)	(0.317)	(0.334)
Time controls							
$Pre\text{-}trend(Dec-Feb)_d$						-0.184	-0.201*
						(0.376)	(0.088)
$\Delta TotalUsers(Feb-Aug)_d$							0.006***
							(0.000)
Constant	0.129***	0.108***	-0.065	-0.182	0.004	-0.007	-0.131
	(0.000)	(0.000)	(0.609)	(0.136)	(0.975)	(0.960)	(0.179)
Observations	374	374	374	374	374	374	374
R^2	0.143	0.146	0.173	0.175	0.182	0.186	0.280
F-stat	11.659	12.013	10.330	11.033	10.319	11.476	8.942

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$.

Standard errors clustered at the province level.

To assess the economic magnitude of the IV estimates in Table 8, we benchmark the coefficient against the observed evolution of active CBDC usage over the pilot period. The estimates imply that an increase in the merchant network of 0.10 (equivalent to one additional CBDC merchant per 1,000 adults)is associated with an increase of approximately 2.6 basis points in the share of active CBDC users at the district level. This effect is economically meaningful when compared to the overall change in active usage observed during the pilot. On average, the share of adults actively using the CBDC increased by 13 basis points between February and August. Accordingly, the IV estimates indicate that the expansion of the merchant network accounts for around one quarter of the total observed increase in active CBDC usage. This result reinforces the interpretation that merchant availability is a central mechanism driving not only adoption at the extensive margin, but also sustained engagement at the intensive margin.

Consistent with the results for bill payment volumes, the estimated effect remains robust in the most demanding specification, which controls for both pre-treatment trends and changes in the

total number of users. These additional controls allow the analysis to disentangle the direct impact of merchant availability from broader adoption dynamics and underlying growth trends in CBDC participation. The persistence of the effect after accounting for these factors suggests that merchant adoption operates as an independent and economically meaningful channel for increasing active CBDC use, reinforcing the presence of two-sided network effects within the CBDC ecosystem.

To further validate the identification strategy, Annex C presents a set of placebo regressions in which changes in the number of active users between December 2024 and February 2025 (i.e., during a period prior to the implementation of the treatment) are regressed on contemporaneous changes in the number of CBDC-accepting merchants. The estimated coefficient on merchant adoption is statistically insignificant throughout this pre-treatment window, indicating the absence of a systematic relationship between merchant availability and active usage before the intervention took place.

These placebo results provide additional support for the causal interpretation of the main findings by ruling out the possibility that the estimated post-treatment effects are driven by pre-existing correlations or underlying trends in CBDC adoption and usage. In particular, the lack of a significant relationship in the pre-treatment period suggests that districts experiencing larger subsequent increases in merchant adoption were not already on a differential trajectory in terms of active usage. Taken together, the placebo tests reinforce the validity of the identification strategy and strengthen the conclusion that the observed increases in active CBDC use are attributable to the treatment-induced expansion of merchant acceptance rather than to confounding pre-trends.

7 POLICY DISCUSSION AND CONCLUDING REMARKS

7.1 Policy discussion

The main objective of the CBDC pilot was to gather evidence to assess whether a retail CBDC has the potential to expand the adoption and use of digital payments in regions with low financial inclusion. In this context, the pilot serves as a testing ground to evaluate both demand- and supply-side responses to the introduction of a new digital payment instrument, as well as the effectiveness of targeted policy interventions aimed at fostering its uptake.

The empirical findings of this study have implications across several dimensions of CBDC design and implementation. In particular, the results highlight the role of differentiated outreach and merchant-side adoption in driving both initial enrollment and sustained transactional use. Building on these findings, we propose a set of policy considerations that seek to inform the scaling of digital payment solutions and to support the broader objective of expanding access to and usage of digital financial services in Peru, especially in underserved and low-banked regions.

7.1.1 Awareness Campaigns

Based on the survey and regression results, the Central Bank's participation and backing in the pilot are positively associated with the probability of being an active CBDC user, underscoring the importance of clear and consistent communication regarding the institutional backing of the initiative. Survey evidence further suggests that knowledge of the Central Bank's role in the pilot has a clearly positive effect on user trust: among respondents who were informed about the existence of the Central Bank and its role in the economy, 81% reported that the BCRP's participation in the pilot increased their confidence in using BiPay.

In this context, and conditional on the CBDC being maintained as a payment instrument beyond the pilot phase, a next step would be to strengthen and standardize communication and educational efforts regarding the participation of BCRP at the national level. Rather than introducing entirely new messaging, these efforts would aim to reinforce existing information by clearly emphasizing the Central Bank's endorsement, explaining the intended use cases and benefits of the digital currency, and addressing common concerns related to privacy, security, and accessibility. Such initiatives could leverage the pilot's experience in rural and underserved areas to incorporate digital literacy components where informational gaps are more pronounced.

These communication efforts should prioritize the channels that have proven most effective during the pilot, particularly in-app notifications—through which 36% of surveyed users reported learning about the Central Bank's role—and social media, which reached 31% of users. This approach would allow for broad dissemination while ensuring consistency in messaging across regions.

Furthermore, the CBDC's offline payment functionality has significant potential to foster adoption in areas with limited connectivity; however, most users remain unaware of this feature. This highlights the need for more targeted informational and instructional communication, especially if the CBDC is expanded to increasingly remote and rural areas where smartphone ownership, internet connectivity, and access to digital infrastructure are more limited. While current demand for offline functionality may be low due to high smartphone penetration among pilot users, its relevance is likely to increase under a broader rollout scenario.

Finally, the survey results underscore that while institutional trust and functionality are foundational, immediate economic incentives remain a primary driver of sustained engagement. A significant portion of participants identified cashback benefits as the most important factor for downloading and continuing to use the CBDC wallet. This suggests that for a CBDC to remain competitive and encourage a permanent shift in consumer behavior, communication efforts should not only focus on security and backing but also clearly articulate the tangible value proposition to the user.

7.1.2 Interoperability

While the total number of users and transactions has been growing at a rapid pace, CBDC usage remains concentrated primarily in bill payments, with P2P and P2M transactions lagging behind. This usage pattern can be partly explained by the closed-loop nature of the CBDC system, which prevents funds from being transferred directly into bank accounts.

Such lack of interoperability may discourage broader adoption, particularly among self-employed workers—many of whom are micro-merchants—who, as indicated by the regression results, have a lower probability of being active users. The lack of interoperability makes it more costly and time-consuming for these users to accept CBDC payments and subsequently deposit funds into their bank accounts, thereby reducing the attractiveness of the CBDC for everyday commercial transactions.

Moreover, survey results highlight that interoperability is a key feature for 90% of users. In addition, inactive users identify several areas for improvement of the CBDC, notably the limited network of individuals and merchants to whom they can transfer funds (19%) and the lack of functionality to transfer money to other digital wallets (12%).

Enhancing interoperability is essential to expand the use of the CBDC beyond bill payments and promote more frequent P2P and P2M transactions. The closed-loop nature of the current pilot limits usability, particularly for everyday commercial activity, as users are unable to transfer funds directly

to bank accounts. In this context, interoperability would reduce transaction frictions, improve liquidity management for users and significantly increase the practical usefulness and adoption of the CBDC as a general-purpose means of payment.

7.1.3 Impact of the differentiated advertising scheme and CBDC adoption and use

According to the methodology employed, the quasi-experimental design generated exogenous variation that enables causal identification of the effects of differentiated advertising campaigns on access to and usage of the CBDC wallet. Specifically, the empirical results indicate that the differentiated advertising campaigns implemented during the CBDC pilot exerted a positive and statistically significant effect on both adoption and usage outcomes across multiple dimensions.

These findings provide evidence that geographically targeted policy interventions are effective in mitigating regional heterogeneity in digital payment adoption. The observed heterogeneous treatment effects across districts suggest that localized implementation strategies—calibrated to baseline adoption rates, merchant density, and connectivity constraints—can enhance the efficiency of public resource allocation in promoting digital financial inclusion. Accordingly, these results have direct policy relevance for the design of nationwide campaigns aimed at accelerating merchant onboarding and scaling the digital payments ecosystem to accommodate an expanding user base.

The reduced-form estimates show that differentiated advertising campaigns increased the total number of CBDC users, the number of active users, transaction activity through bill payments, and merchant participation in treated districts. These effects are robust across alternative specifications and remain statistically significant after accounting for pre-treatment trends and placebo tests, suggesting that the observed impacts are not driven by differential baseline dynamics.

Beyond user adoption, the results highlight the central role of merchants in fostering effective CBDC usage. The instrumental variables analysis shows that an increase in the number of merchants per capita leads to higher levels of bill payment activity and active usage, even after controlling for alternative channels of growth such as changes in the overall user base. This finding underscores that expanding merchant acceptance is not merely a complementary outcome of CBDC adoption, but a key mechanism through which digital currency usage becomes more frequent and economically meaningful.

From a policy perspective, these findings suggest that initiatives aimed at expanding the CBDC ecosystem should jointly target both sides of the market. While awareness campaigns and user acquisition strategies are effective in increasing adoption, their impact on sustained usage is amplified when accompanied by policies that incentivize merchant participation. Measures such as simplified onboarding processes for merchants, targeted incentives for early adoption, and integration with existing P2M infrastructures can enhance the acceptance network and increase transaction opportunities for users.

7.2 Concluding remarks

This paper provides empirical evidence on the adoption and use of a retail CBDC using data from the BCRP's CBDC pilot, one of the first initiatives to generate quasi-experimental evidence in an emerging economy with low levels of financial inclusion. Using both individual-level survey data and district-level transactional data, the analysis shows that trust, awareness of the central bank's role, and knowledge of the CBDC's functionalities are key determinants of active usage at the individual level. At the aggregate level, the results indicate that the pilot had a statistically significant impact

on both adoption and usage, increasing the number of users and merchants as well as transaction activity, particularly through bill payments. The instrumental-variable analysis further highlights merchant adoption as a central mechanism through which the pilot translated into higher levels of active use and transaction intensity.

These findings underscore that a retail CBDC's effectiveness in promoting digital payments depends not only on user acquisition but also on the development of a broad, functional acceptance network. Evidence from Peru suggests that policies expanding merchant participation are critical for transforming CBDCs from a mere store-of-value into a regularly used means of exchange. Furthermore, survey data highlights that economic incentives, such as cashback benefits, are vital for encouraging the adoption of new digital instruments in markets dominated by a single payment method. Broadly, this study contributes to the international debate on CBDC design by providing micro-level, causal evidence from a real-world implementation—emphasizing the roles of trust, incentives, and ecosystem development in regions where cash remains dominant and financial inclusion gaps persist.

Finally, this paper presents a first draft of the analysis, and the results reported herein will be expanded and further developed in subsequent documents. In parallel, a broader research agenda that builds on the results presented in this paper is being developed, with the objective of further evaluating the impact of the CBDC pilot and informing future policy and design decisions. Over the course of the pilot, additional surveys and empirical studies will be conducted to assess whether new factors emerge or whether previously identified mechanisms are reinforced over time. This agenda incorporates new administrative and survey-based data sources, enabling the assessment of the CBDC's effects on a broader set of outcomes, including credit supply and demand, as well as real-sector variables such as commercial activity and the degree of informality. By expanding the scope and depth of the analysis, future research will contribute to a more comprehensive understanding of the potential macroeconomic and financial inclusion implications of a retail CBDC wallet.

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A Sampling strategy and composition of the survey

A.1 Target population and sampling design

General objective of the survey: To understand the adoption, usage, satisfaction, and barriers associated with BiPay in order to inform service improvements and its positioning relative to other payment methods, within the framework of the BCRP CBDC pilot.

Target population: Individuals aged 18 and over, residing in eight selected departments (low financial inclusion regions), with some level of linkage to the CBDC app (active users, passive users, or those who downloaded the app but did not use it).

Sampling design:

- Sampling type: Non-probabilistic convenience sampling, based on a database of clients provided to the survey firm, which contacted potential respondents and invited them to participate in the survey (remote surveys); and multistage probabilistic sampling (in-person surveys).
- Sample size: 1,114 completed surveys
- Sample distribution by department:

Region	Universe	% Universe	Sample	% Sample	% Weighted*	Margin of error
Cajamarca	207 607	22%	229	21%	22%	±6.9%
Puno	199 150	21%	202	18%	21%	±6.9%
San Martín	132930	14%	150	13%	14%	±8.0%
Huánuco	131 314	14%	150	13%	14%	±8.0%
Ayacucho	88 179	9%	101	9%	10%	±9.8%
Apurímac	74 693	8%	100	9%	8%	±9.8%
Ucayali	63 037	7%	100	9%	7%	±9.8%
Madre de Dios	31 909	3%	82	7%	3%	±9.8%
Total	**928 819**	**100%**	**1,114**	**100%**	**100%**	±3.0%

** Distribution after applying weighting factors.*

A.2 Demographic charateristics

Demographic characteristics of CBDC users and total population in the low financial inclusion regions:

Variable	CBDC users	Total population*
Gender		
Male	67	52
Female	33	48
Area of residence		
Urban	75	61
Rural	25	39
Age range		
18 to 25	33	19
26 to 42	49	38
43 to 59	15	27
60 or more	2	15
Employment type		
Formal	41	39
Informal	41	57
Not employed (unemployed or inactive)	18	22
Education level		
Primary or below	6	37
Secondary	45	46
Tertiary or above	49	16
Source	**BCRP Survey**	**ENAHO**

** It refers to the characteristics of the total adult population in the regions of interest and not to the characteristics of the total number of CBDC users.*

B Robustness Check for Determinants of CBDC use

B.1 Excluding Bitel users as a covariate

Table 9: Logit regression: determinants of active CBDC use (Excluding bitel)

	$\Pr(\text{ActiveCBDC}_i = 1)$					
	(1)	(2)	(3)	(4)	(5)	(6)
Individual-level characteristics						
$CentralBank_i$	0.819***	0.744***	0.660***	0.512**	0.451*	0.439*
	(0.000)	(0.001)	(0.003)	(0.032)	(0.054)	(0.062)
Age_i	-0.027	-0.060	-0.069*	-0.073*	-0.080*	-0.081**
	(0.504)	(0.139)	(0.081)	(0.091)	(0.057)	(0.048)
Age_i^2	0.001	0.001*	0.001**	0.001**	0.001**	0.001**
	(0.303)	(0.063)	(0.036)	(0.041)	(0.024)	(0.019)
$Male_i$	-0.159	-0.156	-0.166	-0.108	-0.121	-0.174
	(0.348)	(0.373)	(0.342)	(0.558)	(0.511)	(0.320)
Province-level geographic controls						
$RuralPop_p$	-0.659	-0.784	-0.743	-0.887	-0.863	-0.992*
	(0.227)	(0.122)	(0.144)	(0.109)	(0.117)	(0.063)
Pop18-24$_p$	0.903	1.076	1.031	0.557	0.554	-0.012
	(0.339)	(0.248)	(0.265)	(0.569)	(0.567)	(0.991)
Pop25-40$_p$	-0.464	-0.440	-0.545	-0.407	-0.503	-0.856
	(0.516)	(0.537)	(0.464)	(0.579)	(0.510)	(0.272)
$PrimaryEdu_p$	1.910	2.096	1.974	2.074	1.989	1.972
	(0.216)	(0.155)	(0.183)	(0.175)	(0.193)	(0.168)
$SecondaryEdu_p$	0.663	0.795	0.788	0.577	0.538	0.119
	(0.763)	(0.719)	(0.721)	(0.798)	(0.811)	(0.956)
Employment status						
Self-employed		-0.442**	-0.394**	-0.450**	-0.410**	-0.355**
		(0.016)	(0.027)	(0.011)	(0.016)	(0.040)
Employer		0.303	0.323	0.330	0.347	0.280
		(0.455)	(0.434)	(0.401)	(0.384)	(0.479)
Unemployed		-0.404*	-0.331	-0.242	-0.196	-0.156
		(0.097)	(0.191)	(0.345)	(0.447)	(0.539)
Additional controls						
$Banked_i$			0.433**		0.329	0.220
			(0.019)		(0.117)	(0.279)
$CBDCKnowledge_i$				0.151***	0.148***	0.147***
				(0.000)	(0.000)	(0.001)
$CBDCSatisfaction_i$				1.160***	1.134***	1.130***
				(0.000)	(0.000)	(0.000)
$DigitalWallet_i$						0.975***
						(0.001)
Constant	0.348	0.899	0.919	0.668	0.721	0.669
	(0.800)	(0.541)	(0.543)	(0.653)	(0.634)	(0.642)
Observations	1114	1114	1114	1114	1114	1114

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$.

Standard errors clustered at the province level.

B.2 Other definition of $ActiveCBDC_i$

$ActiveCBDC_i$ represents individuals who use CBDC at least every 15 days.

Table 10: Logit regression: determinants of active CBDC use (alternative definition 1)

	$\Pr(\text{ActiveCBDC}_i = 1)$					
	(1)	(2)	(3)	(4)	(5)	(6)
Individual-level characteristics						
$CentralBank_i$	1.043***	1.020***	0.957***	0.790***	0.743***	0.737***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age_i	-0.011	-0.068*	-0.076*	-0.072*	-0.078*	-0.078*
	(0.779)	(0.075)	(0.052)	(0.077)	(0.059)	(0.053)
Age_i^2	0.000	0.001	0.001*	0.001	0.001*	0.001*
	(0.772)	(0.106)	(0.079)	(0.116)	(0.093)	(0.083)
$Male_i$	-0.282	-0.332*	-0.341*	-0.374**	-0.383**	-0.428**
	(0.131)	(0.072)	(0.066)	(0.049)	(0.045)	(0.027)
$Bitel_i$	0.373	0.391	0.364	0.422	0.401	0.445
	(0.200)	(0.176)	(0.199)	(0.175)	(0.187)	(0.149)
Province-level geographic controls						
$RuralPop_p$	-0.175	-0.517	-0.472	-0.331	-0.291	-0.331
	(0.763)	(0.335)	(0.371)	(0.526)	(0.572)	(0.518)
$Pop18\text{-}24_p$	2.484**	2.948**	2.897***	2.690**	2.642**	2.375**
	(0.014)	(0.010)	(0.010)	(0.017)	(0.017)	(0.033)
$Pop25\text{-}40_p$	0.335	0.569	0.492	0.568	0.498	0.338
	(0.620)	(0.452)	(0.510)	(0.461)	(0.511)	(0.661)
$PrimaryEdu_p$	2.272	2.313	2.183	2.056	1.947	1.850
	(0.151)	(0.129)	(0.146)	(0.172)	(0.190)	(0.204)
$SecondaryEdu_p$	-2.680	-2.776	-2.807	-2.721	-2.699	-2.946*
	(0.115)	(0.108)	(0.098)	(0.128)	(0.124)	(0.089)
Employment status						
Self-employed		-0.129	-0.090	-0.125	-0.095	-0.064
		(0.399)	(0.561)	(0.413)	(0.541)	(0.688)
Employer		0.331	0.346	0.253	0.264	0.215
		(0.302)	(0.280)	(0.420)	(0.400)	(0.492)
Unemployed		-0.457*	-0.407*	-0.385	-0.347	-0.324
		(0.052)	(0.097)	(0.116)	(0.168)	(0.196)
Additional controls						
$Banked_i$			0.356**		0.296	0.216
			(0.048)		(0.114)	(0.242)
$CBDCKnowledge_i$				0.197***	0.194***	0.197***
				(0.000)	(0.000)	(0.000)
$CBDCSatisfaction_i$				0.231	0.204	0.196
				(0.206)	(0.265)	(0.294)
$DigitalWallet_i$						0.712***
						(0.003)
Constant	-0.600	0.280	0.335	-0.342	-0.295	-0.533
	(0.636)	(0.838)	(0.806)	(0.809)	(0.833)	(0.707)
Observations	1114	1114	1114	1114	1114	1114

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$.

Standard errors clustered at the province level.

B.3 Other definition of $CentralBank_i$

$CentralBank_i$ reflects only the individual's awareness of the BCRP's participation in the CBDC pilot (and not knowledge of the BCRP's role in the economy)

Table 11: Logit regression: determinants of active CBDC use (alternative Central Bank variable)

	$\Pr(\text{ActiveCBDC}_i = 1)$					
	(1)	(2)	(3)	(4)	(5)	(6)
Individual-level characteristics						
$CentralBank_i$	0.669***	0.619***	0.574***	0.379**	0.349*	0.379*
	(0.000)	(0.000)	(0.001)	(0.041)	(0.056)	(0.054)
Age_i	-0.020	-0.050	-0.060	-0.062	-0.070*	-0.070*
	(0.601)	(0.207)	(0.124)	(0.145)	(0.093)	(0.085)
Age_i^2	0.000	0.001*	0.001*	0.001*	0.001**	0.001**
	(0.353)	(0.092)	(0.053)	(0.066)	(0.040)	(0.034)
$Male_i$	-0.219	-0.203	-0.215	-0.166	-0.181	-0.247
	(0.199)	(0.260)	(0.231)	(0.379)	(0.333)	(0.151)
$Bitel_i$	1.243***	1.326***	1.307***	1.343***	1.328***	1.410***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Province-level geographic controls						
$RuralPop_p$	-0.684	-0.779*	-0.738	-0.867*	-0.843*	-0.986**
	(0.151)	(0.086)	(0.103)	(0.093)	(0.099)	(0.043)
$Pop18\text{-}24_p$	0.744	0.981	0.955	0.458	0.470	-0.151
	(0.422)	(0.286)	(0.288)	(0.632)	(0.616)	(0.882)
$Pop25\text{-}40_p$	-0.291	-0.255	-0.364	-0.261	-0.359	-0.767
	(0.684)	(0.712)	(0.614)	(0.713)	(0.627)	(0.316)
$PrimaryEdu_p$	1.449	1.638	1.521	1.535	1.448	1.384
	(0.313)	(0.231)	(0.269)	(0.286)	(0.315)	(0.299)
$SecondaryEdu_p$	0.972	1.147	1.161	0.898	0.871	0.462
	(0.651)	(0.595)	(0.592)	(0.686)	(0.695)	(0.828)
Employment status						
Self-employed		-0.517***	-0.466**	-0.515***	-0.473***	-0.418**
		(0.010)	(0.017)	(0.006)	(0.010)	(0.027)
Employer		0.277	0.302	0.323	0.342	0.265
		(0.478)	(0.453)	(0.398)	(0.382)	(0.490)
Unemployed		-0.361	-0.287	-0.183	-0.140	-0.099
		(0.148)	(0.271)	(0.482)	(0.596)	(0.705)
Additional controls						
$Banked_i$			0.447*		0.330	0.207
			(0.018)		(0.121)	(0.307)
$CBDCKnowledge_i$				0.169***	0.165***	0.162***
				(0.000)	(0.000)	(0.000)
$CBDCSatisfaction_i$				1.125***	1.096***	1.086***
				(0.000)	(0.000)	(0.000)
$DigitalWallet_i$						1.070***
						(0.000)
Constant	-0.894	-0.655	-0.641	-0.922	-0.862	-1.007
	(0.497)	(0.638)	(0.657)	(0.509)	(0.547)	(0.459)
Observations	1114	1114	1114	1114	1114	1114

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$.

Standard errors clustered at the province level.

B.4 Marginal Effects

Table 12: Logit regression: determinants of active CBDC use (Average Marginal Effects)

	$\Pr(\text{ActiveCBDC}_i = 1)$					
	(1)	(2)	(3)	(4)	(5)	(6)
$CentralBank_i$	0.185***	0.166***	0.149***	0.108***	0.097**	0.093**
$Bitel_i$	0.264***	0.272***	0.266***	0.256***	0.252***	0.259***
$Banked_i$			0.078**		0.054	0.031
$CBDCKnowledge_i$				0.031***	0.030***	0.029***
$CBDCSatisfaction_i$				0.205***	0.200***	0.193***
$DigitalWallet_i$						0.188***

B.5 Probit

Table 13: Probit regression: determinants of active CBDC use

	$\Pr(\text{ActiveCBDC}_i = 1)$					
	(1)	(2)	(3)	(4)	(5)	(6)
Individual-level characteristics						
$CentralBank_i$	0.543***	0.490***	0.444***	0.337*	0.304*	0.293*
	(0.000)	(0.000)	(0.001)	(0.017)	(0.027)	(0.033)
Age_i	-0.013	-0.031	-0.037	-0.037	-0.041	-0.042
	(0.586)	(0.190)	(0.114)	(0.144)	(0.097)	(0.079)
Age_i^2	0.000	0.001	0.001*	0.001	0.001*	0.001*
	(0.332)	(0.079)	(0.045)	(0.063)	(0.041)	(0.028)
$Male_i$	-0.143	-0.134	-0.140	-0.111	-0.117	-0.156
	(0.150)	(0.191)	(0.170)	(0.305)	(0.279)	(0.118)
$Bitel_i$	0.805***	0.835***	0.818***	0.827***	0.815***	0.858***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Province-level geographic controls						
$RuralPop_p$	-0.433	-0.500	-0.484	-0.556	-0.546	-0.596*
	(0.142)	(0.073)	(0.080)	(0.065)	(0.066)	(0.037)
$Pop18\text{-}24_p$	0.489	0.633	0.612	0.360	0.365	0.030
	(0.378)	(0.262)	(0.271)	(0.542)	(0.531)	(0.961)
$Pop25\text{-}40_p$	-0.198	-0.147	-0.205	-0.150	-0.196	-0.386
	(0.641)	(0.728)	(0.641)	(0.731)	(0.662)	(0.398)
$PrimaryEdu_p$	0.855	1.010	0.952	0.946	0.907	0.820
	(0.323)	(0.224)	(0.253)	(0.271)	(0.289)	(0.301)
$SecondaryEdu_p$	0.481	0.596	0.598	0.483	0.476	0.167
	(0.709)	(0.640)	(0.639)	(0.711)	(0.716)	(0.892)
Additional controls						
$Banked_i$			0.243*		0.180	0.106
			(0.028)		(0.145)	(0.377)
$CBDCKnowledge_i$				0.099***	0.097***	0.096***
				(0.000)	(0.000)	(0.000)
$CBDCSatisfaction_i$				0.636***	0.622***	0.634***
				(0.000)	(0.000)	(0.000)
$DigitalWallet_i$						0.632***
						(0.000)
Constant	-0.531	-0.374	-0.345	-0.529	-0.499	-0.589
	(0.503)	(0.653)	(0.688)	(0.528)	(0.559)	(0.464)
Obs	1114	1114	1114	1114	1114	1114

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$.

Standard errors clustered at the province level.

B.6 Linear Probability Model

Table 14: OLS regression: determinants of active CBDC use

	$\Pr(\text{ActiveCBDC}_i = 1)$					
	(1)	(2)	(3)	(4)	(5)	(6)
Individual-level characteristics						
$CentralBank_i$	0.168***	0.151***	0.135***	0.097*	0.087*	0.083*
	(0.000)	(0.000)	(0.001)	(0.016)	(0.025)	(0.028)
Age_i	-0.003	-0.009	-0.011	-0.010	-0.011	-0.011
	(0.685)	(0.253)	(0.165)	(0.223)	(0.161)	(0.138)
Age_i^2	0.000	0.000	0.000*	0.000	0.000	0.000**
	(0.403)	(0.109)	(0.067)	(0.101)	(0.069)	(0.047)
$Male_i$	-0.046	-0.042	-0.044	-0.034	-0.035	-0.045
	(0.166)	(0.210)	(0.191)	(0.317)	(0.295)	(0.133)
$Bitel_i$	0.295***	0.303***	0.296***	0.287***	0.282***	0.292***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Province-level geographic controls						
$RuralPop_p$	-0.150	-0.165	-0.154	-0.165*	-0.157	-0.171*
	(0.143)	(0.083)	(0.103)	(0.100)	(0.117)	(0.066)
$Pop18\text{-}24_p$	0.164	0.204	0.190	0.102	0.095	-0.011
	(0.379)	(0.268)	(0.291)	(0.576)	(0.596)	(0.953)
$Pop25\text{-}40_p$	-0.083	-0.070	-0.088	-0.061	-0.074	-0.131
	(0.559)	(0.610)	(0.528)	(0.652)	(0.591)	(0.317)
$PrimaryEdu_p$	0.290	0.313	0.286	0.296	0.277	0.249
	(0.331)	(0.270)	(0.314)	(0.302)	(0.335)	(0.325)
$SecondaryEdu_p$	0.188	0.217	0.216	0.181	0.182	0.103
	(0.666)	(0.618)	(0.619)	(0.676)	(0.675)	(0.796)
Additional controls						
$Banked_i$			0.084*		0.060	0.034
			(0.040)		(0.167)	(0.402)
$CBDCKnowledge_i$				0.031***	0.031***	0.030***
				(0.000)	(0.000)	(0.001)
$CBDCSatisfaction_i$				0.192***	0.186***	0.182***
				(0.000)	(0.000)	(0.000)
$DigitalWallet_i$						0.212***
						(0.001)
Constant	0.295	0.356	0.362	0.281	0.287	0.232
	(0.273)	(0.219)	(0.220)	(0.313)	(0.310)	(0.377)
Obs	1114	1114	1114	1114	1114	1114
Adj-R^2	0.070	0.090	0.096	0.140	0.143	0.168

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$.

Standard errors clustered at the province level.

C Placebo tests for Impact Evaluation

C.1 Reduced form Results

C.1.1 Placebo test for the number of bill payments

Table 15: OLS regression: Placebo test for bill payments

	Results (OLS)				
	(1)	(2)	(3)	(4)	(5)
Variable of interest					
$Treatment_d$	0.015	0.032	-0.004	-0.033	0.003
	(0.943)	(0.890)	(0.985)	(0.883)	(0.988)
Territorial and demographic characteristics					
$Rural_d$		1.049***	-0.936	-0.889	-0.853
		(0.008)	(0.183)	(0.222)	(0.252)
(log) $AdultPop_d$			1.337***	1.422***	1.400***
			(0.001)	(0.000)	(0.001)
Financial access indicators					
(log) $BankedPop_p$			0.041		0.804
			(0.964)		(0.468)
(log) $DigitalWallet_p$			0.039		0.439
			(0.898)		(0.391)
(log) $CellphonePop_p$			-3.093		-5.033
			(0.523)		(0.277)
Population structure and education					
Pop18-24$_p$				0.564	0.613
				(0.734)	(0.720)
Pop25-40$_p$				-1.222	-1.295
				(0.389)	(0.361)
$PrimaryEdu_p$				0.600	1.222
				(0.227)	(0.245)
$SecondaryEdu_p$				0.636	1.020
				(0.373)	(0.216)
Constant	1.934***	1.173***	-7.985***	-7.104***	-4.524
	(0.000)	(0.006)	(0.003)	(0.007)	(0.332)
Observations	374	374	374	374	374
R^2	0.036	0.056	0.157	0.166	0.171

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$.

Standard errors clustered at the province level.

C.1.2 Placebo test for active users

Table 16: OLS regression: Placebo test for active users

	Results (OLS)				
	(1)	(2)	(3)	(4)	(5)
Variable of interest					
$Treatment_d$	-0.001	-0.001	-0.002	-0.001	-0.002
	(0.932)	(0.934)	(0.780)	(0.865)	(0.758)
Territorial and demographic characteristics					
$Rural_d$		0.000	-0.007	-0.009	-0.007
		(0.978)	(0.621)	(0.510)	(0.579)
(log) $AdultPop_d$			0.006	0.007	0.007
			(0.328)	(0.245)	(0.271)
Financial access indicators					
(log) $BankedPop_p$			0.009		0.006
			(0.745)		(0.723)
(log) $DigitalWallets_p$			-0.018**		-0.019*
			(0.012)		(0.104)
(log) $CellphonePop_p$			0.110**		0.116*
			(0.041)		(0.090)
Population structure and education					
$Pop18\text{-}24_p$				-0.022	-0.018
				(0.225)	(0.223)
$Pop25\text{-}40_p$				0.003	0.004
				(0.901)	(0.857)
$PrimaryEdu_p$				0.013	-0.006
				(0.651)	(0.867)
$SecondaryEdu_p$				0.004	0.003
				(0.866)	(0.917)
Constant	0.018***	0.017	-0.044	-0.008	-0.057
	(0.001)	(0.143)	(0.322)	(0.916)	(0.564)
Observations	374	374	374	374	374
R^2	0.027	0.027	0.045	0.035	0.047
Standard errors	Cluster	Cluster	Cluster	Cluster	Cluster

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$.

Standard errors clustered at the province level.

C.2 Second-Stage Results (IV)

C.2.1 Effect on active users

	Results (OLS)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variable of interest							
(log) $CBDCMerchants_d$	-0.007	-0.007	-0.027	-0.016	-0.030	-0.030	-0.035
	(0.926)	(0.927)	(0.767)	(0.853)	(0.744)	(0.744)	(0.740)
Territorial and demographic characteristics							
$Rural_d$		0.000	-0.009	-0.010	-0.010	-0.010	-0.008
		(0.997)	(0.586)	(0.504)	(0.535)	(0.535)	(0.494)
(log) $AdultPop_d$			0.007	0.007	0.008	0.008	0.007
			(0.263)	(0.181)	(0.213)	(0.213)	(0.146)
Financial access indicators							
(log) $BankedPop_p$			0.008		0.005	0.005	0.006
			(0.759)		(0.774)	(0.774)	(0.668)
(log) $DigitalWallet_p$			-0.018***		-0.019*	-0.019*	-0.021**
			(0.001)		(0.066)	(0.066)	(0.044)
(log) $CellphonePop_p$			0.115**		0.122**	0.122**	0.126**
			(0.016)		(0.021)	(0.021)	(0.016)
Population structure and education							
$Pop18\text{-}24_p$				-0.020	-0.016	-0.016	-0.018
				(0.309)	(0.360)	(0.360)	(0.256)
$Pop25\text{-}40_p$				0.003	0.005	0.005	0.004
				(0.866)	(0.795)	(0.795)	(0.813)
$PrimaryEdu_p$				0.013	-0.005	-0.005	-0.009
				(0.618)	(0.884)	(0.884)	(0.770)
$SecondaryEdu_p$				0.003	-0.000	-0.000	-0.000
				(0.912)	(0.991)	(0.991)	(0.987)
Time controls							
$Pre\text{-}trend_d$							0.000
							(0.752)
Constant	0.019	0.019	-0.045	-0.008	-0.058	-0.058	-0.067
	(0.224)	(0.411)	(0.252)	(0.900)	(0.519)	(0.519)	(0.470)
Observations	374	374	374	374	374	374	374
R^2	0.023	0.023	0.030	0.027	0.029	0.029	0.029
F-stat	11.659	12.013	10.330	11.033	10.319	10.319	8.224

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$.

Standard errors clustered at the province level.

D Pictures of the differentiated advertising campaign

D.1 Campaign photos for Ananea, Puno

In these photos, Bitel staff (Puno Branch) can be seen developing face-to-face campaigns in the district of Ananea, Puno, a region in the south of the country. Officials visited merchants to promote the adoption of the BiPay digital wallet and also to encourage greater transactionality among already affiliated businesses.

D.2 Campaign photos for Yunguyo, Puno

In these photos, BCRP personnel can be seen in the district of Yunguyo, Puno. BCRP officials traveled to that region to evaluate the development of the differentiated campaigns. The BCRP accompanied the visits made by Bitel staff to different merchants who are users of the BiPay digital wallet.

E Descriptive statistics

E.1 Descriptive statistics for the first objective: determinants of active CBDC use

Variable	Type	Description	Obs	Mean	Std. Dev.	Min	Max	Source
$ActiveCBDC_i$	Binary	Indicator equal to 1 if the individual actively uses the CBDC wallet.	1114	0.80	0.40	0	1	CBDC Survey
$CentralBank_i$	Binary	Indicator equal to 1 if the individual knows the BCRP's economic role and its involvement with the pilot.	1114	0.19	0.39	0	1	CBDC Survey
Age	Cont.	Age of the respondent (years).	1114	32.47	11.04	18	72	CBDC Survey
$Male_i$	Binary	Indicator equal to 1 if the respondent is male.	1114	0.66	0.47	0	1	CBDC Survey
$Bitel_i$	Binary	Indicator equal to 1 if the respondent's mobile provider is Bitel.	1114	0.91	0.30	0	1	CBDC Survey
$EmploymentStatus_i$	Categorical	Employment status of the respondent (four categories).	1114	2.08	1.04	1	4	CBDC Survey
$Banked_i$	Binary	Indicator equal to 1 if the respondent has a bank account.	1114	0.69	0.46	0	1	CBDC Survey
$CBDCKnowledge_i$	Categorical	Number of CBDC functionalities the respondent knows about (scale 0–7).	1114	3.82	2.11	0	7	CBDC Survey
$CBDCSatisfaction_i$	Binary	Indicator equal to 1 if the respondent reports satisfaction with the CBDC wallet.	1114	0.72	0.46	0	1	CBDC Survey
$DigitalWallet_i$	Binary	Indicator equal to 1 if the respondent uses any digital wallet.	1114	0.65	0.48	0	1	CBDC Survey
$RuralPop_p$	Cont.	Share of the population living in rural areas in the respondent's province.	1114	0.35	0.21	0.03	1.00	ENAHO
$Pop18\text{-}24_p$	Cont.	Share of the provincial population aged 18–24.	1114	0.18	0.04	0.05	0.27	ENAHO
$Pop25\text{-}40_p$	Cont.	Share of the provincial population aged 25–40.	1114	0.37	0.05	0.22	0.50	ENAHO
$PrimaryEdu_p$	Cont.	Share of the provincial population with primary education.	1114	0.25	0.08	0.13	0.50	ENAHO
$SecondaryEdu_p$	Cont.	Share of the provincial population with secondary education.	1114	0.44	0.06	0.25	0.61	ENAHO

E.2 Descriptive statistics for the second objective: evaluation of the differentiated advertising campaign

Variable	Type	Description	Obs	Mean	Std. Dev.	Min	Max	Source
$\Delta TotalUsers_d$	Cont.	Percentage change in the total number of CBDC users in district d (Aug 2025–Feb 2025).	374	6.90%	0.10	0.00%	144.15%	CBDC data
$\Delta ActiveUsers_d$	Cont.	Percentage change in the number of active CBDC users in district d (Aug 2025–Feb 2025).	374	0.14%	0.00	-0.23%	1.81%	CBDC data
$\Delta CBDCMerchants_d$	Cont.	Percentage change in the number of CBDC-accepting merchants in district d (Aug 2025–Feb 2025).	374	0.10%	0.00	0.00%	1.21%	CBDC data
$\Delta BillPaymentVolume_d$	Cont.	Percentage change in CBDC bill payment transaction volume in district d (Aug 2025–Feb 2025).	374	2.64%	0.05	-9.63%	42.47%	CBDC data
$Treatment_d$	Binary	Indicator equal to 1 if district d belongs to the treatment group.	374	0.50	0.50	0	1	Authors
$Rural_d$	Binary	Indicator equal to 1 if district d is classified as rural.	374	0.42	0.49	0	1	INEI
log $AdultPop_d$	Cont.	Log of the adult population in district d.	374	8.36	0.92	6.06	11.24	INEI
log $BankedPop_p$	Cont.	Log of the share of banked population in province p.	374	-0.82	0.22	-1.64	-0.45	ENAHO
log $DigitalWallet_p$	Cont.	Log of the share of individuals using digital wallets in province p.	374	-1.59	0.57	-3.50	-0.71	ENAHO
log $CellphonePop_p$	Cont.	Log of the share of the population with a mobile phone in province p.	374	-0.04	0.03	-0.41	-0.01	ENAHO
$TotalUsers(\Delta Dec\text{-}Feb)_d$	Cont.	Percentage change in total CBDC users in district d between Dec and Feb.	374	2.31%	0.03	0.00%	33.89%	CBDC data
$ActiveUsers(\Delta Dec\text{-}Feb)_d$	Cont.	Percentage change in active CBDC users in district d between Dec and Feb.	374	0.03%	0.00	-0.30%	0.33%	CBDC data
$BillPayment(\Delta Dec\text{-}Feb)_d$	Cont.	Percentage change in CBDC bill payment transaction volume in district d between Dec and Feb.	374	0.05%	0.02	-10.33%	11.94%	CBDC data