



Rise of the CBDCs: policy approaches and technologies

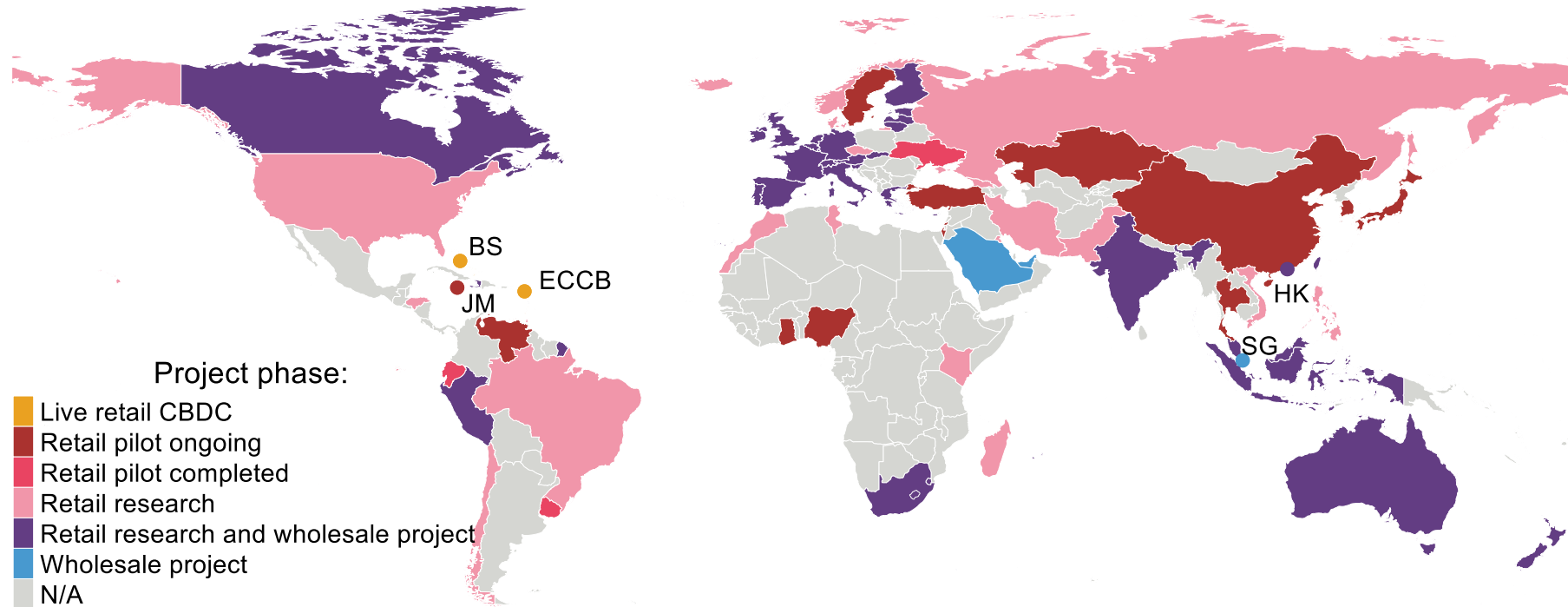
Raphael Auer, **Giulio Cornelli** and Jon Frost*

Sixth Meeting of the Arab Regional Fintech Working Group, 25 November 2021

*The views are those of the authors and not necessarily the Bank for International Settlements

CBDCs research and pilots around the globe: a stock take

- Draw on R Auer, G Cornelli and J Frost (2020), "Rise of the central bank digital currencies: drivers, approaches and technologies", *BIS Working Papers*, No 880 ([link to the data](#))

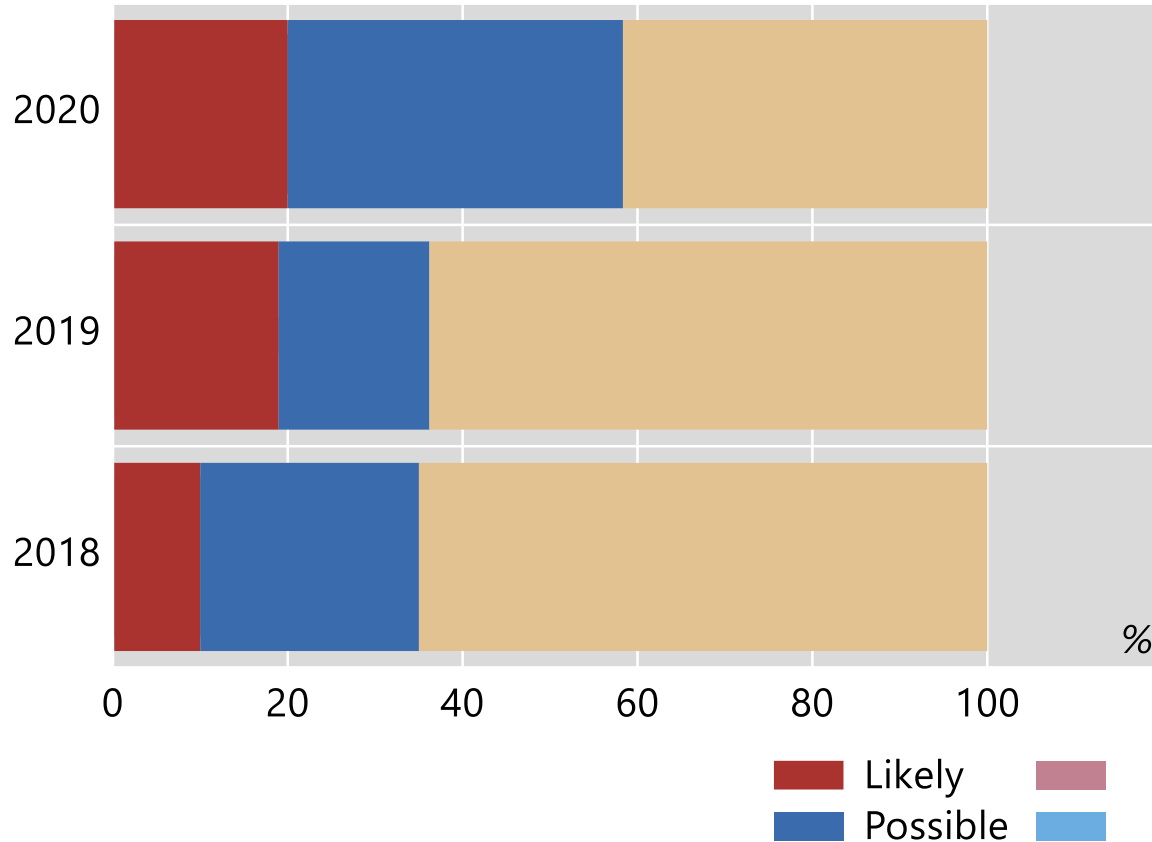


BS = The Bahamas; ECCB = Eastern Caribbean Central Bank; HK = Hong Kong SAR; JM = Jamaica; SG = Singapore. The use of this map does not constitute, and should not be construed as constituting, an expression of a position by the BIS regarding the legal status of, or sovereignty of any territory or its authorities, to the delimitation of international frontiers and boundaries and/or to the name and designation of any territory, city or area.

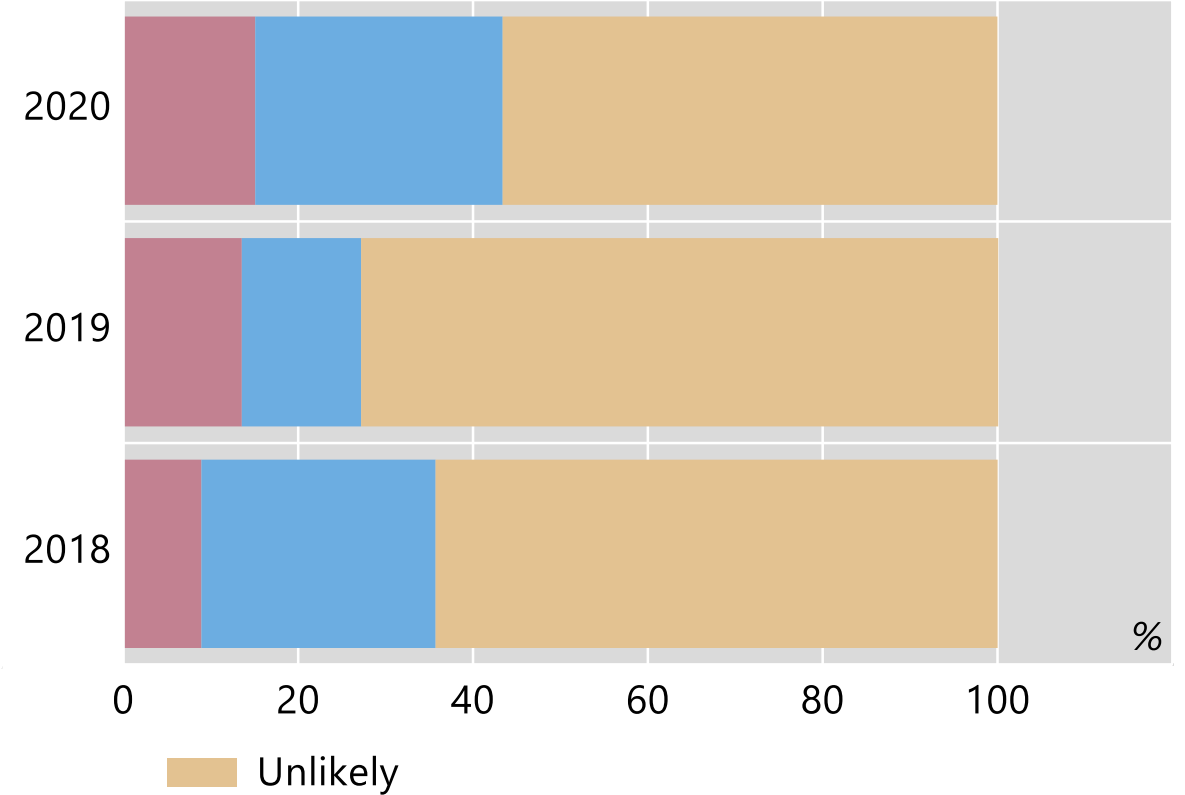
Source: R Auer, G Cornelli and J Frost, "Rise of the central bank digital currencies: drivers, approaches and technologies", *BIS Working Paper*, no 880, August 2020.

Likelihood of CBDC issuance is increasing

Responses on likelihood of retail CBDC issuance in the medium term



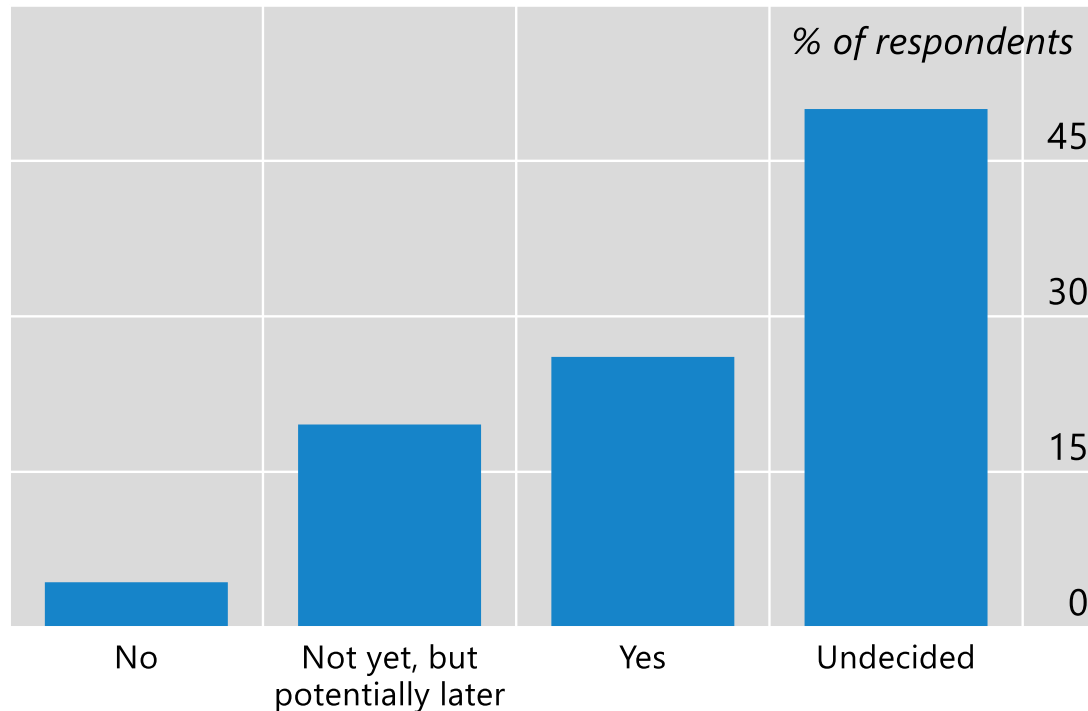
Responses on likelihood of wholesale CBDC issuance in the medium term



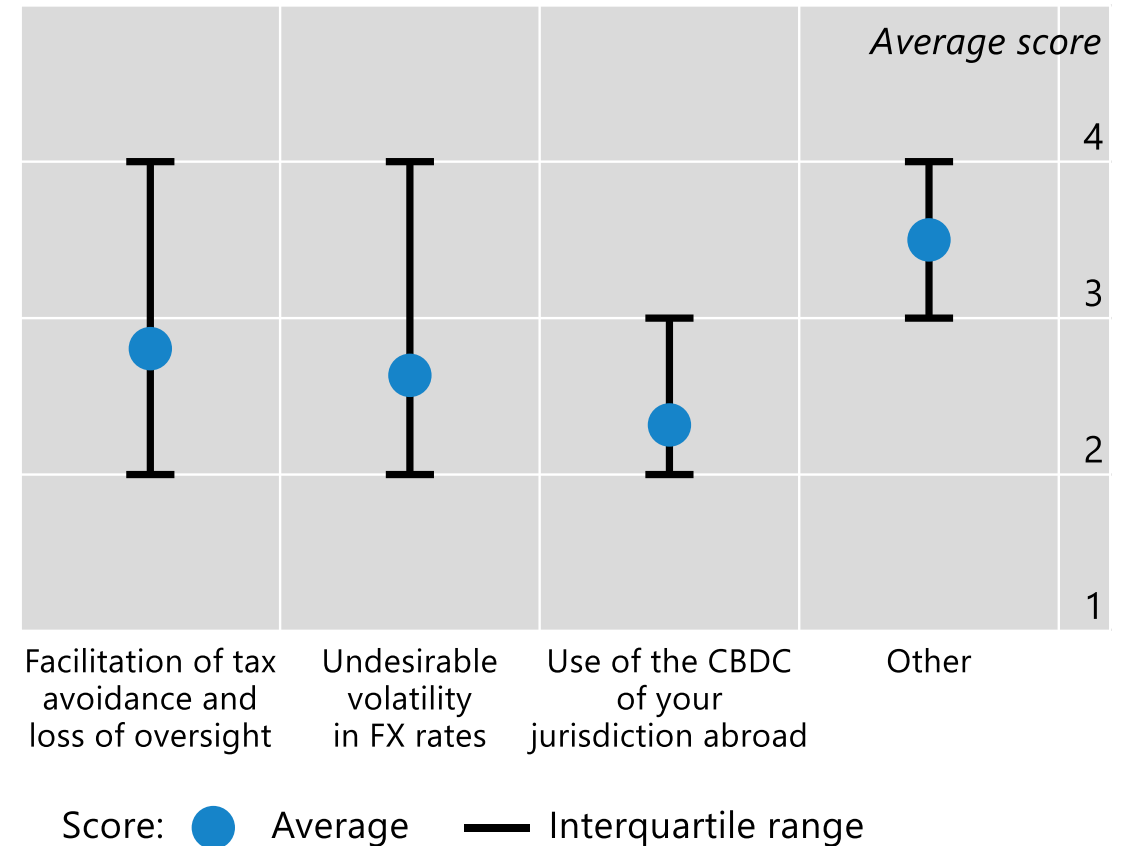
Sources: C Boar and A Wehrli: "Ready, steady, go? – Results of the third BIS survey on central bank digital currency", *BIS Paper*, no 114, 2021.

Cross-border CBDC use is considered, but central banks are cognisant of risks

Domestic use by foreign residents?

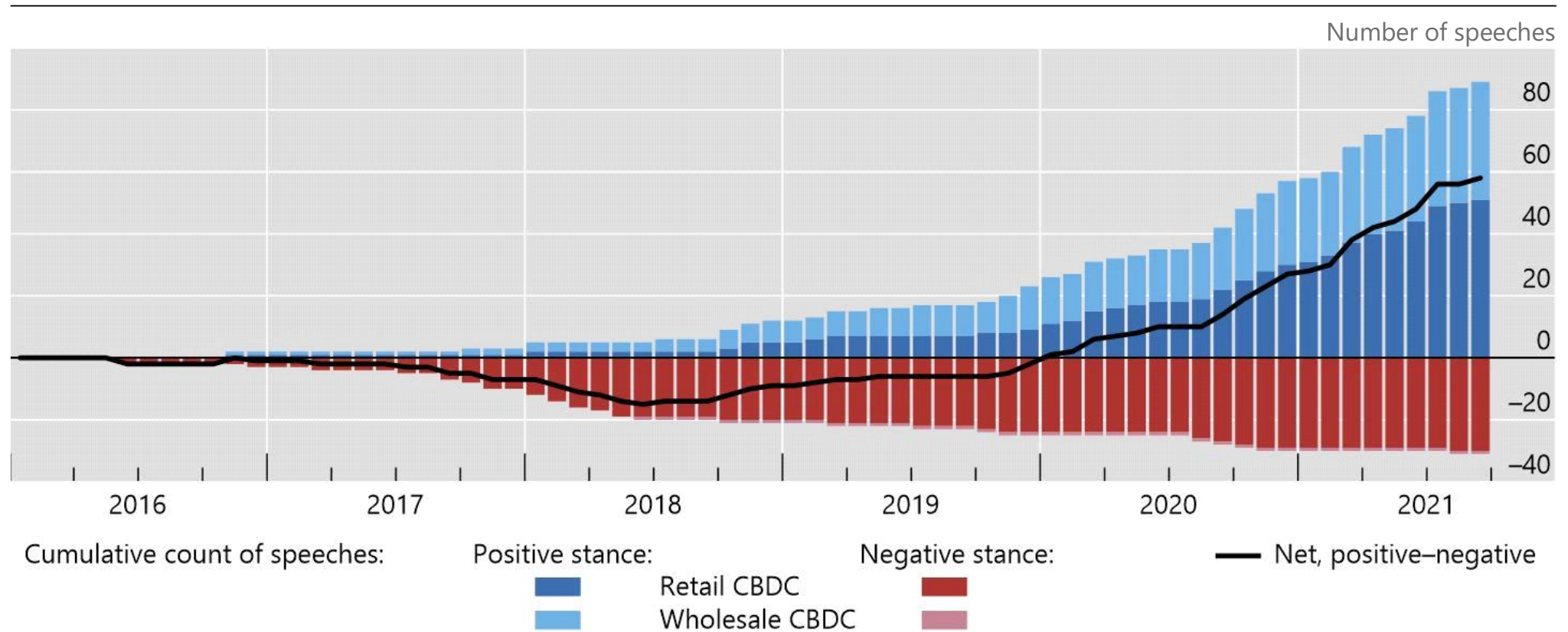


How important are the following risks?



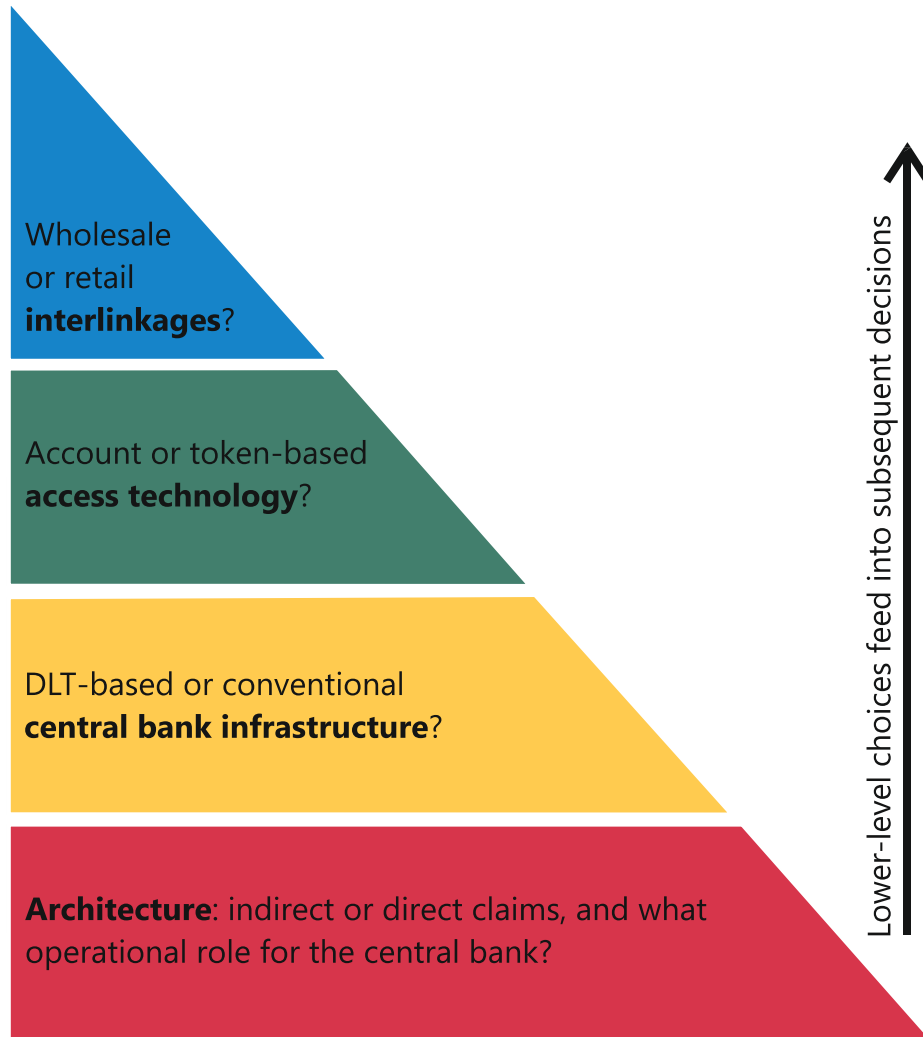
Source: R Auer, C Boar, G Cornelli, J Frost, H Holden and A Wehrli, "CBDCs beyond borders: results from a survey of central banks", *BIS Papers*, no116, June 2021.

Speeches on CBDCs have turned more positive since late 2018



Source: R Auer, G Cornelli and J Frost (2020), "Rise of the central bank digital currencies: drivers, approaches and technologies", *BIS working papers*, No 880, August.

Auer and Boehme CBDC pyramid: design choices

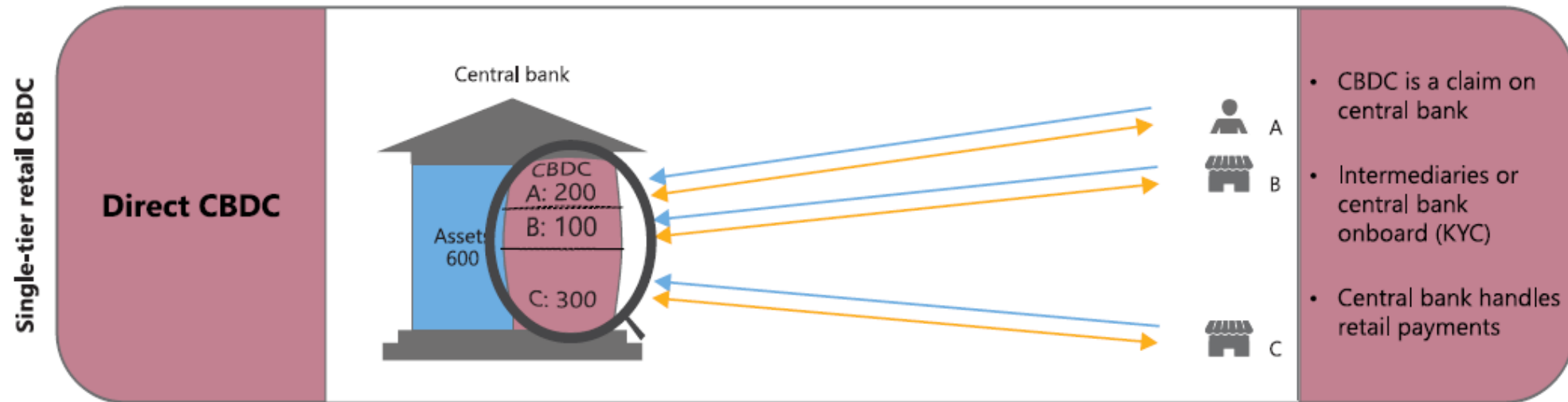


- Does the domestic access framework allow non-residents to hold CBDC?
- Token-based (or value-based) access does not require DLT
- DLT is only an option for some architectures (and not required for any)
- Different architectures come with different operational requirements for central bank

A foundational design choice: the architecture

- Retail CBDCs are issued by the central bank to the general public
 - But how is the CBDC issued to the population, and who executes payments?
- 4 architectures with different implications for the monetary and financial system:
 - I. (Indirect/Synthetic “CBDC”)** – narrow payment banks
 - II. Direct CBDC** – payments operated by the central bank
 - III. Hybrid CBDC** – claims on the central bank, but operated by private sector, central bank backup
 - IV. Intermediated** – direct claims, operated by private sector, without full transaction record by the central bank

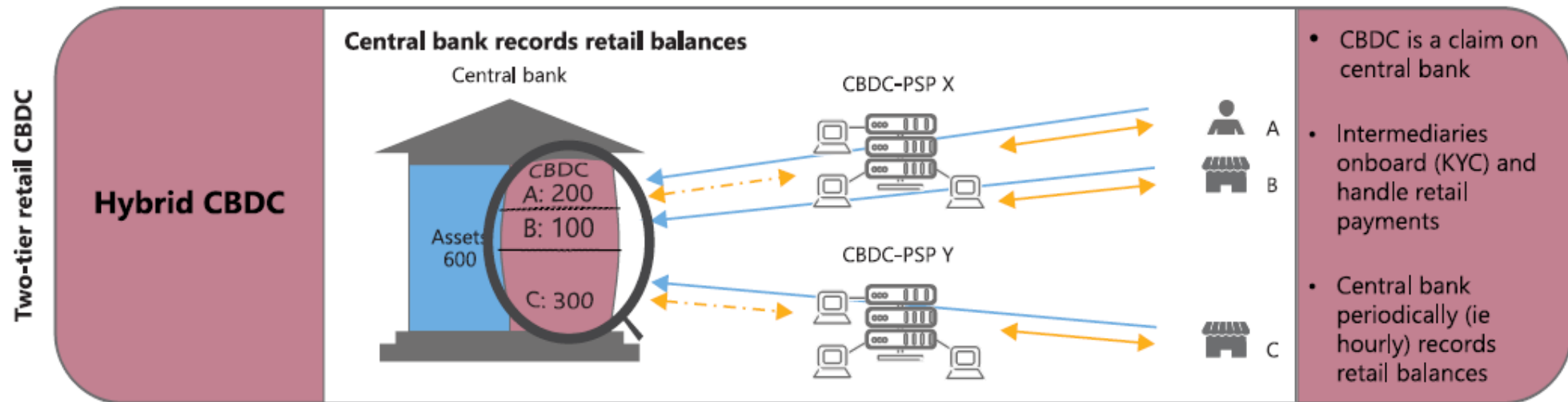
The Direct CBDC: **central bank-operated payments**



- Direct claims on the central bank
 - Private sector payment at most provides KYC
- Central bank operates payments:
 - How well-suited is the central bank for this activity?
 - Absence of risk-taking may impair real time payments

Source: adapted from R Auer and R Böhme, "Central bank digital currency: the quest for minimally invasive technology", *BIS Working Papers*, no 948, June 2021.

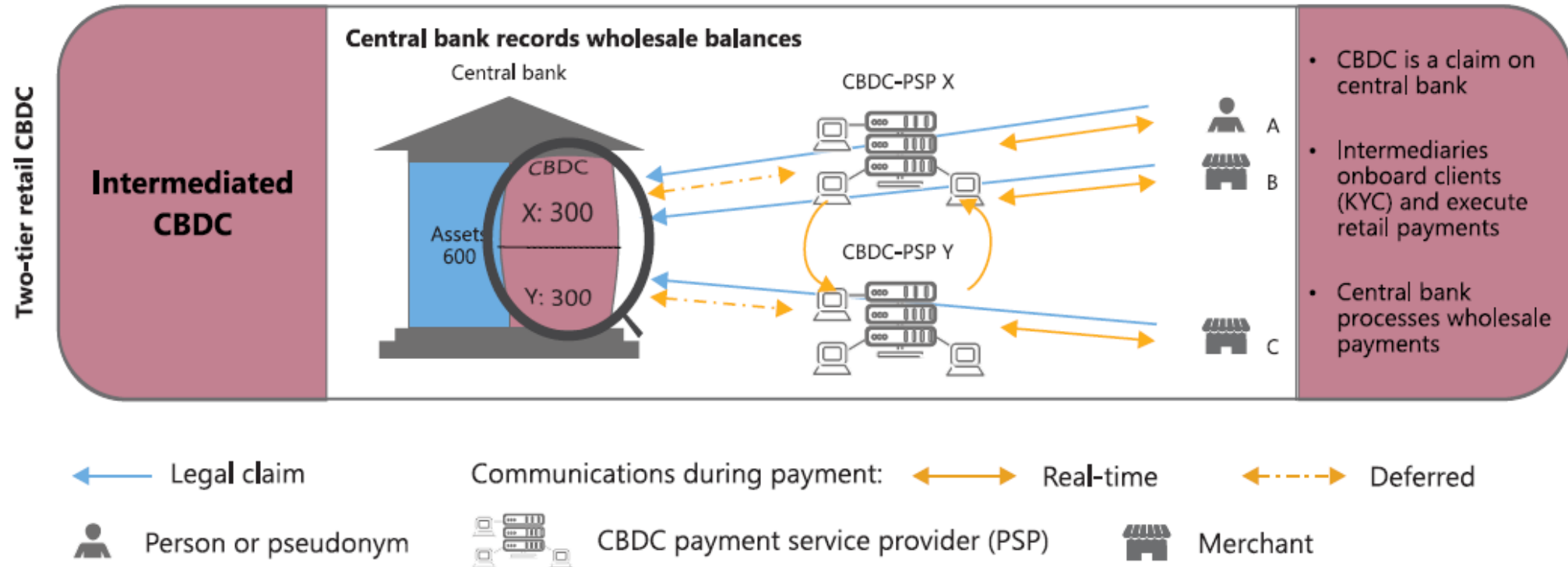
The Hybrid **CBDC** with a central bank backup



- Auer and Böhme (2020) propose hybrid approach:
 - Private sector payment providers perform onboarding, due diligence, and payments
 - The central bank has the technical means and legal power to switch retail client relations from a failing PSP to a working one.

Source: adapted from R Auer and R Böhme, "Central bank digital currency: the quest for minimally invasive technology", *BIS Working Papers*, no 948, June 2021.

Two-tier CBDC without a backup: fully **Intermediated CBDC**



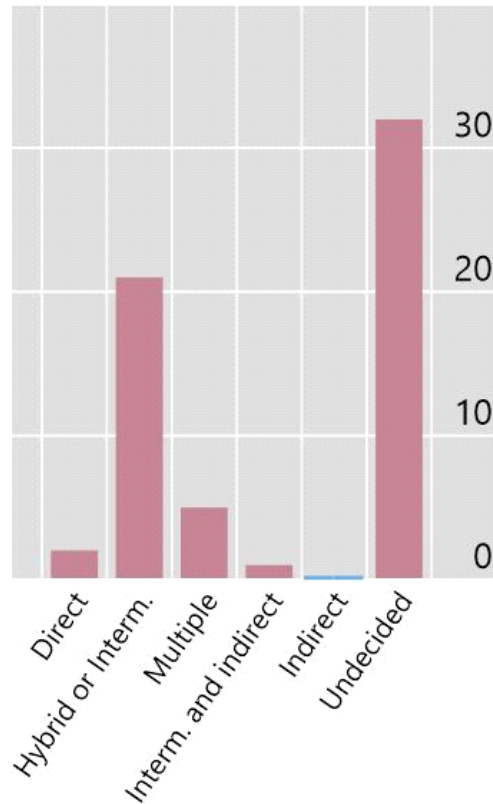
- Direct claims on the central bank
- But central bank only operates a wholesale ledger
 - Associated need for financial supervision

Source: adapted from R Auer and R Böhme, "Central bank digital currency: the quest for minimally invasive technology", *BIS Working Papers*, no 948, June 2021.

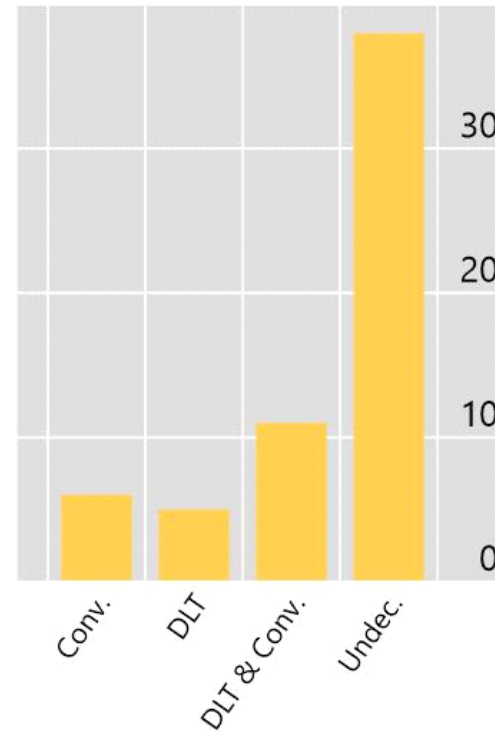
Histograms on design choices of retail CBDCs

Number of retail CBDC projects investigating each design option

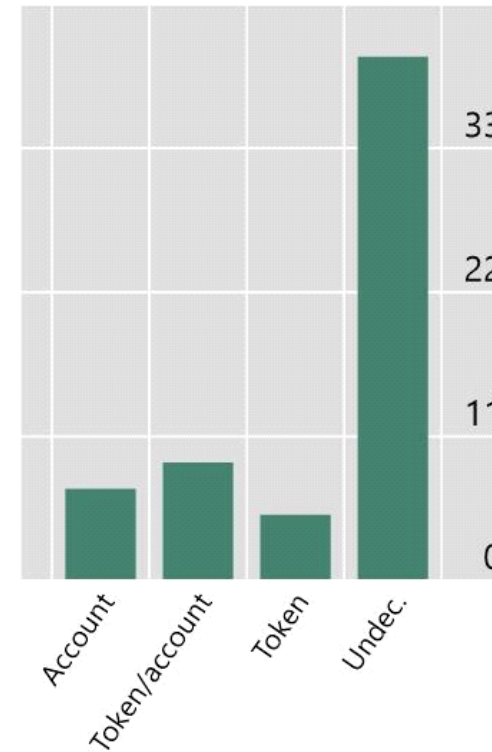
Architecture



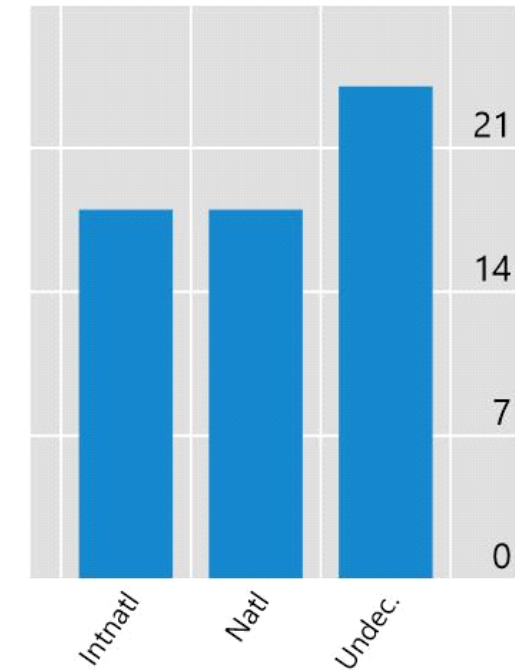
Infrastructure



Access



Interlinkages



Source: R Auer, G Cornelli and J Frost (2020), "Rise of the central bank digital currencies: drivers, approaches and technologies", *BIS working papers*, No 880, August.

Conclusion

- Retail CBDCs are not created equal
- A wide range of options are being considered
 - Jurisdictions differ in their economic and institutional conditions and - if they issue a CBDC - they will pursue heterogeneous designs
 - International cooperation is key to foster exchange of knowledge and experiences

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