Public Demand and Financial Implications for Retail CBDC: A Randomized Survey Experiment*

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December 7, 2025

Abstract

This study investigates the public demand for retail Central Bank Digital Currency (CBDC) and its implications for financial intermediation by focusing on its potential substitution effects on existing digital payment methods and viability as a store of value. Using an information-provision survey experiment, we analyze public responses to technically various CBDC issuance types, including online and offline applications and a physical card type, with and without interest payments. The survey experiment finds that, while CBDC design features do not significantly influence its demand as a payment method, offering positive interest payments can enhance its appeal as a store of value. Moreover, it indicates that payment practices and trust in central banks would have a greater impact on demand for CBDC than its technical design features.

JEL Classification: E41, E58, G11

Keywords: CBDC, Privacy, Demand for CBDC, Issuance Type, Survey Experiment

*The authors are grateful to Hwan Koo Kang, Hosung Jung, Dongseop Kim, Indo Hwang, Yongmin Park, Jihyun Kim, Jangyoun Lee, Jiwon Lee, and Jusung Lee for useful comments and suggestions, as well as participants at the forum at Seoul National University Institute for Research in Finance and Economics, the BK21 Seminar at Sungkyunkwan University (2023), and the BOK Interim Seminar (2023). This study is supported by the Bank of Korea. The authors received the IRB approval from Sungkyunkwan University (IRB No.2023-05-034). Kwon was supported by a Korea University Grant (K2527171). The views expressed in this paper are those of the authors and may not necessarily reflect the official views of the Bank of Korea. All errors are our own. All authors contributed equally to this paper.

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1 Introduction

Over recent years, a large number of central banks around the world have been engaged in Central Bank Digital Currency (henceforth, CBDC) works such as research and pilot tests.[1] According to Iorio et al. (2024), 94% of 86 central banks that responded to the survey on CBDCs and Crypto are working on CBDC projects as of late 2023.[2] A few countries, such as the Bahamas and Nigeria, have adopted CBDCs, and in their cases, the primary objective is to focus on financial inclusion to improve accessibility to financial markets and digital payment methods for the unbanked and underbanked population due to the underdeveloped financial infrastructure.

CBDCs are categorized into two types as a digital form of cash: retail and wholesale, depending on their target users. A wholesale CBDC is primarily intended for use by financial institutions, central banks, and other large-scale entities involved in financial markets. It is used for interbank settlements, payment and settlement systems, and the management of financial assets. On the other hand, a retail CBDC is designed for use by the general public. It operates as a digital version of cash and can be used for various transactions, including everyday purchases and online payments. In particular, a retail CBDC could have a significant impact on the overall financial market and payment systems since it is used by all economic agents within an economy. Above all, it can potentially weaken the financial intermediation and payment services functions of existing financial institutions by excessively replacing financial assets and payment methods, such as bank deposits. Moreover, this could limit the transmission channels of monetary policy and render the receiving end of financial institutions vulnerable, potentially leading to a weakening of the effectiveness of monetary policy, financial instability, and a decline in real activities[3] (Williamson, 2022; Davoodalhosseini, 2022; Niepelt, 2020; Assenmacher et al., 2024). Therefore, if considering

[1] For instance, ECB announced, "After two years, the Governing Council will decide whether to move to the next stage of preparations, to pave the way for the possible future issuance and roll-out of a digital euro." on October 18th, 2023 (Source: Reuters, Last access on Dec. 21, 2024). South Korea will launch a central bank digital currency (CBDC) pilot program involving 100,000 citizens, jointly managed by the Bank of Korea (BOK), the Financial Services Commission (FSC), and the Financial Supervisory Service (FSS) in the fourth quarter of next year, as announced on November 23rd, 2023 (Source: ECB Press Release, and Korea Times. Last access on December 21, 2024).

[2] According to the annual BIS survey report (Iorio et al., 2024), the share of central banks engaged in CBDC works has been monotonically increasing from about 65% in 2017 to 94% in 2023.

[3] As regards this issue, Fabio Panetta, Member of the Executive Board of the ECB, at the Committee on Economic and Monetary Affairs of the European Parliament expressed concerns that a Digital Euro is "too successful" and thus it can potentially crowd out private payment solutions and disturb financial intermediation in his speech on March 2022.

the issuance of retail CBDC, it is essential to conduct research on public demand for CBDC and the substitution effects of CBDC. However, our understanding of the demand for retail CBDCs and how responses of financial intermediaries such as banks to CBDCs affect the CBDC demand is still limited.

This study investigates the public demand for a retail CBDC across issuance types distinguished by whether they offer additional offline functionality: an online app, an online app with an offline app, and an online app with an offline app and a physical card.[4] The types determine the level of privacy protection, which has been discussed in existing literature as likely to significantly influence the demand for CBDC (Choi et al., 2025; Ahnert et al., 2022; Agur et al., 2022).[5] In addition, we consider cases where central banks pay positive interest on a CBDC in order to examine the demand for a CBDC as not only a medium of exchange (henceforth, MOE) but also a store of value (henceforth, SOV). More specifically, the questions that this study aims to address are the following. When introducing a retail CBDC, to what extent will the currently used digital payment methods such as bank deposits and credit cards be substituted with a CBDC? How will its issuance type, i.e., the level of privacy protection, influence the substitution effects of such a retail CBDC? Will interest payments on CBDC affect its demand? How will additional income affect liquid asset portfolios, including retail CBDC, and will they vary by issuance format? Furthermore, will societal factors such as public trust in the central bank, educational level, and gender influence the demand for CBDC?

We design an information-provision survey to answer those questions as follows. The survey considers technical issuance types with the main characteristics, such as on/offline use with/without transaction privacy protection and interest payments. Specifically, survey participants are randomly divided into one of five subgroups, and we introduce one of five different issuance types of CBDC to each subgroup to analyze the treatment effects across CBDC design types. The first type is an online mobile app-based CBDC, which can be built on mobile devices such as smartphones; the second is an online and offline mobile app-based CBDC; the third is an on/offline app-based CBDC and an offline physical form of CBDC storing card; the fourth is an online mobile app-based CBDC with positive interest; and the fifth

[4]Throughout this paper, we succinctly refer to an information transmission technology that uses the Internet as 'online' and a technology that uses Near Field Communication (NFC) as 'offline.' For instance, an offline card refers to a physical card that operates via NFC.

[5]The provision of transaction privacy has long been acknowledged as one of the key functions of money. Among others, Kahn et al. (2005) emphasize that money provides anonymity in purchases, which credit-based transactions cannot match. This underscores why privacy considerations are pivotal in determining public preferences for CBDC designs.

is an on/offline app-based CBDC with positive interest and an offline physical form of CBDC storing card. What is noteworthy in CBDC types is that online mobile app-based CBDC is relatively inferior to offline mobile app-based CBDC and CBDC storing cards in terms of transaction privacy protection because detailed information about CBDC transactions is recorded in digital ledgers through Internet connections, but online CBDC is still superior to payment methods issued by commercial banks and private firms in the sense that the central bank does not use the transaction data for commercial use. The different types of CBDC discretely determine the relative level of privacy protection. Then the survey participants answer how much they are willing to substitute payment methods and liquid assets into CBDC, and how much the commercial banks and mobile pay service providers should provide additional benefits for using their payment methods to offset the substitution effects of the CBDC. Lastly, they are asked to report information on other individual characteristics that will be used as control variables.

The survey results show several novel findings. First, the overall frequency of CBDC usage as a payment method turns out to be 21.8%. This is similar to those of credit cards (21.7%) and mobile payment service apps (21.4%). The largest decrease (8.2%p) after the CBDC adoption is observed in the frequency of debit card usage. This would result from the facts that debit cards are relatively inferior to credit cards and mobile payment service apps in terms of convenience and benefits such as discounts and point accumulation, and that they play the most similar role as cash in transactions, compared with the others. Second, the specific design features of CBDCs do not significantly influence the demand for CBDC as a payment method overall. This may be due to respondents limited concerns about transaction privacy and their relatively low perceived need for offline functionality. Indeed, our survey shows that relatively few individuals use physical cash primarily for privacy protection, and awareness of offline functionalitynamely, the importance of cashs independence from technologyremains low. Furthermore, this finding could be closely tied to the strong trust in the central bank and government, which reduces the impact of different CBDC types on demand, because, regardless of their design features, all CBDCs are ultimately issued by the central bank. Third, although overall CBDC demand as a payment method appears insensitive to design features, the physical card-type offline CBDC—which enhances privacy protection—significantly decreases carrying cash in respondents' liquid asset portfolios, including precautionary cash holdings, demand deposits, and savings deposits, by approximately 6 to 7 percentage points.[6] On balance, evidence on privacy protec-

[6]However, the design features of CBDC do not significantly affect the other assets in the portfolio.

tion design is mixed, as it affects cash substitution but not overall payment choice. Lastly, the portfolio choice for the newly endowed income is affected by interest payments. Offering positive interest rates on CBDC holdings increases the overall demand for CBDC. This suggests that survey participants might view the CBDC as an alternative store of value rather than a payment method in this scenario.

Based on our survey results, we discuss several policy implications. Setting an appropriate holding limit such as EUR 3,000—approximately equivalent to KRW 4,250,000—can be beneficial, as it can prevent excessive substitution away from bank deposits, while still allowing users to benefit from CBDC holdings. At the same time, the demand for CBDC is strongly influenced by individuals' willingness to adopt new technologies and their trust in the central bank, suggesting that effective communication and trust-building will be as important as technical design choices in shaping adoption. Finally, the results indicate that some individuals exhibit a persistent preference for CBDC that is not easily altered by financial incentives from banks or payment service providers. Taken together, these findings underscore the importance of a policy framework that balances innovation with the stability of the financial system.

1.1 Related Literature

A growing strand of research examines the determinants of demand for CBDCs and their implications for financial intermediation, welfare, and monetary policy. However, three critical gaps persist in this literature. First, there is limited synthesis between survey-based analyses of payment choice and behavioral models of stated versus revealed preferences. Second, the methodological rigor in survey experiment designincluding information treatments, bias checks, and statistical poweris underexplored. Third, the economics of privacy and anonymity in CBDCs remains conceptually discussed but rarely integrated into empirical demand estimation. This study directly addresses these gaps by experimentally varying information on CBDC design attributes (anonymity, offline use, and transaction cost) and evaluating their marginal effects on respondents' stated preferences.

Previous empirical works highlight the complexity of CBDC adoption decisions. For instance, discrete choice experiments such as Choi et al. (2023) show that respondents preferences depend on payment attributes like convenience and cost, while Fujiki (2023) and Huynh et al. (2020) report that transaction speed and usability significantly shape adoption likelihood. Related Canadian evidence in Li (2023) and structural simulations by Gross and Letizia (2023) confirm that even a well-designed CBDC cannot fully substitute existing pay-

ment instruments unless it outperforms them on accessibility and perceived security. In addition, Ozili and Alonso (2024) shows that negative media sentiment toward CBDCs reflects pre-existing negative attitudes toward CBDCs in general, suggesting that public perception and media narratives can be significant barriers to CBDC adoption. Auer et al. (2023) surveys global central bank digital currency (CBDC) initiatives, showing that their design and adoption are shaped by local economic, technological, and financial conditions, while sharing common featurescomplementing rather than replacing cash, involving intermediaries, and increasingly considering cross-border paymentswith central banks learning from each other to ensure inclusive, resilient, and future-ready digital payment systems. These findings reinforce the necessity of distinguishing stated preferencesbased on hypothetical designsfrom revealed preferences inferred from actual payment behavior. Our study contributes by calibrating stated preferences with enhanced respondent comprehension and contextualized CBDC scenarios, addressing validity concerns that prior surveys try to mitigate.

The recent literature also emphasizes survey experimental design as a methodological frontier in CBDC research. Most prior studies present limited manipulation of information content, risking framing bias and low internal validity. In contrast, Náñez Alonso et al. (2025) demonstrate the usefulness of synthetic experimental responses to model acceptance rates under varying artificial intelligence (AI)-generated conditions, suggesting that systematic design variation can substantially improve empirical power. Adopting a similar perspective, we provide structured treatments to test how informational cuessuch as explanations of digital payments or privacy assurancesalter adoption intentions.

The third body of literature focuses on the economics of privacy and its trade-offs in digital payments. Ozili (2023) discusses how privacy regulation, fintech expansion, and digital inclusion jointly shape CBDC acceptance. Náñez Alonso et al. (2021) further identifies country-level conditions under which CBDC design can optimize innovation and payment infrastructure openness. Fairweather et al. (2024) conducted a choice experiment and found that, while Australian consumers value transaction privacy, they are more willing to share their transaction data with the RBA rather than a commercial bank. Choi et al. (2025) similarly conducted a randomized survey experiment with Korean participants and found that both a higher degree of privacy protection and providing information on its privacy benefits significantly increase the public's willingness to use CBDC for privacy-sensitive purchases. Despite the growing interest, few studies empirically test whether individuals privacy attitudes translate into measurable changes in CBDC demandan omission this study explicitly addresses through targeted information framing.

Model-based analyses extend these micro-level findings to macroeconomic implications. Auer et al. (2025) and Tercero-Lucas (2023) highlight that introducing CBDCs may affect bank intermediation and financial stability depending on the strength of substitution between deposits and CBDCs. Similarly, the DSGE models of Barrdear and Kumhof (2022) and search-theoretic frameworks by Lee (2023), Davoodalhosseini (2022) and Keister and Sanches (2022) show that CBDCs can enhance monetary policy effectiveness if designed with appropriate interest features, including the potential currency substitution impacts in steady states.

The remainder of the paper is organized as follows. Section 2 describes how we designed and conducted the experimental survey. Section 3 presents the survey results to analyze the average treatment effects on demand for CBDC. In addition, we discuss the effects of limiting CBDC holdings and the average effects of socioeconomic variables such as gender and age in Section 4. Lastly, we conclude in Section 5.

2 Experimental Design

To examine how the introduction of a retail CBDC with different types and features would affect public choices of media of exchange and stores of values, we conduct the information-provision experiment in a survey form. Information-provision experiments aim to examine the treatment effects of the different information sets provided in the course of a survey, given that the survey samples are randomly drawn from the same population distribution. The literature using information-provision experiments has been fast emerging in economics, with applications in macroeconomics, finance, political economy, public economics, labor economics, and health economics (Haaland et al., 2023).

The information-provision experiment is best suited to address our research questions at least for two reasons. First, a retail CBDC has not been introduced to Korea, but the infrastructure for the introduction is well-developed. For example, the Internet penetration rate is 97.6% as of October 2023[7] and a total of 64.19 million cellular mobile connections were active in early 2023, with this figure equivalent to 123.9% of the total population.[8] Thus, the responses to the provided information are less likely to be affected by the survey

[7]DataReportal, und We Are Social, und Meltwater. "Countries with the highest internet penetration rate as of October 2023." Chart. October 19, 2023. Statista. Accessed November 14, 2023. https://www.statista.com/statistics/227082/countries-with-the-highest-internet-penetration-rate/

[8]DataReportal, und We Are Social, und Meltwater. "Digital 2023: South Korea" retrieved from https://datareportal.com/reports/digital-2023-south-korea on November 14, 2023.

respondents' subjective belief about the infrastructure enabling the presented digital form. Second, although many central banks have discussed many features and types of retail CBDCs, no known type is considered to be a "default," so the information can be provided without filtering survey respondents' subjective beliefs about what a retail CBDC ought to be. These two reasons make the interpretation of the treatment effects free from the concerns of compounding factors.

Beginning with a screening module on respondent characteristics, the whole survey consists of nine modules, including a module asking to recall the current use of payment methods and allocation of cash and cash-like products, and another module asking to anticipate the expected use of payment methods and allocation of cash and cash-like products. Our main treatment is to introduce a retail CBDC with different forms and features between such two modules. Figure 1 shows how the survey experiment is conducted. Upon participating in the survey, survey respondents answer their demographic characteristics in Module SQ so that each group is equally representative of the entire survey population in terms of gender, age, region of residence, and education attainment. Next, without knowing which type of information will be given, the respondents report the current ways of using various payment methods in Module A,[9] including cash, debit cards, credit cards, and mobile payment services[10], and the current ways of holding current liquid assets and hypothetically endowed liquid assets.

Then, the survey participants are randomly split into one of the five subgroups, and participants in each group receive information about a retail CBDC with different forms and features. Specifically, Group 1 participants were informed that the central bank considers introducing a retail CBDC, and its form will be a mobile application, a so-called 'online digital wallet' on mobile phones, working through the connection to the Internet. In addition, the following information is provided graphically: Users can pay and send money via this mobile application for transactions at online and offline stores. They are told that since the central bank issues the CBDC, there is no default risk, and the likelihood of using the transaction and transfer records for commercial use is low. Group 2 participants were informed that the retail CBDC will have two types of mobile applications or digital wallets, which

[9]The (translated version of the) questionnaire is, "Which payment methods do you use in your household to make purchases? Please answer in 1% units for each entity so that the total sums to 100% of your spending."

[10]Bank transfers, prepaid cards, and gift cards are collectively grouped as "other payment methods," which account for only a small fraction of the entire transactions. According to the Bank of Korea report "Survey results on the usage of payment methods and mobile financial services in 2021", only 7.9% of the entire transactions in 2021 were made by these other methods. In our survey, the other payment methods account for 10% of the transactions.

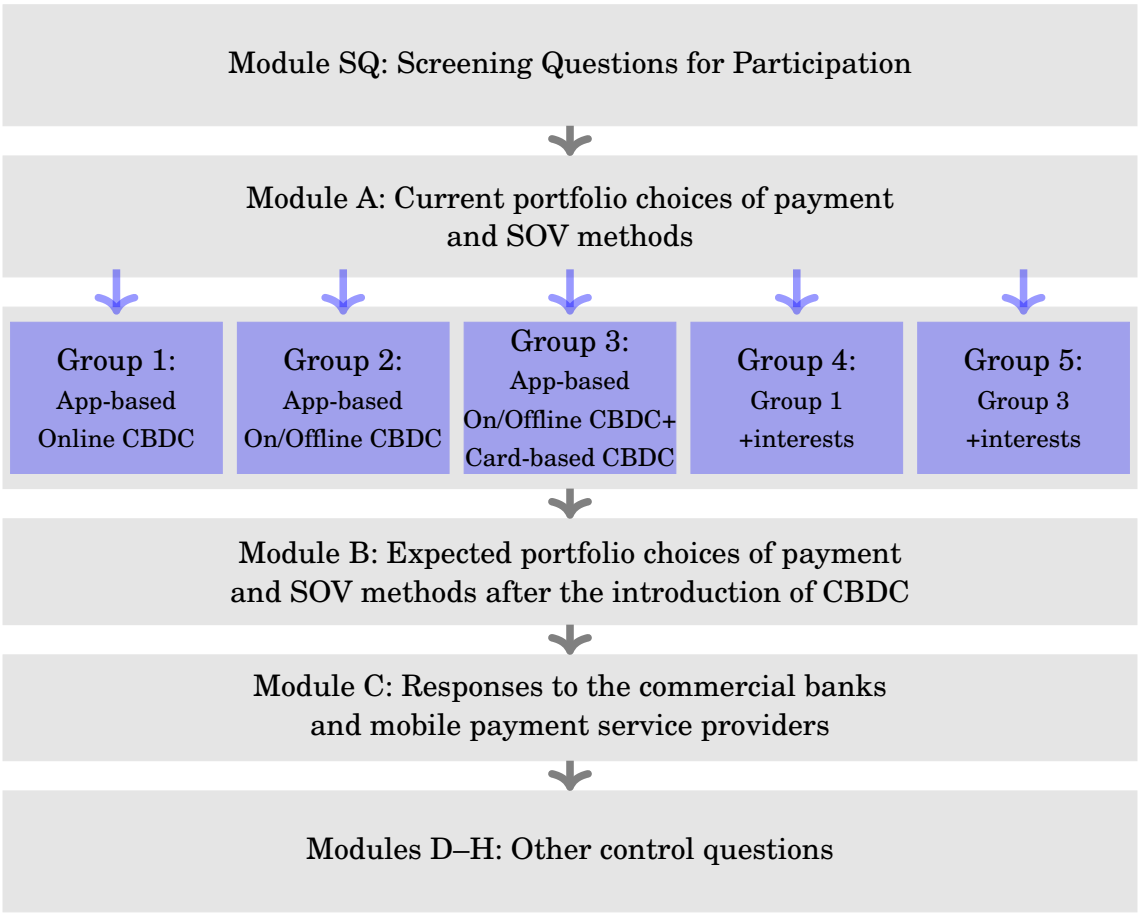


Figure 1: Experimental Design

work with the connection to the Internet and without the connection using the Near Field Communication (NFC) method, respectively. Furthermore, more details are explained as follows: a separate digital wallet for offline transactions, a so-called 'offline digital wallet,' will be provided and can be used without an Internet connection. This offline functionality protects the transaction privacy of its users because no information about transactions is recorded at all, and makes the CBDC closer to cash as both can be used without an Internet connection. CBDC users can transfer their balances between online and offline digital wallets without incurring fees. Therefore, they can choose either type of wallet for transactions, depending on their preferences or the value they place on transaction privacy. For Group 3 participants, it was graphically shown that online and offline digital wallets will be available for a retail CBDC, as introduced in Group 2, and additionally, a physical card-like form will be provided. They were also informed that a card similar to a typical prepaid card, the so-called 'CBDC card' that can store CBDC balances, would be offered. Payments and money transfers can be made using the NFC method, even directly between CBDC cards. The CBDC card protects transaction privacy in a similar way to offline digital wallets and does not need mobile devices. It is noteworthy that the CBDC issuance type introduced to Group 2 would be more preferred to Group 1 if participants care for protecting transaction privacy, and the CBDC introduced to Group 3 would be more preferred to Group 2 if participants were concerned about technology independence. Carrying the CBDC card provides an essentially similar experience of using cash for transactions and transfers because neither require additional devices nor need an Internet connection.

Groups 4 and 5 participants were given the same information as Groups 1 and 3,[11] respectively, but the only difference is that the balance in their online CBDC accounts is eligible to receive 0.6% to 0.7% of an interest. We set the rate to be similar to the commercial banks' average deposit interest rates as of Feb 2023.[12] The CBDC interest rate was aligned to provide respondents with a realistic and policy-consistent reference point, rather than to test alternative rate scenarios.[13] Figure 2 presents a screenshot of sample graphics shown

[11] We did not consider adding interests to the features introduced to Group 2 because the treatment effect to such a group, say, Group 2', can be interpolated by treatment effects from other groups jointly. If there were noticeable differences between Groups 1 and 2, then the differences can be understood as the treatment effect solely driven by the app-based offline CBDC. Hence, given that giving interests does not alter the effect of the app-based offline CBDC, the difference between Group 2 and Group 2' would be the average differences between Groups 1 and 4, and Groups 3 and 5.

[12] Source: *Weighted-average interest rates of financial institutions, February 2023*, Press release of the Bank of Korea. Reported on March 31, 2023.

[13] As an indirect complement, Section 4.3 reports respondents' views on how much additional benefit commercial banks would need to offer to maintain their deposits.

to respondents in Group 3. The corresponding screenshots for each subgroup are in the Appendix.

Figure 2: Group 3 (App+Card-Based Online+Offline CBDC)

Given the technical nature of the information provided, we verified respondents' comprehension using three quiz questions: one specific to each treatment and two common across all treatments. The overall accuracy rates were high (at least 70.7% for each question), and there were no notable differences across groups. For respondents who answered incorrectly, the survey interface displayed feedback indicating the incorrect choice and offered a detailed explanation. Therefore, we are confident that the results reported here are not driven by miscomprehension of the provided information.

In Module B, the respondents report ways of using a specific type of CBDC as well as several payment methods shown in Module A with knowing which type of CBDC will be

available. When they answer their choice of payment methods and liquid asset portfolio, the answers that they reported in Module A are shown with the questionnaire.

For the remainder, the survey participants in all groups respond to the identical questionnaire. In Module C, the survey participants answer how much the commercial banks and mobile payment service providers should offer additional benefits of using their payment methods to offset the effect of the CBDC introduction. For example, when survey participants answered in Module B that they would reduce the usage of mobile payment services for using CBDC, we ask them to choose the minimum additional benefits that they are willing to revert the usage of mobile payment services. The remaining modules (D to H) collect information on other individual characteristics that might be used as control variables. For instance, the participants are asked to report their overall willingness to accept new technology-based services, recent changes to the use of services provided by commercial banks, concerns for privacy, trust toward the central bank, government institutions and policies, and other preferences such as risk preferences and time preferences.

2.1 Experimental Procedure

In October 2023, we conducted an online survey via Hankook Research, a survey company, using a nationally representative sample of 2,879 participants born in South Korea and aged at least 19 years. Each participant received the participation fee of KRW 2,000 (USD 1.51, as of November 14, 2023) upon completing the survey. The full survey questionnaire written in Korean and its English translation are available in Online Appendix. Table 1 shows that our samples are reasonably representative of the South Korean population.[14]

3 Average Treatment Effects on Demand for CBDC

We employ the following regression specification to estimate the impact of treatments regarding offline functionality and remuneration scheme on demand for CBDC as a payment method or a liquid asset:

$$Y_i = \beta_0 + \sum_{k=1}^{K} \beta_k T_i^k + \gamma X_i + \epsilon_i \tag{1}$$

[14]Balance check results among treatment groups are presented in Appendix Table A.1, and no statistically significant differences were found in gender, age, education, trust in the BOK, and attitudes toward new mobile applications and technology.

Table 1: Sample Characteristics

	This Survey	South Korea population
Female	0.50	0.50
Age		
19–29	0.15	0.15
30–39	0.15	0.16
40–49	0.18	0.19
50–59	0.20	0.20
60 or above	0.32	0.31
Living in Seoul	0.19	0.18
Marital Status	0.61	0.60
College Degree	0.49	0.47
Employment		
Employed	0.51	0.40
Self-employed	0.12	0.15
Not-employed	0.37	0.45

Notes: This table displays statistics for the overall South Korea population and compares it to the characteristics of the sample of surveys. National statics on gender, age, and place of residence are from the South Korea Demographic Statistics, December 2022. Marital status, and education levels are from the South Korea Population Census 2015, and employment data is from the 2019 Korea Labor Income Panel Study.

where Y_i represents the outcome variable of interest for individual i. In the right-hand side of the equation T_i^k is a binary indicator of the treatment group $k = 1,2,...,K$, where K denotes the number of treatment groups (that is, alternative CBDC design scenarios), excluding the control group. We consider a control vector X_i that includes individual socioeconomic characteristics such as gender, age, living region, education level, and household income and wealth. The control vector also includes variables such as technology acceptance attitudes, privacy knowledge and attitude, trust in commercial banks and the Bank of Korea, political tendency, and attitude toward public policies.

3.1 Demand for CBDC as a Payment Method: Use Frequency

In this section, we focus on how the introduction of a retail CBDC changes the choice frequencies of different payment methods.

Figure 3 shows the flows from the current usage rates of payment methods (on the left end) to the anticipated usage rates of payment methods, including the retail CBDC (on the right end). As of October 2023, cash is used as a payment method in 11.0% of the total retail transactions and personal transfers, and debit cards are used in 25.2%. Also, credit cards are used in 29.3% and mobile apps are used in 24.6%. The total sum of percentage is not 100% because we exclude "other payment methods," which account for about 9.96% of the payments.[15] The thickness of each flow intuitively shows to what extent demand for CBDC substitutes each existing payment method. For example, a thick flow from debit cards to CBDC indicates that, on average, the introduction of CBDC replaces the use of debit cards by 8.2 percentage points. Overall, survey participants respond that for 21.8% of all typical situations involving retail transactions and personal transfers, they would demand CBDC as a payment method. The introduction of CBDC decreases the usage of debit and credit cards while the usage of cash and mobile payment services is less affected.

The similar Sankey diagrams for each survey subgroup are relegated into the Appendix. Survey participants respond that they would demand CBDC as a payment method for 22.0–22.9% of retail transactions and personal transfers. The highest and second highest ratio is observed in Groups 3 (22.9%) and 5 (22.7%), respectively, where CBDC provides offline functionality services. On the other hand, the lowest ratio is in Group 1 (20.0%), where CBDC provides only online services. In a similar pattern, the ratios of debit and credit

[15] We exclude the other payment methods for the figure because "other methods" are not clearly specified, so the interpretation of them is unclear. Including it does not add any further insights about the changes in payment methods.

cards decrease more than mobile payment service apps and cash in Groups 3 and 5.

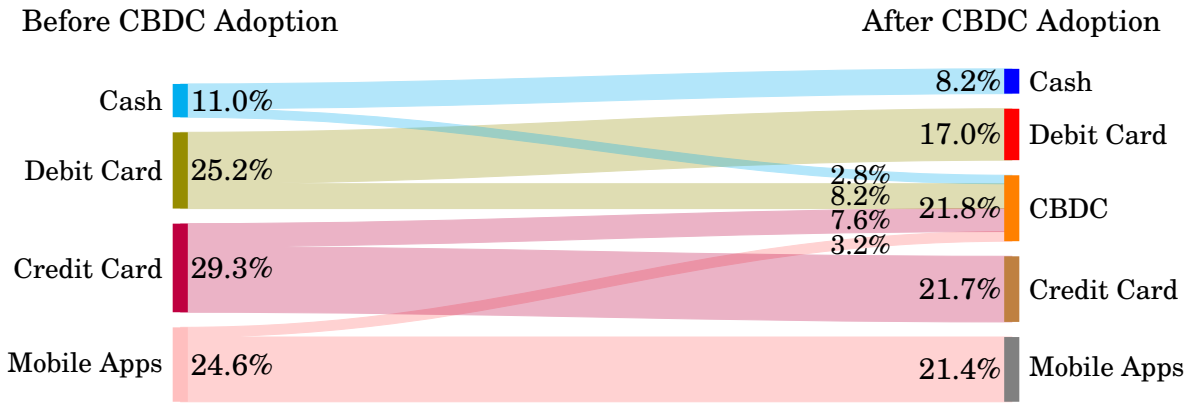


Figure 3: Sankey Diagram for Payment Methods Portfolio, All

To estimate the treatment effects on the demand for CBDC with different forms and features as a payment method, we regress each flow from the existing payments method to CBDC on the treatment dummies and control variables. Table 2 shows regression results of how much the usage of each payment method decreases after the introduction of CBDC.

First, Models (1) to (4) show regression results of how much the usage of cash or debit cards as a payment method decreases after the introduction of CBDC. Compared to the baseline Group 1, there are no significant treatment effects in the usage of cash and debit cards. However, in Models (3) and (4), we could find a minor, but consistent tendency that the introduction of card-type offline CBDC (in Groups 3 and 5) increases the outflow from debit cards to CBDC. This result would suggest that consumers consider the card-type CBDC as an alternative to physical forms of debit cards.

Models (5) and (6) show regression results of how much the usage of credit cards decreases if CBDC is introduced. Compared to the baseline Group 1, survey participants in Group 3 significantly respond more to use CBDC. They seem to see the card-type offline CBDC as an alternative to physical forms of credit cards. However, such a significant treatment effect is not observed in Group 5, where the card-type offline CBDC is available, and interests can also be paid on CBDC. Interest rates could reinforce the perception of CBDC as a store of value (henceforth, SOV) method rather than a payment method, thereby nullifying the treatment effect to some extent. We revisit this claim when investigating changes of SOV portfolios.

In Models (7) and (8) in Table 2, the regression results do not present any significant treatment effects on the usage of mobile applications as a payment method, compared to

Table 2: Demand for CBDC: Changes in Use Frequency

	Cash to CBDC		Debit Card to CBDC		Credit Card to CBDC		Mobile Apps. to CBDC	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Group 2	0.521	0.475	1.350	1.304	2.040	1.992	-1.861	-1.875
	(0.85)	(0.78)	(1.05)	(1.01)	(1.45)	(1.44)	(-1.45)	(-1.45)
Group 3	-0.223	-0.239	1.792	1.740	3.300*	3.471*	-1.972	-1.675
	(-0.32)	(-0.34)	(1.41)	(1.37)	(2.37)	(2.51)	(-1.52)	(-1.31)
Group 4	0.876	0.882	-0.149	-0.274	0.725	0.749	0.036	0.063
	(1.30)	(1.29)	(-0.12)	(-0.21)	(0.52)	(0.54)	(0.03)	(0.05)
Group 5	0.283	0.230	1.969	1.927	0.124	0.155	0.304	0.414
	(0.45)	(0.37)	(1.49)	(1.45)	(0.09)	(0.11)	(0.24)	(0.32)
Cons	2.441***	-0.842	7.206***	9.727*	6.348***	-11.412**	3.993***	4.939
	(5.74)	(-0.35)	(8.07)	(2.26)	(6.39)	(-2.77)	(4.38)	(1.24)
Observations	2,879	2,879	2,879	2,879	2,879	2,879	2,879	2,879
R-squared	0.0011	0.0135	0.0016	0.0124	0.0029	0.0354	0.0022	0.0209
Control	No	Yes	No	Yes	No	Yes	No	Yes

Notes: The numbers in parentheses indicate t statistics. * implies $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$. The dependent variable is how much the usage of each payment method is replaced by CBDC. Control variables include socioeconomic characteristics such as gender, age, residential area, education level, household income, wealth, attitudes toward new technology-based services, privacy knowledge and attitude, trust in commercial banks and the Bank of Korea, political tendency, and attitude toward public policies.

the baseline group.

To further investigate how CBDC design features influence the intention of CBDC usage, we estimate additional regressions using the intended CBDC usage rate as the dependent variable (Table 3). Unlike the main specification in Table 2, where the dependent variable measures changes in the usage of existing payment methods before and after a hypothetical nationwide CBDC introduction, this specification captures the respondents' direct intention to use CBDC.

Table 3: Demand for CBDC: Total CBDC Use Frequency

	(1)	(2)
Group 2	2.569	2.418
	(1.86)	(1.83)
Group 3	4.161**	4.581***
	(2.94)	(3.40)
Group 4	1.557	1.407
	(1.13)	(1.09)
Group 5	2.788*	2.804*
	(2.02)	(2.11)
Cons	22.49***	7.234
	(23.63)	(1.64)
Controls	No	Yes
R-squared	0.0033	0.1047
N	2879	2879

Notes: The numbers in parentheses indicate t statistics. * implies $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$. The dependent variable is total CBDC use frequency. Control variables include socioeconomic characteristics such as gender, age, residential area, education level, household income, wealth, attitudes toward new technology-based services, privacy knowledge and attitude, trust in commercial banks and the Bank of Korea, political tendency, and attitude toward public policies.

The results indicate that Group 3, which features app-based and card-type offline CBDC, significantly increases the intended CBDC usage rate. Group 5, which combines Group 3's design with positive interest payments, also shows a positive but smaller effect. These findings are consistent with prior studies showing that individuals tend to express higher willingness to adopt CBDCs when privacy-protective features are emphasized (Choi et al., 2025).

At the same time, the limited treatment effects observed in Table 2 for the change in existing payment methods align with the well-documented "privacy paradox", the discrepancy between individuals' stated privacy concerns and their relatively privacy-insensitive behav-

iors in practice (Barth and de Jong, 2017; Athey et al., 2017; Goldfarb and Tucker, 2022). In our context, respondents who appreciate privacy-enhancing CBDC designs may not necessarily reduce their use of other payment instruments, reflecting this broader behavioral pattern. Moreover, since cash usage is relatively low in our sample, privacy-related motivations, typically strongest among cash users, may exert only limited influence on behavioral change.

Overall, the treatment effects of introducing CBDC with different technical features turn out not to be strong.[16] This might be due to the respondents' limited concerns about transaction privacy concerns and the weak need for offline functionality in CBDC. Indeed, our survey (Table 4) shows that relatively few individuals use physical cash primarily for privacy protection, and awareness of offline functionality—namely, the importance of cash's independence from technology—remains low.

Table 4: Cash Usage

Statement	**Respondent Ratio (%)**
Congratulatory/condolence money (e.g., weddings, funerals)	30.1
Sending allowances to parents, children, or relatives	17.7
Traditional markets, apartment 7-day markets, etc.	16.0
Discounts for cash payments (e.g., clothing stores, nail salons)	13.8
Small transactions under KRW 1,000	11.0
Religious or charitable contributions (e.g., church offerings, Buddhist donations)	5.5
Areas or disaster scenarios where communication/IT systems are partially or fully unavailable	2.4
Situations where leaving a record is undesirable (e.g., motel stays, adult products, psychiatric treatments, cosmetic surgery)	1.9
Private lesson or tutoring fees	1.6
Total	100.0

Notes: The survey respondents were asked to answer the following question: "Please select up to three situations where you use cash (banknotes and coins) more often than other payment methods (e.g., bank transfers, cards, mobile payments, gift certificates) in order of priority from 1st to 3rd."

Furthermore, this finding could be closely linked to their trust in the central bank and government. Table 5 shows the survey result on why respondents think introducing CBDC

[16] As a robustness check, we estimate ANCOVA models controlling for preCBDC payment shares to better account for the compositional nature of the portfolio data. The results are broadly consistent with our main findings: most treatment effects remain statistically insignificant, while Group 3 treatment continues to significantly increase substitution from credit cards to CBDC. One notable difference is that Group 2 treatment now shows a newly significant increase in substitution from credit cards to CBDC.

would be useful. The ratios of the respondents who choose "A higher level of personal information protection compared to privately issued payment methods" and "The availability even in the event of computer failures or natural disasters that restrict electronic transactions" are relatively low to other ratios.[17] A large portion of respondents choose "Reduction in the issuance and circulation costs of physical cash" (22.0%) and "Safer from risks such as theft compared to physical cash" (22.7%).

Table 5: Usefulness of CBDC

Statement	**Respondent Ratio (%)**
Reduction in the issuance and circulation costs of physical cash	22.0
Safer from risks such as theft compared to physical cash	20.7
No risk of default	13.8
A higher level of personal information protection compared to privately issued payment methods	13.3
It does not aim to profit from transaction intermediary fees	11.5
It does not commercially use transaction information	7.1
Availability even in the event of computer failures or natural disasters that restrict electronic transactions	6.6
Enables overseas remittances to be done more cheaply, faster, and more safely	5.0
Others	0.2
Total	100.0

The respondents' limited concerns regarding transaction privacy and the weak necessity of offline functionality in CBDCs might stem from their trust in the central bank. Table 6 shows to what extent respondents trust the Bank of Korea, compared to commercial banks. Most of the respondents (83.5%) trust the Bank of Korea more or at least as much as commercial banks. Trust in the central bank appears to have an effect that makes one believe that, regardless of the form of CBDC issuance, the central bank would adequately protect transaction privacy and be well-prepared for offline transactions.

[17] This would be consistent with the result of the European Central Bank's survey regarding a digital euro, which revealed that offline capabilities are the least anticipated feature among respondents, with just 8% citing offline usage as their top preference (Thomadakis et al., 2023). Public users might expect to use CBDC on mobile devices such as smartphones. Meanwhile, our findings need not be considered inconsistent with those of Choi et al. (2025), who asked separate questions about consumption requiring privacy and that which does not, and found treatment effects mainly in consumption requiring privacy.

Table 6: Trust Levels in the Bank of Korea

Statement	**Respondent Ratio (%)**
1. Trust the Bank of Korea much more than private banks	32.4
2. Trust the Bank of Korea slightly more than private banks	30.6
3. Trust the Bank of Korea as much as private banks	20.5
Subtotal(1+2+3)	83.5
4. Trust private banks slightly more than the Bank of Korea	3.9
5. Trust private banks much more than the Bank of Korea	1.7
Subtotal(4+5)	5.6
Do not know the difference between the Bank of Korea and private banks	10.9
Total	100.0

3.2 Demand for CBDC as a liquid asset: Portfolio Changes

This section focuses on the effects of the introduction of CBDC on liquid asset portfolios. In particular, we estimate the treatment effects on the demand for CBDC as a liquid asset and subsequent changes in liquid asset portfolios. The main variable of interest is the extent to which CBDC replaces carrying cash, precautionary cash holdings, demand deposits, and savings deposits, respectively. The dependent variable in the following regressions is the ratio of the amount replaced by CBDC to the amount previously held by each individual. The number of observations in each specification differs because participants who reported zero holdings are respectively dropped. Table 7 shows regression results.

Models (1) and (2) in Table 7 show the regression results for how much carrying cash as a liquid asset would be replaced by CBDC. We find that, as shown in Groups 3 and 5, the card-type offline CBDC significantly replaces carrying cash, compared to the baseline Group 1. That is, compared to the scenario where only app-based CBDC is available, the introduction of a card-type offline CBDC that enhances privacy protection leads to a further reduction in the reliance on carrying cash, by approximately 6 to 7 percentage points.

Models (3) to (6) demonstrate how much precautionary cash holdings and demand deposits could be replaced by CBDC. No significant treatment effects are observed. Somewhat surprisingly from the policy perspective, positive interest rates on CBDC in Groups 4 and 5 do not lead to a further reduction in the demand deposit holdings, compared to the scenarios such as Groups 2 and 3, where no interest rate is paid on the app-based CBDC.

Lastly, Models (7) and (8) show regression results of how much savings deposits CBDC would replace. In comparison to the baseline Group 1, no significant treatment effects are observed, either. Additionally, in Model (8) with control variables, the constant term is not

Table 7: Demand for CBDC: Portfolio Replacement Ratio by CBDC

	Carrying Cash to CBDC		Precautionary Cash to CBDC		Demand Deposits to CBDC		Savings Deposits to CBDC	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Group 2	5.083	5.169	0.795	0.464	0.461	0.229	0.868	0.560
	(0.27)	(0.16)	(0.27)	(0.16)	(0.20)	(0.10)	(0.34)	(0.22)
Group 3	6.116*	6.789**	-0.707	-0.793	2.356	2.763	1.452	1.579
	(2.30)	(2.58)	(-0.24)	(-0.28)	(1.01)	(1.19)	(0.57)	(0.63)
Group 4	2.147	2.291	-1.040	-1.107	0.443	0.443	-0.944	-1.301
	(0.80)	(0.86)	(-0.35)	(-0.37)	(0.19)	(0.19)	(-0.38)	(-0.53)
Group 5	6.738*	7.325**	4.244	4.053	0.474	0.574	3.417	3.325
	(2.53)	(2.78)	(0.20)	(0.25)	(0.20)	(0.25)	(1.30)	(1.30)
Cons	52.82***	38.54***	53.54***	35.02***	41.33***	25.06***	27.66***	2.242
	(27.57)	(4.38)	(25.04)	(3.82)	(24.84)	(3.32)	(15.21)	(0.29)
Observations	2,641	2,641	1,977	1,977	2,836	2,836	2,327	2,327
R-squared	0.0035	0.0276	0.0022	0.0318	0.0004	0.029	0.0014	0.0429
Control	No	Yes	No	Yes	No	Yes	No	Yes

Notes: The numbers in parentheses indicate t statistics. * implies $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$. The dependent variable is the ratio of the amount replaced by CBDC to the amount previously held by each individual. Control variables include socioeconomic characteristics such as gender, age, residential area, education level, household income, wealth, attitudes toward new technology-based services, privacy knowledge, and attitude, trust in commercial banks and the Bank of Korea, political tendency, and attitude toward public policies.

significant anymore.

Table 8: Total Demand for CBDC: Replacement Ratio by CBDC

	(1)	(2)
Group 2	0.001	-0.001
	(0.05)	(-0.05)
Group 3	0.011	0.015
	(0.51)	(0.67)
Group 4	0.006	0.006
	(0.30)	(0.28)
Group 5	0.015	0.016
	(0.69)	(0.73)
Cons	0.426***	0.215**
	(27.03)	(3.16)
Observations	2873	2,873
R-squared	0.0002	0.0319
Control	No	Yes

Notes: The numbers in parentheses indicate t statistics. * implies $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$. The dependent variable is the ratio of the total demand for CBDC to the total amount of money previously held by respondents. Control variables include socioeconomic characteristics such as gender, age, residential area, education level, household income, wealth, attitudes toward new technology-based services, privacy knowledge and attitude, trust in commercial banks and the Bank of Korea, political tendency, and attitude toward public policies.

Now, we estimate the treatment effects on the total demand for CBDC. The total CBDC demand is calculated as the sum of CBDC holding amount that replaces carrying cash, precautionary cash holdings, demand deposits, and savings deposits. we use the ratio of the total demand for CBDC to the total amount of money previously held by respondents as the dependent variable. Table 8 shows regression results. In comparison to the baseline Group 1, no significant treatment effects are found. In fact, these results align with the regression outcomes for the demand deposits replacement by CBDC because the majority of CBDC demand stems from demand deposits.

To further examine how different treatments affect CBDC demand, we asked participants how they would allocate a hypothetical KRW 1,000,000 (approximately USD 697.1 as of December 2024) among CBDC, carrying cash, precautionary cash, demand deposits, and savings deposits if they were to receive that amount. Table 9 shows the regression results. Compared to baseline Group 1, survey participants in Groups 4 and 5 significantly increase their CBDC holdings. This suggests that participants might view CBDC as a more attractive store of value if a positive interest rate is offered to CBDC holdings.

Table 9: Demand for CBDC: Allocation of Newly Endowed Income (KRW 1 Million)

	(1)	(2)
Group 2	2.644	2.457
	(1.68)	(1.59)
Group 3	2.152	2.590
	(1.41)	(1.74)
Group 4	3.443*	3.320*
	(2.21)	(2.16)
Group 5	3.432*	3.474*
	(2.21)	(1.30)
Cons	22.49***	2.161
	(21.00)	(0.42)
Observations	2,879	2,879
R-squared	0.0022	0.0639
Control	No	Yes

Notes: The numbers in parentheses indicate t statistics. * implies $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$. The dependent variable is the amount of money that would be allocated to CBDC among carrying cash, precautionary cash, demand deposits, savings deposits, and CBDC, assuming the participants were to receive hypothetical KRW 1,000,000 (approximately USD 697.1 as of December 2024). Control variables include socioeconomic characteristics such as gender, age, residential area, education level, household income, and wealth. Control variables also include attitudes toward new technology-based services, privacy knowledge and attitude, trust in commercial banks and the Bank of Korea, political tendency, and attitude toward public policies.

4 Discussions

4.1 Holding Limit of CBDC and Financial Intermediation

One of the main concerns about newly issued CBDCs is that their demand could be too strong and thus could substitute a significant amount of bank deposits, leading to financial disintermediation. To address this issue, Bindseil (2020) and Bindseil and Panetta (2020) suggest a Digital Euro holding limit of EUR 3,000 to reconcile payment efficiency with financial stability.[18] We use the survey result to examine whether this level of holding limit can become a binding constraint for most Korean consumers.

Figure 4 demonstrates the distribution of CBDC demand. We calculate CBDC demand as the sum of the CBDC holding amount that replaces carrying cash, precautionary cash holdings, and demand deposits. The median CBDC holdings are KRW 400,000, and the 90th percentile is KRW 3,010,000. Less than 7 percent of participants are constrained if the Bank of Korea sets the holding limit at KRW 4,250,000, which is approximately equivalent to EUR 3,000, as of November 2023.

The average amount of CBDC that replaces demand deposits is KRW 750,000 with the holding limit and KRW 1,200,000 without the limit.[19] This implies that the total demand deposits would decrease by up to 19.6% with the holding limit but by up to 31.3% without the limit, providing a critical implication of introducing CBDC on financial intermediation. According to Cho and Hwang (2022), a 20% decrease in demand deposits reduced total production by 0.19%, and a 30% decrease reduced total production by 0.5%.[20] Therefore, setting the CBDC holding limit to around KRW 4,250,000 appears to appropriately maintain the financial intermediation without significantly restricting users' use and holding of CBDC.

In addition, Table 10 shows the ratio of survey participants constrained by CBDC holding limits and the deposit reduction ratio. It suggests that if the holding limit is set too low, the effect of introducing CBDC on financial intermediation would be minimal, whereas it could significantly constrain demand for CBDC. This aligns with ECB simulation stud-

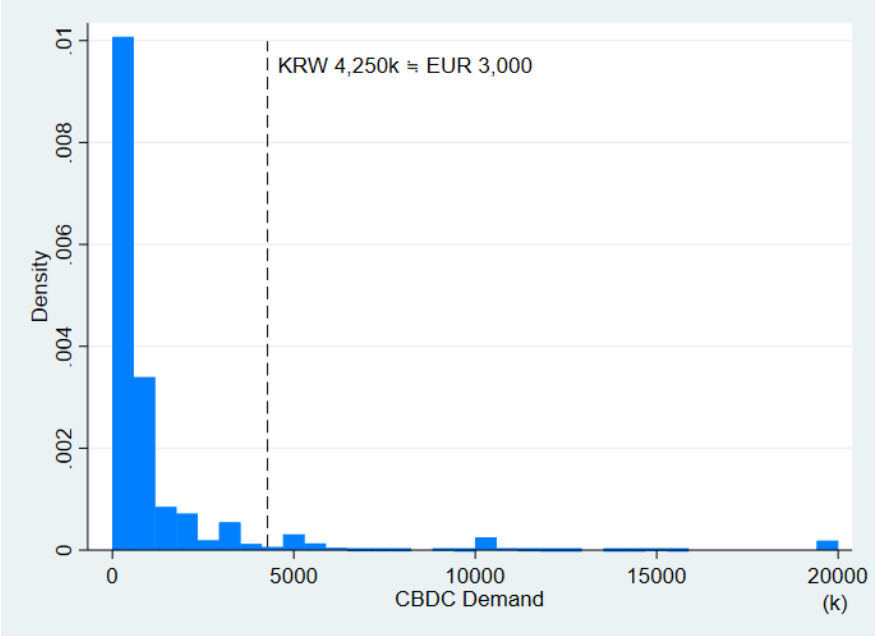
[18] Likewise, Li (2023) structurally estimates household CBDC demand under various caps, finding that limits reduce substitution away from deposits.

[19] For supplementary details, Figure A.6 shows the distribution of CBDC demand that additionally replaces savings deposits. In this case, the median CBDC holding amount is KRW 600,000, and about 17 percent of participants are constrained by the holding limit.

[20] Cho and Hwang (2022) extended the New Keynesian Dynamic Stochastic General Equilibrium (DSGE) model of Smets and Wouters (2007) by incorporating CBDC and demand deposit and assuming perfect competition in the bank industry to analyze the impact of introducing CBDC on financial intermediation and monetary policy transmission mechanisms. They calibrate their model with parameter values for the Korean economy.

ies and CEPR policy analyses, such as Meller and Soons (2023) and Bindseil and Panetta (2020), recommending conservative initial caps in the EUR 1,500–3,000 range. More generally, policymakers should treat the holding limit as a prudential tool: setting the cap too low may undermine the CBDC's usefulness, whereas setting it too high could heighten the risk of bank disintermediation. Although our simulations illustrate the potential magnitude of deposit substitution under different holding limits, these results should be interpreted as indicative bounds rather than definitive assessments of banking-sector or macroeconomic stability, as the analysis does not account for banks' potential responses or general equilibrium effects.

Figure 4: Demand for CBDC: Shift from Cash and Demand Deposits



Notes: CBDC demand denotes the sum of the amounts of CBDC that replace carrying cash, precautionary holding cash, and demand deposits. We set the demand for CBDC capped at KRW 20,000k.

4.2 Individual Characteristics and Demand for CBDC

We now examine the individual characteristics that affect the demand for CBDC. Table A.2 presents regression results with a full list of control variables. A consistent pattern across regressions is that individuals who are willing to adopt the new mobile applications and technology services (New Mobile App. & Tech.) are significantly more inclined to hold CBDC. Specifically, regarding demand deposits, participants with the most positive attitude

Table 10: Holding Limit (KRW, Thousand) and Deposit Reduction

	2,000	2,500	3,000	3,200	5,000	10,000
Restricted Participants (%)	14	10	9	7	4	3
Deposit Reduction (%)	14.8	16.1	17.4	17.8	20.8	25.1

Notes: The Deposit Reduction is calculated as the ratio between the sum of CBDC that replaces demand deposits and the sum of demand deposits. Therefore, the Deposit Reduction implies that the total demand deposit would decrease by up to the figures in the table with the holding limit.

towards New Mobile App & Tech. hold CBDC by approximately 17.4 percentage points more than those with the weakest willingness. This seems to be because CBDCs could be regarded as a new technological device that provides a payment service.

Moreover, individuals who express greater trust in the Bank of Korea, as compared to commercial banks, exhibit a stronger willingness to demand CBDC. These characteristics increase CBDC holding, replacing demand deposits by about 4.2 percentage points. Additionally, CBDC's substitution for cash increases by around 5 percentage points. This result could be considered as expected, as trust in payment methods or asset issuers is among the most critical factors considered when choosing a payment method or asset. Meanwhile, this is also consistent with the result that trust in privacy protection of financial institutions and big-tech companies significantly decreases cash and demand deposits whose uses can generate a vast of transaction information.

4.3 Strength of CBDC Demand

We further examine the strength of respondents' preference for CBDC as a robustness check of our experiment. Specifically, respondents who indicated they would hold or use CBDC instead of deposits were asked how much additional benefit commercial banks (or payment service providers) would need to offer for them to maintain their deposits (or continue using their payment methods), thereby offsetting the shift toward CBDC. We use an ordered logit model, including the treatment group indicators, the replacement ratio, and the willingness to use CBDC first at online and offline stores as control variables.

Table 11 presents the regression results for demand and savings deposit holdings. First, we find no significant treatment effects compared to baseline Group 1 in any of the specifications. Interestingly, respondents who exhibit a higher replacement ratio and indicate a willingness to use CBDC first for online payments require greater financial benefits to switch back to bank deposits. For demand (savings) deposits, a one-unit increase in the

replacement ratio is associated with a 0.249 (0.447) increase in the log odds of moving to a higher benefit category. Similarly, respondents who intend to prioritize using CBDC for online (offline) payments have 0.518 (0.340) higher log odds of moving to a higher benefit category for demand deposits and 0.468 (0.245) higher log odds for savings deposits, compared to those who do not prioritize online (offline) payments.[21] The logit analysis in Table A.3, which focuses on those unwilling to switch, aligns with these findings.[22] Likewise, the generalized ordered logit analysis in Table A.5, which examines usage frequency, also yields consistent results.[23]

In summary, our experimental findings indicate that individuals with a strong demand for CBDC prioritize factors other than financial incentives. Consequently, any measures taken by banks and payment service providers to counter the shift away from bank deposits (or other payment methods) may not effectively change the preferences of those who strongly favor CBDC.

5 Concluding Remarks

This study provides novel insights into the public demand for retail Central Bank Digital Currency (CBDC) and its potential impacts on the public asset portfolios as a payment method and a store of value, and furthermore financial intermediation. Our information-provision experiment survey, encompassing various issuance types and features of CBDC, sheds light on how individuals might adapt to and use CBDC in their daily financial activities.

Our three main findings and implications are summarized as follows. Firstly, the introduction of a CBDC could lead to significant shifts in payment method preferences. The observed decline in debit card usage upon CBDC adoption underscores a preference for more convenient and beneficial payment options. Interestingly, the specific design features of CBDCs, such as online/offline accessibility and transaction privacy, did not significantly influence their demand as a payment method. This could be attributed to the strong public trust in central banks and governments, which seems to override concerns about transaction privacy and the need for offline transactions. Secondly, our study of the average treatment

[21] The effect of priority use of CBDC for offline payments on savings deposits is not statistically significant.

[22] By contrast, the logit analysis in Table A.4, which examines respondents reporting both the highest financial benefit requirements and unwillingness to switch, shows somewhat mixed results.

[23] We employed a generalized ordered logit model with respect to usage frequency as a means of payment because the parallel lines assumption was violated.

Table 11: Strength of CBDC Demand

	Demand Deposits		Savings Deposits	
	(1)	(2)	(3)	(4)
Group 2	0.0932	0.0773	0.0323	0.0309
	(0.82)	(0.68)	(0.29)	(0.28)
Group 3	0.0338	-0.0155	0.0480	0.0100
	(0.29)	(-0.13)	(0.41)	(0.09)
Group 4	0.193	0.155	0.0728	0.0468
	(1.65)	(1.33)	(0.62)	(0.40)
Group 5	0.0801	0.0600	0.135	0.124
	(0.67)	(0.51)	(1.11)	(1.03)
Replacement Ratio	0.249*		0.447***	
	(2.39)		(4.18)	
Priority Use of CBDC for Online Payments		0.518**		0.468**
		(3.16)		(3.11)
Priority Use of CBDC for Offline Payments		0.340*		0.245
		(2.09)		(1.66)
Observations	2,596	2,601	2,469	2,474

Notes: The numbers in parentheses indicate t statistics. * implies $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$. The dependent variable is an ordinal variable indicating the level of economic benefit respondents require to maintain their deposits instead of holding CBDC. Higher response values correspond to greater required benefits.

effects of CBDC types reveals that a physical card-type offline CBDC notably reduces the use of cash in liquid asset portfolios, suggesting a shift towards digital financial assets. However, these changes in portfolio composition do not appear to extend to other asset types, such as savings or investment products. This finding is critical for understanding the broader financial implications of CBDC implementation. Thirdly, and perhaps most importantly, the impact of interest payments on CBDC usage on the portfolio choice of newly endowed income is significant. Our results show that the provision of positive interests on CBDC holdings increases its attractiveness as a store of value, which could have far-reaching implications for monetary policy and financial stability. This shift in perception from a mere medium of exchange to a store of value could transform the role of CBDC in the financial system.

In conclusion, while the introduction of CBDCs presents opportunities for enhancing financial inclusion and improving payment system efficiency, it also brings challenges, particularly in terms of its impact on traditional financial intermediation and monetary policy transmission. Our study underscores the need for careful consideration of CBDC design features, particularly in terms of interest payments, to balance these opportunities and challenges. Lastly, while the present study is based on a nationally representative survey experiment in Korea—a country characterized by very high digital adoption and relatively strong trust in its central bank—the findings should be interpreted as context-specific evidence rather than universally generalizable conclusions. Future research could extend this framework to cross-country contexts, particularly by using data from jurisdictions with active CBDCs (e.g., the Bahamas, Nigeria) or with different levels of digital maturity and institutional trust. Such comparative analysis would help assess how cultural and infrastructural differences shape CBDC adoption and thereby qualify and validate the broader applicability of our findings. In addition, future work could incorporate behavioral frameworks such as prospect theory or loss aversion to further explore how perceived risks, especially related to privacy, influence individuals CBDC adoption decisions. Another possible avenue for future research is to conduct follow-up surveys that track how trust in central banks and payment preferences evolve over time. Such longitudinal evidence would help clarify the dynamic aspects of CBDC adoption beyond the cross-sectional perspective considered here.

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A Appendices

A.1 Balance Check

Table A.1: Balance Check Across Treatment Groups

	(1) Group 1 (Control)	(2) Group 2	(3) Group 3	(4) Group 4	(5) Group 5	Prob > F
Gender	1.500	-0.003	0.007	0.007	-0.000	0.9963
		(0.030)	(0.029)	(0.030)	(0.030)	
Age	4.388	-0.017	-0.000	0.010	-0.017	0.9970
		(0.085)	(0.084)	(0.085)	(0.085)	
Education	2.846	0.064	0.069	0.041	0.061	0.8033
		(0.063)	(0.063)	(0.063)	(0.063)	
Attitude towards New	1.691	0.008	-0.003	0.022	0.009	0.9030
Mobile App. & Tech		(0.027)	(0.027)	(0.027)	(0.027)	
Trust in	2.105	0.025	0.033	0.151	0.199	0.5770
the Bank of Korea		(0.139)	(0.138)	(0.144)	(0.144)	
# of obs.	572	577	580	578	572	

Notes: Column (1) reports the mean values for Group 1 (Control Group). In column (2)–(5), mean differences between Control Group and Treatment Groups are reported. Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

A.2 Tables and Figures

Figure A.1: Sankey Diagram for Payment Methods Portfolio, Group 1

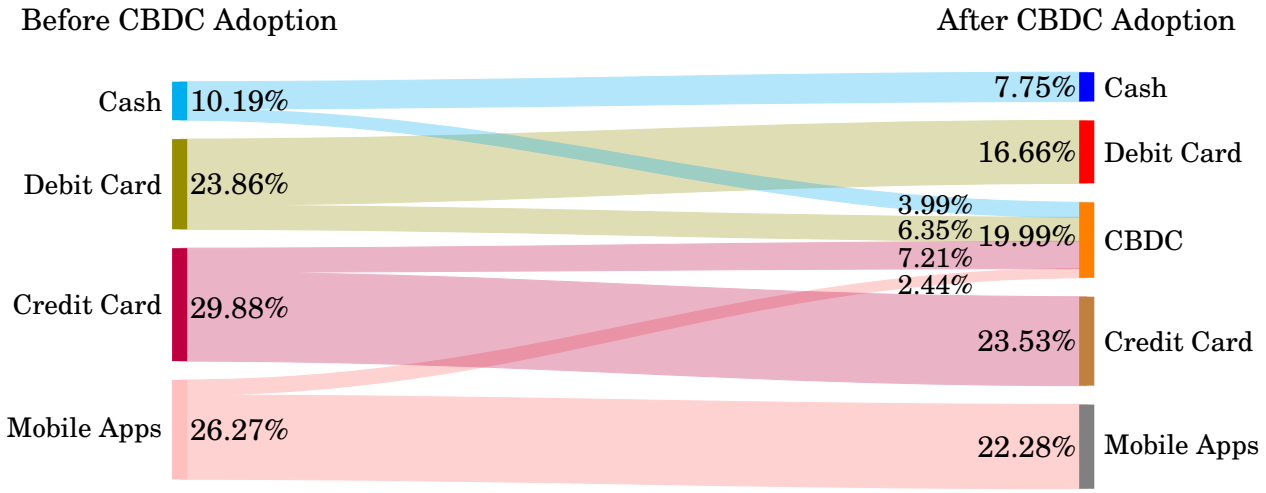


Figure A.2: Sankey Diagram for Payment Methods Portfolio, Group 2

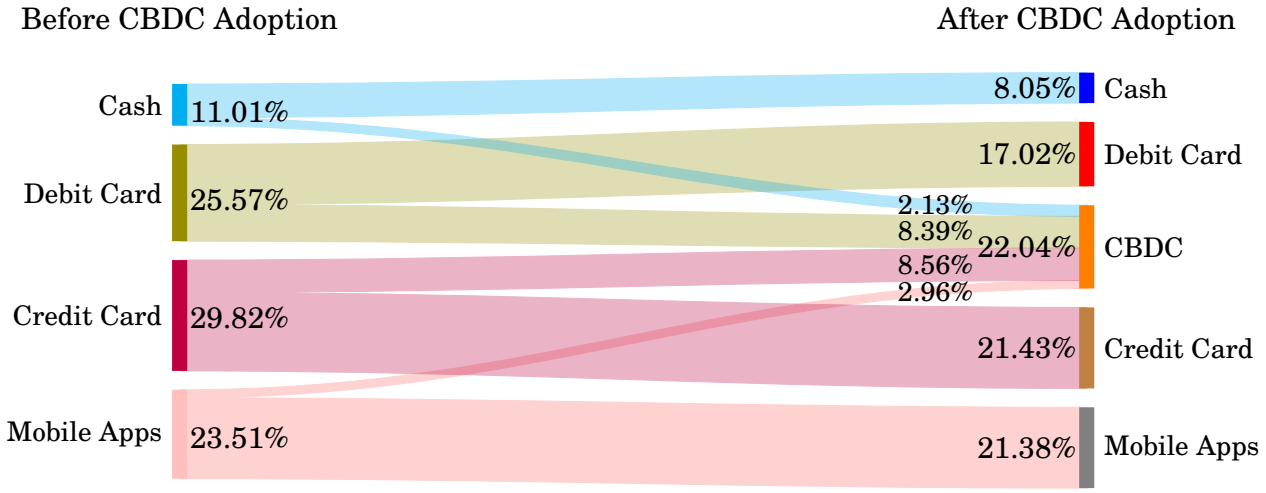


Figure A.3: Sankey Diagram for Payment Methods Portfolio, Group 3

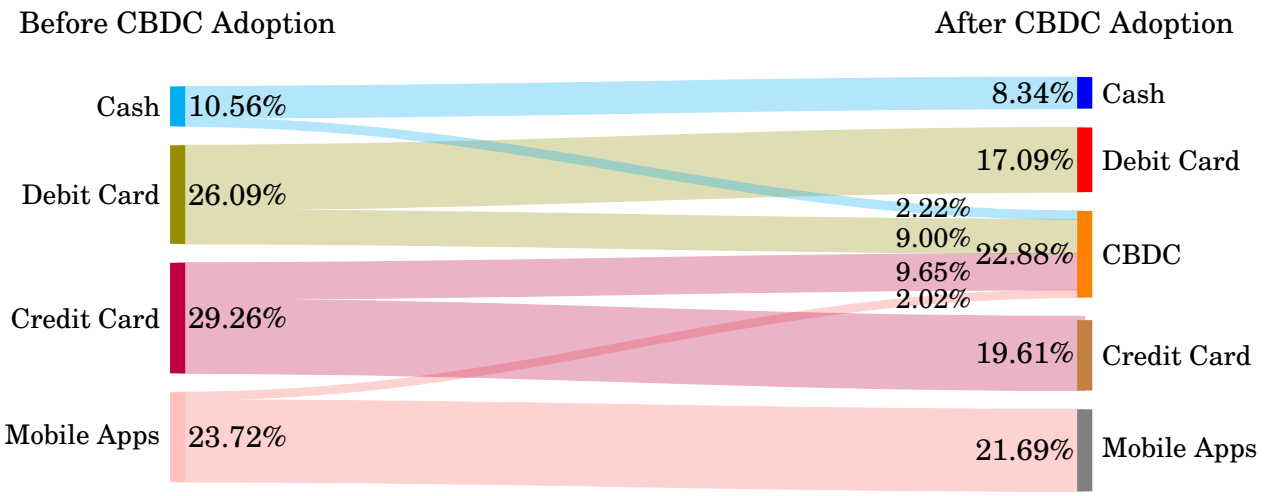


Figure A.4: Sankey Diagram for Payment Methods Portfolio, Group 4

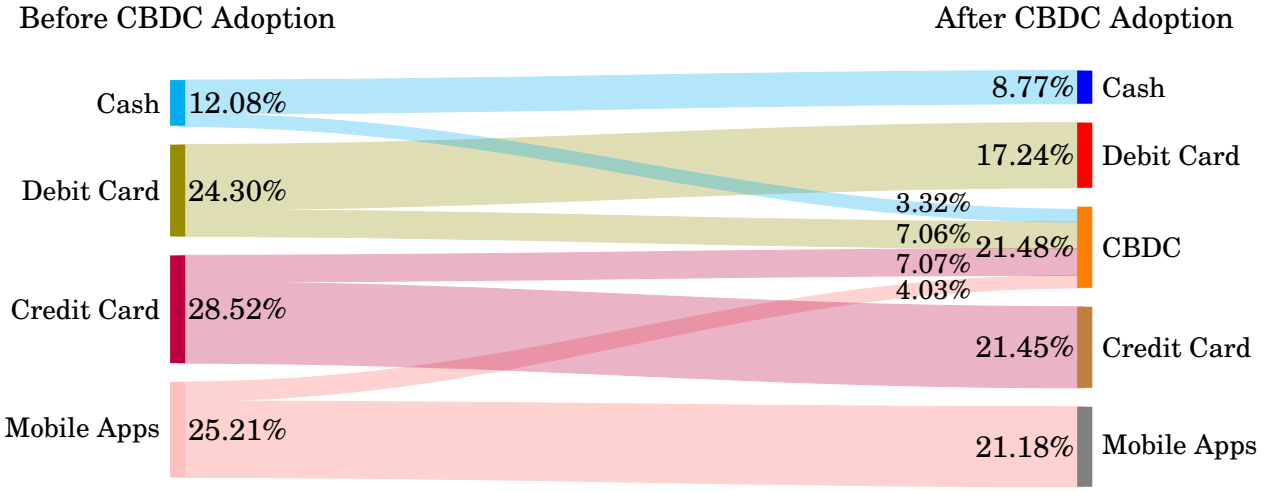
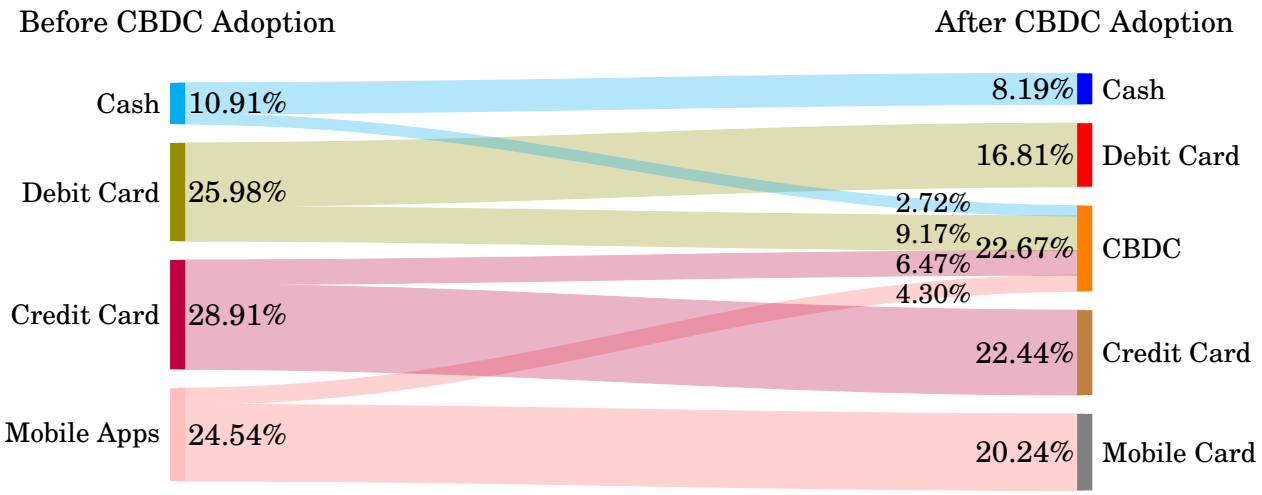


Figure A.5: Sankey Diagram for Payment Methods Portfolio, Group 5



A.3 Questionnaire and Screenshots

A.3.1 Korean Version

The original survey questionnaire in Korean is available at the following Open Science Framework repository: https://osf.io/34kyq

A.3.2 English Version

The translated survey questionnaire in English is available in the following Open Science Framework repository: https://osf.io/2v49t

A.4 Replacement Effects of CBDC

Table A.2: Demand for CBDC: Replacement Effects of CBDC with All Control Variables

	Carrying Cash		Precautionary Cash		Demand Deposit		Savings Deposit	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Group 2	5.083	5.169	0.795	0.464	0.461	0.229	0.868	0.560
	(0.27)	(0.16)	(0.27)	(0.16)	(0.20)	(0.10)	(0.34)	(0.22)
Group 3	6.116*	6.789**	-0.707	-0.793	2.356	2.763	1.452	1.579
	(2.30)	(2.58)	(-0.24)	(-0.28)	(1.01)	(1.19)	(0.57)	(0.63)
Group 4	2.147	2.291	-1.040	-1.107	0.443	0.443	-0.944	-1.301
	(0.80)	(0.86)	(-0.35)	(-0.37)	(0.19)	(0.19)	(-0.38)	(-0.53)
Group 5	6.738*	7.325**	4.244	4.053	0.474	0.574	3.417	3.325
	(2.53)	(2.78)	(0.20)	(0.25)	(0.20)	(0.25)	(1.30)	(1.30)
Attitude towards New Mobile App. & Tech.		2.659*		5.863***		5.791***		3.292**
		(2.31)		(4.63)		(5.78)		(2.95)
Attitude towards Interactive Kiosks		-1.682		-1.172		-1.564		-1.873*
		(-1.79)		(-1.14)		(-1.88)		(-2.05)
Use Frequency of Mobile Banking & Fast Payment		-1.793		1.592		-0.534		0.882
		(-1.66)		(1.33)		(-0.55)		(0.83)
Attitude Towards Telemarketing and Promotional Text Messages		2.249*		2.075		0.811		2.978**
		(2.21)		(1.86)		(0.88)		(2.96)
Trust in privacy protection of FI & Bigtech		-1.930*		-1.782		-1.823*		-1.509
		(-2.06)		(-1.73)		(-2.21)		(-1.72)
Withdrawal Failure Risk of Bank Deposits		0.540		1.317		0.477		2.466
		(0.38)		(0.83)		(0.37)		(1.76)
Perception of Commercial Banks' Default Risk		1.896		0.531		1.870		1.039
		(1.34)		(0.34)		(1.46)		(0.75)
Political Orientation		0.733		-0.457		2.070*		1.922*
		(0.74)		(-0.42)		(2.31)		(1.99)
Preference on Private vs Public Service		2.726		1.893		-0.292		2.333
		(1.44)		(0.91)		(-0.18)		(1.31)
Preference on Public Service Provided by Private Sectors		-4.421*		-5.934**		0.407		-3.235
		(-2.32)		(-2.84)		(0.25)		(-1.79)
Gender		-0.491		-0.827		-1.378		-0.218
		(-0.29)		(-0.44)		(-0.93)		(-0.13)
Age		0.777		-0.265		0.189		1.632**
		(1.15)		(-0.37)		(0.33)		(2.66)
Residential Region		2.229		1.605		-0.385		3.895
		(1.08)		(0.69)		(-0.21)		(1.84)
Education Level		-1.905*		-0.659		-1.259		-1.617*
		(-2.26)		(-0.73)		(-1.73)		(-2.10)
Trust in the Bank of Korea		4.804**		5.397**		4.231**		2.307
		(2.65)		(2.71)		(2.69)		(1.38)
Household Income		-0.0324		-0.0961		-0.284		-1.382**
		(-0.07)		(-0.18)		(-0.68)		(-3.00)
Household Wealth		0.652		-0.564		-0.682		-0.694
		(1.47)		(-1.19)		(-1.76)		(-1.65)
Cons	52.82***	38.54***	53.54***	35.02***	41.33***	25.06***	27.66***	2.242
	(27.57)	(4.38)	(25.04)	(3.82)	(24.84)	(3.32)	(15.21)	(0.29)
Observations	2,641	2,641	1,977	1,977	2,836	2,836	2,327	2,327
R-squared	0.0035	0.0276	0.0022	0.0318	0.0004	0.029	0.0014	0.0429
Control	No	Yes	No	Yes	No	Yes	No	Yes

Notes: The numbers in parentheses indicate t statistics. * implies $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$. The dependent variable is the ratio of the amount replaced by CBDC to the amount previously held by each individual.

A.5 Strength of Demand for CBDC

Table A.3: Strength of Demand for CBDC: Respondents Reporting Unwillingness to Switch Back

	Demand Deposits		Savings Deposits		
	(1)	(2)	(3)	(4)	(5)
Group 2	-0.0915	-0.131	-0.114	-0.104	0.00499
	(-0.47)	(-0.67)	(-0.51)	(-0.46)	(0.04)
Group 3	0.0107	-0.0683	0.212	0.216	-0.0281
	(0.06)	(-0.35)	(1.01)	(1.03)	(-0.23)
Group 4	0.279	0.214	0.387	0.399*	-0.105
	(1.53)	(1.16)	(1.91)	(1.98)	(-0.86)
Group 5	0.223	0.187	0.521**	0.518**	-0.0290
	(1.21)	(1.00)	(2.62)	(2.60)	(-0.24)
Replacement Ratio	0.737***		0.954***		
	(5.00)		(5.87)		
Replacement Ratio with Savings Deposits				0.925***	
				(5.81)	
Priority Use of CBDC for Online Payments		0.521*			0.392*
		(2.21)			(2.39)
Priority Use of CBDC for Offline Payments		0.613**			-0.110
		(2.63)			(-0.69)
Cons	-2.464***	-2.362***	-2.892***	-2.797***	0.526***
	(-15.83)	(-16.77)	(-16.36)	(-16.55)	(5.94)
Observations	2,873	2,879	2,873	2,873	2,879

Notes: The numbers in parentheses indicate t statistics. * implies $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$. The dependent variable is an indicator variable, which equals 1 if respondents indicate they are unwilling to switch back to bank deposits and 0 otherwise. Coefficients are estimated using the logit model.

Table A.4: Strength of Demand for CBDC: Respondents Reporting Both the Highest Financial Benefit Requirements and Unwillingness to Switch Back

	Demand Deposits		Savings Deposits		
	(1)	(2)	(3)	(4)	(5)
Group 2	0.133	0.127	0.00679	0.00540	0.00499
	(1.05)	(1.00)	(0.06)	(0.04)	(0.04)
Group 3	0.0615	0.0406	-0.0237	-0.0246	-0.0281
	(0.49)	(0.32)	(-0.19)	(-0.20)	(-0.23)
Group 4	0.0946	0.0713	-0.104	-0.106	-0.105
	(0.75)	(0.57)	(-0.85)	(-0.87)	(-0.86)
Group 5	0.00259	-0.00776	-0.0226	-0.0224	-0.0290
	(0.02)	(-0.06)	(-0.18)	(-0.18)	(-0.24)
Replacement Ratio	-0.350**		-0.152		
	(-3.29)		(-1.48)		
Replacement Ratio with Savings Deposits				-0.147	
				(-1.41)	
Priority Use of CBDC for Online Payments		0.391*			0.392*
		(2.18)			(2.39)
Priority Use of CBDC for Offline Payments		0.139			-0.110
		(0.81)			(-0.69)
Cons	0.834***	0.600***	0.639***	0.624***	0.526***
	(8.39)	(6.66)	(6.55)	(6.64)	(5.94)
Observations	2,873	2,879	2,873	2,873	2,879

Notes: The numbers in parentheses indicate t statistics. * implies $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$. The dependent variable is an indicator variable, which equals 1 if respondents indicate that they are unwilling to switch back to bank deposits or require more than 2 % points interest rate to switch back and 0 otherwise. Coefficients are estimated using the logit model.

Table A.5: Strength of Demand for CBDC: Use Frequency

Variable	Use Frequency	Use Frequency
Never use CBDC		
Group 2	0.399*	0.362
	(2.16)	(1.93)
Group 3	0.272	0.123
	(1.54)	(0.69)
Group 4	0.231	0.141
	(1.31)	(0.78)
Group 5	0.258	0.108
	(1.46)	(0.59)
Replacement Ratio	1.545***	-
	(7.44)	
Priority Use of CBDC for Online Payments	-	1.123***
		(3.84)
Priority Use of CBDC for Offline Payments	-	0.778**
		(2.92)
Cons	1.279***	1.712***
	(9.77)	(14.04)
$0-0.5\%$ point		
Group 2	0.301	0.258
	(1.78)	(1.52)
Group 3	0.138	0.0119
	(0.85)	(0.07)
Group 4	0.207	0.128
	(1.25)	(0.77)
Group 5	0.257	0.136
	(1.54)	(0.81)
Replacement Ratio	1.232***	-
	(6.70)	
Priority Use of CBDC for Online Payments	-	1.019***
		(3.82)
		Continued

Table A.5 – Continued

Variable	Use Frequency	Use Frequency
Priority Use of CBDC for Offline Payments	-	0.795**
		(3.24)
Cons	1.177***	1.509***
	(9.51)	(13.29)
0.5 – 1.0% point		
Group 2	0.215	0.201
	(1.50)	(1.41)
Group 3	0.0269	-0.0226
	(0.19)	(-0.16)
Group 4	0.0463	-0.0141
	(0.33)	(-0.10)
Group 5	0.0152	-0.0444
	(0.11)	(-0.32)
Replacement Ratio	0.773***	-
	(5.63)	
Priority Use of CBDC for Online Payments	-	0.243
		(3.82)
Priority Use of CBDC for Offline Payments	-	0.755***
		(3.24)
Cons	0.839***	1.032***
	(7.71)	(13.29)
1.0 – 1.5% point		
Group 2	0.190	0.193
	(1.55)	(1.58)
Group 3	0.0676	0.0480
	(0.56)	(0.40)
Group 4	-0.0551	-0.0715
	(-0.46)	(-0.59)
Group 5	-0.179	-0.188
	(-1.49)	(-1.56)
		Continued

Table A.5 – Continued

Variable	Use Frequency	Use Frequency
Replacement Ratio	0.597***	-
	(5.27)	
Priority Use of CBDC for Online Payments	-	0.281
		(1.78)
Priority Use of CBDC for Offline Payments	-	0.460**
		(2.98)
Cons	0.160	0.287***
	(1.66)	(3.31)
1.5 – 2.0% point		
Group 2	0.0770	0.0712
	(0.65)	(0.60)
Group 3	0.0851	0.0623
	(0.72)	(0.53)
Group 4	-0.113	-0.137
	(-0.95)	(-1.15)
Group 5	-0.183	-0.191
	(-1.54)	(-1.60)
Replacement Ratio	0.474***	-
	(4.42)	
Priority Use of CBDC for Online Payments	-	0.386*
		(2.51)
Priority Use of CBDC for Offline Payments	-	0.405**
		(2.70)
Cons	-0.261**	-0.194*
	(-2.75)	(-2.27)
Above 2.0% point		
Group 2	-0.0546	-0.111
	(-0.23)	(-0.47)
Group 3	-0.201	-0.344
	(-0.84)	(-1.42)
		Continued

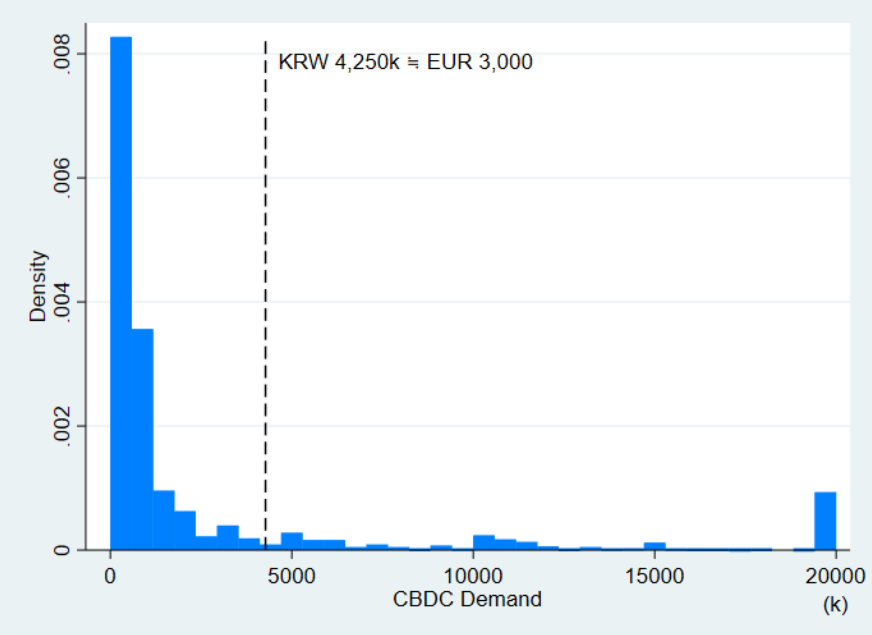
Table A.5 – Continued

Variable	Use Frequency	Use Frequency
Group 4	0.358	0.243
	(1.65)	(1.13)
Group 5	0.496*	0.484*
	(2.36)	(2.28)
Replacement Ratio	1.303***	-
	(6.98)	
Priority Use of CBDC for Online Payments	-	0.771**
		(2.90)
Priority Use of CBDC for Online Payments	-	0.938***
		(3.53)
Cons	-3.229***	-3.023***
	(-16.16)	(-17.87)
Observations	2,873	2,879

Notes: The numbers in parentheses indicate t statistics. * implies $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$. The dependent variable is an ordinal variable indicating the level of economic benefit respondents require to continue using their payment methods instead of adopting CBDC. Higher response values correspond to greater required benefits. Coefficients are estimated using the generalized ordered logit model.

A.6 Demand for CBDC including the amount from cash, demand deposit, and savings deposit

Figure A.6: Demand for CBDC: Shift from Cash, Demand Deposits, and Savings Deposits



Notes: CBDC demand denotes the sum of the amounts of CBDC that replace carrying cash, precautionary holding cash, demand deposit, and savings deposit. We set the demand for CBDC capped at KRW 20,000k.

A.7 Screenshots of the CBDC Design Module by Treatment

Figure A.7: Group 1 (App-Based Online CBDC)

Figure A.8: Group 2 (App-Based Online + Offline CBDC)

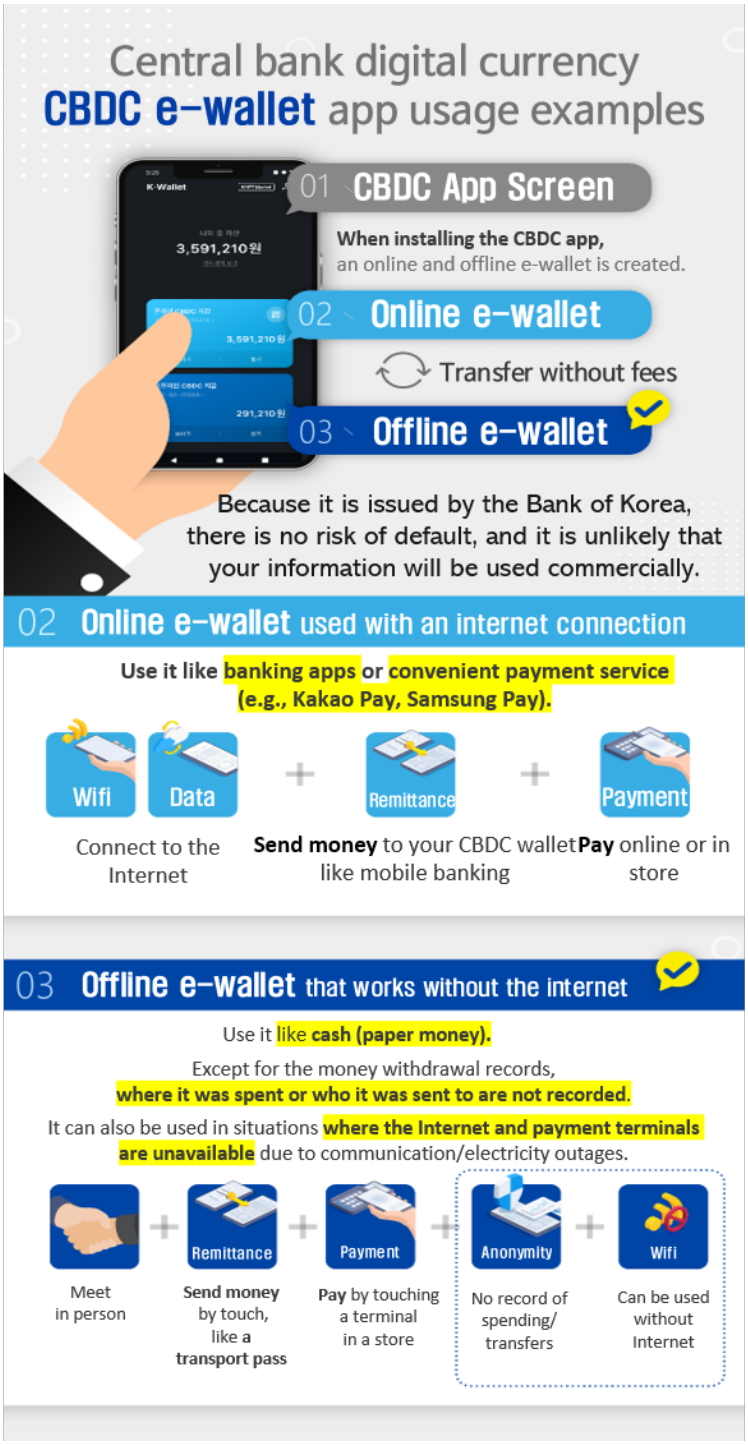


Figure A.9: Group 4 (App-Based Online CBDC + Interest)

Figure A.10: Group 5 (App+Card-Based Online+Offline CBDC + Interest)