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# TOWARDS A **RETAIL** CENTRAL BANK DIGITAL EURO

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Note:

Yves BLAVET was one of three dozen payment professionals taking part in the European Central Bank's Market Advisory Group (MAG) on the Digital Euro from November 2021 to November 2023.

Members were contributing to the design of the Retail Digital Euro on a personal capacity and were requested to express their personal views, based on their expertise, rather than the views of their employers.

Being widely based on the MAG's work, this document presents the personal views of its author and should not be considered as reflecting the views of Societe Generale.

# INTRODUCTION: WHY A DIGITAL EURO?

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Central Banks are concerned about the preservation of their role in the digital age:

- **Disappearance of cash** as a means of payment (and as an anchor for commercial bank money)
- Risk to see **private actors** (big tech companies) issue their own digital currencies (Facebook's Libra & Diem project)
- Risk to see **crypto 'currencies'** supersede fiat currency (Bitcoin)
- Risk to see a development of **Decentralised Finance (DeFi)** **mainly** (if not exclusively) with **USD** denominated stablecoins
- Need of a digital currency for **innovation** purposes: programmability, machine-to-machine payments, micropayments, atomic payment vs delivery transactions

 **For the EU and the ECB, launching a Digital Euro is seen as a major sovereignty issue.**

Other countries may have a different approach:

- In the **US**, the Fed is cautious and seems in favour of US denominated stablecoins fully backed by central bank assets. A retail CBD\$ is not a priority.
- In the **UK**, the Bank of England is 'considering' the launch of a CBD£.

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**WHAT IS A CBDC?**

# WHAT IS A CENTRAL BANK DIGITAL CURRENCY?

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- ‘Electronic cash’: **A central bank liability**, denominated in an existing unit of account, which serves **both as a medium of exchange and a store of value** (*BIS’s definition*).
- A Central Bank Digital Currency may be **tokenised or not**.
- Most Central Banks are considering issuing their CBDC. However, many CBDC implementations **may not use any sort of Distributed Ledger Technology**.
- **China's digital RMB was the first digital currency to be issued by a major country.** The **digital Yuan** is centralised (as opposed to crypto currencies such as the Bitcoin) and managed by the PBOC.
- **Although traditional funds transfer mechanisms might be used, CBDCs could be exchanged in a different way:**
  - If it is account based, with **accounts managed by a central authority**, each transfer can be seen as an internal (on-us) transfer and does not require any interbank settlement mechanism.
  - It could be tokenised and exchanged **on a blockchain** without the validation of a central authority. Transactions change the ownership of the tokens without any form of settlement mechanism.

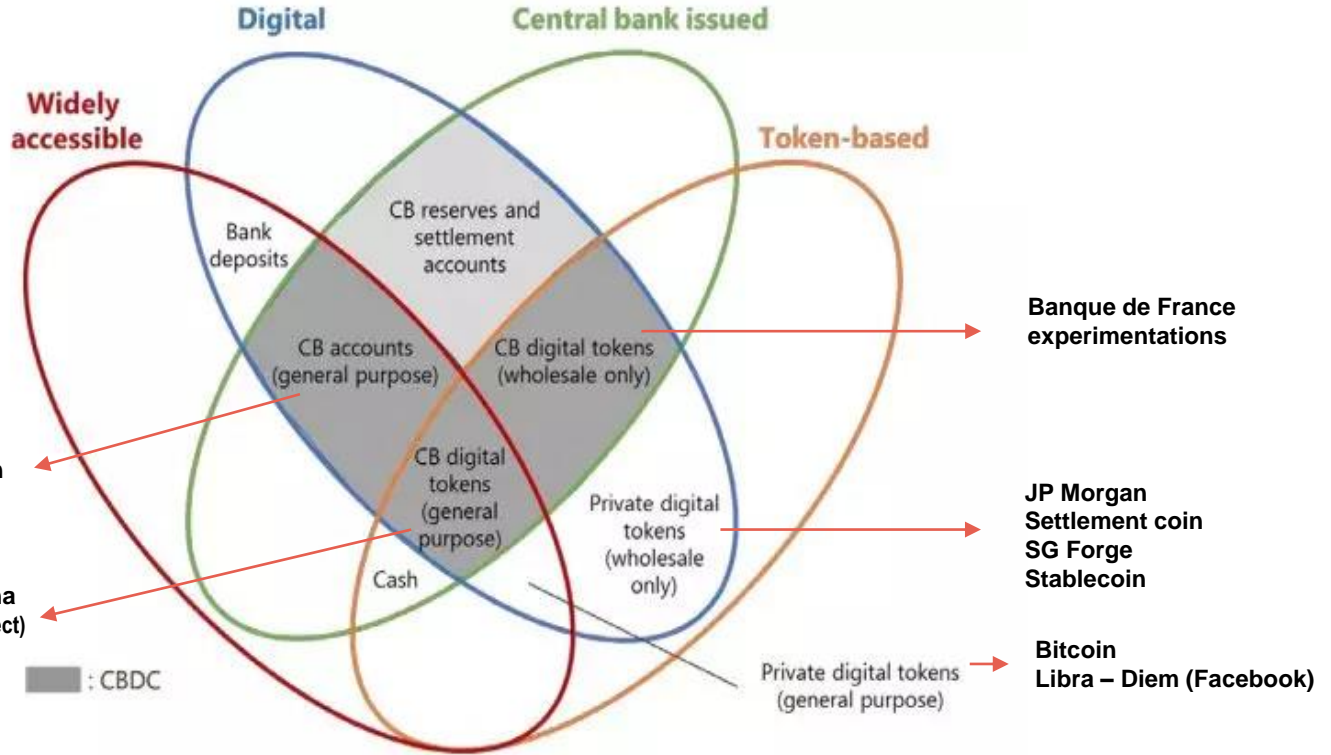
# CBDC TAXONOMY

## The Money Flower

Bank for International Settlements

March 2018

Based on Bech & Garratt (2017)



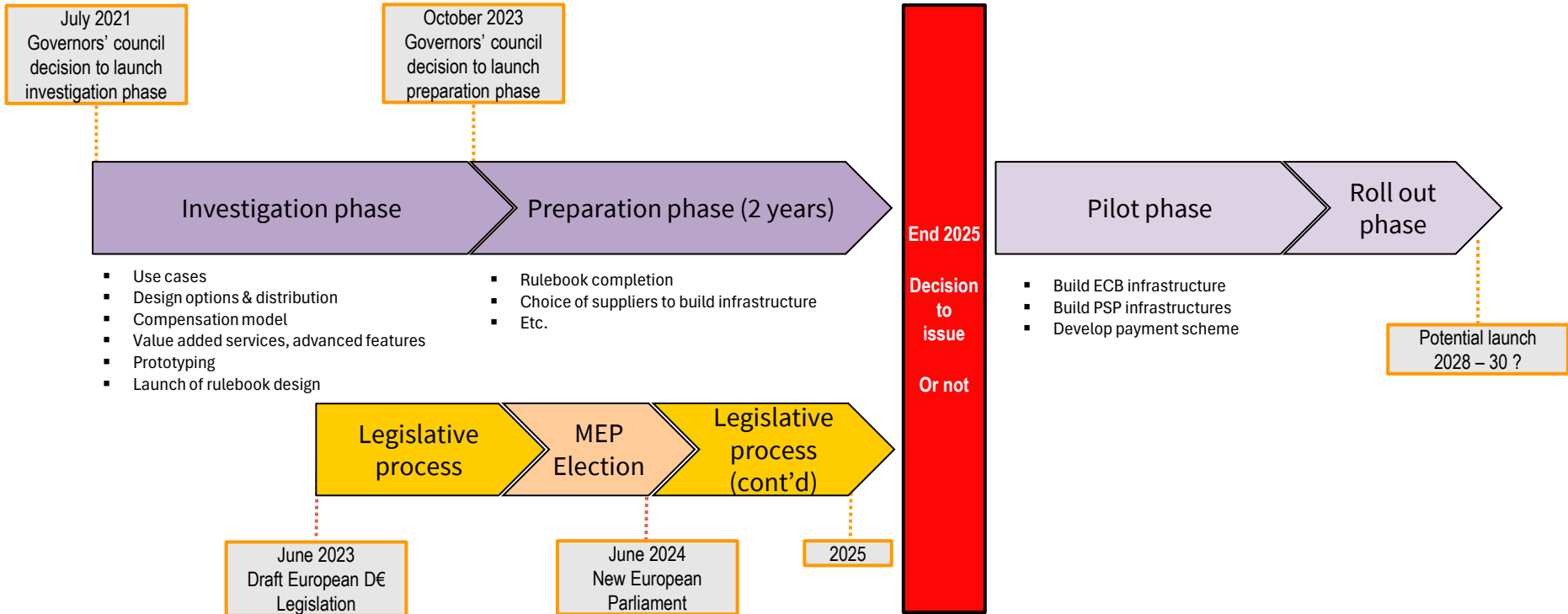
Digital €?

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## The Digital Euro Project

# THE ECB's DIGITAL EURO PROJECT LIKELY ROADMAP





# THE DIGITAL EURO IN A NUTSHELL (1)

## Principles

- A **retail digital currency**, as opposed to a wholesale (interbank) currency
- A **complement to cash**, accessible to all EU citizens (inclusion)
- Widely used for payments but **not as a store of value**
- Providing a **high level of privacy** while subject to AML-CFT filtering
- Relying on **European technology** to ensure sovereignty
- **One-to-one convertibility with cash**
- A **resilient system** in case of crisis or malfunction (e.g., networks down)

## Use cases

- Allows payments between **consumers, merchants and governments**
- **Businesses would not be allowed to hold D€s.**
- Used for Point of Sale (POS) and e-commerce transactions
- Allows **peer to peer offline** transactions (no 4G signal needed) both for convenience and resilience (available from **Day 1**)
- Should allow **conditional payments** (but will not be a programmable currency\*)

(\*) A programmable currency is a currency which permanently would be able to check that it is used under specific conditions, such as a Green Euro that could permanently be used only to pay environment friendly goods and services. Obviously, this would lead to a fragmentation of the currency and is not acceptable to the ECB.

A conditional payment is a payment that can be triggered out of a digital euro wallet only if a specific set of conditions is met. For instance, some euros may be spent only at restaurants, such as those on lunch vouchers. But when these euros hit the restaurant's account, they become fully fungible with any sum in euros.

# THE DIGITAL EURO IN A NUTSHELL (2)

## Form factors

- A **digital euro wallet** “compatible” with the future **European Digital Identity Wallet (DIW)**
- Allows **contactless payments**, mainly on **smartphones** (NFC and QR code)
- Fallback form factor on **cards** for inclusion purposes

## Distribution and acceptance

- Credit institutions (**banks**) **must distribute** (at least to **their** pre-existing **clients**). Other **PSPs may distribute**.
- **Legal tender** : all merchants must accept the **D€** (both in-store and on-line when relevant).
- Banks and PSPs providing **cash services must provide** (free 1 to 1) **convertibility between D€ ⇔ cash**.
- Distributing PSPs manage **all client facing functions** and must perform **AML-CFT** checks and fraud prevention.

## Privacy

- The **ECB has no knowledge** of the **D€ users' identity** and **transaction** details.
- **Off-line** payments are **anonymous** but limited to **small amounts**.
- PSPs are **not allowed to use D€ payment data** except for **AML-CFT** and fraud prevention.

## Limitations

- The digital euro **does not bear interest**.
- There is an **individual holding limit** (maybe € 3000) per citizen.
- However, **transactions** are allowed **above the limit** thanks to a (reverse) waterfall mechanism!

# THE DIGITAL EURO IN A NUTSHELL (3)

## Features

- To allow funding / defunding and (reverse) waterfall, a D€ may be **linked to an IBAN** (possibly **with another PSP**).
- There can be **several D€ wallets per person** but they will have to split their holding limit across their wallets.
- There can be more than one user for D€ wallets (“**joint wallets**”). Each user may contribute part of their holding limit.

## Business model

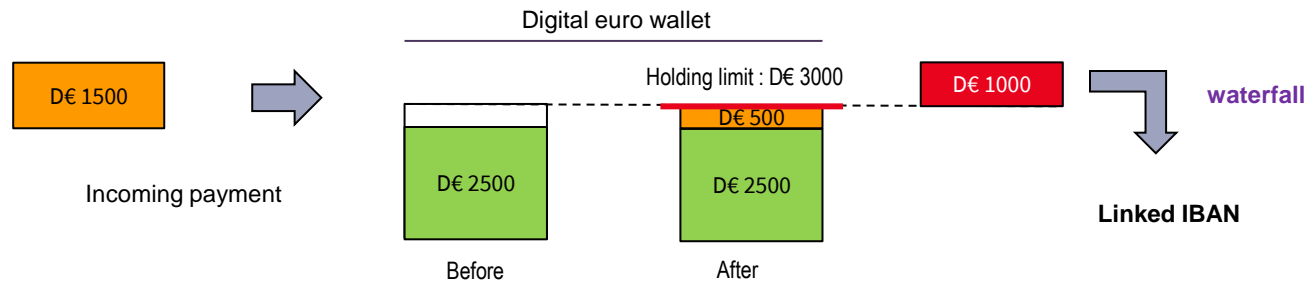
- The digital euro **must be cheaper** than the other forms of electronic payments.
- **Opening a digital € wallet is free for the consumer.**
- **Payments in digital € are free for the consumer.**
- **Merchants** maybe charged an **acquisition fee** can (and will) be **capped** by the ECB at a lower level than other payments.
- There is an inter-PSP fee (interchange) paid to the provider of the D€ wallet.
- **Funding and defunding** either manual or automatic (waterfall & reverse) **are free.**
- When an IBAN is linked to a D€ wallet, **the provider of the banking account receives no compensation.**
- PSPs are allowed to charge hypothetical “value added services”, but all the “core services” are free for consumers.
- The **ECB will pay** for its **own costs**

## Technology

- Most probably, the system will be **token based** (with “digital banknotes”) but most probably **not in the blockchain.**
- D€ wallets can be accessed by third-party PSPs with **PSD2-like APIs.**

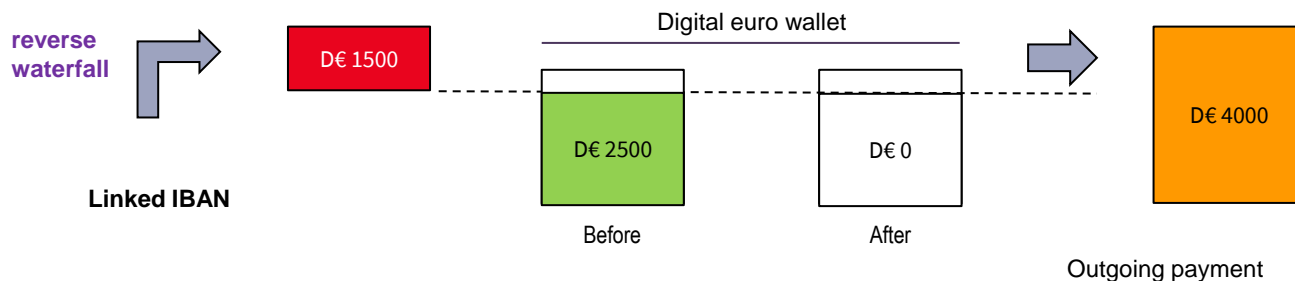
# WHY YOU WON'T NEED A SINGLE CENT ON YOUR WALLET (1/2)

- **Waterfall mechanism:** funds in excess of the holding limit are offloaded to a linked commercial banking account



An incoming payment of € 1500 hits a wallet with a balance of € 2500. The € 1000 exceeding the holding limit of € 3000 are automatically cascaded to a linked IBAN. In the absence of a linked IBAN, the transaction is denied.

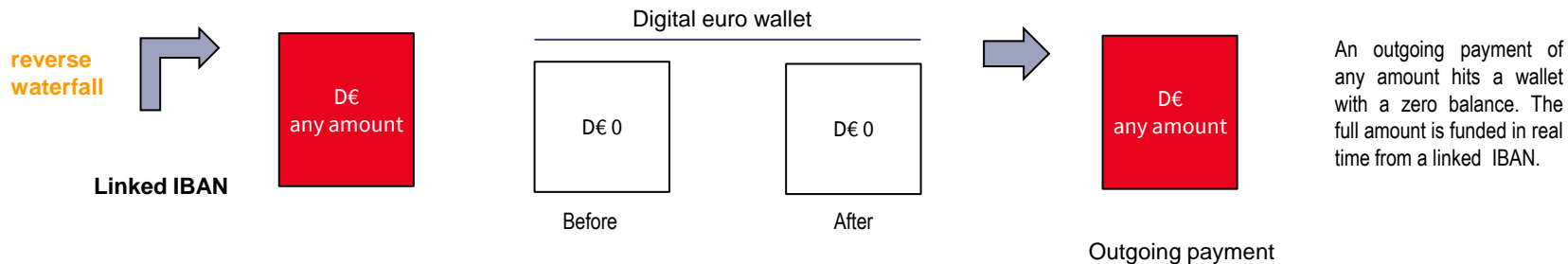
- **Reverse waterfall mechanism:** to issue a transaction, missing funds are drawn from a linked commercial banking account



An outgoing payment of € 4000 hits a wallet with a balance of € 2500. The missing € 1500 are funded in real time from a linked IBAN.

# WHY YOU WON'T NEED A SINGLE CENT ON YOUR WALLET (2/2)

- Just as **PayPal** does, the Digital euro system allows online payments even with a zero balance on the wallet.



- Obviously, this does not work for **offline transactions** (but most transactions even 'physical' at POS will be online).
  - You can transfer digital euros from your digital wallet to your mobile phone under a tokenized form.
  - These tokenized digital euros can be transferred contactless from one phone to another.
  - The payee (beneficiary) can transfer its tokenized digital euros back to its own digital euro wallet when coming back online.

Note: The above is our understanding of offline transactions, but the ECB has not yet released anything detailed on the subject.

# THE STAKES FOR BANKS: FINANCIAL STABILITY

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## Is the digital € a threat for the balance sheet of banks?

- **In the short term, until citizens receive recurring income in Digital euros, the impact on banks' balance sheets should be limited under normal circumstances.**
  - Consumers will not have more incentive to keep balances in their D€ wallets than in their PayPal wallet.
  - Many consumers may keep zero balances, even if they use the D€.
- **In case of flight-to-quality, the lower the usual balances, the stronger the liquidity tensions. → low holding limit required**
- **Over the long run, a successful Digital € could drain significant deposits away from banks' balance sheets.**
- **With a holding limit that would be higher than the mean salary in many countries, what would happen if the D€ wallet were to become the consumer's main liquidity account?**

# THE STAKES FOR BANKS: IMPLEMENTATION COSTS

## A non-comprehensive list of the impacts on the information systems of banks:

- Client facing functionalities: **mobile app / internet site**
- **Subscription** / cancellation and **interbank portability** of digital euro wallets
- Specific **off-balance sheet pseudo accounting**
- Implementation of a **brand-new means of payment: from authorisation to settlement**
- **Funding and defunding** mechanisms
- Two level transactions in real time: **waterfall and reverse waterfall**
- **Merchant acceptance** functionalities
- **Cash services: deposits & withdrawals** linked to a D€ wallet and **authenticated by a mobile phone**
- Potential issuance of **D€ cards**
- Transverse processes: **AML-CFT and fraud prevention**
- **Back-office** functionalities, including management of **disputes**
- **PSD2-like** access to D€ wallets (through **APIs**) and payment initiation by third parties
- **User training** (legally mandatory) and **support**

Which level of mutualization for the banking community?



**A major program, much bigger than SEPA for retail banks...**

# THE STAKES FOR BANKS: BUSINESS MODEL

## Key requirements of the European Commission's draft Digital Euro legislation

- Access to the Digital € and usage should be **free for consumers**.
- The digital euro should be **cheaper for merchants** than all other comparable means of electronic payments.
- The **ECB will bear its own costs**.

### Prices will be regulated :

- An **inter-PSP** (a.k.a. interchange) **fee** will be paid by the PSP of the payee (=merchant) to the PSP of the payer (consumer). However, this inter-PSP fee will be set to cover the costs of the 25% cheapest PSPs.

*Reminder : in international card systems, the interchange fee mainly covers fraud prevention and the cost of actual fraud*

- **No inter-PSP fee is paid for the funding / defunding of a digital euro wallet (either manual or automatic).**

*Consequence: an opportunity for non-European wallet providers (the X-Pay) to filter revenues while off-loading part of the work and cost of fraud on the European banking system, at no cost.*

- There will be a **maximum fee for merchant acceptance**, which will also be based on the 25% cheapest offers in the market.



- Distribution is **mandatory**, but the draft legislation suggests that **75% of the volumes might be processed at a loss!?**
- Will **margins or even prices slowly converge** towards zero?
- With no revenues to cover fraud prevention, banks funding the wallets from their IBANs will have no other solution than adopting **the most stringent anti-fraud scoring**, hence jeopardizing the reliability of the new payment instrument.
- The model is potentially **biased in favour of providers of cloud services**, most of whom provide payment services for free (data).
- What will be the **loss of revenues** for banks on payments if the Digital Euro is widely successful?



# CONDITIONS OF SUCCESS

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1. **Foster usage:** make sure **the digital euro brings compelling value to** the sole decision maker, i.e., **the consumer** (In terms of use cases and customer experience)
2. **Deliver:** Building in five years' time a **highly complex system** that would compete with card systems built over decades and the payment methods developed more recently by cash rich Big Tech firms.
3. **Win the reliability challenge:** business continuity, fraud prevention, dispute management, etc.
4. **Keep the support of the banking community,** while asking it to bear the bulk of the construction and running costs.
5. Make sure the Digital € is **environment friendly,** or it may trigger strong resistance from the public.
6. **Avoid drawing too many resources** from the European payments industry or it will end-up lagging behind its foreign competitors.
7. **Make sure the project does not backfire,** handing over digital € payments to non-European giants in the name of sovereignty.

# CONCLUSION

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- There are many **legitimate political reasons** for the EU and the ECB to want to launch a CBD€.
- For that motive, the **launch** of the Digital Euro is **very likely**.
- However, this project is confronted with **many challenges**, not least that of addressing actual daily needs for the consumers and not only strategic concerns for the governments and the central banks.