FINTECH AND BLOCKCHAIN IN CHINA

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FINTECH? (1)

- Tech is great…..but what is **not** tech? Is excel sheet tech?
- Before embracing, better understand…..

FINTECH? (2)

- **Tech** boosts quality service or strengthen one part of traditional financial industry
  - Peer-to-Peer lending on platforms (P2P)
    - Big Data → better risk control
  - Insurance (fraud prevention):
    - Artificial Intelligence, Machine Learning
- **Tech** creates a new sector but not revolutionary
  - Say, robotic investment advisory based on AI and ML
- Blockchain is significantly different
  - Revolutionary ideas confronts fundamental (and well-studied!) finance/economics principles
- (Almost) no **tech** in ICO……

MEDIA EXCITEMENT

The Blockchain Matters More Than The President

By The Foundation for Economic Education · on January 19, 2017 2:35 pm · in Politics

11 January, 2017

## The importance of the blockchain: The second generation of the internet

By Nick Hammond

- Key difference: Blockchain technology is trying to solve social/economics issues, hence facing fundamental limits
- But what are they? Can we push the limit?

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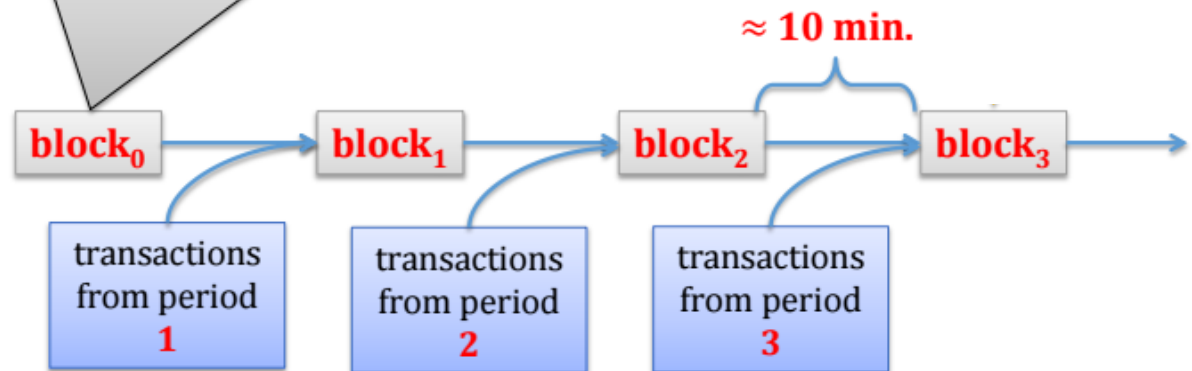The University of Chicago Booth School of Business

ROAD MAP

- Brief introduction of Blockchain

- Decentraliation vs centralization

- Challenges of blockchain technology outside the payment application

- How could cryptographic technology help in addressing economic issues?
  - Trade-finance examples in China
  - ….and limitations

- Some comments on Libra

BITCOIN IN ONE SLIDE
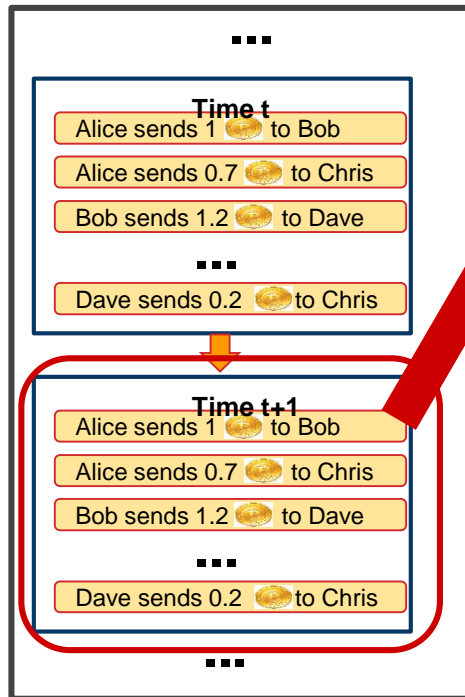
- Transactions broadcast to the public (mempool)
- Miners compete to add a block (record these transactions) by solving hard math problems
  - Reward: coinbase and transaction fees
  - **Rewards are recognized only if followed by other future miners (hence, incentives!)**
- Difficulty adjust (with more miners) so that one block with size <1MB is added every 10 minutes
  - **Arms race**: I gain, but hurts you the same

Time t
Alice sends 1 to Bob
Alice sends 0.7 to Chris
Bob sends 1.2 to Dave
...
Dave sends 0.2 to Chris

Time t+1
Alice sends 1 to Bob
Alice sends 0.7 to Chris
Bob sends 1.2 to Dave
...
Dave sends 0.2 to Chris

the "**genesis block**" created by Satoshi on **03/Jan/2009**

$\approx$ **10 min.**

$block_0$ → $block_1$ → $block_2$ → $block_3$

transactions from period **1**

transactions from period **2**

transactions from period **3**

WHAT IS BLOCKCHAIN?

- A ledger consisting of blocks each containing data, hash, & hash pointer to previous block
  - Tamper resistance: changing any part would make it no longer consistent with the rest of the chain

- Blocks are added to the ledger via consensus protocols maintained by either centralized or decentralized nodes
  - Proof-of-Work or Proof-of-Stake, or hybrid
  - Economic incentives involved

- Permissionless vs Permissioned

DECENTRALIZATION VS. CENTRALIZATION

- Ignore technology for a second

- Decentralization: fairness and stability

- Centralization: efficiency

    Because of its decentralized nature, a blockchain will always be slower and more cumbersome than a standard database. But blockchain developers are trying to minimize those problems by doing away with features such as proof-of-work, which is necessary in a public system open to anyone but superfluous in a system designed for private use.

    The Economist

DOMINANCE OF MINING POOLS

Pool Size Decomposition Monthly
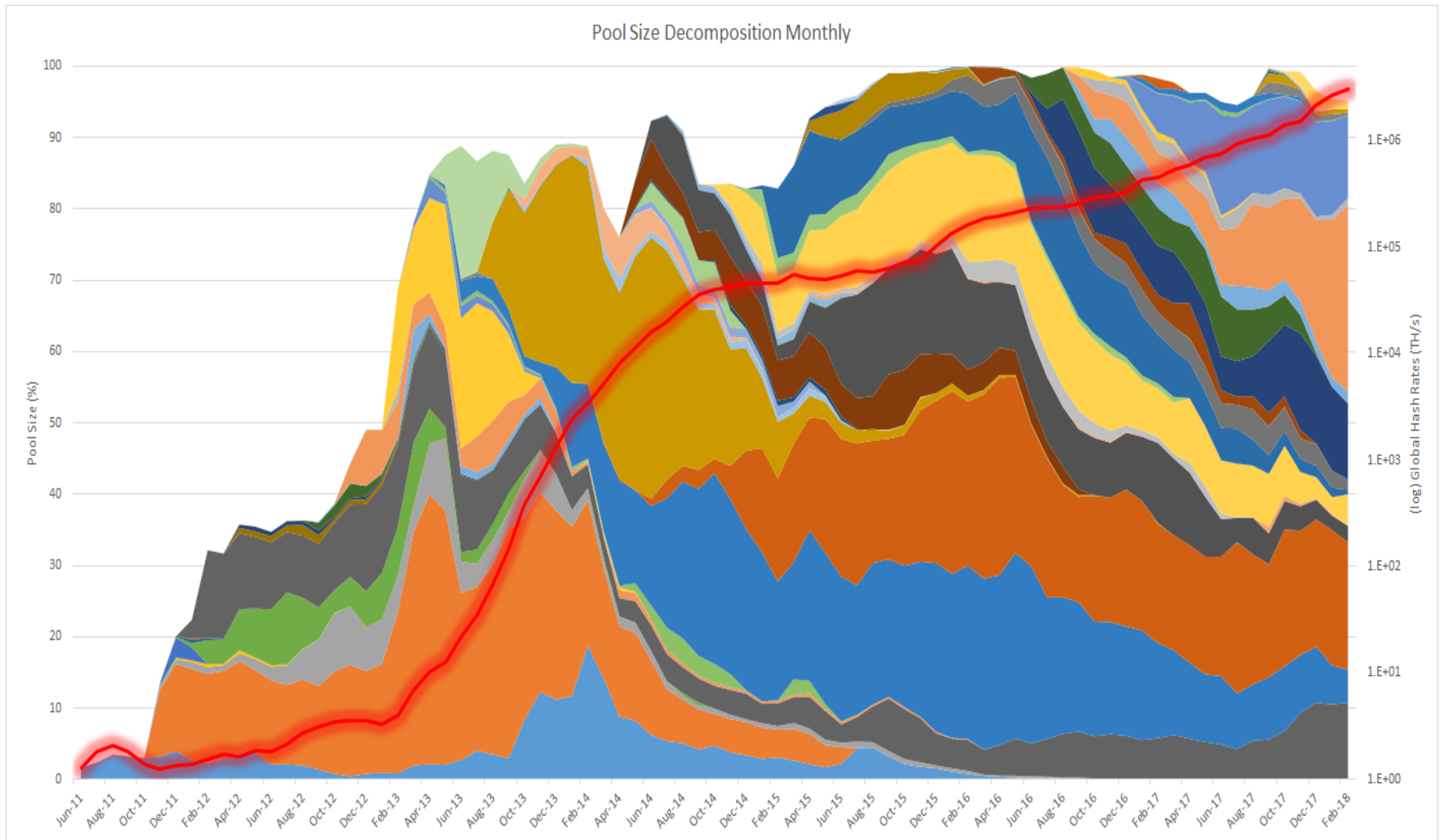
- "**Decentralized Mining in Centralized Pools**" by He and Cong

OTHER APPLICATIONS?

- The application of "money" is very special
  - Essentially, simple accounting records
    - Central bank is also doing simple accountings
  - Simple "state-of-world": how much have I paid you?
  - And has used cryptography (*pk*/*sk*) very unique to this application…. (and zealots seem to ignore this fact)
  - "Central banks" in developed countries better?

- Other applications (e.g. trade-finance), state-of-world way more complicated

- And, Possession vs. Ownership
  - House; you need legal enforcement (policemen) to expel someone who is possessing your property
  - "Money"---only for exchange---is different

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DISTRIBUTED LEDGER TECHNOLOGY

- The essence of Blockchain technology

- **Shared** databases are particularly useful for
  - Multi-party transactions and/or cooperation, with potential size/power disparity among participants
  - Trade Finance or Syndicated Loans
  - DLT needs jointly maintained…..current applications typically falling short on this
    - *Oneconnect* at Ping'an; *Microtech* (微观互联)

- Establishment of such system needs great effort in coordination
  - China has its own advantage on this front

TRADE-FINANCE APPLICATION

- April 2019, **Tianjin Port Blockain Verification Trial** project
  - "*In-depth integration of blockchain technology with the transactions, financing, logistics and regulatory stages of cross-border trade*"
  - "*To establish a blockchain cross-border trade ecosystem*"

- Implemented by Oneconnect of Ping'an (平安) Group, China
  - Permissioned blockchain, a DLT system where transaction data are **cross-validated** for "truth-checking"
  - Ping'an as the only central node, immediate consensus

- How to address data ownership and privacy issue?
  - Zero-knowledge cryptographic technology
  - Also partially address manipulation issue
  - But...

DOWNSIDE OF BLOCKCHAIN

- **"Blockchain Disruption and Smart Contracts", by Cong and He**
    - Blockchain technology is a double-edged sword for "competition"

- Decentralized consensus, together with smart contract, facilitates the entry and enhance **competition**
    - A new seller can say "pay me if you are satisfied"

- But information distribution in generating decentralized consensus may well foster **collusion**
    - "…the technology really facilitates is *Cartel management* for groups that don't trust each other but which still need to work together…", *Financial Times*, May 2015
    - "….encrypting sensitive data is not a viable solution because smart contracts then cannot decide whether a transaction is valid." Report of Central Bank of Brazil

LIBRA (1)

- Facebook users (1.62B as of 2019) can use Libra as payment/transfer, most of them cross-border
  - Just like Tenpay in Wechat, really convenient and brings all business onto Wechat
  - If works, fascinating international payment system, killing SWIFT essentially
  - Brings huge convenience to emerging or underdeveloped countries where financial service is lagging behind

- Relies on blockchain technology
  - So far, permissioned-blockchain. In the future will be permissionless, though I do not see clear benefit
    - Bitcoin and most of cryptocurrencies are permissionless
  - Central Bank Digital Currency?

LIBRA (2)

- Libra is one kind of "stable coin"

- What is stable coin?
    - **Stablecoins** are cryptocurrencies designed to minimize the volatility of its price relative to some "stable" asset or basket of assets
    - A stablecoin can be pegged to fiat money, or to exchange-traded commodities (such as precious metals or industrial metals, or even other cryptocurrencies

- Most of stable coins are just backed by some assets
- Same for Libra!
    - "Libra is fully backed by a reserve of real assets. A basket of bank deposits and short-term government securities will be held in the Libra Reserve for every Libra that is created, building trust in its intrinsic value."   Libra white paper

LIBRA (3)

- If tight regulation ensures Libra fully backed by bank deposits or short-term government securities….
  - Facebook is not printing its own money (and hence has no Seigniorage Right, 铸币权)
  - Libra cannot extend more credit to the economy (no serious concern of financial stability
  - Libra project is advancing the "financial infrastructure"

- Bad examples (scandals) of stablecoins (Tether)
  - It is hard to ensure full backing, unless it is tightly regulated

- For Libra, there are more complicated issues
  - Its international nature requires coordination of multiple central banks e.g., what is the weight of each fiat currency?
  - Helping dollars? Chicken-and-Egg question
  - Privacy? Illegal activities?

THANK YOU IN TECH