PEMPAL

Treasury Community of Practice TCOP

Digital Money and PFM: Some Implications for Cash (& Debt) Managers

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Outline

Digital money: what and why

Digital money in PFM

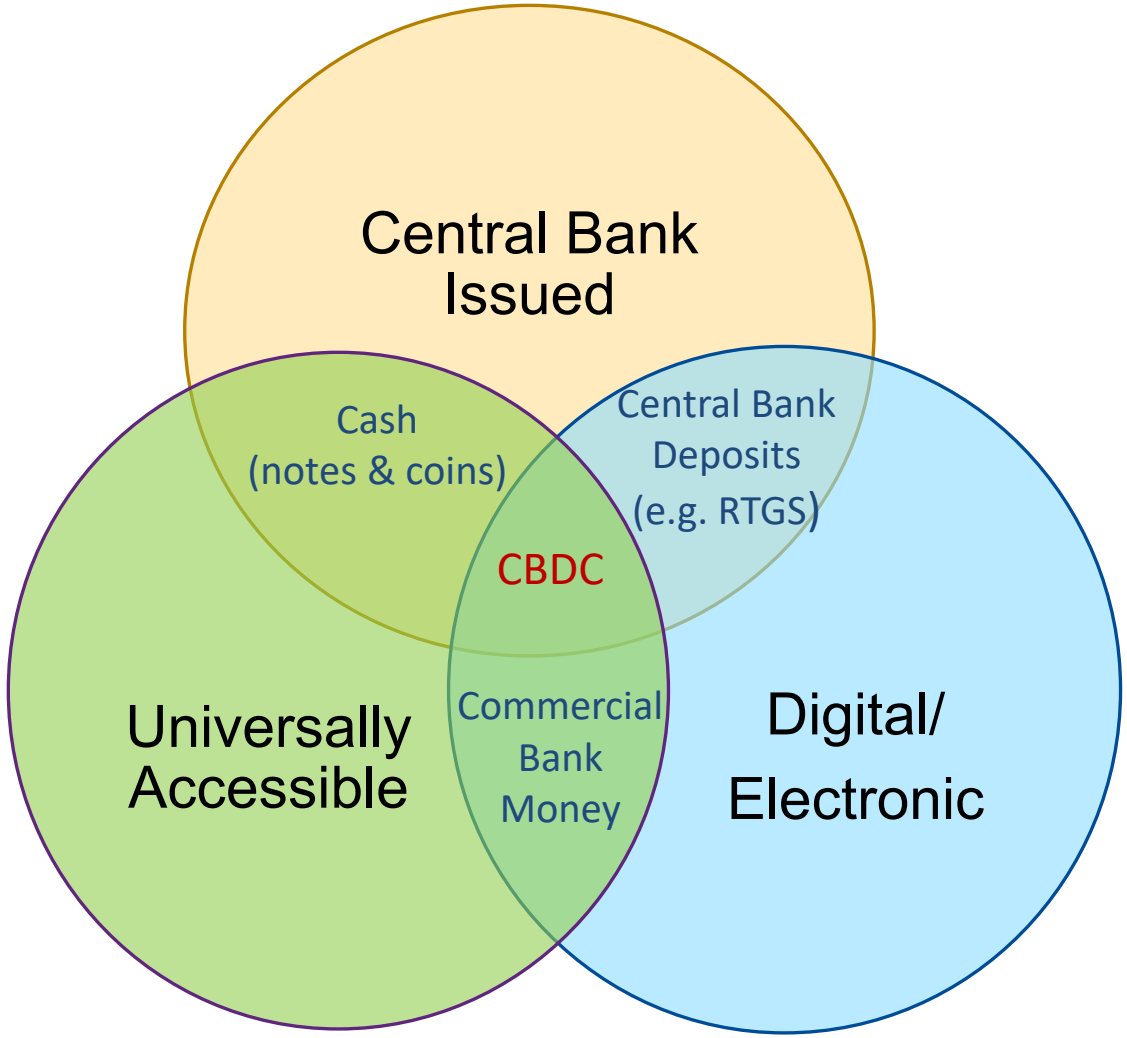
- Revenue
- Expenditure
- Financing

Implications for Treasuries

- Cash Management
- Digital Bonds

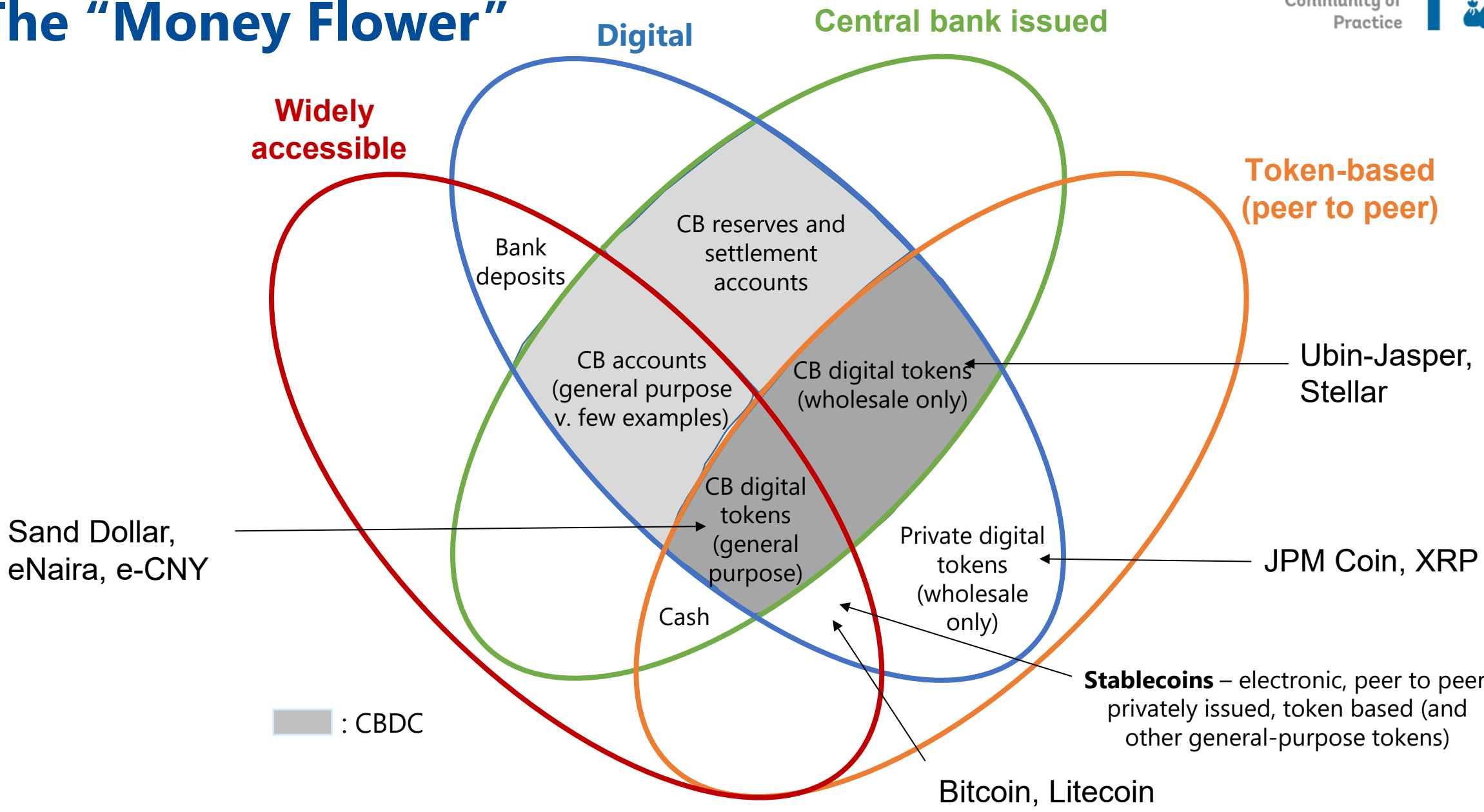
See Annex for some Definitions

Digital forms of money not new, but new forms are increasing…



Source: Bjerg, CBS 2017

The "Money Flower"

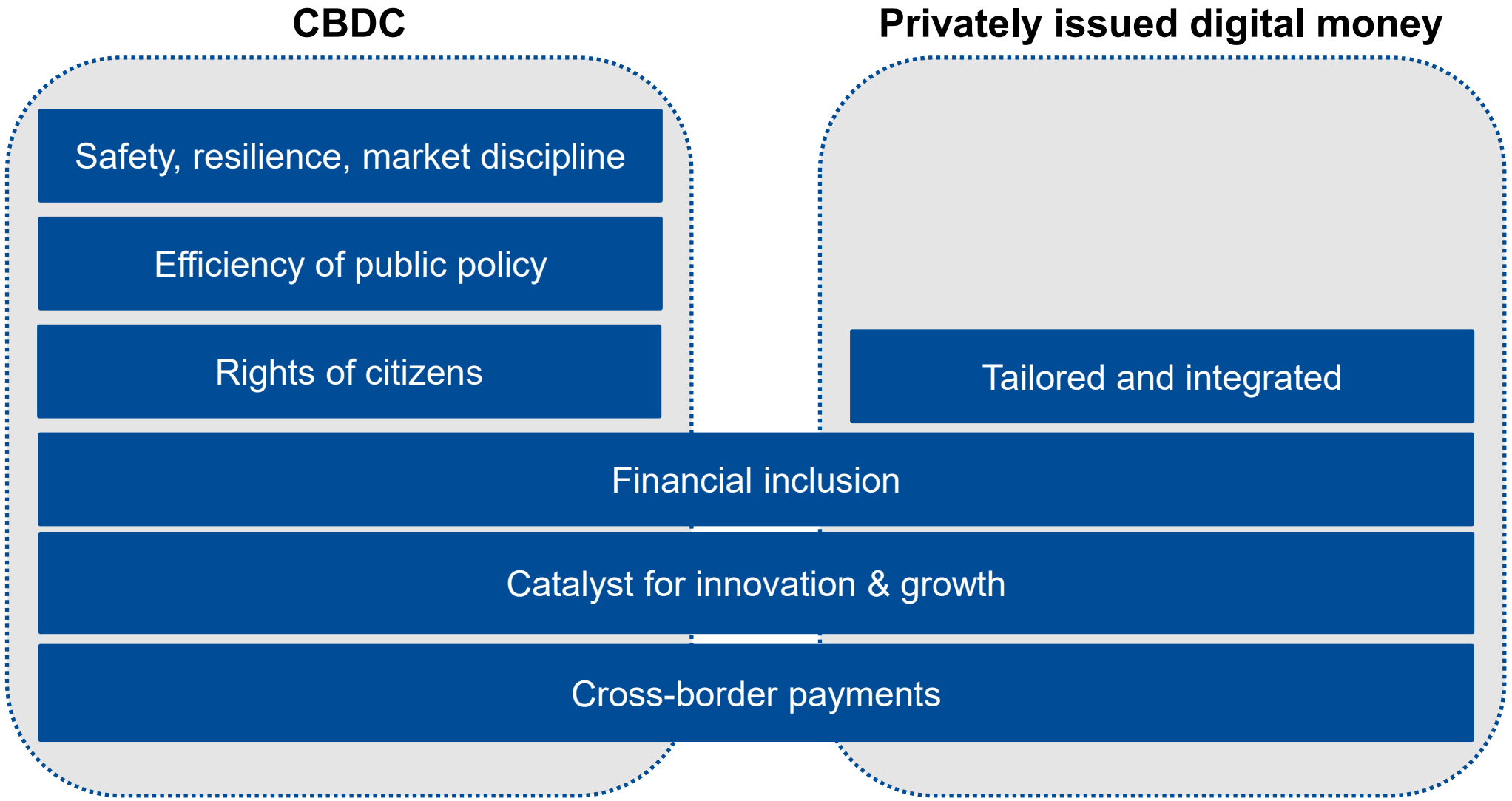


Source: Bech and Garrat, BIS, 2017

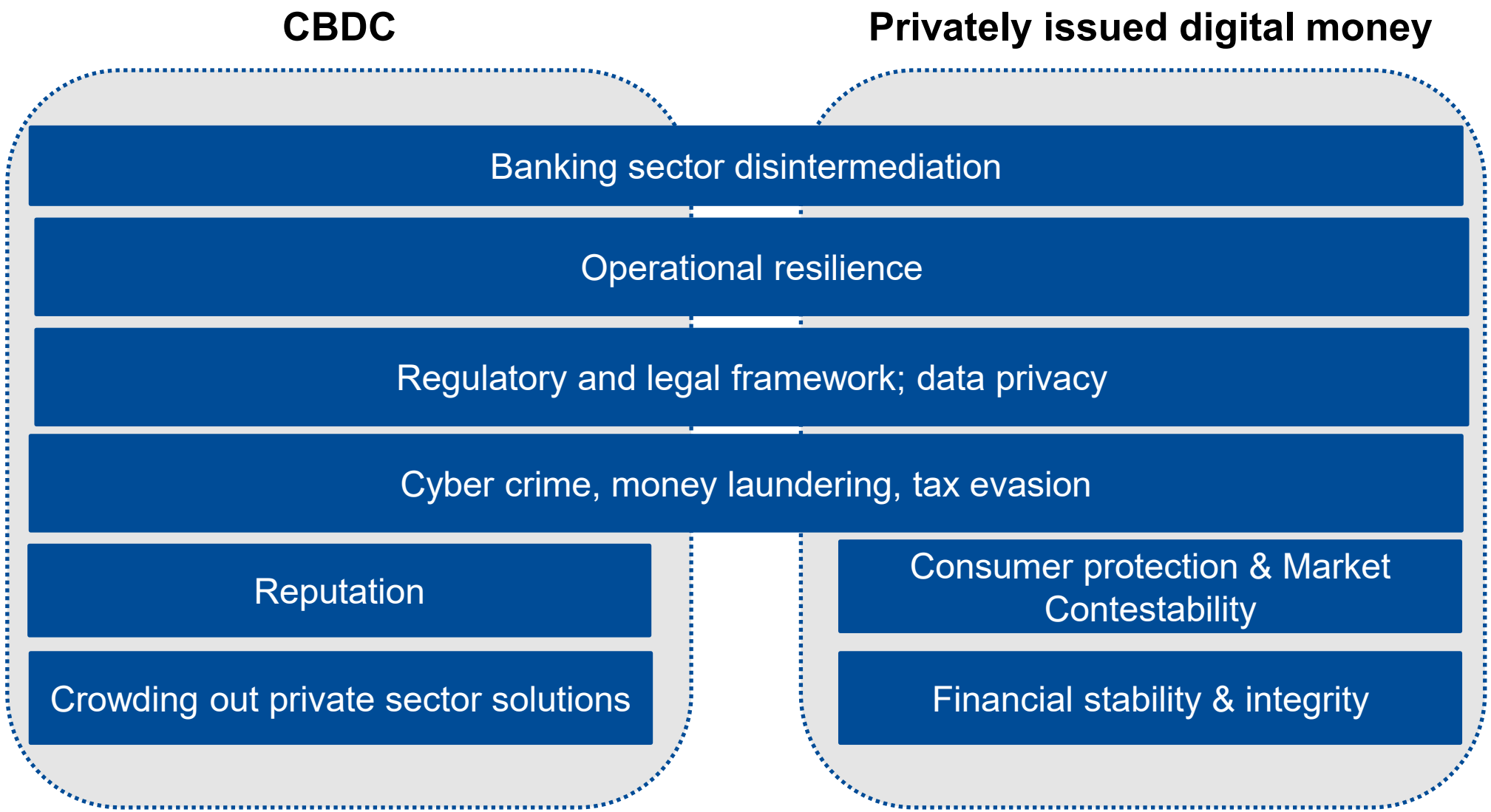
Bank Deposits vs. Digital Money & Crypto-assets

	Bank deposits	E-money	Stablecoins	CBDC	Crypto-assets
	Private money			Public money	Not money
Denomination	National currency	Same as banks	Same as banks	Same as banks	Own
Redemption pledge	Fixed @ face value		Fixed / Flexible	None	None
Backstop	Government	Private	Private	None (Implicitly Gov)	None
Backing asset	Mixed	Safe & liquid	Safe / Varied	None	None

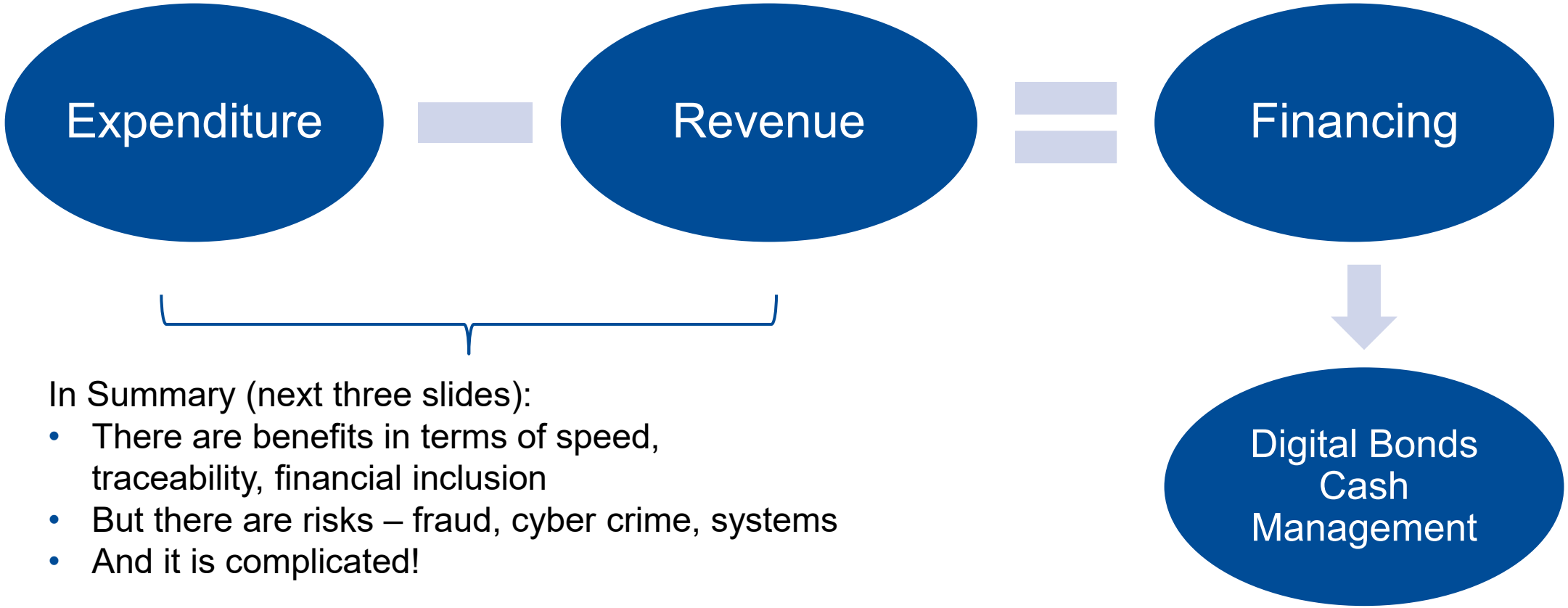
Digital money offers potential benefits…



… as well as risks and challenges…



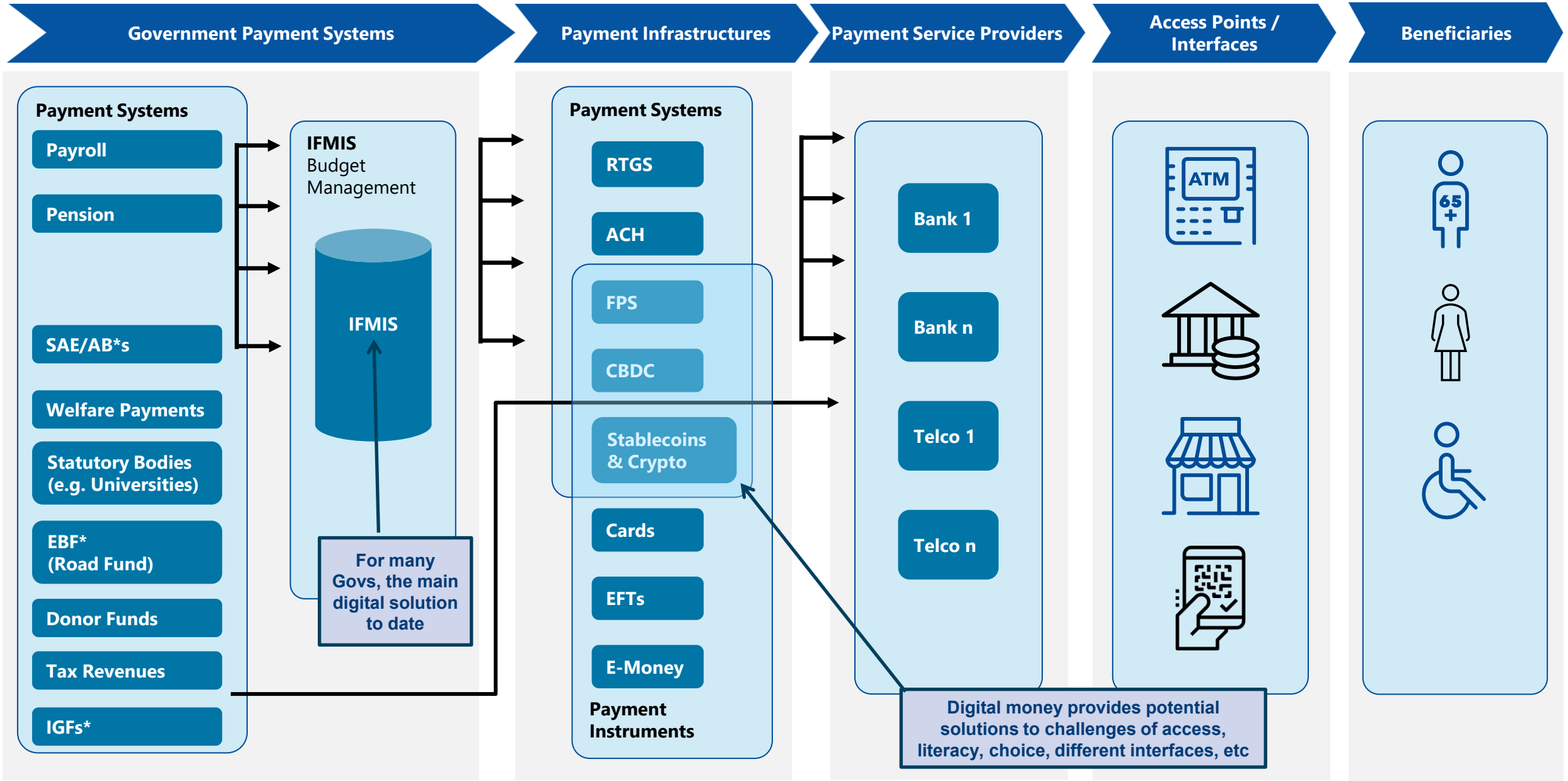
Digital Money in PFM



In Summary (next three slides):

- There are benefits in terms of speed, traceability, financial inclusion
- But there are risks – fraud, cyber crime, systems
- And it is complicated!

The Digital Payments Ecosystem in Government



* EBF: Extra-budgetary Funds; SAE/ABs: Self-Accounting Entities/Autonomous Budgetary Institutions; IGFs: Internally-Generated Funds

Source: IMF

Digital Money and Payment Solutions

Mobile Money	• Easy access, but over reliance on smart phones • Examples: Brazil, Peru, Kenya
Government Issued Cards	• Direct access for recipient, and targeted fund usage • But: lack of POS, risks of fraud, theft, misusage • Examples: USA, Egypt
Fast Payment Systems	• High interoperability, instant access, but may require bank a/c, fraud target • Examples: Brazil (Pix), Thailand
CBDC	• Direct real time, secure, efficient, but: privacy, trust concerns • Examples: Nigeria, Bahamas; pilots in China, Ghana, Kazakhstan
Stablecoins and Crypto	• Enable X-border payments; programmability to automate payments • But crypto is slow; Stablecoins concerns about singularity, crime etc • Examples: El Salvador, Palau
Tokenisation	• Only potential • Examples; projects by BIS, HKMA, SNB, WB

Stablecoins

Boost following GENIUS Act

- Act requires backed 1:1 by low-risk assets
- Similar to money market funds and narrow banking – but prohibited from paying interest

Rapid Growth

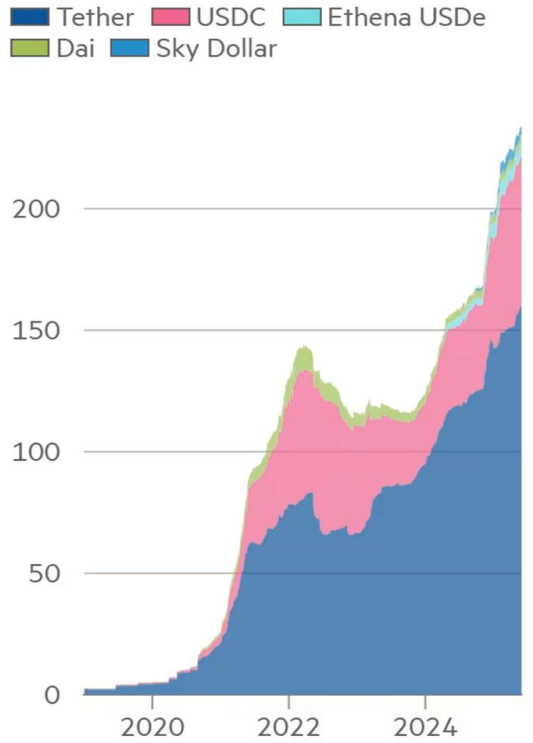
- Overwhelmingly in USD (99%), esp Tether and Circle
- USD 230 bn in 2025 (cf EUR 350 mn) – forecast to grow to USD 2 tr by 2028

On-off ramp for crypto, but also X-border transactions

- Most transactions outside the US

Stablecoins are growing fast

Market capitalisation of stablecoins ($bn)

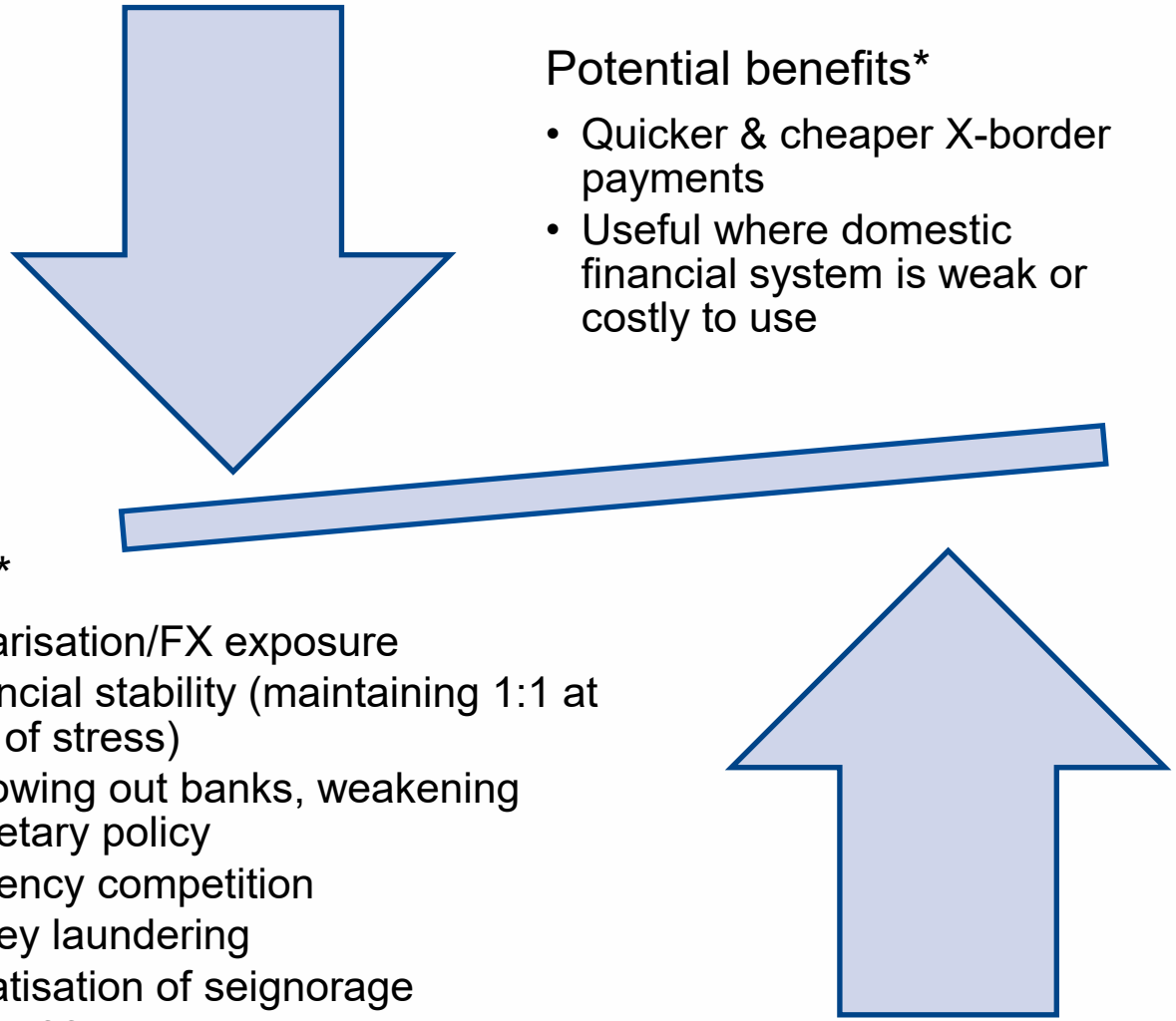


©*FT* Source: BIS

Stablecoins – Yes or No

Potential benefits*

- Quicker & cheaper X-border payments
- Useful where domestic financial system is weak or costly to use



Risks*

- Dollarisation/FX exposure
- Financial stability (maintaining 1:1 at time of stress)
- Hollowing out banks, weakening monetary policy
- Currency competition
- Money laundering
- Privatisation of seignorage
- Lack of fungibility between tokens

BIS **

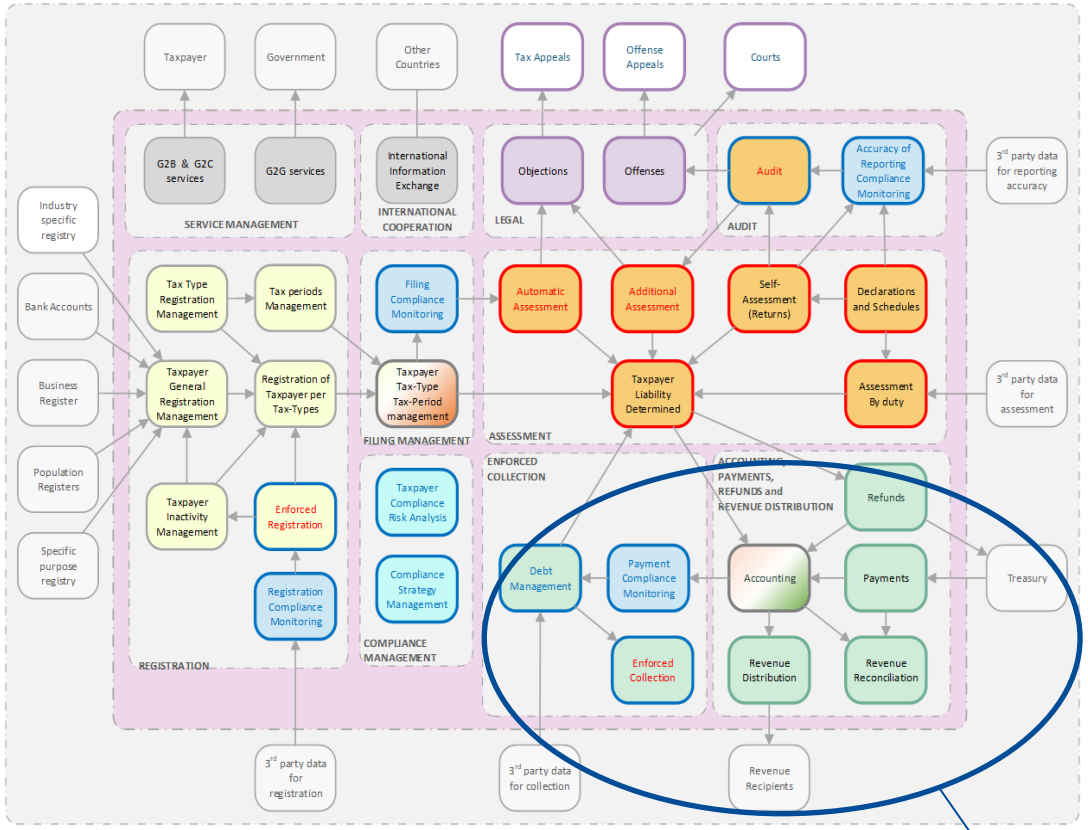
- Stablecoins fail to meet the key characteristics of money – singleness, elasticity and integrity
- "Go-to choice for illicit use"
- Strong preference for CBDC

** See Hélène Rey (and other articles) in IMF 'Finance and Development' (Sept 2025)*
*** Chapter 3 in BIS Annual Report 2025 (reported also by Chris Giles, FT, 24 June 2025)*

Digital Money and Revenue

The Tax Ecosystem is Complex

Registration, assessment, compliance, legal, audit, etc as well as collection, refunds etc

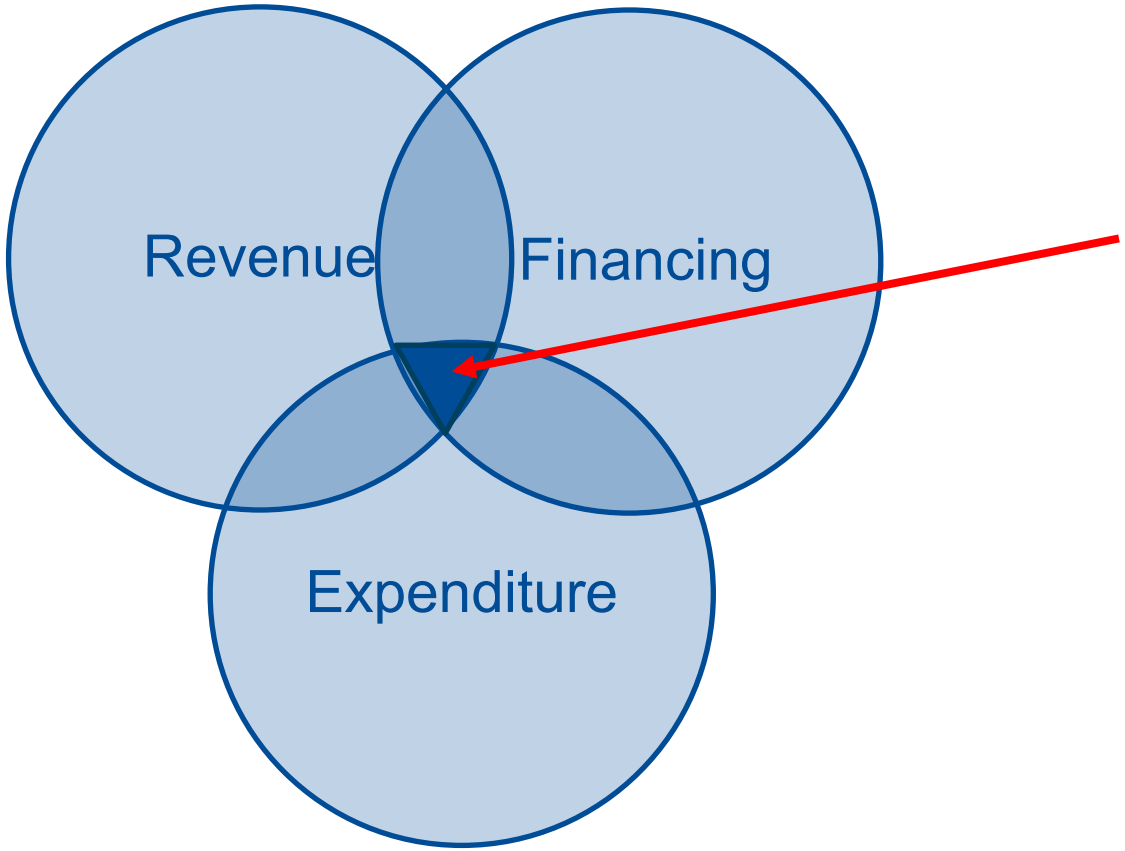


Source: IMF

Scope for digital money: in areas of payments & collection

Potential benefits	Considerations	Cross cutting
• Broadening tax base and enhance public trust • Enhanced transparency, traceability and auditability of tax payments. • Operational efficiency (time and cost) of tax transactions. • Real time data access • New avenues for investment strategies	• Redesign of banking and financial arrangements. • Rethink accounting and reporting systems • New ways of communication and data exchange • Address privacy concerns and cybersecurity threats.	• Building Institutional and technical capacity • Robust regulatory framework • Develop new digital infrastructure • Bridge between different payment systems • Integrate with existing financial framework

Government Cash Management



Intersection of three large flows

Focus on the benefits and risks for the management of the net cash flow and related cash balances

Identifying the Three Pillars

- Treasury Single Account
- Cash Flow Forecasting
- Active Cash Management

The TSA & Cash Consolidation: an Overview

Well understood concept (and substantially established in PEMPAL countries); but different models:

- Coverage extends only to C.Gov or also to SNGs (sometimes to SoEs)
- Centralised or decentralised payments
- Payments processed by MoF via central bank or directly; or by MDAs via commercial banks
- ZBAs or control via credit limits managed through CB, banks or IFMIS

Challenges – in many countries globally

- Revenue transfers may be delayed by the banks (sometimes by the MDAs)
- EBFs, NPIs (and donors, also some MDAs) resist inclusion of “their” balances in TSA
- Inadequate IFMIS – problems of reconciliation, control, and failure to separate cash and permission to spend

Some Immediate Conclusions

- Good practice TSA requires modern banking system and efficient IFMIS
- Implies much greater scope for benefits among MICs/LICs than HICs

The TSA: Potential Benefits from Digital Money

Opportunities

- Greater automation and speed of transactions (both revenue and expenditure)
- Fewer Intermediaries
- Improved transparency, traceability & auditability
- Easier Reconciliation
- New pathways to reach under-served areas (mobile money, stablecoin)

Benefits

- Lower transaction costs
- Reduces cash-costly time-lags & leakages
  - Instant crediting of revenue, rapid transfers to distant beneficiaries
- Wider TSA coverage
  - Increased EBF & donor confidence
  - Integrating fintech transactions with IFMIS (Nigeria example)
  - Swifter consolidation (India example)
- Improved control - identifying corruption, waste

Digital Money & Cash Management

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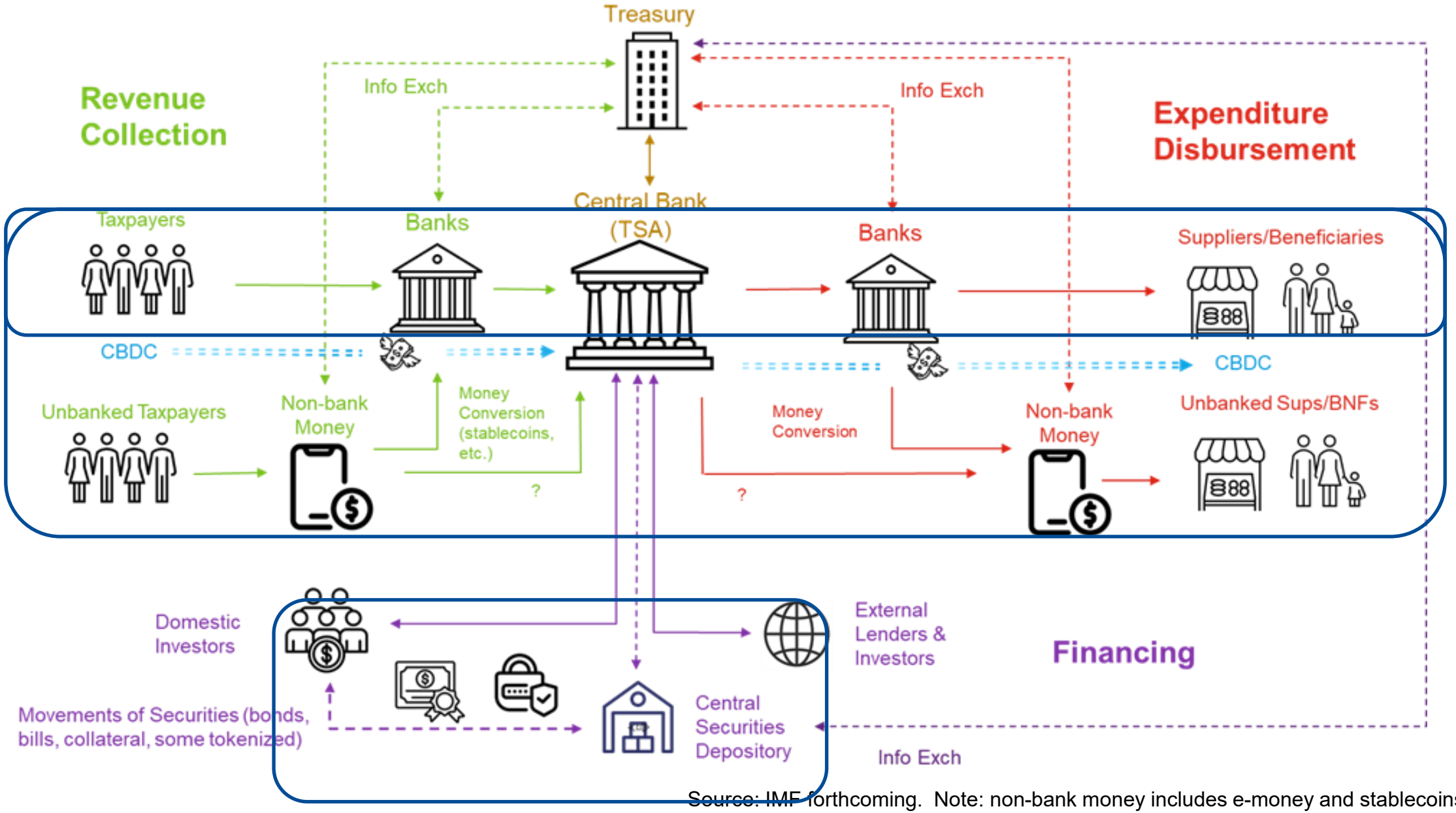

Source: IMF forthcoming. Note: non-bank money includes e-money and stablecoins

Cash Flow Forecasts

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Forecasts support…

- Orderly achievement of budget targets
- Financing strategies to meet cash management objectives

But require…

- Large volumes of data (outturn and commitment data from IFMIS, bank statements, returns from MDAs, etc)

Digital money potentially supports → Improved granularity → Greater reliability and timeliness → Improved tracking

Bringing benefits from → More precise modelling → Forecast accuracy → More dynamic & responsive decision making

Also opens opportunities for more advanced forecasting tools

Active Cash Management

Active cash management => smoothing cash flows by borrowing and lending in the money market (usually with Tbills and repo), generating lower average cash balances with benefits of lower costs and to wider financial polices

Digital money potentially brings wide-ranging benefits to security markets and investor confidence – see later for digital bonds

Active cash managers will benefit from that, and especially

- Lower transaction costs
- Reduced settlement time lags (more relevant to less advanced countries)
- Tokenised securities for repo reducing counterparty risk
- New investors, greater participation in the market

Risks and Challenges

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Risks from new types of digital money…

- Issuer risk (eg from privately issued stablecoins - worse for crypto assets)
- Exchange risk (stablecoins losing their fixed peg at times of stress)
- Volume of conversion operations at end of day bringing financial stability risks in less liquid markets
- Risks linked to custody risks & owner identification for tokenized money or money held on new platforms
- …as well as the extensive risks of cybercrime, data privacy breaches, and new avenues for tax evasion & fraud…

…bring new challenges for cash managers

- New moneys fragment liquidity and increase operational risk
- Smart contracts can undermine fungibility (Brazil example)
- Technology and skill investment required to manage the information flows across new forms of money and distributed ledgers if the potential benefits are to be realised

Digital Bonds

Digital bonds are securities issued, registered and stored on a blockchain

Potentially make debt management more cost effective

- Instantaneous settlement reduces risk and improves liquidity management for all parties
- Reduced need for intermediaries and automated workflows reduces cost
- Smart contracts automate post-trade operations (debt servicing); can also support eg ESG goals
- Blockchain reduces issuance costs (lower intermediation and connectivity costs), opens market to new participants, lowers trading costs (direct access to ledger)
  - Linking bond issuance to mobile money (Kenya, Uganda) reaches unbanked (but “phoned”) population – for small investments
- Reduced operational costs and improved debt transparency and data

Potential Benefits – an Elaboration

OBJECTIVES	POTENTIAL BENEFITS
Cost-effective Debt Management	Instantaneous settlement reduces settlement risk and speeds up funds raising for issuers (T+0) Cost reduction resulting from less financial intermediaries Automated settlement process reduces settlement failures, fraud risk, human errors and head costs Reduced post-trade costs with automated workflow of payments (coupon payments, reimbursement) Decentralization of the custody function can eliminate custodian banks costs Eliminates the need for a trusted central counterparty Lower connectivity costs to transactional systems
Debt recording and transparency	Immutable digital ledgers makes it hard to alter the debt instrument value and related payments Single ledger for recording all debt contracts without need for reconciliation between creditors and debtors Single ledger eliminates the need for reconciliation of trade details between back-offices Real-time capture of the debt transaction and update of the portfolio Enhanced traceability of debt transactions and opened shared data and records Fast and secured access for authorized participants Single ledger facilitates debt reporting Improved access to trading statistics and possible automation of market indicators calculations
Broaden investor base and increased liquidity	Direct distribution on open ledger platform Fractionalized ownership can unlock access to government bonds for retail investors (Financial inclusion) Innovation through the issuance of new debt instruments with conditionalities (i.e. customization, green bonds) Simplified issuance process for smaller corporates Simplified delivery of collateral can increase liquidity of digital bonds Foster cross-border investments through easier access to cross-border payments Fractionalization and simplified access can promote liquidity in the secondary market Reduced settlement time improves liquidity management for all the transaction's counterparts Tokenization can unlock liquidity for illiquid assets

Source: IMF

Potential risks of digital money related technologies supporting bond issuance (as they currently stand)

Scalability:
DLT platforms may struggle to handle efficiently large-scale operations or high transaction volumes – operationally complex. Limited block size can delay transaction confirmation

Interoperability:
Lack of interoperability among DLT platforms hinders seamless data sharing and collaboration. Diverse or incompatible standards

Liquidity Risk:
Risk of market fragmentation. Limited transaction throughput and price volatility during market stress can impact liquidity

Settlement Risk: Probabilistic settlement on permissionless platforms introduces the possibility of competing blocks and transaction reversals

Compliance & Legal Risks:
The absence of comprehensive regulations poses challenges, including fraud, market manipulation, and data protection concerns

Regulatory Challenges:
Adapting existing regulations to DLT and ensuring compliance across jurisdictions are ongoing challenges

Public Sector Digital Bonds 2021-24 (mn units)

	Issuer	Issuer type	Issuance Date	Issuance Place	Amount	Ccy	Maturity	Coupon	Instrument type	Native / Tokenized	Use of CBDC	DLT Type	DLT Platform	Settlmnt Day	Dealer / Lead Manager
1	EIB	Supranational	Nov-24	Luxembourg	100	EUR	Nov-29	2.545	Bond	Native	Yes	Private	GS DAP	T+0	GS,DZB,LBBW
2	EIB	Supranational	Nov-24	Luxembourg	100	EUR	Nov-27	2.36	Bond	Native	Yes	Private	HSBC Orion	T+0	HSBC,BNP, Natw.
3	City of Lugano	Subnational	Oct-24	Switzerland	120	CHF	Oct-33	1	Bond	Native	Yes	Private	SDX	T+0	ZKB
4	KFW	Public Agency	Aug-24	Germany	50	EUR	Nov-24	3.46	Bond	Native	No	Private	Cashlink	T+0	DZB
5	AIIB	Supranational	Aug-24	Luxembourg	300	USD	Jan-27	4	Eurobond	Native	No	Private	D-FMI	Unknown	Citi
6	Slovenia	Government	Jul-24	Slovenia	30	EUR	Nov-24	3.65	Bond	Native	Yes	Private	Neobonds	T+0	BNP
7	KFW	Public Agency	Jul-24	Germany	100	EUR	Dec-25	3.125	Bond	Native	No	Private	Polygon Bloc	T+1	Deutsche Bank
8	Swiss National Bank	Government	Jun-24	Switzerland	64	CHF	Jun-24	discount rate	Monetary Bills	Native	Yes	Private	SDX	T+0	Auction
9	World Bank	Supranational	Jun-24	Switzerland	200	CHF	Jun-31	1.1575	Bond	Native	Yes	Private	SDX	T+0	Commerzbank
10	Quincy, Massachusetts	Subnational	Apr-24	USA	10	USD	Apr-31	?	Municipal Bond	Native	No	Private	Onyx Digital Assets	Unknown	JPM
11	City of St-Gallen	Subnational	Feb-24	Switzerland	100	CHF	Feb-27	1.25	Bond	Native	Yes	Private	SDX	T+0	BKB,UBS,Safra
12	City of Lugano	Subnational	Feb-24	Switzerland	100	CHF	Feb-34	1.415	Bond	Native	Yes	Private	SDX	T+0	ZKB,BKB,Safra
13	Hong Kong	Government	Feb-24	Hong Kong	743	USD	Feb-26	Multicur	Green Bond	Native	No	Private	HSBC Orion	T+1	HSBC,BoC,CA,GS
14	Basel Canton	Subnational	Nov-23	Switzerland	105	CHF	Dec-27	1.3	Bond	Native	Yes	Private	SDX	T+0	BKB
15	Zurich Canton	Subnational	Nov-23	Switzerland	100	CHF	Dec-34	1.45	Bond	Native	Yes	Private	SDX	T+0	ZKB,UBS,Raiff.
16	Philippines	Government	Nov-23	Philippines	15000	PHP	Nov-24	6.5	Retail Bond	Tokenized	No	Public	PDAX	T+2	LBP,DBP
17	World Bank	Supranational	Oct-23	Luxembourg	100	EUR	Oct-26	3.399	Eurobond	Native	Yes	Private	D-FMI	T+0	TD Securities
18	EIB	Supranational	Jun-23	Luxembourg	1000	SEK	Jun-25	3.638	Green Bond	Native	No	Public	CA Blockch.	T+0	CA,SEB
19	EIB	Supranational	Feb-23	Luxembourg	50	GBP	Feb-25	SONIA+(	FRN Bond	Native	No	Private	HSBC Orion	T+2	HSBC
20	Hong Kong	Government	Feb-23	Hong Kong	800	HKD	Feb-24	4.05	Green Bond	Tokenized	No	Private	GS DAP	T+0	GS
21	City of Lugano	Subnational	Jan-23	Switzerland	100	CHF	Jan-29	1.625	Bond	Native	No	Private	SDX	T+0	ZKB
22	EIB	Supranational	Nov-22	Luxembourg	100	EUR	Nov-24	2.507	Bond	Native	Yes	Private	GS DAP	T+0	GS
23	IADB	Supranational	Jul-22	Spain	10	USD	Jul-24	2.205	Bond	Native	No	Private	IBERCLEAR	T+0	BBVA
24	EIB	Supranational	Apr-21	Luxembourg	100	EUR	Apr-23	0	Bond	Native	Yes	Public	Forge	T+1	GS,SocGen

Source: IMF. Note: list excludes electronic securities recorded on digital platforms which do not use blockchain technology; and excludes purchase of old securities that have been tokenised (issuance by "misuse of language") Only 3 government issuers (Slovenia, Hong Kong and Philippines). Only one auction (SNB Tbills).

Some Examples

Hong Kong Government	• Registered as traditional securities before mirroring on DLT platform (hence “tokenised” not “native” bonds) • Access only to selected participants. On issuance banks exchange cash from their RTGS accounts for minted HKD cash tokens on platform. • Tokenised securities and cash tokens processed on same DLT platform; secondary market transactions OTC but registered on platform
Banque de France	• EIB issued 4 digital bonds on different platforms v wholesale CBDC. DvP required interoperability of platforms • BdF mints necessary cash token on its platform and deposits in banks’ wallets
Philippines Treasury	• Issued Tokenised Tbonds on a digital trading platform • Primary registry the traditional bond CSD – but mirrored on platform • Retail investors could buy small amounts and hold them in digital wallets on the platform • Cannot so far be sold on secondary market and servicing off-chain, but in future accessible via a mobile payment app (which has more users than there are holders of bank accounts)
Swiss provinces	• Private DLT operated by Swiss Digital Exchange (SDX), also listed on traditional exchange with same ISIN. Book building & pricing off chain; registry & custody on chain • SNB issued CBDC on SDX – same ledger as digital bonds – digital bonds can settle v CDBC on T+0 – although can also use RTGS. Debt serving still outside DLT

Some Tentative Conclusions

Greatest potential benefits flow to those who are less able to secure them

- The benefits are much more limited for highly digitized countries with a good quality IFMIS, efficient and responsive banks, liquid markets and a financially sophisticated population
- Securing the benefits elsewhere requires investment in systems and skills – and competence in risk analysis and regulation
- CBDC very much less problematical than other forms of digital money

Requires a degree of caution, for example:

- CB money (CBDC, if available) should remain preferred option for wholesale financing
- Governments should only adopt new currencies in their operations when they can be seamlessly and inexpensively consolidated into the TSA with limited issuer and exchange risks; and there are sufficiently liquid markets to support this requirement
- Acceptable stablecoins must be backed by CB money or other high quality liquid assets and meet high-performance requirements for the interconnection between their infrastructure and the CB ledger
- Proceeds in the form of other types of private money in the retail market should be converted into safer forms of money beyond the forecasted needs in those currencies

Which has implications for use of digital moneys for revenue & expenditure...

- Trade-offs might be necessary in fulfilling objectives for different functions of fiscal operations and management
- Align new digital money adoption by MoF with the preparedness to face challenges and mitigate new risks

Annex: Some Definitions

- **Central Bank Digital Currency (CBDC):** Potentially a new form of digital central bank money that can be distinguished from reserves or settlement balances held by commercial banks at central banks. It is a central bank liability, denominated in an existing unit of account, which could perform all functions of money: unit of account, medium of exchange and a store of value. CBDC could be available to individuals ("retail" CBDC) or selected financial institutions (“wholesale” CBDC). CBDCs are not crypto assets.

- **Distributed Ledger Technology (DLT)**: A means of saving information through a distributed ledger, such as a repeated digital copy of data available at multiple locations. A database that’s stored, shared and synchronized on a computer network. Data is updated by consensus among the network participants. Blockchain is one example, but it doesn’t necessarily maintain its record using the same chain of blocks architecture.

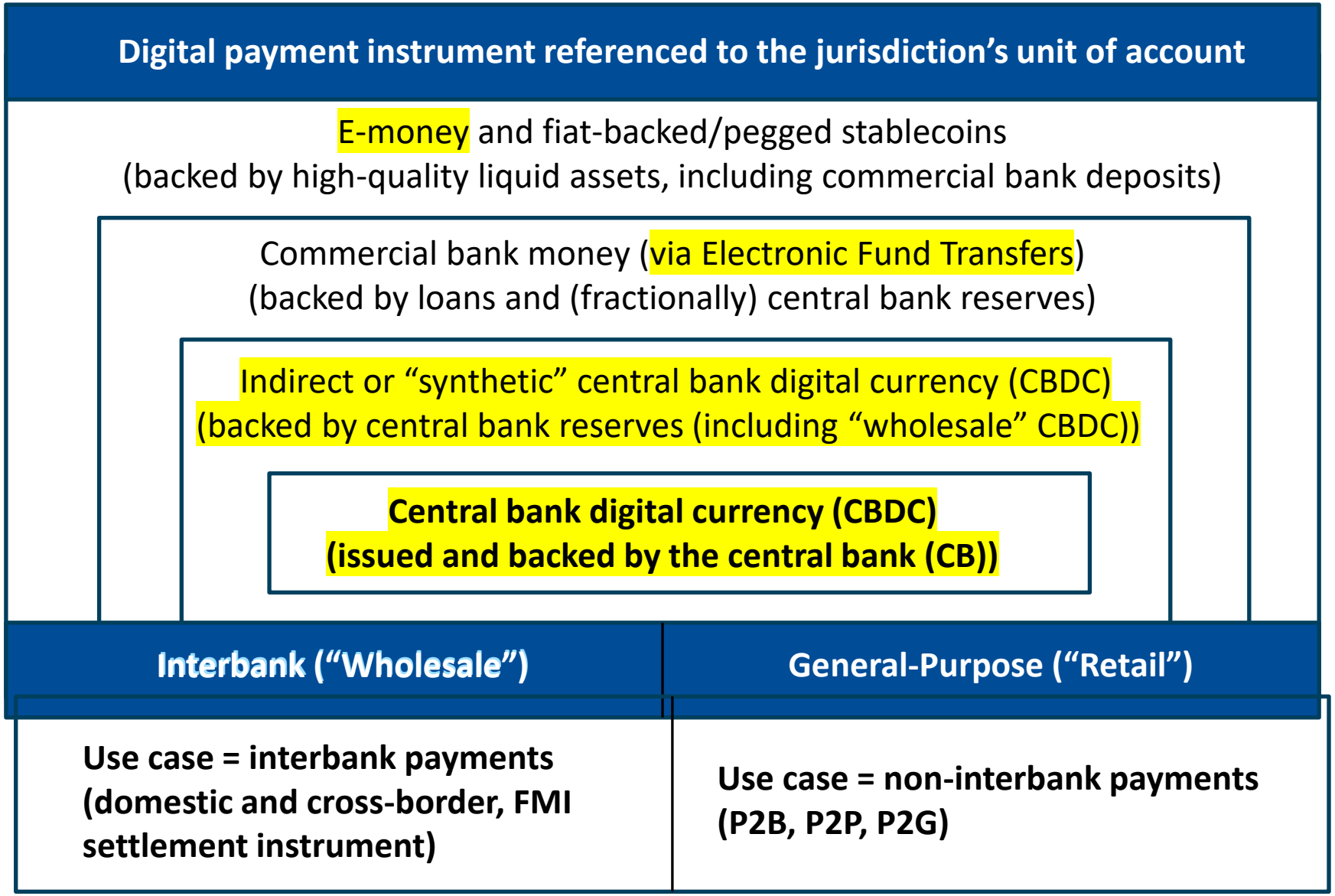
- **Digital Money**: Digital money is a digital representation of value issued by the public or private sector. Examples of digital money include central bank digital currencies (CBDCs) and stablecoins issued by the private sector. A digital form of fiat currency that is issued by a central bank is defined as CBDC. Private digital money differs in their design and stability of value. Non-stablecoin crypto-assets (e.g., Bitcoin), denominated in their own units of account, exhibit large price volatility, making them poor media of exchange and stores of value, and therefore are not currently considered money under IMF definition. Stablecoins seek to minimize price fluctuations by pegging their valuation to fiat currencies or other existing assets, backing their issuance with assets (including assets denominated in globally used official currencies individually or as a basket), or by managing their outstanding supply using algorithms. Other examples of digital money may include e-money. [For **Digital Fiat Currencies** see also next slide]

- **E-money**: A stored monetary value or prepaid product in which a record of the funds or value available to the consumer for multipurpose use is stored on a prepaid card or electronic device like a computer or phone, and which is accepted as a payment instrument by other than the issuer (multipurpose use). The stored value represents a claim enforceable against the e-money provider to repay the balance on demand and in full.

- **Stablecoins** are crypto assets that aim to maintain a stable value relative to a specified asset or a pool or basket of assets. To achieve stability, assets backing stablecoins are usually held. These can be fiat currencies, bank deposits, short-term market instruments, and even other crypto assets. A stablecoin is a type of cryptocurrency that is designed to maintain a stable value relative to a specific asset or a basket of assets. Unlike other crypto-assets like Bitcoin or Ethereum, which can experience significant price volatility, stablecoins aim to provide stability and reduce the risk associated with price fluctuations

- **Digital Public Infrastructure**: a set of secure, open, and interoperable digital systems that act as foundational building blocks for public services.

Annex: Digital Fiat Currency



Annex: Some Acronyms

ACH	Automated Clearing House
AIIB	Asian Infrastructure Investment Bank
BIS	Bank for International Settlements
CB	Central Bank
CBDC	Central Bank Digital Currency
CSD	Central ~Securities Depository
DLT	Distributed Ledger Technology
DvP	Delivery versus Payment
EBF	Extra-budgetary Fund
EFT	Electronic Funds Transfer
EIB	European Investment Bank
ESG	Environmental, Social and Governance,
FPS	Fast Payments Service
HIC/MIC/LIC	Higher/Middle/Lower Income Countries
HKMA	Hong Kong Monetary Authority
IADB	Inter-American Development Bank
IFMIS	Integrated Financial Management Information System
MDAs	Ministries, Departments and Agencies
NPI	Non-market non-profit Institution
OTC	Over the Counter
PFM	Public Financial Management
POS	Point of Sale
RTGS	Real Time Gross Settlement (System)
SNB	Swiss National Bank
SNG	Sub-national Government
SoE	State-owned Enterprise
TSA	Treasury Single Account
ZBA	Zero-balance Account

THANK YOU!