Blockchain technology in the financial system

David Yermack
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The irony implicit in today’s session

- Bitcoin’s genesis block
  January 3, 2009

- “The root problem with conventional currency is all the trust that's required to make it work. The central bank must be trusted not to debase the currency, but the history of fiat currencies is full of breaches of that trust.”
  Satoshi Nakamoto,
  February 11, 2009
Where we are ten years after Bitcon

Thai Central Bank Builds Blockchain Solution for Digital Currency Project

Yogita Khatri
May 7, 2019 at 12:00 UTC

The Bank of Thailand, the country’s central bank, has moved ahead with its digital currency project by building a blockchain-based prototype solution.

The solution will enable the central bank to settle interbank transactions using a digital currency among its eight commercial bank partners. BoT’s tech partner Wipro announced the news on Tuesday.

They built the prototype as part of the central bank’s digital currency project, called Inthanon. Wipro and blockchain enterprise software firm R3 on Corda platform provided development services.

The solution will enable decentralized interbank real-time gross settlement (RTGS) using a wholesale Central Bank Digital Currency (CBDC) for faster payments, Wipro said, adding:
Logic of a blockchain

• Each transaction \( n \) is encrypted into \( \text{Tx}(n) \).

• Each new block \( n \) includes:
  – The new transaction, \( \text{Tx}(n) \)
  – An encryption of the previous block, \( \text{S}(n - 1) \).

• Two implications of this structure:
  – Even if \( \text{Tx}(1) = \text{Tx}(2) \), we will have \( \text{S}(1) \neq \text{S}(2) \), making it impossible to recover the raw data
  – If \( \text{Tx}(n) \) is changed, every block \( n, n+1, n+2, \ldots \), will also change

Source: Ethereum white paper
Wall Street discovers the blockchain
Late 2015

THE MARCH OF FINANCIAL SERVICES FIRMS INTO BITCOIN & BLOCKCHAIN STARTUPS

Problems with open blockchains make them infeasible for industry

- No customer privacy / confidentiality
  - Marketing problem
  - Compliance problem

- Cost of mining

- Spontaneous forks arising due to network latency
  - Probabilistic confirmation of transactions

- Hard forks arising due to disagreements
  - Potential for schisms and instability
Permissioned ledgers

Source: BIS Annual Economic Report 2018
Cognitive dissonance at JPMorgan

“Bitcoin is a fraud. It’s just not a real thing, eventually it will be closed. It’s worse than tulip bulbs. It will not end well. Somebody is going to get killed.”
Interbank settlement schemes

USC: Utility Settlement Coin

Create a universal token to exchange liquidity globally between financial counterparts, backed by fiat funds held in central bank accounts (sort of “pseudo-central bank”).

Sources:
https://www.slideshare.net/FIWARE/fiware-tech-summit-alastria-towards-economy-40

UBS Building Virtual Coin For Mainstream Banking

Sources:
UBS is working on a prototype virtual currency that it hopes will be used by banks and financial institutions as a basis to settle interbank financial transactions.

But unlike the second digital currency, the Swiss bank's proposed “utility settlement coin,” would be backed to real-world commodities and central bank accounts.

The virtual coin would be used to power transactions on traditional financial platforms built on blockchain technology, similar to the distributed, peer-reviewed network of which currently powers Bitcoin.

For instance, UBS might have its own blockchain-based platform to issue tokens, and another bank might have a blockchain-based book trading platform, but both could use the same utility settlement.

Distributed ledgers such as the blockchain enable ownership of assets to be verified by a network of computers on the Internet rather than a centralised authority. The first use of digital ledgers was to create tokens, the virtual currency linked to Internet commerce and online e-commerce, but has increasingly become a growing number of legitimate businesses and new financial services startups around the world. Other fe
How large could the savings be?

“Clearing, settling and managing post-trade processes costs between $65 billion and $80 billion a year globally, according to consultancy Oliver Wyman.

“In a joint study with the venture arm of Spanish bank Santander, the consultancy estimated that blockchain technology could reduce the bank’s infrastructure costs in cross-border payments, securities trading and regulatory compliance by as much as $20 billion a year by 2022.”

Implies 25% to 30% operating cost reduction

Source: https://blogs.wsj.com/digits/2015/09/03/ubs-building-virtual-coin-for-mainstream-banking/
Trade finance

Source: BIS Annual Economic Report 2018