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Discussion

“Embedded supervision: How to build regulation into blockchain finance” by Raphael Auer

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VIEWS EXPRESSED DO NOT NECESSARILY REFLECT THOSE OF THE
BANK OF CANADA





Chairman William Weatherall Wilkins with ledger for Fidelity Fiduciary Bank's shares aka the Villain in Mary Poppins Returns. © Walt Disney

Summary

A case for (a) regulators directly monitoring financial market's ledgers using (b) a distributed ledger model (with proof-of-stake-like protocol) where (c) transactions are considered final if it is financially unprofitable to alter transactions.

Main benefit:

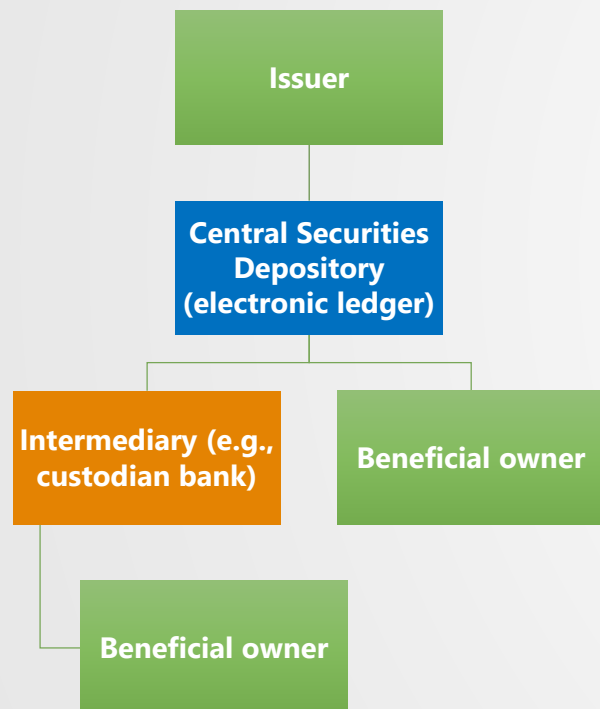
- Reduce regulatory costs
- Levelling playing field large and small firms by reducing fixed costs

Other benefits:

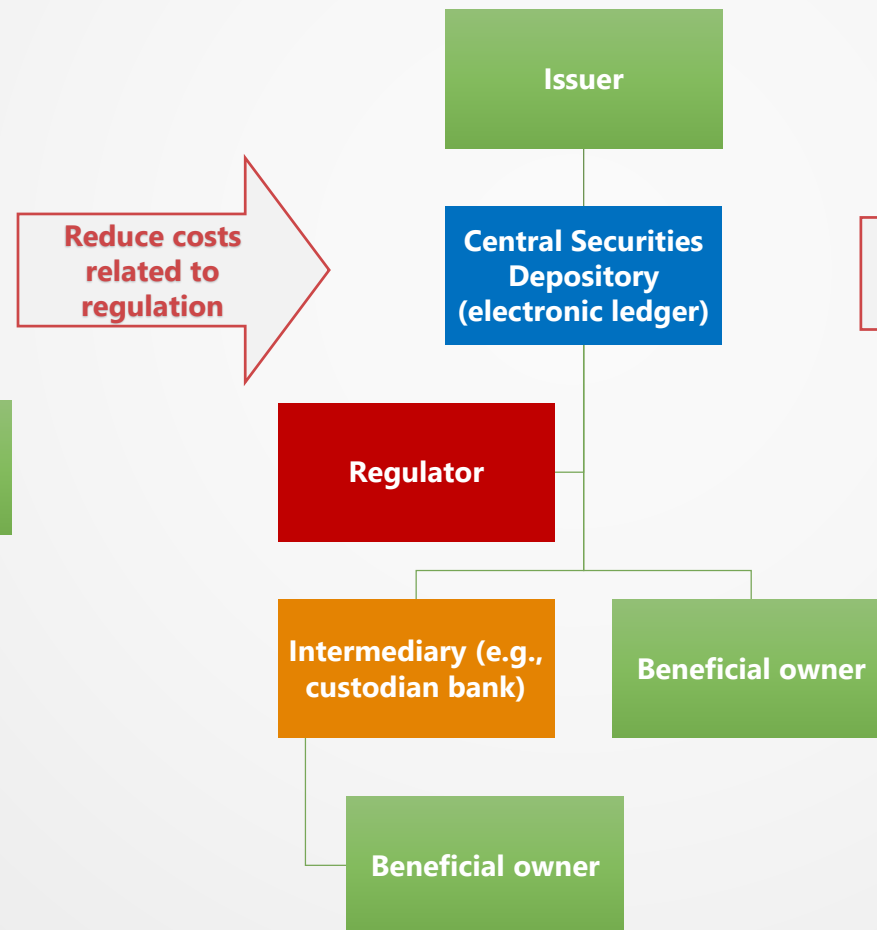
- Reducing cost by official sources delivering data for smart contracts
- Better governance structure for disputes regarding smart contracts

Dissecting the proposed model

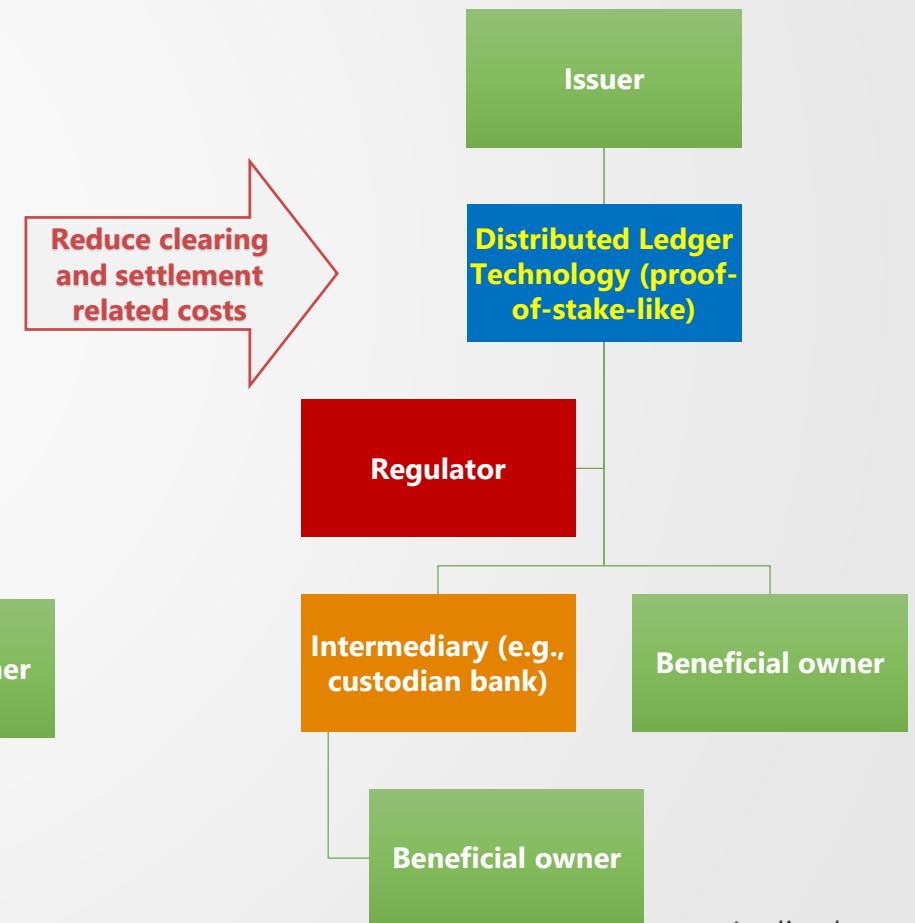
(a) CSD model without regulatory access to ledger



(b) CSD model with instant regulatory access to ledger



(c) DLT (proof-of-stake) model with regulatory access to ledger



(stylized examples)

What reduced *regulatory cost* requires in either model

Regardless of how clearing and settlement occurs, ledger-based monitoring requires:

1) Ability to identify actors on the ledger

- Initiative by FSB: Global Legal Entity Identifier (LEI) for Financial Markets
 - Call for tool to improve ability to quickly assess market participants' exposure
 - Improved risk management within firms
 - Better assessment of micro and macroprudential risks
 - Facilitation of orderly resolution
 - Containing market abuse and curbing financial fraud
 - Enabling higher quality and accuracy of financial data overall
- Global Legal Entity Identifier Foundation (GLEIF) established in 2014
- On-demand regulatory access to the ledger (e.g., data feed)
 - ✓ In model **(b)**, CSDs could provide regulators with LEI-to-ISIN data (“who owns what?”)

2) Ability to observe beneficial owner

- Need to be able to look-through custodians
- Possible when beneficial owner is recorded on the ledger (as of now not in all countries)

Settlement in CSD versus DLT (with proof-of-stake-like protocol)

When profitable for coalition of record keeper and shady party to erase historical transaction?

- Answer: When the joint benefit to the record keeper(s) and the shady party exceeds their joint cost
- DLT with proof-of-stake-like protocol in model **(c)**:

Money lost on past transaction > Capital staked by record keeper(s)

- Central securities depository in models **(a)** and **(b)**:

Money lost on past transaction > Reduction in net worth of CSD

-/- money recovered through legal proceedings + financial penalties
+ jail time for fraud

Clearing and settlement costs in CSD system

Report gives no estimate of clearing and settlement related costs in CSD system

- Back-of-the-envelope based on annual report of Canadian Depository for Securities



2018

Revenue: CAD 90 million

Operating cost: CAD 58 million

Number of transactions settled: 519 million

"Revenue per transaction" \approx CAD 0.17 (EUR 0.12)*

"Cost per transaction" \approx CAD 0.11 (EUR 0.08)*

(*) Those numbers do not take into account, among others,

- Other activities by securities depository

- (e.g., processing CAD 3.73 trillion related to money markets, dividends and interest)

- Liquidity cost savings provided to market participants due to settling payments at the end-of-day using an extensive collateral system

- How do these costs compare to the costs that would be incurred in a DLT-based model where different verifiers pledge sufficient capital to make it unprofitable to reverse trades?

Clearing and settlement costs in DLT system

Report gives no estimate of benefits in terms of clearing and settlement related costs in the DLT system with the proof-of-stake-like protocol that it advocates

- Paper derives equation for costs with broad parameters on when economic finality is achieved.
- Paper stops there. No attempt to truly use these parameters to estimate what the costs would be of using DLT with proof-of-stake-like protocol to process the actual volume of transactions.
 - Some practical difficulties with the assumptions:

Potential losses on many transactions are theoretically unbounded

- One parameter is the maximum possible loss that can occur with hindsight on a transaction
 - May work for some transactions, unrealistic for others:
 - Buy-side of stock can lose at most the transaction price
 - Sell-side of stock can, with hindsight, lose out an infinitely large amount
 - Also unrealistic in context of, for example, options, currencies and total return swaps.
- Why important? Verifiers need to pledge a stake that exceeds the maximum possible loss
 - No finite amount is sufficient to achieve economic finality.
 - Verifiers pledging the security?
 - But that may also require a record of the verifier buying the security? Chicken and egg problem.

Clearing and settlement costs in DLT system (continued)

- Some practical difficulties with the assumptions (continued)

Anything recorded on the ledger is vulnerable to attacks

- Model assumes that record of transactions lose relevance over time
 - Important, because it limits verification capital necessary achieve economic finality
 - Idea: offsetting transactions occur, so history becomes less relevant
 - But should offsetting transactions not also be recorded on the ledger?
 - If recorded on the distributed ledger, then they must be vulnerable and verification capital is necessary for those transactions as well.
 - If ultimate proof of offsetting transactions is not on the distributed ledger, how is then the accuracy of the record of those transactions ensured?
 - On a ledger in a CSD?
- Assumption may be ok for some securities that expire automatically
 - Options, futures
 - Some contracts expire really slowly (e.g., swaps, long-term bonds)
 - Does not work for all securities (e.g., stocks, preferred stocks, typically don't expire)

Concluding remarks

- Thought-provoking, well-written, pleasure to read
- Stronger case in the area of achieving regulatory cost savings when regulators directly access the market's ledger... (...progress in this area is already underway without a DLT based on proof-of-stake-like protocol)
- Weaker case regarding cost reductions in the areas of clearing and settlement due to the adoption of a DLT based on proof-of-stake
- Could change by providing a cost comparison between the CSD and DLT
 - › Requires a credible calibration of the model with DLT based on proof-of-stake
 - › Open question whether this can be done for many different securities
- Having data delivered by official sources can also be achieved in the CSD model
 - › In fact, derivatives clearing for e.g. equity options relies on data feeds of exchanges.
- Recommend to read

Thank you

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