



HKEX's Proof-of-Concept Use Case for HKMA's mBridge Project

Introduction

The Hong Kong Monetary Authority's (HKMA) Central Bank Digital Currency (CBDC) project has been renamed Multiple Central Bank Digital Currency Bridge, or mBridge Project¹.

The mBridge Project is a proof-of-concept (POC) use case that explores a hypothetical scenario where FX spot and futures products use CBDC for settlement and connect with HKEX infrastructure.

- The mBridge Project has expanded to cover four central banks: HKMA, People's Bank of China's (PBoC) Digital Currency Institute, Bank of Thailand (BOT) and Central Bank of the United Arab Emirates.
- The mBridge Project includes four different currencies: Hong Kong Dollar (HKD), Renminbi (RMB), Thai Baht (THB) and United Arab Emirates Dirham (AED).

A robust foreign exchange (FX) mechanism for both spot (liquidity sourcing) and derivatives (hedging) is critical to:

- Facilitate CBDC usage at the wholesale level;
- Control FX transaction costs; and
- Develop different use cases within the CBDC network.

Project Lionrock Inthanon - the previous phase of HKMA's CBDC project - introduced a board rate mechanism to

convert HKD and THB. The board rate approach, though useful in its design, can be improved by expanding the FX mechanism with:

- Products (spot and derivatives); and
- Quoting mechanisms, especially after adding two additional central banks to the network and increasing the number of FX pairs.

HKMA and Bank for International Settlements (BIS) have asked Hong Kong Exchanges and Clearing Limited (HKEX) to apply new technologies and develop an appropriate FX mechanism. The mBridge Project is intended to be a POC of such a mechanism for research purposes.

Through this POC project, HKEX has explored the launch of new FX spot and derivatives products and/or services. This test case uses CBDC for settlement, facilitates CBDC price discovery by future users and connects HKEX and CBDC infrastructure.

This paper will discuss the following aspects of the POC project:

- Current challenges;
- Use case design;
- Considerations; and
- Expected benefits.

¹ The previous phase of the project was called Project Inthanon-LionRock. That phase completed in December 2019.

² Central Bank of the United Arab Emirates and the People's Bank of China's (PBoC) Digital Currency Institute

Current Challenges

OTC trading dominates FX activity, especially for emerging currencies, and accounts for 98% of traded volume³. Building a more efficient FX market requires action in several areas⁴: transparency, price discovery, liquidity, settlement efficiency, credit risk (derivatives) and documentation (derivatives).

Global payment volumes heavily influence FX activities and currently the two are largely segregated. Integrating FX markets and facilities closely with payment infrastructure may speed up payment velocity, raise efficiency and lower transaction costs.

For the mBridge Project, it is critical to develop different ways of facilitating FX “crosses” between the four

currencies by providing alternative price discovery channels and liquidity sourcing mechanisms. Given the results of the first stage of the project, the board rate standalone model may not be able to meet market demand.

Prevailing FX market conventions and practices need to be upgraded and supported by new technologies to embrace new market norms such as T+2 spot settlement cycle (vs atomic settlement) and weekday market operations (vs 24x7 model).

Given these challenges and market trends, HKEX's CBDC settlement capability should be developed for trades in both securities and exchange-traded derivatives.

Use case design

To enrich FX mechanisms and meet FX conversion and hedging needs, HKEX's mBridge Project proposes a POC use case for FX spot and derivatives products and/or services for selected currency pairs.

This use case intends to demonstrate how FX transactions can be settled in CBDC. The prevailing exchange ecosystem utilized by end users, brokers, OTC Clear participants, exchange participants (EPs) and clearing participants (CPs) for OTC, securities and derivatives

trading will be enabled for CBDC settlement when HKEX's clearing system is connected with the CBDC's corridor under the mBridge Project.

The OTC settlement test case aims to provide CBDC settlement with trade compression. Spot FX aims to support real-time FX conversion in conjunction with atomic payment-versus-payment (PvP) settlements. The FX futures aim to provide FX risk management tools for users under the mBridge Project.



³ BIS, 2019 Triennial Central Bank Survey of Foreign Exchange and Over-the-counter (OTC) Derivatives Markets, https://www.bis.org/statistics/rpfx19_fx_annex_tables.xlsx; WFE, statistics portal, <https://statistics.world-exchanges.org/ReportGenerator/Generator>

⁴ BIS, BIS Quarterly Review: FX trade execution: complex and highly fragmented (Dec 2019), https://www.bis.org/publ/qtrpdf/r_qt1912g.htm; BIS Quarterly Review: FX settlement risk remains significant (Dec 2019), https://www.bis.org/publ/qtrpdf/r_qt1912x.htm

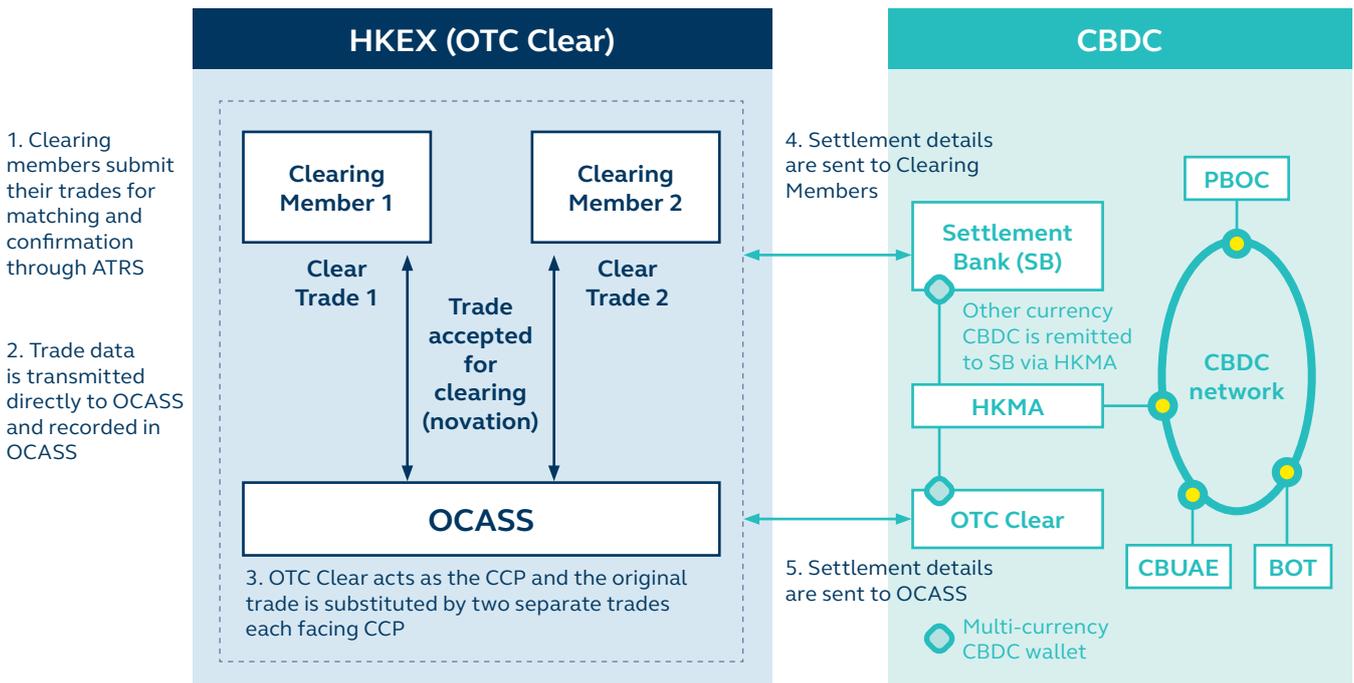
Scope 1 – OTC Clear for CBDC settlement

Currently, real-time settlement systems in Hong Kong are interlinked to enable banks to perform PvP settlement for the currency pairs of the four major currencies traded in Hong Kong. With the adoption of CBDC for foreign exchange transactions, THB and AED would also be eligible for settlement.

Utilising HKEX's OTC Clearing for CBDC settlement of OTC trades could allow trade compression and offer capital savings and trade affirmation to participants.

The eligible currency pairs will be restricted to the combination of four currencies included in the mBridge Project.

To be consistent with the nature of CBDC as the interim payment medium, only CBDC (hence no fiat) will be used for settlement. In case of a shortage of CBDC, liquidity can be sourced through either the spontaneous fiat and CBDC conversion facility⁵, or the contingent CBDC liquidity tool within the mBridge Project.



Scope 2 – Spot FX for conversion

Spot FX, which replicates conventional spot FX conversion, could be listed and traded in the Stock Exchange of Hong Kong Limited (SEHK) when it is equipped with functions and features such as CBDC settlement, atomic PvP settlement and operations on a 24x7 basis.

Further in the future, dedicated digital infrastructure and other new technologies could be deployed to integrate systems, optimize workflows and support the launch of new markets and products with CBDC settlement capabilities, such as spot conversion services.



⁵ Where each central bank manages the respective “converter.”

Scope 3 – FX Futures / derivatives for risk management

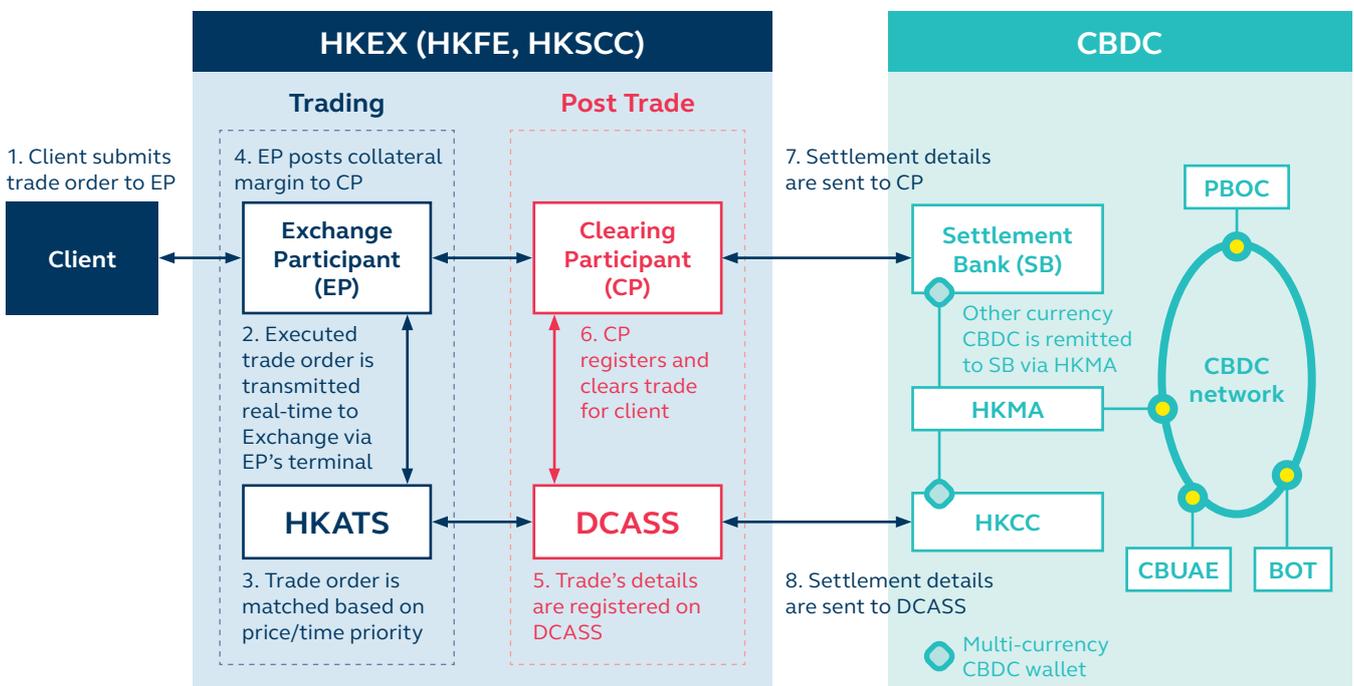
FX futures utilise existing derivatives trading and settlement infrastructure, the latter of which will be enhanced to allow for CBDC settlement at maturity.

Similar to the Spot FX, eligible currency pairs for FX futures with CBDC settlement will be restricted to the combination of currencies from the four participating jurisdictions in the mBridge Project.

At the early implementation stage, only CBDC will be used for settlement/delivery upon futures maturity. Further research will be needed to decide whether CBDC

could also be considered as collateral for fulfilling margin requirements and daily variation adjustment (VA), with an expanded CBDC usage scope and enhanced collateral management system.

Several settlement banks of HKEX's CPs are participating in the project. Once HKEX's settlement system is connected to the mBridge Project infrastructure, those banks will have the capacity to process CBDC settlements against derivatives transactions. The settlement banks will process CBDC flows on behalf of CPs, allowing EPs and their end-users to settle through CBDC.



Scope 3 – FX Futures

Considerations

For the aforementioned products/models, there are several considerations from technical, business & market, legal, regulatory & operational, and risk management perspectives.

Technical:

- HKEX sets up a node (wallet) with the HKMA to connect HKEX's infrastructure with that of the mBridge Project.
- Relevant HKEX settlement and clearing systems shall be upgraded to fulfill the technical requirements.

Business & market:

- End clients, EPs, CPs and settlement banks support new trading and settlement arrangements from infrastructure and business perspectives.
- HKEX considers launching a dedicated programme to enhance liquidity, facilitate price discovery and improve liquidity sourcing.



Legal, regulatory and operational:

- Regulators develop a legal framework for CBDC trading and settlement and integrate it into relevant HKEX rules to determine if there is any need for a licensing requirement to operate a FX spot trading platform.
- Policy approvals are obtained, particularly for cross-border flows of the currencies involved.
- System changes will be implemented to create new products on HKEX trading and clearing platforms.
- A mechanism is in place to differentiate between the fiat currency and its digital equivalent.
- HKEX allows 24x7 trading and real-time atomic PvP settlement.
- Hong Kong Futures Exchange Limited's market opening hours and T / T+1 session breaks accommodate new digital currency market activities.

Risk management:

- HKEX will deploy contingency plans to ensure ample CBDC liquidity.
- HKSCC and/or HKCC set up a CBDC usage threshold per participant.
- Additional collateral and risk management infrastructure will be required for spot and derivative products.
- Position limits on proposed futures contracts can reflect OTC market reality.

Miscellaneous:

- Actual market/product launches are subject to further approval by internal and external stakeholders.
- Explore cooperation with financial institutions and authorities in the other three jurisdictions on, for example, mutual product offerings and establishment of a joint clearing pool.

Expected Benefits

The use case could serve as an additional mechanism to facilitate price discovery of FX transactions in the CBDC corridor.

CBDC offers efficient and timely settlement, thus benefiting market participants, especially for FX transactions.

The adoption of CBDC settlement could also enable HKEX to extend around-the-clock settlement and other related services. HKEX may use this to prepare for further connections with digital assets and also promote Hong Kong as the global risk management centre for fiat and digital currencies.

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