

Assessing the Factors that Promote Adoption and Use of a CBDC Wallet: Evidence from Peru

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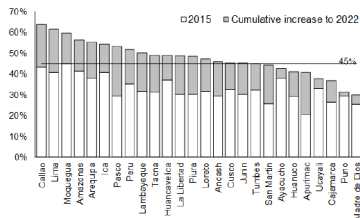
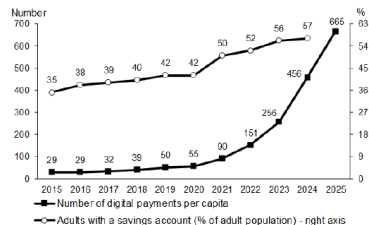
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Motivation

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The Gap the Pilot Was Designed to Close

- ▶ Digital payments in Peru grew enormously over the last decade — but almost entirely **among the already-banked**: most digital instruments require a bank account as the entry point.
- ▶ Only **52%** of adults held a savings account in 2022 (ENAH0), with sharp regional heterogeneity: Lima/Callao above 60%, **eight regions below 45%**.
- ▶ 2015–2022: regions with higher initial inclusion grew *faster* ⇒ no convergence, persistent structural barriers.



Stated objective of the CBDC pilot (BCRP)

"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."

This paper translates that objective through two complementary questions:

	Objective 1	Objective 2
Question	What individual characteristics and perceptions predict active use?	What was the causal impact of differentiated advertisement on adoption and use?
Level	Individual	District
Source	Survey of BiPay users (1,114)	Bitel → BCRP transactional data
Variation	— (correlational)	Randomized treatment
Method	Logit	Instrumental Variable

Results

- ▶ Awareness of the CB's role raises the chance of active use in **+9 pp**; prior use of other wallets, **+19 pp**.
- ▶ The differentiated advertisement increased users, active use, and bill payments — but its dominant effect was on **merchants** (>80% of the observed gap).
- ▶ IV strategy: merchant expansion **explains** about a quarter of the increase in active users and bill payments.

Takeaway: The decisive margin of the pilot was the **acceptance network**: merchants are the mechanism that converts adoption into active use.

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- 4 Individual Determinants of Active Use
- 5 Causal Impact of the Advertising Campaign
- 6 Policy Implications and Conclusions

The BCRP's CBDC Pilot

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Institutional Design of the Pilot

- ▶ **April 2024:** Published the regulatory framework. Regulation on Digital Money Innovation Pilots (Circular 0011-2024-BCRP).
- ▶ The design follows a **Hybrid model** (Auer & Böhme, 2020): the BCRP issues and regulates; the private sector distributes (onboarding, KYC, app).
- ▶ Participant: **Viettel Perú (Bitel)**, telcom company, via its **BiPay** wallet; accessible to any user, regardless of operator.
- ▶ **BiPay is not a new app:** it is Bitel's pre-existing e-money wallet. The pilot backed its balances with sovereign CBDC rather than launching new infrastructure.
- ▶ **Pre-funding:** Bitel deposits funds with the BCRP, which then issues an equivalent amount of CBDC ⇒ contains liquidity risk.
- ▶ Transactions are **free and tax-exempt**; offline functionality is available.

Timeline

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- A vertical timeline with a downward-pointing arrow on the left. Four red dots mark the milestones, each followed by a text description.
- 2021–23: Feasibility study (BCRP–IMF)
 - Apr 2024: Pilot regulation
 - Oct 2024: Pilot launch (Bitel–BiPay)
 - Mar 2025: Evaluation phase + differentiated advertising

CBDC Adoption Nationwide: Users and Transactions

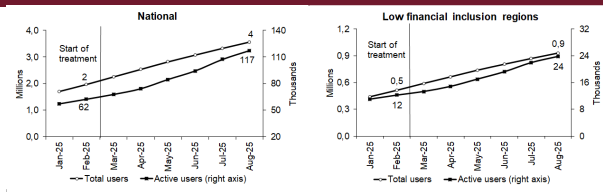


Figure 10: Total and active users (National vs. low financial-inclusion regions). Source: BCRP.

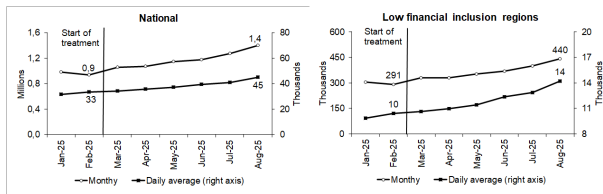
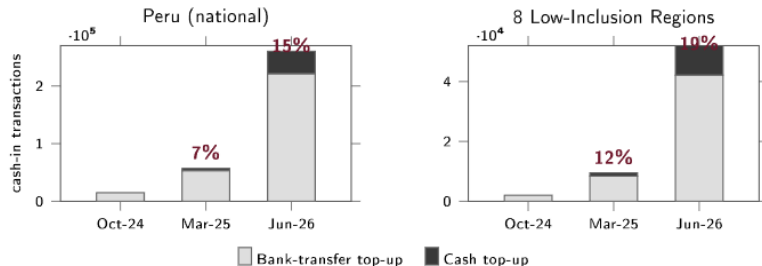


Figure 11: Number of CBDC transactions (National vs. low financial-inclusion regions). Source: BCRP.

- ▶ Total and active users climbing steadily. Same for Transactions.
- ▶ Active users rose from 62k to 117k nationally (+88%), and from 12k to 24k in the 8 low-inclusion regions (+100%) — growing **fastest precisely where the pilot targets inclusion**.

More Cash-Dependent Users Are Coming In



Share of cash-in transactions that are cash deposits (vs. bank transfers). Source: BCRP.

- At launch almost nobody used cash. It has risen steadily since — reaching **15%** nationally and **19%** in the 8 low-financial inclusion regions by Jun. 2026.
- A direct signal that the pilot is gradually pulling in **cash-dependent, likely unbanked users** — exactly the population it was designed to reach.

Quasi-Experimental Design

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- ▶ Universe (eligible): districts in the 8 regions with ≥ 100 Bitel customers; 402 districts and **201 districts** assigned to treatment.
- ▶ **Pairwise Randomization** (Bruhn & McKenzie, 2009): efficient in small samples; units are first grouped into pairs based on similarity in relevant baseline characteristics.
- ▶ We balance six covariates simultaneously (adult population, rural Bitel share, youth phone penetration, digital-wallet penetration, consumer credit access and balances).
- ▶ Within each pair, one district is randomly assigned to treatment, the other to control.

Balance

No significant differences in means: in the stratification variables, and in covariates **not used** in the matching (population, financial inclusion, informality).

Final Sample

After excluding oversized/over-exposed pairs: **187 pairs (374 districts)** with comparable treatment intensity.

The Treatment: Differentiated Advertising Scheme (Mar–Jun 2025)

- ▶ Selected municipalities received a bundle consisting on:

Components

- ▶ One-time bonus of **20 GB** mobile data on enrollment.
- ▶ Weekly raffles with cash prizes (transaction threshold).
- ▶ Targeted social media messaging and printed material.
- ▶ In-person field campaigns: merchant activation, agent training.

Important for identification

The *cashback* on bill payments ran **nationally and uniformly** — it affects treated and control districts equally, so it does not contaminate the experimental design.

Individual Determinants of Active Use

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Objective 1 (Individuals, correlational)

What individual characteristics and perceptions are associated with **active use**? Independent-firm survey of **1,114** BiPay users across the 8 regions (Oct–Nov 2025; 3% margin of error, 95% confidence).

$$\Pr(\text{ActiveCBDC}_i = 1) = F(\alpha + X_i'\beta + G_p'\gamma)$$

X_i : **CentralBank_i** (aware of the BCRP *and* its role in the pilot); age, gender, Bitel customer, banked; employment status; **CBDCKnowledge_i**; **CBDCSatisfaction_i**; **DigitalWallet_i** (uses other wallets).

G_p : province-level % rural, age structure, education.

Interpretation

Convenience sampling and possible endogeneity $\Rightarrow$ we read these as **correlations**, not causal effects.

Results: Determinants of Active Use (Logit)

	(1)	(2)	(3)	(4)	(5)	(6)
CentralBank _i	0.919***	0.842***	0.764***	0.581**	0.526**	0.522**
Age _i	-0.020	-0.050	-0.058	-0.062	-0.069*	-0.069*
Age _i ²	0.000	0.001	0.001*	0.001*	0.001**	0.001**
Male _i	-0.229	-0.213	-0.221	-0.176	-0.189	-0.253
Bitel _i	1.311***	1.384***	1.361***	1.384***	1.367***	1.447***
SelfEmployed _i		-0.498**	-0.453**	-0.505***	-0.468***	-0.414**
Employer _i		0.263	0.288	0.305	0.325	0.248
Unemployed _i		-0.354	-0.286	-0.186	-0.145	-0.104
Banked _i			0.400**		0.294	0.173
CBDCKnowledge _i				0.166***	0.164***	0.163***
CBDCSatisfaction _i				1.110***	1.085***	1.077***
DigitalWallet _i						1.053***
Geographic controls	✓	✓	✓	✓	✓	✓
Observations	1,114	1,114	1,114	1,114	1,114	1,114

*** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$. SE clustered by province. Geographic controls: % rural, provincial age structure, and education.

- **Awareness of the Central Bank's role:** institutional trust.
- **Bitel customer:** consistent with the pilot's design.
- **Self-employed users** are less active — the lack of interoperability makes it harder for them to use it as micro-merchants.
- With **other wallet** use, banking status loses significance: what matters is *digital familiarity*, not the bank account per se.

Magnitudes: Average Marginal Effects

	$\Delta \text{Pr}(\text{active use}), \text{pp}$	
	(1)	(6)
CentralBank _i	+18.5***	+9.3**
Bitel _i	+26.4***	+25.9***
CBDCSatisfaction _i	–	+19.3***
DigitalWallet _i	–	+18.8***
CBDCKnowledge _i (per feature)	–	+2.9***
Banked _i	–	+3.1 (n.s.)

Average marginal effects from the logit. (1): basic specification; (6): full controls. Robust to alternative active-use thresholds, alternative CentralBank definitions, and probit/LPM (see appendix).

- ▶ Awareness of the BCRP's role is associated with **+9 to +19 pp** in active use.
- ▶ Prior wallet experience ($\approx +19$ pp) and satisfaction ($\approx +19$ pp) matter too.
- ▶ Robustness: alternative definitions of active user, Central bank knowledge, excluding some covariates (bitel), alternative methods (probit, LPM), etc.

Takeaway: Institutional trust (BCRP) and perceived security lower barriers where formal financial experience is limited.

Causal Impact of the Advertising Campaign

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Descriptive Trends: The Gap Shows Up in Merchants

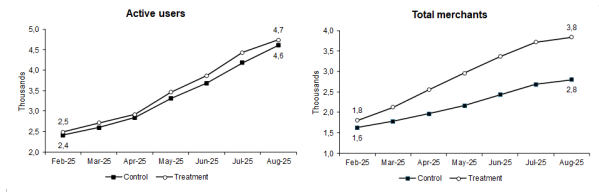


Fig. 13: Active users & merchants, treated vs. control.

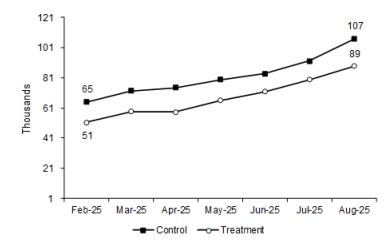


Fig. 14: Transactions, treated vs. control. Source: authors' calculations.

Growth, Feb–Aug 2025 (treated vs. control):

- ▶ Total users: **+76%** vs. **+78%**
 - ▶ Active users: **+90%** vs. **+91%**
 - ▶ Transactions: **+72%** vs. **+66%**
 - ▶ **Merchants: +113% vs. +72%**
-
- ▶ Users and transactions look **similar** across groups.
 - ▶ The visible gap is in **merchants** — the **supply** side of the ecosystem.

First differences with random assignment

$$\Delta Y_d = \alpha_0 + \alpha_1 \text{Treatment}_d + X'_p \alpha_2 + \mu_r + \varepsilon_d$$

- ▶ Outcomes Y_d per capita: total users, active users, bill payments, merchants.
- ▶ X_p : pre-treatment province covariates; μ_r : macro-region FE; SE clustered by province.
- ▶ Because assignment was randomized, α_1 captures the **causal effect**. Our most demanding specification also controls for the pre-trend (Dec. 2024–Feb. 2025).

Reduced Form: Δ Total Users

	(1)	(2)	(3)	(4)	(5)	(6)
Treatment_d	0.914* (0.059)	0.870** (0.050)	0.924 (0.118)	0.802* (0.090)	1.050* (0.064)	0.755* (0.060)
Rural_d		-2.788 (0.482)	-6.212 (0.162)	-5.355 (0.223)	-6.297 (0.138)	-1.076 (0.164)
(log) AdultPop_d			1.988** (0.014)	1.455* (0.061)	1.569** (0.042)	-0.756 (0.210)
(log) BankedPop_p				-8.195 (0.366)	-4.089 (0.410)	-0.930 (0.284)
(log) DigitalWallet_p				2.488 (0.479)	5.523 (0.246)	1.643** (0.045)
(log) CellphonePop_p				-1.913 (0.951)	-8.639 (0.746)	-2.038 (0.686)
Pop18-24_p					5.372 (0.133)	3.830 (0.155)
Pop25-40_p					1.373 (0.747)	1.393 (0.726)
PrimaryEdu_p					4.425 (0.141)	9.836 (0.134)
SecondaryEdu_p					-0.499 (0.870)	-0.978 (0.648)
Pre-trend (Dec-Feb)_d						3.019*** (0.005)
Constant	11.702*** (0.000)	13.725*** (0.001)	-3.056 (0.629)	8.925 (0.381)	20.979 (0.268)	12.689** (0.045)
Observations	374	374	374	374	374	374
R²	0.058	0.069	0.108	0.097	0.141	0.772

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. P-values in parentheses; SE clustered by region.

Reduced Form: Δ Active Users

	(1)	(2)	(3)	(4)	(5)	(6)
Treatment_d	0.028** (0.021)	0.028** (0.018)	0.027** (0.016)	0.028** (0.035)	0.028** (0.019)	0.028** (0.017)
Rural_d		0.013 (0.698)	-0.067 (0.205)	-0.053 (0.289)	-0.061 (0.215)	-0.062 (0.209)
(log) AdultPop_d			0.047** (0.040)	0.048* (0.062)	0.047* (0.067)	0.048* (0.058)
(log) BankedPop_p				0.019 (0.765)	0.037 (0.457)	0.038 (0.441)
(log) DigitalWallet_p				0.018 (0.205)	0.028 (0.157)	0.026 (0.130)
(log) CellphonePop_p				0.321 (0.277)	0.250 (0.342)	0.263 (0.295)
Pop18-24_p					0.103 (0.207)	0.097 (0.233)
Pop25-40_p					-0.074 (0.315)	-0.070 (0.328)
PrimaryEdu_p					-0.022 (0.356)	0.030 (0.274)
SecondaryEdu_p					-0.014 (0.835)	0.004 (0.930)
Pre-trend (Dec-Feb)_d						-0.112 (0.671)
Constant	0.181*** (0.000)	0.172*** (0.000)	-0.081 (0.589)	-0.191 (0.249)	-0.008 (0.968)	-0.014 (0.942)
Observations	374	374	374	374	374	374
R²	0.042	0.042	0.083	0.082	0.091	0.093

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. P-values in parentheses; SE clustered by province.

Reduced Form: Δ Bill Payments

	(1)	(2)	(3)	(4)	(5)	(6)
Treatment_d	0.594* (0.064)	0.599* (0.060)	0.557* (0.097)	0.581* (0.060)	0.594* (0.053)	0.599** (0.017)
Rural_d		0.328 (0.726)	-0.645 (0.525)	-0.521 (0.564)	-0.660 (0.526)	-0.663 (0.525)
(log) AdultPop_d			0.571 (0.129)	0.560 (0.131)	0.522 (0.164)	0.522 (0.168)
(log) BankedPop_p				0.850 (0.703)	2.506 (0.340)	2.499 (0.342)
(log) DigitalWallet_p				-0.144 (0.855)	0.475 (0.714)	0.481 (0.699)
(log) CellphonePop_p				8.639 (0.433)	6.449 (0.563)	6.422 (0.569)
Pop18-24_p					0.777 (0.670)	0.832 (0.665)
Pop25-40_p					-0.001 (1.000)	0.101 (0.951)
PrimaryEdu_p					0.670** (0.040)	2.166 (0.262)
SecondaryEdu_p					2.554 (0.142)	3.535* (0.066)
Pre-trend (Dec-Feb)_d						-0.016 (0.956)
Constant	2.124*** (0.000)	1.887** (0.012)	-1.047 (0.764)	0.850 (0.707)	7.372 (0.360)	7.375 (0.360)
Observations	374	374	374	374	374	374
R²	0.038	0.039	0.050	0.052	0.063	0.063

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. P-values in parentheses; SE clustered by province.

Reduced Form: Δ Merchants

	(1)	(2)	(3)	(4)	(5)
Treatment_d	0.084** (0.011)	0.084*** (0.010)	0.082** (0.015)	0.083** (0.013)	0.083** (0.015)
Rural_d		-0.042 (0.488)	-0.093* (0.094)	-0.086 (0.108)	-0.093* (0.077)
(log) AdultPop_d			0.032*** (0.004)	0.025** (0.014)	0.026** (0.011)
(log) BankedPop_p				-0.034 (0.575)	-0.038 (0.518)
(log) DigitalWallet_p				0.002 (0.942)	0.012 (0.756)
(log) CellphonePop_p				0.185 (0.585)	0.189 (0.545)
Pop18-24_p					0.074 (0.349)
Pop25-40_p					0.020 (0.417)
PrimaryEdu_p					0.022 (0.333)
SecondaryEdu_p					-0.088* (0.098)
Constant	0.156*** (0.000)	0.187*** (0.002)	-0.048 (0.642)	-0.024 (0.817)	-0.035 (0.875)
Observations	374	374	374	374	374
R²	0.163	0.172	0.188	0.195	0.199

*** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$. No pre-trend available for this margin.

Treatment Effects

	Δ Total users	Δ Active users	Δ Bill payments	Δ Merchants
Treatment _d	0.755* (0.060)	0.028** (0.017)	0.599** (0.017)	0.083** (0.015)
Controls + region FE	✓	✓	✓	✓
Pre-trend (Dec–Feb)	✓	✓	✓	n.a.
Observations	374	374	374	374
Effect (per 1,000 adults)	+7.6 users	+0.28 active	+6.0 payments	+0.83 merchants
% of variation explained	≈12%	≈25%	≈25%	>80%

Most demanding specification per outcome (full tables above). Placebo tests on the Dec–Feb pre-period show no significant effect, supporting the design's validity.

Takeaway: The campaign moved all four margins, but its dominant effect was on the **merchant network**: it explains more than 80% of the observed network expansion.

► **Placebo:** Change between December and February. All the coefficients were not significant.



What we already know: the campaign boosted users and usage, but its biggest effect was on merchants in treated regions.



The question that follows: what is the **causal impact** of that merchant growth on CBDC use itself?



We instrument merchant growth using the random assignment of the campaign — an Instrumental Variables (IV) strategy.

Merchant Impact: Δ Active Users (Full Table)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta \text{Merchants}_d$	0.333*** (0.001)	0.338*** (0.001)	0.334*** (0.001)	0.331*** (0.002)	0.340*** (0.001)	0.334*** (0.000)	0.261*** (0.001)
Rural _d		0.027* (0.089)	-0.036 (0.367)	-0.024 (0.529)	-0.030 (0.431)	-0.032 (0.399)	-0.002 (0.944)
(log) AdultPop _d			0.036* (0.036)	0.039* (0.037)	0.039* (0.043)	0.040* (0.035)	0.033* (0.043)
(log) BankedPop _p				0.030 (0.492)	0.050 (0.121)	0.051 (0.105)	0.072*** (0.000)
(log) DigitalWallet _p				0.017 (0.109)	0.024* (0.080)	0.020 (0.108)	-0.011 (0.601)
(log) CellphonePop _p				0.259 (0.186)	0.186 (0.312)	0.209 (0.247)	0.274 (0.127)
Pop18-24 _p					0.079 (0.297)	0.075 (0.331)	0.072 (0.328)
Pop25-40 _p					-0.081 (0.163)	-0.078 (0.167)	-0.077 (0.186)
PrimaryEdu _p					-0.029 (0.172)	0.020* (0.051)	0.019* (0.054)
SecondaryEdu _p					0.015 (0.771)	0.038 (0.306)	0.038 (0.317)
Pre-trend (Dec-Feb) _d						-0.184 (0.376)	-0.201* (0.088)
Δ TotalUsers (Feb-Aug) _d							0.006*** (0.000)
Constant	0.129*** (0.000)	0.108*** (0.000)	-0.065 (0.609)	-0.182 (0.136)	0.004 (0.975)	-0.007 (0.960)	-0.131 (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
First-stage F	11.7	12.0	10.3	11.0	10.3	11.5	8.9

Merchant Impact: Δ Bill Payments (Full Table)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta \widehat{\text{Merchants}}_d$	7.031** (0.039)	7.150** (0.041)	6.778* (0.051)	6.979** (0.031)	7.148** (0.022)	7.166*** (0.003)	6.338** (0.013)
Rural _d		0.627 (0.311)	-0.018 (0.981)	0.081 (0.907)	0.005 (0.995)	0.005 (0.995)	0.824* (0.050)
(log) AdultPop _d			0.356 (0.359)	0.389 (0.235)	0.338 (0.306)	0.337 (0.283)	0.125 (0.676)
(log) BankedPop _p				1.079 (0.555)	2.780 (0.167)	2.779 (0.167)	3.242** (0.042)
(log) DigitalWallet _p				-0.158 (0.770)	0.392 (0.672)	0.394 (0.649)	-0.328 (0.664)
(log) CellphonePop _p				7.388 (0.402)	5.098 (0.561)	5.087 (0.569)	6.070 (0.478)
Pop18-24 _p					0.259 (0.882)	0.367 (0.840)	0.370 (0.849)
Pop25-40 _p					-0.143 (0.923)	-0.070 (0.963)	-0.071 (0.962)
PrimaryEdu _p					0.514*** (0.002)	1.940 (0.118)	1.942* (0.099)
SecondaryEdu _p					3.169*** (0.002)	4.253*** (0.000)	4.250*** (0.000)
Pre-trend (Dec-Feb) _d						-0.005 (0.985)	-0.289 (0.349)
Δ TotalUsers (Feb-Aug) _d							0.152** (0.002)
Constant	1.025 (0.129)	0.552 (0.476)	-0.723 (0.813)	1.021 (0.610)	7.620 (0.181)	7.622 (0.177)	4.463 (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
First-stage F	11.7	12.0	10.3	11.0	10.3	9.0	7.8

IV Results: Merchants Drive Active Use

	Δ Bill payments	Δ Active users
$\Delta \widehat{\text{Merchants}}_d$	6.338** (0.013)	0.261*** (0.001)
Controls + region FE	✓	✓
Pre-trend (Dec–Feb)	✓	✓
Δ Total users	✓	✓
Observations	374	374
First-stage F	7.8	8.9

Most demanding specification (full tables above). Coefficients stable across all 7 specifications; SE clustered by province.

Result

+1 merchant per 1,000 adults $\Rightarrow$

- ▶ **+6.3** bill payments per 1,000 adults,
- ▶ **+2.6 bps** in the active-user share.

$\approx \frac{1}{4}$ of the total increase observed Feb–Aug in both cases.

Takeaway: Merchants are the mechanism: a bigger acceptance network is what sustains active use.

Policy Implications and Conclusions

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1. Communicate the backing (who's behind it)

- ▶ Only **24%** know the BCRP is behind it — knowing this builds trust.
- ▶ Fix: promote it via app notifications, social media, and make more visible the offline feature.

2. Turn on interoperability

- ▶ **90%** of users want it — today it's mostly used for bill payments.
- ▶ Without it, P2P/P2B lags and self-employed users are left behind.

3. Grow both sides together

- ▶ Campaigns that target users work best when paired with campaigns that bring in merchants.
- ▶ Simplify merchant sign-up. Incentives.

1. One of the first pieces of **quasi-experimental** evidence on a retail CBDC in an emerging economy with low financial inclusion.
2. Individually, **trust and institutional awareness**, digital familiarity, and satisfaction are the central determinants of active use.
3. At the aggregate level, differentiated advertising had positive causal effects on users, active use, and, most strongly, on the **merchant network**.
4. The IV analysis identifies **merchant expansion as the mechanism**: it converts initial adoption into sustained use ($\approx \frac{1}{4}$ of the increase in activity).
5. For a CBDC to become a **regularly used means of payment**: a broad acceptance network, well-targeted incentives, clear communication of the central bank's backing, and **interoperability**.

Thank you!

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Appendix

Sample details, robustness, and next steps

A1. Survey Composition

Region	Universe	Sample	Margin of error
Cajamarca	207,607	229	±6.9%
Puno	199,150	202	±6.9%
San Martín	132,930	150	±8.0%
Huánuco	131,314	150	±8.0%
Ayacucho	88,179	101	±9.8%
Apurímac	74,693	100	±9.8%
Ucayali	63,037	100	±9.8%
Madre de Dios	31,909	82	±9.8%
Total	928,819	1,114	±3.0%

- ▶ Non-probability convenience sampling (remote) + multi-stage probability sampling (in-person).
- ▶ CBDC user profile vs. regional adult population: more urban (75% vs. 61%), younger (82% ≤42 years vs. 57%), more male (67% vs. 52%), higher tertiary education (49% vs. 16%).
- ▶ 68% banked; 69% own a smartphone; 87% have mobile internet; 91% are Bitel customers.

A2. Logit Robustness: Alternative Definitions

	Active every 15 days		CentralBank = pilot only	
	(1)	(6)	(1)	(6)
CentralBank _i	1.043*** (0.000)	0.737*** (0.000)	0.669*** (0.000)	0.379* (0.054)
Bitel _i	0.373	0.445	1.243***	1.410***
DigitalWallet _i		0.712***		1.070***
Observations	1,114	1,114	1,114	1,114

- ▶ With the “every 15 days” definition, CentralBank’s marginal effects rise to +15/+23 pp.
- ▶ Probit and linear probability model estimates are qualitatively identical.

P-values in parentheses; SE clustered by province.

A3. Next Steps

- ▶ **Extend the panel.** A second survey wave, planned for 2026, will let us test whether the individual-level effects — and the merchant-driven mechanism — persist beyond the six-month window studied here.
- ▶ **Map the network.** Visualize the merchant-user acceptance network directly — geographic density of merchants, distance-to-nearest-merchant — rather than inferring the network's role only through district aggregates.
- ▶ **Simulate scale-up.** Complement the causal estimates with agent-based simulation of network growth under alternative interoperability and holding-limit scenarios — a natural extension for collaboration with payment-systems modeling teams.
- ▶ **Track financial-stability margins.** As adoption scales, monitor deposit substitution and holding concentration directly, moving beyond the current pilot's negligible-scale argument.
- ▶ **Follow the interoperability roadmap.** Once interoperability with fast payment systems is enabled, re-run this identification strategy to test whether the merchant-network mechanism still dominates.