Question: 15. Should a CBDC pay interest? If so, why and how? If not, why not?

Return to CBDC Benefits, Risks, and Policy Considerations

Question

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1. **Should a CBDC pay interest?**
2. **If so, why and how?**
3. **If not, why not?**

Answer

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The answer depends on the architecture, design and implementation. (See: 15_common).

1. If it is a replacement for cash: **NO**
2. If it is a replacement for a bank accounts or equivalent such as Payment Cards savings, checking, investment, direct pay, credit, debit cards, etc.): **YES**

Overview

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Before an answer can be provided about paying interest on CBDC, it is essential to clearly state the purpose and goals of the CBDC. Based upon the information in the White Paper, it is not clear if the CBDC should be a replacement for Physical Money, a replacement for bank accounts, or a hybrid combination of the two. Currently, there is no interest paid on cash. In fact, that is a motivation for not hoarding cash, but to put it into an account. The interest paid on the account, depends on the kind of account (i.e., checking, savings, certificate of deposit, money market, etc.).

1. Is the CBDC suppose to be an alternative to existing physical dollar bills? If so:

- What denominations are to be created (\$1, \$2, \$5, \$10, \$20, \$50, \$100)?
- What about coins? (i.e., penny, nickel, dime, quarter, half-dollar)
- Will it be able to be used everywhere physical money is used?
- Can transaction be made using a combination of CBDC and Physical Money?
- Can CBDC and Physical Money be interchanged? Where? Fees?

2. Is it supposed to be the equivalent of a financial account (i.e, savings, checking, investment, direct pay, credit, debit cards, etc.) ? If so:

- How many accounts can an individual have?
- Is there a cost for maintaining the accounts?
- How will rules such as Know-Your-Customer(KYC) be applied?
- Can the accounts be garnered for taxes? Child support? Student debt? Other debt?
- Does it require a court order or warrant to review the account activity?
- Is there an age limit on who can have an account?
- Do you have to be a US Resident to have an account?
- What IDs need to be associated with the account?
- Do you need a taxpayer ID?
- Do you need to have a current street address?

3. Has a trade study been conducted to determine the best solution?

Examples

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There are three categories of requirements alluded to in the White Paper as identified by the identified by the Object Management Group White Paper Analysis:

There are three Currency Models that are applicable to the CBDC.

- **10_cash** - is a model representing the CBDC using cash (i.e., coins, \$1, \$2, \$5, \$10, \$20, \$50 and \$100 bills)) as the basis of the CBDC
- **15_accounts** - is a model that represents the CBDC in using digital accounts (i.e, Savings, Checking, Investment, Direct Pay, Credit Cards, Debit Cards, etc.)
- **30_stablecoins** - is a currency model tying a cryptocurrency to a real world asset such as a fiat currency, gold, indexed funds. etc.

Table 1 provides a list of requirements associated with each of the CBDC model taxonomy.

Table 1: Example of mapping a subset of requirements identified during the White Paper Analysis conducted by the OMG

Topic	Requirements
Digital Cash Model	• B0003, B0004, B0007, B0009, B0013, B0018, B0020, B0022-1, B0022-2, B0022-3, B0024, B0028, B0029, B0034, B0036, B0040, B0042 • P0004, P0027, P0029 • R0013 • D0001, D0006, D0007, D0009

Topic	Requirements
Digital Account Model	• B0005, B0010, B0022-4, B0038, B0047, B0048, B0049, B0051, B0054 • P0002, P0012, P0013, P0017, P0018, P0019, P0020, P0021, P0023, P0024, P0025, P0017, P0028, P0030 • R0002, R0009, R0012, R0015, R0020, R0023 • D0001, D0002, D0003, D0005, D0008, D0010, D0012, D0013,
Stablecoin / Research	• B0016, B0017, B0021 • P0008, P0015, P0016 • R0010, R0017, R0019, R0020, R0021, R0022

Discussion of Examples

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The following discussion of the three models identified in the requirements. Each section is independent of the other sections and can be read *as-is*.

Digital Cash Model

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Many of the OMG identified “desirements” found in the Money and Payments: The U.S. Dollar in the Age of Digital Transformation **White Paper** during the White Paper Analysis appear to be appropriate of a CBDC “Cash Model”. The “Cash Model” uses Digital Money in an analogous model as Cash for CBDC. For example, the requirements **B0004** which is a requirement to *“Protect consumer privacy”* is more closely related to a “cash mode” rather than a bank account model. There are no bank accounts required in order to complete a transaction, just “cash” in exchange for goods and services. This is in contrast to check books, debit or credit card transactions, which are associated with an account offered by intermediary commercial banks and directly tied to an Identity.

Table 2: List of requirements (i.e., desirements) identified in the **White Paper** indicating a **Cash Model**.

Requirement	Statement	Comment
B0003	**Complement, rather than replace, current forms of money and methods for providing financial services**	A “digital cash” is complementary to the existing cash money, just without the need for physical money.
B0004	**Protect consumer privacy**	There are no identities required for cash transactions.

Requirement	Statement	Comment
B0007	**Provide households and businesses a:** **1.** **convenient** **2.** **electronic form of central bank money with** **1.** **safety** **2.** **liquidity**	• Cash probably represents the epitome of liquidity, that is, unless the size of the transaction get too big, then US Federal law requires a person to report cash transactions of more than \$10,000 by filing IRS Form 8300 PDF, Report of Cash Payments Over \$10,000 received in a Trade or Business. [1)] • With cash, your spending is straightforward and there is less risk of identity theft. Ultimately, it's up to each individual to make the best decisions based on their financial health, what they are purchasing, and the risks they are willing to incur[2)].
B0009	**Provide faster and cheaper payments (including cross-border payments)**	US Dollars in the form of cash is used in many parts of the world. As of 2018, the U.S. had $1,671 billion in circulation. As much as half that value is estimated to be in circulation abroad.[3)] Many of these bills are in the former Soviet Union countries and in Latin America. They are often used as hard currency in day-to-day transactions. https://www.thebalance.com/world-currency-3305931#citation-12
B0013	**Provide immediate access to transferred funds**	Sine the digital cash is for all intents and purposes cash, the same accessibility as cash should apply
B0018	**Allow the general public to make digital payments**	Digital cash should be immediate transferrable to traditional cash, and therefore, it should be at least as usable for digital payments as actual cash, but can also be used online just like Direct Pay, Credit or Debit Cards.
B0019	**Provide the safest digital asset available to the general public, with no:** **1.** **associated credit** **2.** **liquidity risk**	With cash, there is no need for credit and by definition it is liquid. See Liquidity Risk
B0020	**Maintain public confidence by not requiring mechanisms, such as deposit insurance**	The only need for https://www.omgwiki.org/dido/doku.php?id=dido:public:ra:xapend:xapend.a_glossary:d:deposit_insurance is when there is not enough cash in hand to pay for liabilities. By definition, a cash-based CBDC would have enough cash.
B0022	**Provide a CBDC that is:** **1.** **Privacy-Protected** **2.** **NOT Intermediated** **3.** **Widely Transferable** **4.** **NOT Identity-Verified**	By definition, cash is considered private and is widely transferable unless the quantity of cash makes it too onerous.
B0024	**Provide transactions finalized and completed in real time**	Since there is no need to do a background check on the participants in a cash transaction, the transaction is real-time.
B0028	**Offer the general public broad access to digital money:** **1.** **free from credit risk** **2.** **liquidity risk**	Cash is by definition does not require credit and inherently no Liquidity Risk.

Requirement	Statement	Comment
B0029	**Support basic purchases of: 1. goods 2. services 3. pay bills 4. pay taxes**	There is no federal statute mandating that a private business, a person, or an organization must accept currency or coins as payment for goods or services. Private businesses are free to develop their own policies on whether to accept cash unless there is a state law that says otherwise. https://www.federalreserve.gov/faqs/currency_12772.htm, Therefore, the same can be applied to Digital Cash. Although it is currently possible to pay Federal taxes in cash, it is more difficult than paying online with Direct Pay, Credit or Debit Cards.
B0034	**Generate new capabilities to meet the speed and efficiency requirements of the digital economy**	Although cash is quick and efficient during face-to-face transactions, it is difficult ver long distances or when the payments become large.
B0036	**Preserve the dominant international role of the U.S. dollar**	See: **B0009**
B0040	**Provide micropayment support**	As long as the micropayment is larger than the cost of conducting the transaction, micropayments are feasible. However, if the cost of the micropayment is very small, then there is probably a need for an account for accumulating the micropayments until it becomes financially viable to process the micropayment.
B0042	**Preserve the dominant international role of the U.S. dollar**	See: **B0009**
P0004	**Protect consumer privacy**	Since there is no need for an account or identification with cash, consumer's privacy is protected.
P0027	**CBDC a risk-free asset**	As long as the CBDC is tied to the US Dollar, it will have the same risk as the US Dollar.
P0029	**The Federal Reserve is committed to ensuring the continued safety and availability of cash**	The Cash Model for CBDC treats the CBDC as a form of cash when the cash model is used.
R0013	**CBDC offers no associated credit or Liquidity Risk**	In the cash model of the CBDC, this is definitely true.
D0001	**Design should be for a non-interest-bearing CBDC, for example, would be less attractive as a substitute for commercial bank money**	CBDC using the cash model would be just another form of cash, and therefore shuold not offer interest
D0006	**Design should allow an increase in CBDC supply to provide an adequate buffer, so there is little effect on the federal funds rate**	The same rules would apply as used with traditional cash
D0007	**Design should allow the Federal Reserve to increase the level of reserves on average, in order to provide an adequate buffer against unanticipated increases in CBDC**	Under the CBDC cash model, the Federal Reserve would treat CBDC reserves similarly to cash reserves

Requirement	Statement	Comment
D0009	**Design should allow for significant foreign demand for CBDC, furthering complicate monetary policy implementation**	See: **B0009**

Digital Account Model

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Many of the OMG identified requirements found in the Money and Payments: The U.S. Dollar in the Age of Digital Transformation **White Paper** during the White Paper Analysis appear to be appropriate of a CBDC **"Account Model"**. The **"Account Model"** uses Digital Money in an analogous model as Accounts for CBDC. For example, the requirements **B0005** which is a requirement to *"Protect against criminal activity| In this context, criminal activity is either Money Laundering or Fraud. Fraud is an intentionally deceptive action designed to provide the perpetrator with an unlawful gain or to deny a right to a victim. Types of fraud include tax fraud, credit card fraud, wire fraud, securities fraud, and bankruptcy fraud. Fraudulent activity can be carried out by one individual, multiple individuals, or a business firm as a whole"* is easily assocaired with **Acounts**.

Table 3: List of requirements (i.e., desirements) identified in the **White Paper** indicating a **Account Model**.

Requirement	Statement	Comment
B0005	**Protect against criminal activity**	In this context, criminal activity is either Money Laundering or Fraud. Fraud is an intentionally deceptive action designed to provide the perpetrator with an unlawful gain or to deny a right to a victim. Types of fraud include tax fraud, credit card fraud, wire fraud, securities fraud, and bankruptcy fraud. Fraudulent activity can be carried out by one individual, multiple individuals, or a business firm as a whole.
B0010	**Expand consumer access to the financial system**	A financial system is the entire set of non-cash based institutions (i.e., banks, thrifts, insurance companies, stock exchanges, etc.) permitting and facilitating the exchange of funds. Expansion would entail adding people to these institutions

Requirement	Statement	Comment
B0022	**Provide a CBDC that is:** **1.** **NOT Privacy-Protected** **2.** **Intermediated** **3.** **NOT Widely Transferable** **4.** **Identity-Verified**	Intermediated generally implies accuntys or digital wallets. Identity-Verified generally implies validating and verifying a person's identity to gain access to their accounts
B0038	**Allow private-sector innovators to focus on:** **1.** **new access services** **2.** **distribution methods** **3.** **related service offerings**	These innovations would predominately be account based.
B0047	**Lower transaction costs**	Normally, there are no transaction costs for using cash
B0048	**Provide a secure way for people to save**	People save money in accounts unless we are offering piggy banks
B0049	**Promote access to credit**	Credit is, by definition, using cash you do not have access too.
B0051	**Generate data about users' financial transactions similarly to current Commercial Bank[4] and nonbank_money**	This kind of data is collected on the activity in accounts.
B0054	**Attract risk-averse users to CBDC**	Risk Adverse investments usually pay little to no incentive to investors, but its value remains constant. Cash represents that kind of investment
P0002	**Provide Yield benefits more effectively than alternative methods**	Cash generall offers no yield, therefore, this would require accounts
P0005	**Protect against criminal activity**	See: **B0005**
P0012	**The firms that operate interbank payment services are subject to federal supervision**	These services typically use accounts to move payments, unless it is referring to armored guards and vehicles
P0013	**Systemically important payment firms are subject to** **1.** **heightened supervision** **2.** **regulation**	Refers to the accounting practices used by the payment firms

Requirement	Statement	Comment
P0017	**The PWG report recommends CBDC complement existing authorities regarding: 1. market integrity 2. investor protection 3. illicit finance**	Refers to the accounting practices for CBDC accounts
P0018	**The Federal Reserve Act does not authorize direct Federal Reserve accounts for individuals**	Refers to accounts
P0019	**Federal Reserve accounts for individuals represent a significant expansion of the Federal Reserve's role in the financial system and the economy**	Refers to accounts
P0020	**The private sector would offer accounts or digital wallets to facilitate the management of CBDC holdings and payments**	Refers to accounts
P0021	**The intermediaries would operate in an open market for CBDC services**	Refers to accounts
P0023	**CBDC would need to be readily transferable between customers of different intermediaries**	Intermediaries imply accounts
P0024	**CBDC would need to comply with the U.S. robust rules**	Implies accounting and oversight rules
P0025	**CBDC intermediary would need to verify the identity of a person accessing CBDC**	Intermediaries imply accounts
P0027	**CBDC a risk-free asset**	See: **B0054**
P0028	**Require significant international coordination to address issues such as: 1. common standards 2. infrastructure, 3. the types of intermediaries able to access any new infrastructure, 4. legal frameworks 5. preventing illicit transactions 6. the cost and timing of implementation**	

Requirement	Statement	Comment
P0030	**The Federal Reserve will only take further steps toward developing a CBDC if: 1. Research points to benefits for households, businesses, and the economy overall that exceed the downside risks 2. Indicates that CBDC is superior to alternative methods**	See: **B0054**
R0002	**Risk to the cost and availability of credit**	See: **B0054**
R0009	**Increased Risk of "runs" or other instabilities to the financial system**	
R0012	**Risk of increased concern related to the potential for: 1. destabilizing "runs" 2. disruptions in the payment system 3. concentration of economic power**	See: **B0054**
R0013	**CBDC offers no associated credit or liquidity Risk**	See: **B0054**
R0015	**Require mechanisms to reduce liquidity Risk**	See: **B0054**
R0016	**Require mechanisms to reduce credit Risk**	See: **B0054**
R0020	**Risk that interest-bearing CBDC could result in a shift away from other low-risk assets, such as shares in money market mutual funds, Treasury bills, and other short-term instruments.**	See: **B0054**
R0023	**Risk of financial panic causing outflows from Commercial Banks to CBDC without prudential supervision, government deposit insurance, and access to central bank liquidity**	See: **B0054**
D0001	**Design should be for a non-interest-bearing CBDC, for example, would be less attractive as a substitute for commercial bank money**	Commercial bank money implies accounts
D0002	**Design should allow the central bank to limit the amount of CBDC an end user could hold**	These restrictions imply accounts
D0003	**Design should allow a limit on the amount of CBDC an end user could accumulate over short periods**	These restrictions imply accounts
D0005	**Design could affect monetary policy implementation and interest rate control by altering the supply of reserves in the banking system**	These restrictions imply accounts
D0008	**Design should allow for interest-bearing at levels of the CBDC to be controlled independently of other safe assets**	These restrictions imply accounts

Requirement	Statement	Comment
D0010	**Design should consider the potential for interest-bearing CBDC as a new policy tool on the channels of influence in monetary policy**	These restrictions imply accounts
D0011	**Design should generate data about users' financial transactions in the same ways that commercial bank and nonbank money generates data today**	These restrictions imply accounts
D0012	**Design should address privacy concerns by leveraging existing tools already in use by intermediaries**	These restrictions imply accounts
D0013	**Design should facilitate compliance with a robust set of rules already intended to combat** **1.** **money laundering** **2.** **the financing of terrorism** **3.** **customer due diligence** **4.** **record keeping** **5.** **reporting requirements**	These restrictions imply accounts

Stablecoin / Research

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The White Paper and summarized by the Object Management Group's White Paper Analysis provide some insight as to "what's next" with CBDC. The **White Paper** is not intended to advance a specific policy outcome and takes no position on the ultimate desirability of a U.S. CBDC [**P0008**]. Furthermore, the Federal Reserve will only take further steps toward developing a CBDC if [**P0030**]:

1. Research points to benefits for households, businesses, and the economy overall that exceed the downside risks
2. Indicates that CBDC is superior to alternative methods

In addition, the Federal Reserve does not intend to proceed with issuance of a CBDC without clear support from [**P0011**]:

1. the Executive Branch
2. Legislative Branch
3. ideally in the form of a specific authorizing law

The following topics are covered in the **White Paper**, which would require further research in order to garner broad public and cross-governmental support [**P0031**]:

> **Note:** Also see: 30_stablecoins in context of Currency Models.

Table 4: List of requirements (i.e., desirements) identified in the **White Paper** that require further research

Requirement	Statement	Comment
B0016	**Provide Stablecoins that are: 1. well-designed 2. appropriately regulated**	Stablecoin is a specific solution
B0017	**Provide Stablecoins that are: 1. faster 2. more efficient 3. more inclusive payment**	Stablecoin is a specific solution
B0021	**Maintain value by not using backing by an underlying asset**	**Conflict** with **B0017**
P0015	**The PWG report recommends that Congress act promptly to enact legislation that would ensure payment of stablecoins**	Stablecoin is a specific solution
P0016	**The PWG report recommends payment stablecoin arrangements are subject to a consistent and comprehensive federal regulatory framework**	Stablecoin is a specific solution
R0010	**CBDC has Risk of significant energy footprint similar to Cryptocurrencies**	Very different answers depending on CBDC mode, **Cash** rather than on **Accounts**
R0017	**Using private digital money could present Risks to both individual users and the financial system as a whole**	Requires Research
R0019	**Risk of reducing the aggregate amount of deposits in the banking system, which could in turn increase bank funding expenses, and reduce credit availability or raise credit costs for households and businesses.**	Requires Research
R0020	**Risk that interest-bearing CBDC could result in a shift away from other low-risk assets, such as shares in money market mutual funds, Treasury bills, and other short-term instruments.**	Requires research
R0021	**Risk of reducing credit availability or raise credit costs for businesses and governments**	Requires Research
R0022	**Risk of stablecoins and other types of nonbank money shifting deposits away from banks even without a CBDC**	Stablecoin is a specific solution

Recommendations

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Determining if a CBDC should pay interest is highly dependent upon the overall goals and purpose of the CBDC which can only be determined by the Federal Reserve. In this review, the requirements identified

by Object Management Group from the White Paper and summarized in the White Paper Analysis are used as the basis for this analysis. From the requirements, it appears that there are two main sets of requirements when it comes to determining potential interest payments. Each of the sets is dependent on how the CBDC is to be modeled:

- **Cash Model** - these are requirements with CBDC characteristics most closely aligned with simple cash model
- **Account Model** - these are requirements with CBDC characteristics most closely aligned with account model (i.e, savings, checking, investment, direct pay, credit, debit cards, etc.)

It is only through System Engineering including a requirements' analysis that a model selection can be made. It may also be determined that the CBDC could actually represent two different things which needs to be developed independently but in parallel.

Regardless of which model (Cash or Account) is used for the CBDC, the Object Management Group recommends that the Federal Reserve use a Model Based Systems Engineering (MBSE) and Unified Architecture Framework (UAF) approach for future CBDC efforts. The CBDC is a complex issue that, once released, could have a life expectancy of many, many years. Only through extensive Systems Analysis, Engineering, Design will CBDC have the stability it needs to instill confidence of the public.

1)

Internal Revenue Service, Cash payment report helps government combat money laundering, Accessed 2 March 2022, https://www.irs.gov/newsroom/cash-payment-report-helps-government-combat-money-laundering

2)

Andrew Beattie, Investopedia, 21 August 2021, Accessed 2 March 2022, https://www.investopedia.com/articles/pf/08/pay-in-cash.asp

3)

U.S. Currency Education Program. U.S. Currency in Circulation. Accessed 2 March 2022. https://www.uscurrency.gov/life-cycle/data/circulation

4)

Commercial banks include banks licensed either by federal or state banking agencies, credit unions, and thrifts from the **White Paper**.