

The Review of Blockchain Economics

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Keywords: Fintech, Blockchain Economics.

Abstract: Fintech is going to be a hot topic in financial academic world. As a typical representative of Fintech, Blockchain has a lot of advantages and has a promising future to be applied in different fields. In order to guide the research in the future, this paper is going to summarize the existing literature, and introduce Blockchain Economics in three aspects: (1) The theoretical models of Blockchain; (2) The characteristics and applications of Blockchain economics--Bitcoin; (3) Other digital currencies.

1. Introduction

As technology develops, Fintech becomes popular gradually, and Blockchain is one of the most important representatives. The traditional ledger is centralized, and a transaction needs a specific centralized ledger writer to be the third person apart from the two people involving in the deal. In order not to harm the profit and development in the future, the writer tends to take notes honestly, which is called “Dynamically Incentivized”. The appearance of Blockchain aims to change this mode. It attaches great importance to decentralizing: there is no specific ledger writer to take notes, but anyone including dealers and buyers can take notes on a public ledger. Before writing into the public ledger, two points must be ensured: (1) Spender must have his signature on the cryptocurrency; (2) There must be enough cryptocurrency in the spender’s account to finish the transaction. However, there might still bring some problems under such rules, so more rules are created to restrict them: (1) Since everyone can record the ledger, ledger writers must finish tasks to record the information (Abadi and Brunnermeier, 2018), because the high cost of recording can prevent dishonest; (2) Since transactions spread in the nodes of network, the order of transaction that nodes receive might be different from the real order happened, which causes a phenomenon that the same information might have several orders in the network, and it is called “fork”. Fork causes problems for people to agree on the authenticity of a record, and it decreases the efficiency. In order to solve this problem, each block will only be added in the block chain after it solves an answer to a mathematical problem (Crosby et al., 2016).

2. The Advantages of Blockchain

Compared to traditional mode, Blockchain has several advantages. The writers are not dynamically incentivized but static incentivized, because there are a lot of writers in the new mode. A great many writers will increase the competition and decrease the privilege and profit. In the transaction consisted of two people, the new mode seems not to show the advantages, but when a lot of transactions happen, this new mode would save many resources to be easy, automatic, efficient and not controlled by the specific writer. The new mode realizes the “point to point” interaction, so it has more development space than the traditional mode: In Financial fields, Blockchain is mostly used in Bitcoin, and it can also apply on issuing stocks. In other fields, Blockchain can govern the copyrights of Internet cultural products, manage the ownership during data interaction on Internet, and also be digital notarization to verify the authenticity of documents while protecting the secrets of users.

3. Blockchain Economics

In the present, academic scholars begin to research Blockchain gradually on three classifications: (1) The theoretical models of Blockchain; (2) The characteristics and applications of Blockchain economics--Bitcoin; (3) Other digital currencies.

In the first classification, Cong and He (2018) built a model of Decentralized Consensus and Information, highlighting the function of record keepers and the nature of information distribution. They found that the quality of consensus and the capacity of information distribution on blockchains depend on the protocols. Joseph and Brunnermeier (2018) constructed a Static Ledger Choice Model and a Dynamic Ledger Choice Model. They discussed in static and dynamic situations and pointed out the mechanisms of two crucial types of ledgers. They managed to prove that a blockchain is more economically beneficial than a traditional ledger. Davidson et al. (2016) discussed Blockchain with economics theories such as Classical economics. They got the conclusion that Blockchains competes with firms, markets and economies, and might be more or less efficient depending on different conditions. Catalini and Gans (2016) researched mainly on Cost of Verification and Cost of Networking. They concluded that Blockchain technology serve as the platform for the creation of digital platforms on which the advantages from network and shared digital infrastructure will not appear at the cost of market power and data access.

In the second classification, researchers mainly discussed on the Bitcoin, which is the most famous application of Blockchain. Böhme et al. (2015) stated that in the technology of Bitcoin, by getting the input of a transaction refer to the output of the previous transaction, transactions could be ordered recursively, and they also analyzed the Centralization and Decentralization in Bitcoin. They predicted that other aspects of Bitcoin architecture are deeply locked in place through its protocol design, so it would be difficult for Bitcoin to make adjustments. Huberman et al. (2017) used mathematical knowledge such as Poisson Process and the cumulative distribution function to build an Economic Model. They mainly discussed why no single miner can control the system, and they noted that this marvelous structure of functionality and usefulness should further encourage economists to study. Ciaian et al. (2016) built the empirically estimable model of Bitcoin price. They used the regression equations to demonstrate their idea in the model. Their model confirms four major results such as that

market forces of Bitcoin supply and demand have an important impact on Bitcoin price. Chiu and Koepl (2017) tried to construct an equilibrium monetary model to discuss a cryptocurrency system in a decentralized network, and the result is specific cryptocurrency systems do have an equilibrium monetary model. Nadarajah and Chu (2017) tested the efficient market hypothesis. They applied eight tests to show that an odd integer power of Bitcoin returns is efficient on the full period as well as on the two subsample periods.

As for the last classification, researchers pay attention to the application of Blockchain on other aspects except for Bitcoin. Crosby et al. (2016) classified the applications to Financial Applications and Non-Financial Applications, and they also researched deep into Risks of Adoption and Corporate Funding & Interest. Bordo and Levin (2017) wanted to talk about the advantages and disadvantages of the central bank digital currency (CBDC). They discussed on the model about interest rate on CBDC, and they found that CBDC could play the role as a costless medium of exchange, secure store of value, and stable unit of account. Keister and Sanches (2018) chose the topic as how to set the parameters such as interest rate when delivering digital currency. They used a model for a general formulation of the type(s) of currency available to agents, combining knowledge in microeconomics and macroeconomics. They found that the central bank should decide to set a lower interest rate on the currency, possibly even a negative rate. Fung et al. (2018) collected data from Sweden, Canada and the U.S. to research on the relationships between governments and digital currency. They drew four conclusions to point out that government should have intervention on digital currency. Dharmapalan and Grey (2017) mainly talks about another application of Blockchain: Digital Fiat Currency. They constructed the DFC model, which combines with the policies from central banks. Their conclusion is that Digital Fiat Currency will serve as a platform for people to pay safely and conveniently.

4. Conclusion

As a blooming technology, there is still much space for Blockchain to apply. With time going on, researchers would get more data to analyze this new technology. In the technology level, Blockchain will find the hidden danger and take the measures to prevent potential problems. In the political level, government might pay more attention to Blockchain and be aware of making more suitable policies about this technology. What's more, in the applications level, Blockchain is definitely going to combine other fields better. Just like the famous definition "Internet Plus", it is probably for people to know "Blockchain Plus" in the coming future.

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