

# The Establishment of Digital Currency Financial System Model and Supervision Model

## Based on the Development Status of Digital Currency

Jiao Yi

Sichuan Agricultural University  
Chengdu, China

Yun Tang

Sichuan Agricultural University  
Chengdu, China

Wenwei Li

Sichuan Agricultural University  
Chengdu, China

**Abstract**—The digital currency appeared with the development of the Internet, but the formation of digital currency financial system and supervision system are not perfect. This paper studies the impact of the monetary system to the existing political, financial, and the development of the digital currency barriers, to establish digital model of monetary and financial system, at the same time, develop a regulatory model for this system, and to give policy suggestions to the existing government monetary policy.

**Keywords**—digital currency; financial system model; supervision model; policy suggestions

### I. INTRODUCTION

Currency is a contract between the owner of wealth and the market for the right of exchange. Marx believed that money is a special commodity that acts as a general equivalent. Currency originates from the exchange value. With the rapid development of economy, the application of digital currency has also emerged along with the evolution of the Internet and financial system. At present, there is still no overall conclusion on the definition of the connotation and concept of digital currency. David Chaum [1] first put forward the theory of digital currency in 1982. This electronic currency system is based on the traditional tripartite model of "bank-person-merchant", which is anonymous and untraceable. The bank of England (BOE) [2] believes that a digital currency is a means of payment that exists only in electronic form. The broad digital currency equivalent to electronic money broadly refers to all currencies that exist in electronic form (Liu Xiangming, 2016; Yao Qian, 2017) [3-4], including electronic money, fictitious money and legal digital money these three kinds. Digital currency includes two kinds: One is virtual currency, (that is privately issued digital currency) which is issued and controlled by developers and is not subject to government regulation, such as bitcoin; the other is legal digital currency, which is the digital currency issued by the central Bank. BIS (Bank for International Settlements) [5] compiles the

available payment instruments and determines which ones are not central bank digital currencies. Liu Xiangming believes that it is neither a physical entity nor a carrier, but digital information used for network investment, transaction and storage, represents a certain amount of value.

Digital currencies are having an increasing impact on people's lives, the research of the domestic and foreign scholars on the digital currency also gradually thorough, mainly including digital currency impact on development of national macro policy, banking, as well as the factors affecting the development of digital currency. After reviewing the existing literature at home and abroad, our article will explore the factors affecting the operation of digital monetary and financial system, and build an independent digital model of the monetary and financial systems. Secondly, it is needed to build a digital currency regulation model for this financial system. Finally, on the basis of the financial system model, put forward policy recommendations to the government.

### II. DIGITAL CURRENCY FINANCIAL SYSTEM MODEL

#### A. Environmental Analysis

1) *The impact on macro policy*: Based on the "decentralized" assumption, some scholars believe digital currency would weaken the central bank and render traditional monetary policy ineffective. King, deputy governor of the Bank of England [6], pointed out that the progress of information technology and network technology made transaction settlement possible in real time, we would not need the central bank to issue base money, and monetary policy would no longer be effective. Friedman [7] pointed that in the next 25 years, electronic payment would replace traditional paper currency and coins, monetary reserve function of central bank's would gradually weakened. To a certain degree, the monetary control of the central bank had

no influence on the economic operation, monetary policy would become relics.

Goodhart [8] insists that the central bank still assumes the responsibilities of money after digital currency appeared, digital currency just make the change in the effective degree of monetary policy, the proportion increase of digital currencies in the currency scale, just change the quantity of base money and the size of the money multiplier, the control of central bank to commercial banks and scale of monetary change with it. Zhao Ping [9] (2006) said that if digital currency was just a digital expression form essentially, it existed with the monetary basis of the central bank, then monetary theory would not change greatly, and the implementation and transmission of monetary policy still worked like before.

From the above study, we can see that the inflow of digital currency into the market has an impact on the implementation of national monetary policy.

2) *Financial industry*: Now, in the market, there are digital currencies by the private, its rise rapidly and fluctuate widely. Its high speculative property increases the risk of investors. The issue of digital currency and circulation will generate a new monetary system, inevitably affects the stability of the financial sector. First, digital currency has a strong impact on third-party payment. The disintermediation of digital currency impacts the third-party payment, replaces traditional value-added services of it, and the combine of digital currencies and bank accounts pose challenges to third-party payment. Second, the use of distributed general ledger will dis-intermediate traditional service providers in different markets and infrastructures, thus causing changes in trading, clearing and settlement, which will have potential impacts on financial market infrastructures such as large-sum payment system, central securities custody system and securities settlement system.

3) *Micro environment*: Digital currency includes three types: Electronic currency, virtual currency and legal tender issued by the central bank. For electronic currency, if the central bank cannot control the issuance of electronic currency, without the guarantee from the central bank, it is difficult for the issuer of electronic currency to gain customers' trust the lender of last resort. At the same time, due to the high speed and secrecy of electronic currency circulation on the Internet, it is more difficult for the central bank to monitor it. China merchants' securities in 2000 on the electronic currency participants opinion survey form is as shown in "Table I".

III. THE ELECTRONIC CURRENCY PARTICIPANTS' OPINION SURVEY FORM

Participants	Reflect the problem	The root cause
<i>consumers</i>	Fear of insufficient safety	Less understanding of online payments
	Troublesome refund procedures	The delivery process needs to be innovated
	Long payment response time	Poor network infrastructure, complex SBT trades
	Online payment tool operation trouble application	Some Banks are more cautious
<i>merchants</i>	Consumers return goods without good reason	The national credit
	Few payment instruments	Banks are wary of doing too much business
	No inter-bank settlement was achieved	Limited electronic process of domestic Banks
<i>enterprise</i>	Get used to the traditional model	Get used to the traditional model
	There are concerns about safety	Little understanding for online payment
	Online settlement tools are limited	Banks are wary of doing too much business
	Different bank/party fails to use online payment	China's financial electronic process
<i>bank</i>	There are no regulations for electronic payment	Policy and regulation lag
	The inter-bank settlement system hasn't been established	China's financial electronic process
	Traditional industries are less interested	The concept is not updated in time

At the same time, there is also a security crisis in privately issued digital currencies, such as Mt. Gox (a Bitcoin trading platform in Japanese) was hacked in 2014 and lost more than 750,000 bitcoins, which the market value up to \$30,000. 6.5 billion dollars. [10]

A. Digital Currency Financial System Model

Based on the above environmental analysis, and Ceng Deli's financial stability assessment model, the digital dispersed global financial system [11], which its interaction of various elements and other external factors make the financial system presents a dynamic process, the financial system is running well, financial stability is achieved, and

the financial system in operation difficulty, said signs appear unstable financial system. The following "Fig. 1" is

concluded to represent the mechanism of action among various factors:

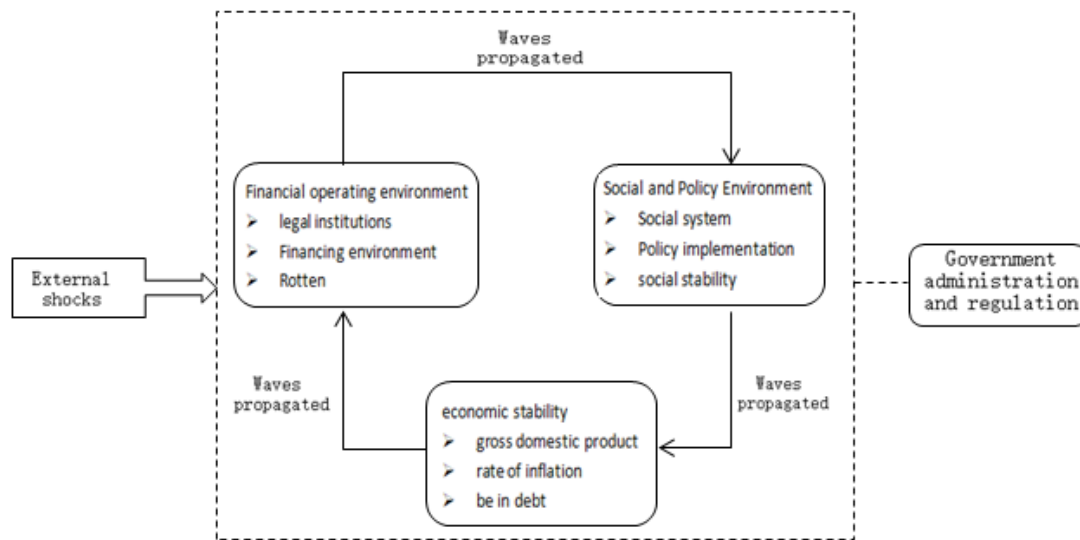


Fig. 1. The global digital decentralized financial system.

#### IV. DIGITAL CURRENCY REGULATION MODEL

##### A. Modeling Background

The industrial chain of digital currency includes digital currency projects, exchanges, wallets, media services, mines, payments and other links. The trading place is one of the most profitable links and the most influential link, because it is the channel through which digital currency projects are listed and traded. Currently, there are 188 digital currency exchanges that can still generate transaction volume worldwide. However, as of 2017, there are 649 cryptocurrencies and 94 crypto-assets in the world; among which, bitcoin, the most well-known and largest crypto-currency, has a market value of \$17.526 billion.

Digital currency as a new thing, its development status and development potential will be a new monetary measurement standard, the government and enterprises attach great importance to it [10]. With the deepening of the research on digital currency, the application of digital currency has become inevitable. However, due to the influence of the current environment, the development of digital currency is facing many difficulties. Among them, the most obvious ones are the trust of digital currency, the security of digital currency and whether digital currency can become real currency

Yin Zhentao, deputy director of the law and finance research office at the institute of finance at the Chinese academy of social sciences, said digital currencies face two risks. The first is on the technical level. Digital currency relies on block-chain technology and a system, which makes it vulnerable to security shocks, such as hacker attacks on computer systems. Yin thinks that another risk of digital currency is credit risk, because digital currency transactions

have middlemen, these middlemen are different from the real organizations. The real organization is visible and tangible, but the digital currency middleman is on the network, the risk is greater. Zhao Zhanzhu, a special researcher at the intellectual property research center of China University of Political Science and Law, believes that digital currencies are anonymous, fast and irrevocable. In addition, digital currencies such as Bitcoin are highly liquid in the world, so many criminals use digital currencies as a new money laundering channel. At present, major central Banks around the world are actively embracing digital currencies, and many central Banks, including the central bank of Singapore and the central bank of Tunisia, are applying block-chain technology to build a more secure digital currency management system.

##### B. Digital Currency Supervision Model Diagram

This paper on the basis of full consideration based on block chain technology digital currency have strong decentralization, anonymity, has an independent digital encryption wallets, anonymity is strong, the characteristics of the financial supervisory institutions and state organs to the participants in the digital currency system to supervise and management status and the trade between them. Some supervision mechanism, combined with block chain technology reference Zhang Jianyi the double chain structure can be put forward by digital currency regulation model, put forward a kind of based on [12], the government and the public, the big Banks supervision mechanism over trust mechanism.

Following the dual system, Banks, as the issuing subjects of digital currency, play an important role in the supervision mechanism. Banks issue digital currency in a centralized and unified way. Point-to-point digital currency transactions are

carried out between customers, which are confirmed and managed by the bank's digital currency issuing system, and banks assume transaction responsibilities. The government has played a leading role and established a unified management mechanism by eradicating the issuance mechanism of digital currency (see "Fig. 2").

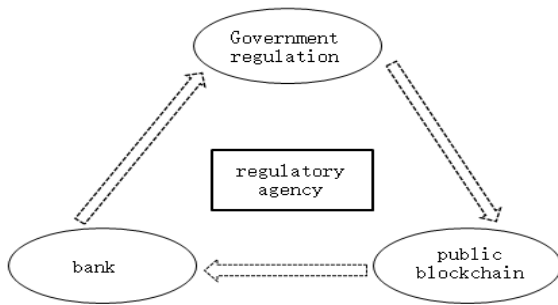


Fig. 2. Digital currency supervision model diagram.

In the process of digital currency transaction, the government has played a leading role to ensure the smooth and standardized process of digital currency transaction. The public plays the role of supervision. Although all digital currency transactions are anonymous, there is a supervision mechanism among the public, which can effectively reduce the fraud in digital transactions. The three are interrelated and restrict each other to form an effective supervision mechanism. This paper designs and implements a regulatory digital currency model, which is simple and effective. It not only ensures operational efficiency and user transaction privacy, but also provides good transaction traceability and identity determination ability for supervision.

## V. CONCLUSION AND SUGGESTIONS

Digital currency has been issued in many countries at present. By last year, more than 15 Central Banks around the world have issued or are considering issuing digital currency. Our team analyzed the economic data of some countries where digital currency has been popular in recent years, and found that digital currency can promote national economic growth. However, as the financial system constituted by digital currency is not perfect, there are many problems of financial risks. In order to promote the sound development of this financial system and the existing financial market, our team puts forward the following suggestions on the government's management of macro policies, the public and the traditional financial system:

### A. Improving the "Regulatory System"

First of all, it is needed to make it clear that under a reasonable "regulatory system", digital currency can promote the development of our economy. In the establishment of the regulatory system, it is necessary to clarify the responsibilities of various regulatory departments, so that there is no cross works and omitted business. It is also necessary to clarify the objects in the digital currency financial system like issuers and investors, and formulate

corresponding management measures, making the regulatory system have laws to follow.

### B. Issuing Digital Currencies Reasonably

The issue of digital currency should be based on the actual situation of the country. Predict whether the issue will have adverse effects on government policies. At the same time, to avoid social security problems caused by big price fluctuations, the stability of the financial market should be considered.

### C. Regulating Private Digital Currency Issuance

For digital currency system is not perfect. Such as early Bitcoin, block chain, because of their large price swings, the interests of the investors cannot get reasonable protection, making the public strengthen their distrust of digital currency then, blocking the development of digital currency. In the new stage of development, our government should strengthen the strict regulation of the digital currency issued by private, such as making special "standard" to standardize the issuance of private digital currencies.

### D. Developing Technology

Through big data, artificial intelligence and other technologies, we can research technological products to monitor the digital currency financial market. Such as the supervision of relevant departments, improve the efficiency of the public business and at the same time, reduce the investment risk of investors, and avoid trading platform fraud, theft or other security incidents.

### E. Striving for Stability

Digital currency financial market can not directly replace the original financial market, we need a transition process, the development of digital currency should be based on the existing economic environment, it needs in seek improvement in stability, instead of being advocated within a leap.

### F. Strengthening International Cooperation

There are many obstacles to the circulation of traditional currencies, for example, it will be affected by the exchange rate and strict regulatory system. But digital currencies are circulated around the world, to avoid using digital currencies to commit crimes; all countries should make joint efforts and formulate corresponding international supervision regulations.

## REFERENCES

- [1] David Chaum. "Blind Signatures for Untraceable Payments". *Advances in Cryptology Proceedings of Crypto*. (3): 199-203.1982.
- [2] Bank of England. *Innovations in payment technologies and the emergence of digital currencies*. 2014.
- [3] Xiangmin Liu. *Legal issues on the issue of digital currency by the central bank*, *China finance*, no. 17, pp.17-19. 2016.
- [4] Qian Yao. *Focusing on the development and regulation of digital currency*, *new financial review*, 6th issue. 2017.

- [5] Committee on Payments and Market Infrastructures, Markets Committee, Central Bank Digital Currencies, March, 2018.
- [6] King, Mervyn. Challenges for Monetary Policy: New and Old [J]. Bank of England quarterly bulletin, 1999, (39): 397-415.
- [7] Benjamin M Friedman. The Future of Monetary Policy: The Central Bank as an Army with a Signal Corps? [J]. International Finance, 1999, 2(3): 321-338.
- [8] Goodhart CAE. Can Central Banking Survive the IT Revolution? [J]. International Finance, 2000, 3 (2): 189-209.
- [9] Monetary liberalization in the E era: development prospects and implications of monetary policy [J]. Economists, 2006, (4): 90-97.
- [10] Gen Li. On the current situation, influencing factors and development trend of digital currency [J]. Shang, 2016(10): 173+163.
- [11] Zeng Deli. Financial stability evaluation model and its application research [D]. Hunan University, 2009.
- [12] Zhang Jianyi, Wang Zhiqiang, Xu Zhizhi, Ouyang Yafei, Yang Tao. Blockchain-based regulatory digital currency model [J]. Computer research and development, 2018, 55(10): 2219-2232.