

Corporate Governance and Blockchains

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1. Introduction

- Blockchians are suitable for ownership-recording.
- Proving timely and accurate record of stock ownership.
- Solve long-standing problem in corporate governance.
- Emerging markets may be the first to use blockchians, due to inadequacy of existing record-keeping systems, mistrust of corrupt and ineffective market regulators, and high penetration of information technology such as smartphones.

2. How Blockchains Work

Time	Digital Signature(s) used in current transaction:	Source Address (controlled by current signatory)	Reference to prior transaction	Recipient Address	Data	Bitcoins at source address prior to transaction	Bitcoins Sent to Recipient	Fee to Verif Agent	Signature(s) required for next transaction:
2:59:38 PM	<i>Timothy Tene</i>	1Zefew	←	1estgE	[a secret]	0.050	0.020	0.015	Person A or B
2:53:31 PM	<i>John Smith</i>	1wEfet	←	1ewYUe	null	25.000	6.000	0.010	Frank Xao
2:52:37 PM	<i>Joe Bookie</i>	1Nuyts	←	1wEfet	[bet winner]	87.500	25.000	0.020	John Smith
2:52:25 PM	<i>John Smith</i>	1EWseg	←	1Nuyts	[sports bet]	12.515	12.500	0.015	Joe Bookie
2:51:04 PM	<i>Frank Xao</i>	1Wefvs	←	1EWseg	null	18.000	12.515	0.015	John Smith

Links to addresses further down in the blockchain

Figure 1. Transaction data in the Bitcoin public ledger.

The figure shows the types of data included in Bitcoin transactions, including the source and recipient, the amount of currency conveyed, and the time. The Data field can be used to convey additional information and is useful for “colored coins” applications as discussed in the text. The Fee to Verification Agent is an optional fee that the source can set aside for the miner who includes the transaction in a block.

Source: SolidX Partners, Inc.

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2. How Blockchains Work

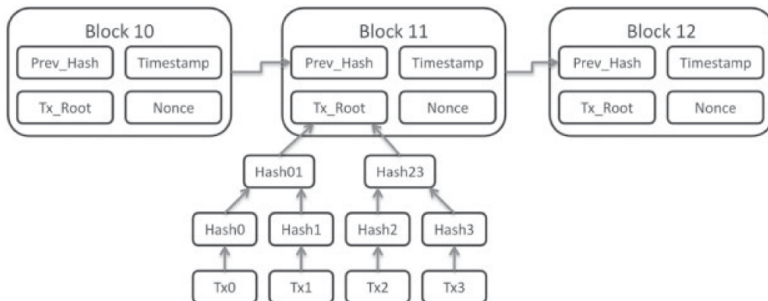
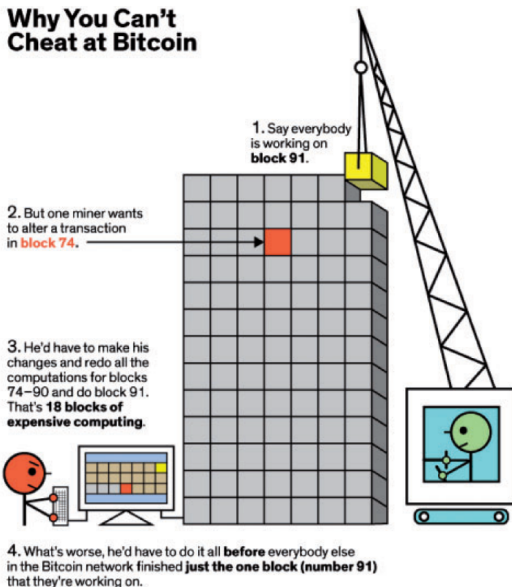


Figure 2. Structure of the bitcoin blockchain.

The figure shows the elements of each block on the Bitcoin blockchain, including transaction data, a timestamp, a nonce or random number related to the proof-of-work algorithm, and the hash of the header of the previous block. If any element of transaction data in a block is changed, the Tx_Root (or Merkle root) of the transaction data will change, causing the hash of the block header to change. Since the hash of the block header is included as an element in the header of the next block, the hash of the next block header will also change, as will the subsequent block headers, *ad infinitum*, thereby making fraud or theft easy to detect at the point at which it occurred.

2. How Blockchains Work

Why You Can't Cheat at Bitcoin



3.1 Greater Transparency of Ownership

Pros

- Crowdsource the function of auditing
- Identify the change instantly
- Takeover defense

Cons

- Activists, raiders or managers, fund managers might wish to conceal their trades.
- Private or permissioned blockchain can be used to limit transparency to a set of member (third party or government)

3.1 Greater Transparency of Ownership (Cont'd)

Identify recognition

- How to connect wallet addresses to individuals?
- Mandatory disclosure could be welfare-improving
- Or, new specialist would occur to de-anonymize?

Bitcoin Identification

- Difficult to maintain anonymity
- Raw data of stock transaction can be used to track identify.

3.2 Improvements in Liquidity

Definition (Liquidity)

Liquidity is the "ability to trade a significant quantity of a security at a low cost in a short time." (Holden, et al (2013))

Traditional trading

- T-day settlement
- Clearing House, Broker, Company ledger

Blockchain Trading

- Real-time settlement, less middlemen, less direct cost.
- Indirect cost including less collateral.

3.3 Impact on Institutional Investors and Activists

Greater Transparency

- Deter secret position held by activist.
- Blockholders' (people with many stocks) trades are highly profitable before disclosure.

Greater Liquidity

- Effects are complex
- Easier entry and easier exit for major shareholder promote ownership by large shareholders.
- Activists accumulate more shares
- Easy sell is a credible threat to the company.

3.4 Impact on Managers

Blockchain trading of a company's shares would likely reduce the effectiveness of equity-based management incentives

De facto compensation system fails

- Insider trading aligns managers' and shareholders' interests
- Managers are unwilling to signal private info due to blockchain trading. Thus, reducing alignment.

Options backdating precluded

- blockchain does not allow backdating

Strengthen relative performance evaluation

- Because any long/short position of manager can be monitor
- Eg. Trading in competitors' stocks

3.5 Impact on Market Microstructure

Easy to differentiate Insider trading from liquidity shock

- Through observe the other shares of the same investor.
- Market maker could make more efficient price.
- greater transparency deter insider trading, encourages outside investors and analysts to acquire information about the firm, thus enhancing outside monitoring.

3.6 Impact on Voting in Corporate Elections

Definition (Empty Voting)

Empty voting occurs when an investor uses borrowed shares or certain combinations of derivative securities to acquire voting rights temporarily, without economic exposure to the cash flow rights connected to the underlying shares. (Hu and Black (2006))

- Not strictly legal, but difficult to observe and enforce.
- Controversial. (like buying votes)
- Blockchains can detect any transaction related to voting rights.

3.7 Real-Time Accounting

Definition (Real-Time Accounting)

a firm could voluntarily post all of its ordinary business transactions on a public blockchain. This would occur automatically if the firm used digital currency as its medium of exchange, since the currency itself would reside on a blockchain, but it could also be done by means of tokenization.

- No relying on accountants and auditors
- real-time financial statements
- reduce value-destroying manipulation of accounting statements
- related party transactions surveillance

3.8 Smart Contracts

Definition (Smart Contracts)

a smart contract is a computerized protocol that executes the terms of a contract.

- reduce costs of verification and enforcement
- less agent cost (the role of bank in corporate bonds)
- mechanical exercise of options
- instant transfer of collateral in default
- payment compensation if performance is reached

The End