Informational Experiment on Consumer's Perception of Central Bank Digital Currency as Liquidity Assets

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Abstract

This study explores how consumers perceive Central Bank Digital Currency (CBDC) in comparison with traditional financial instruments, focusing on the dual role of CBDC as a liquidity asset and a payment method. Through a survey experiment conducted with 3,000 participants, we investigate the distinction between CBDC as a liquidity asset versus a payment method and how awareness of its security and ecosystem might alter consumer preferences and usage patterns.

1 Introduction

When discussing the potential impacts of Central Bank Digital Currency (CBDC) on existing financial instruments such as bank deposits and credit cards, two issues must be taken into consideration. First, it is important to distinguish between the market of liquidity assets (the method of storing one's value in preparation for transactions) and payment methods (the way of transferring values to others). Second, we must acknowledge that consumers' perception of new technology like CBDC may not align with its technological potential. Failing to address these two issues could lead to a biased view of the potential impacts of CBDC.

It is crucial to differentiate between liquidity assets and payment methods because they are complementary, not substitutable. Consumers first allocate their value across various liquidity assets such as cash, bank deposits, and other commercial money. Then, when they encounter a counterpart, they select a payment method like an e-wallet or credit card to transfer value to the counterpart from one of the liquidity assets. In this setting, if CBDC primarily serves as an alternative liquidity asset, it could crowd out bank deposits but not necessarily drive out credit cards and e-wallets from the payment method market. Failing

to distinguish between liquidity assets and payment methods overlooks the key interactions among these financial instruments.

Predicting consumers' choices when they have a comprehensive understanding of CBDC's technical potential is necessary because it is what matters in the long run. CBDC is as secure, protected, and regulated as the banking system, and free from any credit risk. However, because CBDC is often operated on e-wallets in smartphones, consumers may perceive it as just another commercial money used on prepaid cards and other commercial e-wallets like WeChat Pay and AliPay. With this perception, consumers would not regard CBDC as an alternative liquidity asset to bank deposits but would only use it as a convenient payment method. Furthermore, consumers may not be aware of the potential ecosystem that could become available around CBDC to facilitate various types of transactions such as salary payments, security settlements, tax payments, and so on, that are available for bank deposits. Evaluating the preference for CBDC under such a misguided perception will fail to capture the potential threat to bank deposits as a safer and more convenient liquidity asset.

To address these issues, this paper poses several questions. First, we study consumers' perceptions of CBDC's features as liquidity assets and payment methods. Second, we investigate whether making consumers aware of CBDC's technical potential could change their perceptions. Finally, we examine whether the change in perceptions could result in a change in their willingness to allocate value to CBDC as a liquidity asset and the frequency of transactions using CBDC as a payment method. To achieve this, we conduct a large-scale survey experiment with a representative sample in Hong Kong, where the introduction of a version of CBDC, e-HKD, is extensively discussed among the Hong Kong Monetary Authority (HKMA), commercial banks, and other financial companies. In this survey, we perform a discrete choice experiment.

2 Experiment Design

We survey a representative sample of 3,000 people from Hong Kong. The survey includes five categories of questions. First, we ask about their perception of liquidity assets. Second, we ask about their perception of payment methods. Third, we ask for their allocation of liquidity across liquidity assets. Fourth, we ask for their choice of funding method for each payment method. Last, we ask for their choice of payment method in various transaction situations.

We randomly assign the sample into four groups of size 750: control, plain treatment, security-perception-enhanced treatment, and ecosystem-enhanced treatment. The control group and treatment groups differ in the choice sets in the questions; e-HKD is included

in the choice set for the treatment groups but not for the control group when we ask for their allocation of liquidity assets, choice of liquidity assets, and choice of payment methods. The control group and plain treatment group have the same information provided. Three treatment groups differ in the information provided at the beginning of the survey.

In the plain treatment and control group, e-HKD is explained as a digital asset that is free from default risk.

In the security-enhanced treatment group, in addition to this, it is stressed that e-HKD accounts and transaction records are managed in a regulated secure system operated by commercial and central banks like a bank deposit in the savings/current account of a bank. It is intended to give the impression that e-HKD is more secure and regulated than other non-bank commercial money.

In the ecosystem-perception-enhanced treatment group, in addition to this, it is emphasized that e-HKD will have an ecosystem like that of a bank deposit that enables payment in any situation like salary receipt, tax payment, and securities settlement. It is intended to give the impression that e-HKD is not merely money for retail payment, but will be an infrastructure of the entire payment system as well as bank deposit in the existing payment system.

We have two random parameters for respondents. This variation is aimed to identify the price elasticity of liquidity asset holding and payment method choice. In questions 17 to 20, we have bank deposit interest rates XX%. XX is sampled from the uniform distribution [0, 0.3][1]. The interest rates are the same for all mentioned questions within each respondent's answers, meaning that only one XX needs to be sampled for one respondent. In questions 21 to 29, we have credit card cashback rates ZZ%. ZZ is sampled from the uniform distribution [0, 4][2]. The cashback rates are the same for all mentioned questions within each respondent's answers, meaning that only one ZZ needs to be sampled for one respondent.

Before conducting the main experiment, we carry out a pilot study with a sample size of 100 participants. After running the pilot study, we observe the results and modify the questionnaire. Then, we submit the revised design and pre-analysis plan to the AEA Randomized Controlled Trials (RCT) Registry.

[1]Over the past five years, the average annual interest rate for bank deposits has hovered at approximately 0.15%.

[2]The average credit card cashback rate for major banks is 2%.

3 Analysis

Our hypotheses consist of three branches. First, we test whether the information provision affects consumers' perception of e-HKD in the intended direction. Second, we test whether the information provision affects consumers' utility from e-HKD as a liquidity asset, funding, and payment method. Third, we test whether the consumers' utility from e-HKD is higher than existing financial instruments as a liquidity asset, funding, and payment method.

3.1 Perception Enhancement via Information

For questions 1 to 15, we use a linear regression model to test the hypothesis. Let D_{ik} be the indicator variable taking a value of 1 if individual i belongs to treatment status $k = 0, 1, 2$. $k = 0$ indicates the consolidated control group, including groups of control group and plain treatment group. $k = 1$ indicates the security-enhanced information treatment, including groups of security-enhanced treatment and ecosystem-enhanced treatment. $k = 2$ indicates the ecosystem-enhanced information treatment, including the ecosystem-enhanced treatment group. Given $D_{i1} \times D_{i2} = D_{i2}$, we directly use D_{i2} in regression models for the effect of ecosystem-enhanced information treatment.

We consolidate every five questions into a set of three, and denote the response rating by individual i (for $i = 1, \ldots, N$) to question q (where $q = 1, 2, 3$) regarding option j (with $j = 1, \ldots, 5$) as y_{ij}^q. These options represent cash, e-HKD, bank deposits, other digital commercial money, and other liquid assets, respectively. The variable y_{ij}^q can take on the values $1, 2, 3, 4, 5$, which correspond to a rating scale ranging from the lowest rating to the highest rating. The value 3 is designated to represent the response "neutral" and "not sure." The regression models are defined as $y_{ij}^q = \beta_{j1}^q D_{i1} + \beta_{j2}^q D_{i2} + \epsilon_{ij}^q$ where ϵ_{ij}^q is an i.i.d. shocks and β_{jk}^q indicates the effect of group k when answering option j.

Then, the null hypotheses for H_{1a}-H_{2a} are:

- H_{1a}: $\beta_{21}^2 \leq 0$. The perceived rating of e-HKD on cybersecurity is higher among security-enhanced and ecosystem-enhanced treatment groups than the consolidated control group.

- H_{1b}: $\beta_{22}^3 \leq 0$. The perceived rating of e-HKD on the ecosystem is lower among the ecosystem-enhanced treatment group compared to the consolidated control group.

For question 17, we use a multinomial model to test the hypothesis. Let D_{ik} be the indicator variable taking a value of 1 if individual i belongs to treatment status $k = 0, 1, 2$. $k = 0$ indicates the consolidated control group. $k = 1$ indicates the security-enhanced information treatment, including groups of security-enhanced treatment and ecosystem-enhanced

treatment. $k = 2$ indicates the ecosystem-enhanced information treatment, including the ecosystem-enhanced treatment group. Given $D_{i1} \times D_{i2} = D_{i2}$, we directly use D_{i2} in regression models for the effect of ecosystem-enhanced information treatment.

Let y_{ij}^q be the liquidation allocation share by individual $i = 1, ..., N$ in question $q = 17$ for option $j = 1, \cdots, 5$ that represents cash, e-HKD, bank deposits, other digital commercial money, and other liquidity assets. The random utility for individual i to store liquidity t to asset j are defined as $u_{ijt}^q = \beta_{j0}^q + \beta_{j1}^q D_{i1} + \beta_{j2}^q D_{i2} + \epsilon_{ijt}^q$ where ϵ_{ijt}^q is an i.i.d. type-I extreme random variable and β_{jk}^q indicates the effect of group k when answering option j. We normalize the utility of cash to 0, namely, $\beta_{10}^q = \beta_{11}^q = \beta_{12}^q = 0$.

Then, the shares of each liquidity asset $y_i^q = (y_{i1}^q, \cdots, y_{iJ}^q)$ are:

$$\begin{aligned} y_{ij}^q &= \Pr\left[u_{ijt}^q > \max(u_{i1t}^q, \ldots, u_{iJt}^q)\right] \\ &= \frac{\exp(\beta_{j0}^q + \beta_{j1}^q D_{i1} + \beta_{j2}^q D_{i2})}{\sum_{l=1}^5 \exp(\beta_{l0}^q + \beta_{l1}^q D_{i1} + \beta_{l2}^q D_{i2})}. \end{aligned} \tag{1}$$

We choose cash as our baseline and for each option $j, j \neq 1$, our models are as follows:

$$\ln\left(\frac{y_{ij}^q}{y_{i1}^q}\right) = \beta_{j0}^q + \beta_{j1}^q D_{i1} + \beta_{j2}^q D_{i2}. \tag{2}$$

We estimate the model by running the above linear regression models. To guarantee a non-zero share of an asset $j, j \in \{1, 2, ..., 5\}$, we will replace the question 17 answer of 0 with the minimum non-zero share for asset j and normalize all shares with a sum of 100 ensuring that the shares represent a percentage allocation of a portfolio that totals 100%.

Then, the null hypotheses for H_{2a}-H_{2b} are:

- H_{2a}: $\beta_{21}^q \leq 0$. The mean utility of allocating liquidity to e-HKD is lower in the security-enhanced treatment group compared to the consolidated control group.

- H_{2b}: $\beta_{22}^q \leq 0$. The mean utility of allocating liquidity to e-HKD is lower in the ecosystem-enhanced treatment group compared to the security-enhanced treatment group.

We ask respondents about their funding methods for three payment methods: question 18 for "Octopus", question 19 for "e-wallet", and question 20 for "credit card". For question q, $q \in \{18, 19, 20\}$, we use a multinomial logit regression model to test the hypothesis. Let D_{ik} be the indicator variable taking a value of 1 if individual i belongs to treatment status $k = 0, 1, 2$. $k = 0$ indicates the consolidated control group. $k = 1$ indicates the security-enhanced information treatment, including groups of security-enhanced treatment

and ecosystem-enhanced treatment. $k = 2$ indicates the ecosystem-enhanced information treatment, including the ecosystem-enhanced treatment group. Given $D_{i1} \times D_{i2} = D_{i2}$, we directly use D_{i2} in regression models for the effect of ecosystem-enhanced information treatment.

Let y_{ij}^q be the choice answer by individual $i = 1, ..., N$ in question $q = 18, ..., 20$ for option $j = 1, \cdots, 5$ that represents cash, e-HKD, bank deposits, other commercial digital money, and other liquidity assets. The random utilities for individual i are defined as $u_{ij}^q = \beta_{j0}^q + \beta_{j1}^q D_{i1} + \beta_{j2}^q D_{i2} + \epsilon_{ij}^q$ where ϵ_{ij}^q is an i.i.d. type-I extreme random variable and β_{jk}^q indicates the effect of group k when answering option j.

Then, the probability of observing choice $y_i^q = (y_{i1}^q, \cdots, y_{iJ}^q)$:

$$\begin{aligned} \Pr\left[y_{ij}^q = 1; \beta^q\right] &= \Pr\left[u_{ij}^q > \max(u_{i1}^q, \ldots, u_{iJ}^q)\right] \\ &= \frac{\exp(\beta_{j0}^q + \beta_{j1}^q D_{i1} + \beta_{j2}^q D_{i2})}{\sum_{l=1}^5 \exp(\beta_{l0}^q + \beta_{l1}^q D_{i1} + \beta_{l2}^q D_{i2})}. \end{aligned} \tag{3}$$

We estimate the parameters by maximizing the above likelihood function.

Then, the null hypotheses for H_{3a}^q-H_{3b}^q, $q \in \{18, 19, 20\}$ are:

- H_{3a}^q: $\beta_{21}^q \leq 0$, The mean utility of e-HKD used for funding and settling for the payment method in question q is higher in the security-enhanced treatment group compared to the consolidated control group.

- H_{3b}^q: $\beta_{22}^q \leq 0$, The mean utility of e-HKD used for funding and settling in question q is higher in the ecosystem-enhanced treatment group compared to the security-enhanced treatment group.

We ask respondents about their payment method choice for nine payment scenarios: question 21 for "purchase food for 50HKD at a cafe", question 22 for "purchase grocery goods for 500 HKD at a grocery shop", question 23 for "purchase a labtop for 20,000 HKD at an electricity shop", question 24 for "purchase a labtop for 20,000 HKD at an electricity shop", question 25 for "order grocery goods delivery for 500 HKD on a mobile app or on an internet browser", question 26 for "order a laptop delivery for 20,000 HKD on a mobile app or on an internet browser.", question 27 for "transfer 500 HKD to a friend for the payment at the restaurant", question 28 for "pay an annual profit tax to the Inland Revenue Department", question 29 for "receive monthly salary from the employer".

For question q, $q \in \{21, ..., 29\}$, we use a multinomial logit regression model to test the hypothesis. The only difference from the previous analysis is that the alternatives include $j = 1, \cdots, 6$, representing direct cash transfer, direct e-HKD transfer, direct bank transfer, Octopus, e-Wallet, and credit card.

Then, the null hypotheses for H_{4a}^{q}-H_{4o}^{q}, $q \in \{21, ..., 29\}$ are:

- H_{4a}^{q}, $q \in \{21, ..., 29\}$: $\beta_{21}^{q} \leq 0$. The mean utility of direct e-HKD transfer for transactions is higher in the security-enhanced treatment group compared to the consolidated control group.

- H_{4b}^{q}, $q \in \{21, ..., 29\}$: $\beta_{22}^{q} \leq 0$. The mean utility of direct e-HKD transfer for transactions is lower in the ecosystem-enhanced treatment group compared to the security-enhanced treatment group.

Based on the above estimates, we test whether the utility of e-HKD is higher than other liquidity assets as a liquidity asset, funding, and payment method for each question in plain treatment group, security-enhanced treatment group, ecosystem-enhanced treatment group.

For liquidity asset $j, j \in \{1, 3, 4, 5\}$, indicating cash, bank deposit, other commercial digital money, and other liquidity assets in question 17, we have the following hypotheses for treatment status $k, k \in \{0, 1, 2\}$, indicating consolidated control group, security-enhanced treatment group, and ecosystem-enhanced treatment group:

- $H_{5a}^{17,j,k}$: $\sum_{z=0}^{k} \left(\beta_{2z}^{17} - \beta_{jz}^{17}\right) \leq 0$. The mean utility of e-HKD as a liquidity asset for information treatment status k in question 17 is no greater than liquidity asset j.

For liquidity asset $j, j \in \{1, 3, 4, 5\}$, indicating cash, bank deposit, other commercial digital money, and other liquidity assets in question 18-20, we have the following hypotheses for treatment status $k, k \in \{0, 1, 2\}$, indicating consolidated control group, security-enhanced treatment group, and ecosystem-enhanced treatment group:

- $H_{5b}^{q,j,k}$, $q \in \{18, 19, 20\}$: $\sum_{z=0}^{k} \left(\beta_{2z}^{q} - \beta_{jz}^{q}\right) \leq 0$. The mean utility of e-HKD as a funding method for information treatment status k in question q is no greater than liquidity asset j.

For liquidity asset $j, j \in \{1, 3, 4, 5, 6\}$, indicating direct cash transfer, direct bank deposit transfer, octopus, e-wallet, credit card in question 21-29, we have the following hypotheses for treatment status $k, k \in \{0, 1, 2\}$, indicating consolidated control group, security-enhanced treatment group, and ecosystem-enhanced treatment group:

- $H_{5c}^{q,j,k}$, $q \in \{21, ..., 29\}$: $\sum_{z=0}^{k} \left(\beta_{2z}^{q} - \beta_{jz}^{q}\right) \leq 0$. The mean utility of e-HKD as a payment method for information treatment status k in question q is no greater than payment method j.

3.2 Multiple Hypothesis Testing Correction

Five families of hypotheses can be identified in the study:

- Perception enhancement via e-HKD information (2 hypotheses)
- Liquidity allocation via e-HKD information (2 hypotheses)
- Funding and settling method choice via e-HKD information (6 hypotheses)
- Payment method choice via e-HKD information (18 hypotheses)
- Mean utility test of e-HKD for the consolidated control group (4 hypotheses for liquidation allocation, 12 hypotheses for liquidity asset choice of funding and selling method; 45 hypotheses for payment method choice)
- Mean utility test of e-HKD for the security-enhanced treatment group (4 hypotheses for liquidation allocation, 12 hypotheses for liquidity asset choice of funding and selling method; 45 hypotheses for payment method choice)
- Mean utility test of e-HKD for the ecosystem-enhanced treatment group (4 hypotheses for liquidation allocation, 12 hypotheses for liquidity asset choice of funding and selling method; 45 hypotheses for payment method choice)

With the m null hypotheses in one family, we obtain corresponding p-values $p_1, p_2, \ldots, p_m$ from the hypothesis tests. To control the false discovery rate (FDR) at level $\alpha = 0.05$, we implement the Benjamini-Hochberg (BH) procedure (Benjamini and Hochberg, 1995) and bootstrap method (Romano and Wolf, 2010).

3.3 Sensitivity Analysis

We perform a sensitivity analysis focusing on two key parameters: the bank deposit interest rate and the credit card cashback rate.

3.3.1 Bank Deposit Interest Rate

We randomly vary the bank deposit interest rate from 0% to 0.3% above inflation by individual $i = 1, ..., N$ for questions 17 to 20. Let r_i^b be the demeaned bank deposit interest rate. We examine the interactions between the interest rate and treatment group indicators.

For question 17, the utilities are defined as

$$u_{ijt}^q = \beta_{j0}^q + \beta_{j1}^q D_{i1} + \beta_{j2}^q D_{i2} + r_i^b \left(\gamma_{j0}^q + \gamma_{j1}^q D_{i1} + \gamma_{j2}^q D_{i2}\right) + \epsilon_{ijt}^q. \tag{4}$$

For questions 18 to 20, the utilities are defined as

$$u_{ij}^q = \beta_{j0}^q + \beta_{j1}^q D_{i1} + \beta_{j2}^q D_{i2} + r_i^b \left(\gamma_{j0}^q + \gamma_{j1}^q D_{i1} + \gamma_{j2}^q D_{i2}\right) + \epsilon_{ijt}^q. \tag{5}$$

3.3.2 Credit Card Cashback Rate

We randomly vary the cashback rates from 0% to 4% by individual $i = 1, ..., N$ for questions 21 to 29. Let r_i^c be the demeaned cashback rate. We examine the interactions between the interest rate and treatment group indicators.

For questions 21 to 29, the utilities are defined as

$$u_{ij}^q = \beta_{j0}^q + \beta_{j1}^q D_{i1} + \beta_{j2}^q D_{i2} + r_i^c \left(\gamma_{j0}^q + \gamma_{j1}^q D_{i1} + \gamma_{j2}^q D_{i2}\right) + \epsilon_{ijt}^q. \tag{6}$$

Table 1: Variable definitions

Variable	Description
D_{ik}	Indicator for treatment status of individual i in group k
y_{ij}^q	Rating/choice/liquidation allocation percentage by individual i for option j in question q
u_{ij}^q	Random utility for individual i for option j in question q
ϵ_{ij}^q	Type-I extreme random variable for individual i and option j in question q
β_{jk}^q	Effect of group k on the response of option j in question q
β_{jk}^q	Effect of group k on the response of option j compared with baseline option in question q

A Survey Questions

1. Please rate the default risk of **cash** based on your perception.
   (a) No default risk
   (b) Little default risk
   (c) Neutral
   (d) Some default risk
   (e) High default risk
   (f) Not sure
2. Please rate the potential default risk of **e-HKD** based on your perception.
   (a) No default risk
   (b) Little default risk
   (c) Neutral
   (d) Some default risk
   (e) High default risk
   (f) Not sure
3. Please rate the default risk of **bank deposit** based on your perception.
   (a) No default risk
   (b) Little default risk

(c) Neutral

(d) Some default risk

(e) High default risk

(f) Not sure

4. Please rate the default risk of **other digital commercial money** based on your perception.

   (a) No default risk

   (b) Little default risk

   (c) Neutral

   (d) Some default risk

   (e) High default risk

   (f) Not sure

5. Please rate the default risk of **other liquidity assets** based on your perception.

   (a) No default risk

   (b) Little default risk

   (c) Neutral

   (d) Some default risk

   (e) High default risk

   (f) Not sure

6. Please rate the cybersecurity of **cash** based on your perception.

   (a) Highly secure

   (b) Moderately secure

   (c) Neutral

   (d) Somewhat insecure

   (e) Not secure

   (f) Not sure

7. Please rate the potential cybersecurity of **e-HKD** based on your perception.

(a) Highly secure

(b) Moderately secure

(c) Neutral

(d) Somewhat insecure

(e) Not secure

(f) Not sure

8. Please rate the cybersecurity of **bank deposit** based on your perception.

(a) Highly secure

(b) Moderately secure

(c) Neutral

(d) Somewhat insecure

(e) Not secure

(f) Not sure

9. Please rate the cybersecurity of **other digital commercial money** based on your perception.

(a) Highly secure

(b) Moderately secure

(c) Neutral

(d) Somewhat insecure

(e) Not secure

(f) Not sure

10. Please rate the cybersecurity of **other liquidity assets** based on your perception.

(a) Highly secure

(b) Moderately secure

(c) Neutral

(d) Somewhat insecure

(e) Not secure

(f) Not sure

11. Please rate the ecosystem of **cash** (cash as an infrastructure for the ecosystem) based on your perception. A rich ecosystem refers to the numerous use cases and volume of users.

    (a) Highly rich
    (b) Moderately rich
    (c) Neutral
    (d) Somewhat not rich
    (e) Not rich
    (f) Not sure

12. Please rate the potential ecosystem of **e-HKD** (e-HKD as an infrastructure for the ecosystem) based on your perception. A rich ecosystem refers to the numerous use cases and volume of users.

    (a) Highly rich
    (b) Moderately rich
    (c) Neutral
    (d) Somewhat not rich
    (e) Not rich
    (f) Not sure

13. Please rate the ecosystem of **bank deposit** (bank deposit as an infrastructure for the ecosystem) based on your perception. A rich ecosystem refers to the numerous use cases and volume of users.

    (a) Highly rich
    (b) Moderately rich
    (c) Neutral
    (d) Somewhat not rich
    (e) Not rich
    (f) Not sure

14. Please rate the ecosystem of **other digital commercial money** (other digital commercial money as an infrastructure for the ecosystem) based on your perception. A rich ecosystem refers to the numerous use cases and volume of users.

(a) Highly rich

(b) Moderately rich

(c) Neutral

(d) Somewhat not rich

(e) Not rich

(f) Not sure

15. Please rate the ecosystem of **other liquidity assets** (other liquidity assets as an infrastructure for the ecosystem) based on your perception. A rich ecosystem refers to the numerous use cases and volume of users.

(a) Highly rich

(b) Moderately rich

(c) Neutral

(d) Somewhat not rich

(e) Not rich

(f) Not sure

16. What is the amount of money holdings in HKD? The money holdings are financial liquid assets for payments like cash, bank deposits, and other commercial money, and do not include assets for investment like time deposits, stocks, bonds, and funds.

17. How much proportion will you usually keep in each liquidity asset for payment? Make them sum up to 100%. Suppose that the annual inflation rate is 1.8% and the bank deposit gives XX% interest rate[3]. Note that the last-5-year average inflation rate and bank deposit rate in Hong Kong were 1.8% and 0.15%, respectively.

(a) Cash

(b) e-HKD (Treatment groups only)

(c) Bank deposit

(d) Other digital commercial money

(e) Other liquidity assets

[3]XX is drawn from the uniform distribution $U[0, 0.3]$. It is fixed for a respondent.

18. For the following payment methods, which liquidity asset will you mainly use for funding and settling? Suppose that the annual inflation rate is 1.8% and the bank deposit gives XX% interest rate. Note that the last-5-year average inflation rate and bank deposit rate in Hong Kong were 1.8% and 0.15%, respectively.: Octopus

    (a) Cash
    (b) e-HKD (Treatment groups only)
    (c) Bank deposit
    (d) Other digital commercial money
    (e) Other liquidity assets

19. For the following payment methods, which liquidity asset will you mainly use for funding and settling? Suppose that the annual inflation rate is 1.8% and the bank deposit gives XX% interest rate. Note that the last-5-year average inflation rate and bank deposit rate in Hong Kong were 1.8% and 0.15%, respectively.: e-Wallet

    (a) Cash
    (b) e-HKD (Treatment groups only)
    (c) Bank deposit
    (d) Other digital commercial money
    (e) Other liquidity assets

20. For the following payment methods, which liquidity asset will you mainly use for funding and settling? Suppose that the annual inflation rate is 1.8% and the bank deposit gives XX% interest rate. Note that the last-5-year average inflation rate and bank deposit rate in Hong Kong were 1.8% and 0.15%, respectively.: Credit card

    (a) Cash
    (b) e-HKD (Treatment groups only)
    (c) Bank deposit
    (d) Other digital commercial money
    (e) Other liquidity assets

21. For the following transaction scenarios, which payment method with which liquidity asset will you use? Suppose a credit card gives ZZ% cash back that expires in 2 years.[4]: Purchase food for 50 HKD at a cafe.

[4] ZZ is drawn from the uniform distribution $U[0, 4]$. It is fixed for a respondent.

(a) Direct cash transfer

(b) Direct e-HKD transfer (Treatment groups only)

(c) Direct bank transfer

(d) Octopus (choose the funding liquidity asset)

   i. Cash

   ii. e-HKD (Treatment groups only)

   iii. Bank deposit

   iv. Other digital commercial money

   v. Other liquidity assets

(e) e-Wallet (choose the funding liquidity asset)

   i. Cash

   ii. e-HKD (Treatment groups only)

   iii. Bank deposit

   iv. Other digital commercial money

   v. Other liquidity assets

(f) Credit card (choose the settling liquidity asset)

   i. Cash

   ii. e-HKD (Treatment groups only)

   iii. Bank deposit

   iv. Other digital commercial money

   v. Other liquidity assets

22. For the following transaction scenarios, which payment method with which liquidity asset will you use? Suppose a credit card gives ZZ% cash back that expires in 2 years: Purchase grocery goods for 500 HKD at a grocery shop.

(a) Direct cash transfer

(b) Direct e-HKD transfer (Treatment groups only)

(c) Direct bank transfer

(d) Octopus (choose the funding liquidity asset)

   i. Cash

   ii. e-HKD (Treatment groups only)

iii. Bank deposit
iv. Other digital commercial money
v. Other liquidity assets

(e) e-Wallet (choose the funding liquidity asset)
i. Cash
ii. e-HKD (Treatment groups only)
iii. Bank deposit
iv. Other digital commercial money
v. Other liquidity assets

(f) Credit card (choose the settling liquidity asset)
i. Cash
ii. e-HKD (Treatment groups only)
iii. Bank deposit
iv. Other digital commercial money
v. Other liquidity assets

23. For the following transaction scenarios, which payment method with which liquidity asset will you use? Suppose a credit card gives ZZ% cash back that expires in 2 years: Purchase a laptop for 20,000 HKD at an electricity shop.

(a) Direct cash transfer

(b) Direct e-HKD transfer (Treatment groups only)

(c) Direct bank transfer

(d) Octopus (choose the funding liquidity asset)
i. Cash
ii. e-HKD (Treatment groups only)
iii. Bank deposit
iv. Other digital commercial money
v. Other liquidity assets

(e) e-Wallet (choose the funding liquidity asset)
i. Cash
ii. e-HKD (Treatment groups only)

iii. Bank deposit
iv. Other digital commercial money
v. Other liquidity assets

(f) Credit card (choose the settling liquidity asset)
i. Cash
ii. e-HKD (Treatment groups only)
iii. Bank deposit
iv. Other digital commercial money
v. Other liquidity assets

24. For the following transaction scenarios, which payment method with which liquidity asset will you use? Suppose a credit card gives ZZ% cash back that expires in 2 years: Order a food delivery for 50 HKD on a mobile app or on an Internet browser.

(a) Direct cash transfer
(b) Direct e-HKD transfer (Treatment groups only)
(c) Direct bank transfer
(d) Octopus (choose the funding liquidity asset)
i. Cash
ii. e-HKD (Treatment groups only)
iii. Bank deposit
iv. Other digital commercial money
v. Other liquidity assets

(e) e-Wallet (choose the funding liquidity asset)
i. Cash
ii. e-HKD (Treatment groups only)
iii. Bank deposit
iv. Other digital commercial money
v. Other liquidity assets

(f) Credit card (choose the settling liquidity asset)
i. Cash
ii. e-HKD (Treatment groups only)

iii. Bank deposit
iv. Other digital commercial money
v. Other liquidity assets

25. For the following transaction scenarios, which payment method with which liquidity asset will you use? Suppose a credit card gives ZZ% cash back that expires in 2 years: Order grocery goods delivery for 500 HKD on a mobile app or on an Internet browser.

(a) Direct cash transfer
(b) Direct e-HKD transfer (Treatment groups only)
(c) Direct bank transfer
(d) Octopus (choose the funding liquidity asset)
    i. Cash
    ii. e-HKD (Treatment groups only)
    iii. Bank deposit
    iv. Other digital commercial money
    v. Other liquidity assets
(e) e-Wallet (choose the funding liquidity asset)
    i. Cash
    ii. e-HKD (Treatment groups only)
    iii. Bank deposit
    iv. Other digital commercial money
    v. Other liquidity assets
(f) Credit card (choose the settling liquidity asset)
    i. Cash
    ii. e-HKD (Treatment groups only)
    iii. Bank deposit
    iv. Other digital commercial money
    v. Other liquidity assets

26. For the following transaction scenarios, which payment method with which liquidity asset will you use? Suppose a credit card gives ZZ% cash back that expires in 2 years: Order a laptop delivery for 20,000 HKD on a mobile app or on an Internet browser.

(a) Direct cash transfer

(b) Direct e-HKD transfer (Treatment groups only)

(c) Direct bank transfer

(d) Octopus (choose the funding liquidity asset)

   i. Cash

   ii. e-HKD (Treatment groups only)

   iii. Bank deposit

   iv. Other digital commercial money

   v. Other liquidity assets

(e) e-Wallet (choose the funding liquidity asset)

   i. Cash

   ii. e-HKD (Treatment groups only)

   iii. Bank deposit

   iv. Other digital commercial money

   v. Other liquidity assets

(f) Credit card (choose the settling liquidity asset)

   i. Cash

   ii. e-HKD (Treatment groups only)

   iii. Bank deposit

   iv. Other digital commercial money

   v. Other liquidity assets

27. For the following transaction scenarios, which payment method with which liquidity asset will you use? Suppose a credit card gives ZZ% cash back that expires in 2 years: Transfer 500 HKD to a friend for the payment at the restaurant.

(a) Direct cash transfer

(b) Direct e-HKD transfer (Treatment groups only)

(c) Direct bank transfer

(d) Octopus (choose the funding liquidity asset)

   i. Cash

   ii. e-HKD (Treatment groups only)

iii. Bank deposit
iv. Other digital commercial money
v. Other liquidity assets

(e) e-Wallet (choose the funding liquidity asset)
i. Cash
ii. e-HKD (Treatment groups only)
iii. Bank deposit
iv. Other digital commercial money
v. Other liquidity assets

(f) Credit card (choose the settling liquidity asset)
i. Cash
ii. e-HKD (Treatment groups only)
iii. Bank deposit
iv. Other digital commercial money
v. Other liquidity assets

28. For the following transaction scenarios, which payment method with which liquidity asset will you use? Suppose a credit card gives ZZ% cash back that expires in 2 years: pay an annual profit tax to the Inland Revenue Department.

(a) Direct cash transfer

(b) Direct e-HKD transfer (Treatment groups only)

(c) Direct bank transfer

(d) Octopus (choose the funding liquidity asset)
i. Cash
ii. e-HKD (Treatment groups only)
iii. Bank deposit
iv. Other digital commercial money
v. Other liquidity assets

(e) e-Wallet (choose the funding liquidity asset)
i. Cash
ii. e-HKD (Treatment groups only)

iii. Bank deposit
iv. Other digital commercial money
v. Other liquidity assets

(f) Credit card (choose the settling liquidity asset)
i. Cash
ii. e-HKD (Treatment groups only)
iii. Bank deposit
iv. Other digital commercial money
v. Other liquidity assets

29. For the following transaction scenarios, which payment method with which liquidity asset will you use? Suppose a credit card gives ZZ% cash back that expires in 2 years: Receive monthly salary from the employer.

(a) Direct cash transfer
(b) Direct e-HKD transfer (Treatment groups only)
(c) Direct bank transfer
(d) Octopus (choose the funding liquidity asset)
i. Cash
ii. e-HKD (Treatment groups only)
iii. Bank deposit
iv. Other digital commercial money
v. Other liquidity assets

(e) e-Wallet (choose the funding liquidity asset)
i. Cash
ii. e-HKD (Treatment groups only)
iii. Bank deposit
iv. Other digital commercial money
v. Other liquidity assets

(f) Credit card (choose the settling liquidity asset)
i. Cash
ii. e-HKD (Treatment groups only)

iii. Bank deposit

iv. Other digital commercial money

v. Other liquidity assets

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