

CBDC: A gigantic flop?

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A microeconomic approach to CBDC

Macroeconomic dimension

- Disintermediation
- Digital bank runs
- Monetary policy effectiveness

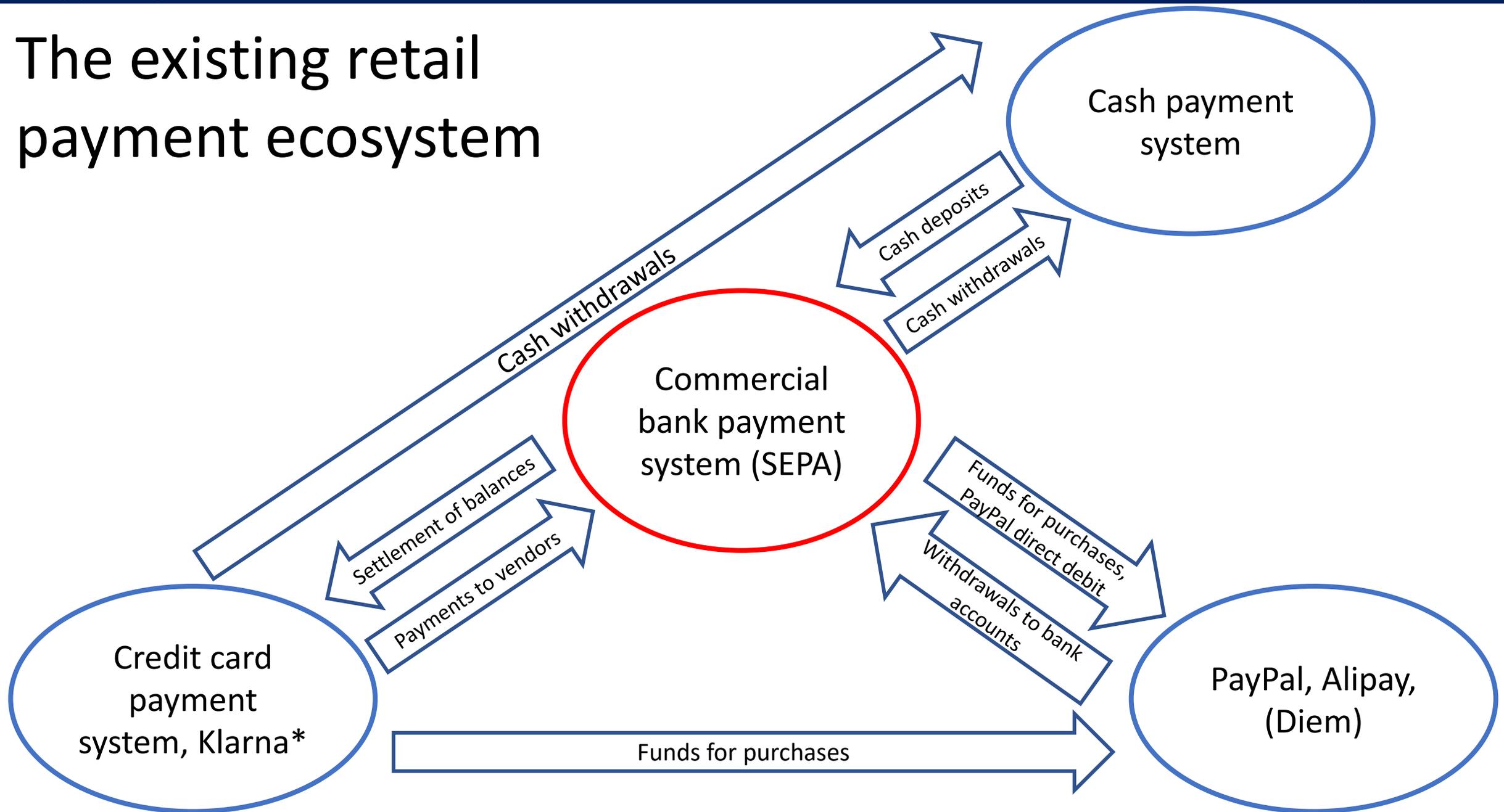
Microeconomic dimension: CBDC implies direct competition with the private sector

- Is there a **market failure** that justifies an extension of central bank activities in the sphere of private banks and private payment service providers?
- Are CBDC solutions able to **compete successfully** with the existing payment objects and payment systems?

The background features a stylized, glowing circuit board. The left side is dominated by a grid of small blue squares, with several larger, bright blue circular nodes connected by thin lines. The right side is a gradient of orange and red, with a large, bright white circular node. The overall aesthetic is futuristic and technological.

The retail payments ecosystem

The existing retail payment ecosystem



*No cash withdrawal possible

The unique selling proposition of the subsystems

Cash

- ❖ Regular payments: elderly people prefer cash and some small stores do not accept cards
- ❖ Anonymity for payments in the informal sector
- ❖ Safe assets
- ❖ Offline use



Credit cards

- ❖ Global and multi-currency usage
- ❖ Short-term overdraft facility, consumer loans
- ❖ Bonus programs (“Miles and More”)
- ❖ Insurance services
- ❖ Better global acceptance than maestro (bank card)
- ❖ No system specific deposits required



PayPal

- ❖ Global and multi-currency usage
- ❖ Easy to handle and fast transactions in P2P (no IBAN, no TAN)
- ❖ Insurance services for consumers and vendors in online-trade
- ❖ Loans to vendors and to consumers
- ❖ No system specific deposits required



Payment systems, instruments and objects

Payment system	Payment instrument	Payment object for settlement	Unit of account
Cash payment system	Banknotes, coins	Banknotes, coins	National Currency
Commercial bank payment systems	Bank transfers, Debit cards Cheques Mobile Payment	Bank deposits (between payer and payee) and central bank reserves (between bank of payer and bank of payee)	Sepa: Euro CHIPS and Fedwire: US-Dollar SWIFT: Multi-Currency system
Credit card payment systems (VISA/Mastercard/ American Express)	Credit cards, debit cards mobile Payment Anonymous: e-money	Bank deposits (between payer and payee)	Multi-Currency schemes
PayPal	No specific instrument	Deposits on PayPal account or bank accounts (direct or indirect via credit cards)	Multi-Currency scheme



CBDC design options



CBDC: Payment object and/or payment system?

		New payment system operated by central banks	
		No	Yes
New central bank payment objects	No	Status quo	Central bank digital retail payment system
	Yes	Public Savings Bank Bindseil (2020)	Digital Cash e-Krona

Digital Euro: Payment object and/or payment system?

Object only:

- ❖ “(...) **the digital euro could make use of – and thereby strengthen – existing pan-European payment solutions** for consumers and merchants across Europe.” (ECB 2020, p. 20).
- ❖ “A **parallel infrastructure would also run counter to the aim of issuing a digital euro** in order to improve the cost and environmental footprint of payments.” (ECB 2020, p. 34).

Object and payment system:

- ❖ “In order to improve the overall resilience of the payment system, the digital euro should be widely available and transacted via **resilient channels that are separate from those of other payment services** and can withstand extreme events.” (ECB 2020, p. 14).
- ❖ “It (the digital euro) should offer the basis for **providing functionalities that are at least as attractive as those of the payment solutions available in foreign currencies or through unregulated entities.**” (ECB 2020, p. 12).

Design options for CBDC objects

		Retail CBDCs	Wholesale CBDCs (Large companies and payment service providers)
Token-based CBDCs Peer-to-peer payments		Digital wallets "e-money"	–
Account-based CBDCs	<i>Means of payment</i>	All-purpose CBDCs	All-purpose CBDCs
	<i>Store of value</i>	Store-of-value CBDCs ("safe assets")	Synthetic CBDCs: (Narrow banks/ Payment service providers)

Design options for CBDC systems

A. New payment object only: Competition with private bank accounts

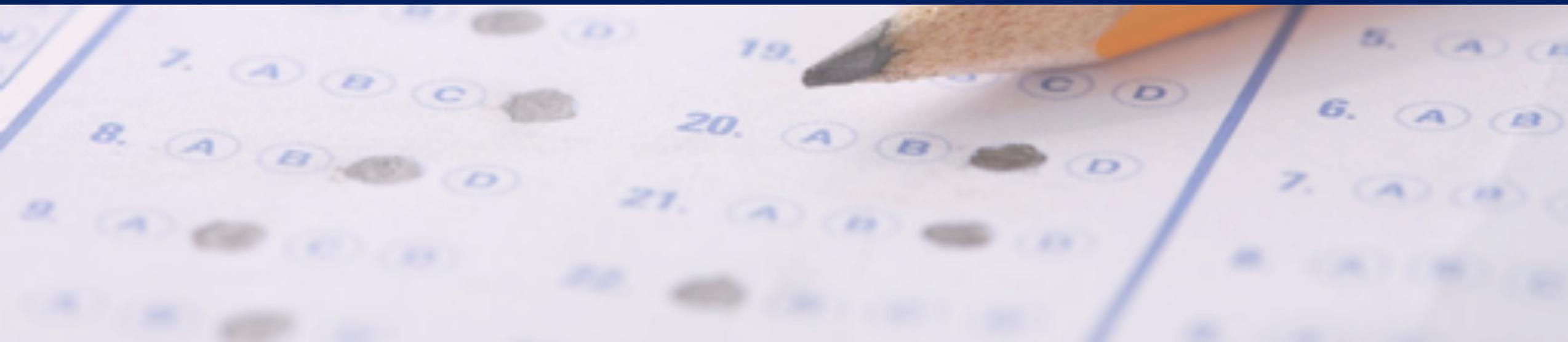
1. Central bank operating as a “Public Savings Bank” (Bindseil model)
2. Store of Value CBDC (synthetic CBDC)

B. New payment system and new payment object: Competition with private retail payment systems

3. Payment systems for stationary trade and services (Digital Cash)
4. Payment systems for stationary and online trade CBDC (e-Krona)

C. A central bank orchestrated global payment system

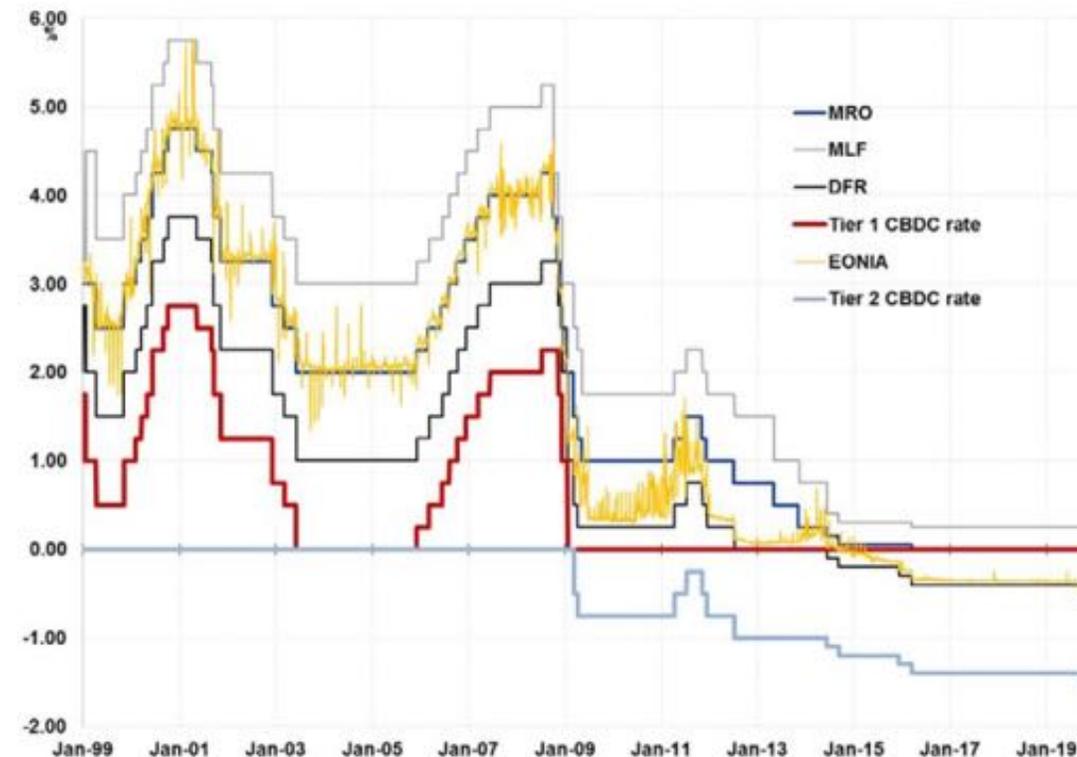
Evaluation of design options



1. Payment CBDC competing with bank accounts

- ❖ Central banks as “**Public Savings Bank**”:
 - “*there would therefore still be a difference relative to the breadth of services by commercial banks*” (Bindseil 2020, p. 26)
- ❖ **Two-tier structure** for the remuneration of CBDCs:
 - “*The **tier 1** remuneration rate r_1 (up to 3.000€) could be set in principle at a relative **attractive level**, up to the rate of remuneration of banks’ excess reserves, and it would in addition be specified that it could never fall below zero.*
 - *The **tier 2** remuneration rate would be set such that tier 2 deposits are **rather unattractive** as store of value, i.e. less attractive than bank deposits or other short-term financial assets, even when taking into account risk premia.” (Bindseil 2020, p. 24)*

- ❖ Example of CBDC remuneration rates relative to historical ECB official interest rates with
 - Tier 1 CBDC rate $r_1 = \max(0, i_{\text{DFR}} - 1\%)$
 - Tier 2 CBDC rate $r_2 = \min(0, i_{\text{DFR}} - 1\%)$



Source: Bindseil 2020

Attractiveness for users compared to a commercial bank account

- ❖ Absolute safety of central bank deposit is irrelevant as commercial deposits below 100.000 € are protected by the **deposit insurance**
- ❖ **Extensive monitoring** of CBDC account is required
 - **Prohibitive tier 2 interest rates** for deposits > 3.000 €
 - Avoiding negative balances due to the lack of an **overdraft facility**
- ❖ For most households CBDC would require the parallel holding of **commercial bank account**
- ❖ If the central banks were to offer the **full range of services** of an online bank, an **obvious market failure** would have to be identified
- ❖ In the case of a banking crisis, the tier 2 interest rate would be insufficient for preventing a **digital bank run**.

2. Store of value CBDC competing with bank accounts

Retail

- ❖ Depending on the remuneration, very attractive for wealthy households as „safe asset“ due to the bail-in risk for commercial bank deposits above 100.000 €. Issuance could be controlled by auctions.

Wholesale

- ❖ Synthetic CBDC as collateral of payment system providers and thus as regulatory response to ensure full convertibility of deposits at any time (Alipay)
 - ❖ Libra Association (2020, p.11): *“Moreover, our hope is that as central banks develop central bank digital (CBDCs), these CBDCs could be directly integrated with the Libra network, removing the need for Libra Networks to manage the associated Reserves, thus reducing credit and custody risk. As an example, if a central bank develops a digital representation of the US dollar, euro, or British pound, the Association could replace the applicable single-currency stablecoin with the CBDC.”*

3. The Digital Cash competing with cash and digital retail payment systems

- A digital euro based on infrastructures **existing in parallel** to those of other payment solutions could help to withstand **extreme events** such as cyber incidents and attacks, natural disasters, and pandemics (ECB, 2020, p.33)
- The payment could be settled immediately as a transfer of pre-funded units between the **devices of payer and payee**. (ECB, 2020, p.31)
- Offline functionality **avoids the sharing of transaction details** with parties other than the payer and payee, enabling the digital euro to become a complement to cash (ECB, 2020, p.31)



Unique selling propositions of the Digital Cash

Compared to cash	Compared to bank card
Anonymity for users	
Cash > Digital Euro ❖ Buyers and sellers avoid any recording of their data	Bank card ≈ Digital Euro ❖ Is the recording of data by Sparkasse worse than recording by ECB?
Broad acceptance	
Cash > Digital Euro ❖ Acceptance can de facto not be enforced by legal tender ❖ Sellers need additional device	Bank card > Digital Euro (in the initial phase of the Digital Euro)
Technical stability	
Cash > Digital Euro ❖ Cash avoids technical failures of payment devices	Bank card ≈ Digital Euro
Loss	
Cash = Digital Euro	Bank card > Digital Euro
Transaction costs	
Cash ≈ Digital Euro ❖ Wallet is required	Bank Card > Digital Euro ❖ Wallet is not required

4. e-Krona competing with private payment systems in stationary and online trade

- ❖ *“All transactions in the e-krona network occur **separately from existing payment networks** (...). Payments occurring in the e-krona network will take place without the involvement of RIX (...).” (Sveriges Riksbank 2020)*
- ❖ *“To be able to use e-kronor for payments, the **digital wallet must first be activated** at a participant connected to the e-krona network. After activation, the user can, for example, receive e-kronor as payment from another user, pay a retailer with e-kronor, make transfers from their bank account to the digital wallet (and vice versa) (...).” (Sveriges Riksbank 2020)*
- ❖ *“However, when a holder of e-kronor wants to pay to a recipient who does not have e-krona accounts or who does not wish to increase their e-krona holdings, there is **a need to exchange e-kronor for commercial bank money, i.e. to go outside the e-krona accounts.**” (Armelius et al. 2020, p. 85)*

Negative unique selling propositions of the e-krona (and also the online digital euro?)

- ❖ Lack of interoperability makes the of underlying CBDC objects less attractive
- ❖ No evident advantage compared to commercial bank payment system
- ❖ For retail and online payments less attractive than private payment networks (PayPal)
 - Need to hold parallel accounts
 - Service spectrum very limited
 - No international payments
 - No multicurrency payments



A central bank operated or orchestrated payment system: The elephant in the room defines the benchmark

- ❖ 377 million accounts
- ❖ 25 currencies (**supranational with multiple currencies**)
- ❖ Easy opening of accounts and transfers (e-mail-address)
- ❖ No need to hold system specific payment objects (**multiple payment objects**)
- ❖ High level of interoperability (**multiple payment systems**)
- ❖ Wide spectrum of services for online merchants and online buyers



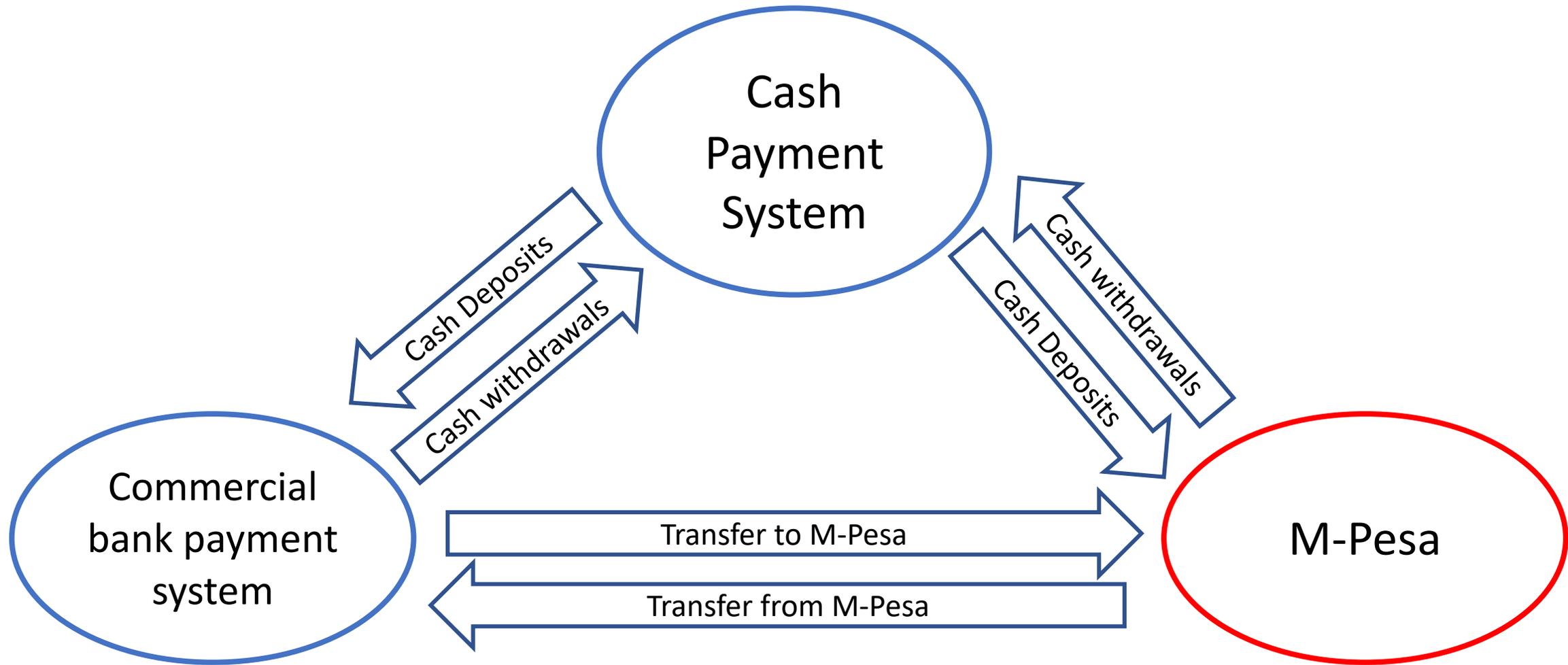
Result of the microeconomic evaluation

CBDC model	Market failure	User perspective (Unique selling proposition)
Object only Retail payment CBDC	Not obvious	Not attractive compared to commercial bank account
Object only Retail store of value CBDC	Lack of safe assets	Attractive for deposits above 100.000 Euro (depending on interest rate)
Object only Wholesale store of value CBDC	Lack of safe assets Central bank control over payment service providers	Collateral for deposits held with payment service providers
Object and payment system for stationary trade: Offline digital euro	Not obvious	Not attractive compared to cash and digital payment solutions (Bank cards)
Object and payment system for stationary and online-trade: e-Krona		Not attractive compared to Paypal and other private payment systems
Central bank orchestrated retail payment system (not necessarily with specific payment object)	Market power of US payment platforms	Global, multicurrency solution would be required



CBDC for financial inclusion?

The payment system provided by mobile network operators (M-Pesa)



Implications for central banks CBDC strategies

- ❖ Clarifying the design features of CBDC: Object only or new payment system?
- ❖ Identifying the market failure(s) that justify the central banks' entry in the competition with private banks and private payment system providers
- ❖ Identifying the unique selling proposition of the digital cash vis-a-vis existing private retail payment ecosystems
- ❖ Is a national single-currency payment system a competitive solution?