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Abstract

This article provides a discussion on some issues in blockchain finance that regulators are concerned about – an area which bitcoin promoters have remained silent about. Blockchain technology in finance has several benefits for financial intermediation in the financial system; notwithstanding, several issues persist which if addressed can make the adoption of blockchain technology in finance easier and accepted by regulators. The blockchain issues discussed in this article are relevant for recent debates in blockchain finance.

JEL Classification: E44, F65, G18, G21, G28

Keywords: Bitcoin; Blockchain; Finance, Fintech, Financial stability, Financial intermediation; Financial institutions; Banking regulation

1. Introduction

Today, there are many financial intermediaries in the global financial system. But, why is the global financial system so inefficient? Despite the presence of many financial intermediaries in the financial system, the cost of financial intermediation is still high, and the cost of borrowing by individuals is also high, which is a serious issue in many countries. The global financial system serves billions of people and performs billions of transactions each day through many financial intermediaries. But the global financial system has many problems, the biggest of these problems is rising cost through fees, delays, onerous paperwork, service charges, cost of regulatory compliance, and also provides opportunities for fraud and crime (Tapscott and Tapscott, 2017), the implication is that financial institutions will ultimately transfer the cost burden to costumers.

A formal financial system relies heavily on trusted third parties to transfer financial claims from one party to another in exchange for a fee or free-of-charge. The third parties may include licensed banks and other licensed financial institutions. Other players in the shadow banking system can also engage in financial intermediation activities outside the purview of direct regulation. In developing countries, these third parties may include insurance firms, microfinance banks, specialised financial institutions, merchant banks, development banks, money-deposit banks and individuals.

In theory, the whole essence of having multiple financial intermediaries is to create competition which can help lower the cost of borrowing and lower the cost of financial intermediation. But in practice, this has not been the case. The high cost of financial intermediation has led to the need to find ways to reduce the cost of financial intermediation and to lower interest rate. So far, there have been many proposals and policy suggestions, both formal and informal, on how to lower the cost of financial intermediation.

In 2018, the most radical proposal for reducing the cost of financial intermediation is the argument in support of using blockchain technology in finance which its promoters claim can potentially eliminate all or most third parties involved in any financial intermediation process. Prior studies have focussed on the demand-side and supply-side issues of blockchain technology in finance, without addressing the issues that regulators need to gain clarity about.

This paper makes a number of contributions to the literature on innovation in finance. It is the first to highlight the issues that regulators worry about in blockchain finance. To date, the majority of the blockchain debate has focused on the demand-side and supply-side of blockchain technology in business (see, Hofmann et al, 2018; Eyal, 2017; Jiang et al, 2018). Instead, we focus on the standard, but more serious issues regulators have with blockchain finance. Two, the article contributes to the literature on innovation in finance. This article supports the need for innovation in finance and brings to light the issues that regulators worry about. Also, the issues highlighted can provide insight which can help blockchain providers understand the regulatory perspective of blockchain finance and what to pay close attention to, for regulatory reasons. Three, the article also contributes to the digital finance literature (see, Gomber et al, 2017; Tyson and Lund, 2017; Ozili, 2018), which advocate for a shift from central-node digital finance which is already in place, to a network-code financing model which do not require the use of traditional financial intermediaries.

The rest of the article is structure as follows. Section 2 discuss the inefficiencies in the financial system and present a conceptual understanding of blockchain. Section 3 present some arguments for promoting blockchain in finance. Section 4 highlight some questions that regulators are asking, at the time of writing. 4. Section 5 concludes.

2. Conceptual Framework

2.1. Why the current financial system is inefficient

The financial system is inefficient because it is clogged with excessive regulation that hinders innovation (Blind et al, 2017; Baer and Pavel, 1988). From hindsight we also know that stiff regulation creates inefficiencies (Barth et al, 2013; Chortareas et al, 2012), the biggest of them is the high cost of complying with regulatory demands and the cost of doing regulatory paperwork. Remember the excessive regulation immediately after the 2008 global financial crisis. Second, the financial system is inefficient because it is too centralised (Popov, 1999), which makes it resistant to change and vulnerable to systems failures and attacks. And from hindsight we know that centralised systems are often backward-looking and less proactive and are not forward-looking compared to decentralised systems¹. Third, the current financial system does not provide a fair platform that allows individual borrowers to engage directly with wealthy individuals or big institutional lenders² to obtain loan in order to avoid the cost they would otherwise incur if they obtain loan from intermediaries such as banks and other lending institutions. Blockchain finance can potentially eliminate these problems.

2.2. Defining Blockchain

Blockchain is a digital ledger where activities or transactions are recorded chronologically and publicly. The recording of transactions or activities in a blockchain network is not centralised and cannot be done, or controlled, by a single person or user. The most common use of blockchain today is for trading in cryptocurrency, that is, buying and selling cryptocurrency such as bitcoins. In crypto-blockchains, transactions made in bitcoin or another cryptocurrency are recorded chronologically and publicly. Multiple users can see all transactions in a blockchain and can add new information to the chain of transactions in the blockchain. Some blockchains require permission to join the blockchain network. Once access is gained, the users can add new information to the blockchain they are interested in, in the network. Other blockchains do not require permission and anyone can add new information to it.

2.3. Understanding how blockchain works

Tapscott and Tapscott (2017) highlights five basic principles underlying blockchain technology.

1. *Distributed Database*: Blockchain requires a distributed database. Each party on a blockchain has access to the entire database and its complete history. No single user

¹ see Davis (2000), Gavetti and Levinthal (2000) and Leveson (2011) from the management science literature.

² such as Goldman Sachs, BlackRock, etc

has absolute control over the data or the information on the database. Every party can verify the records of its transaction partners directly, without an intermediary.

2. *Peer-to-Peer Transmission*: In blockchain, communication occurs directly between peers on the network instead of through a central node. Each node stores and forwards information to all other participating nodes.
3. *Transparency with Pseudonymity*: Every transaction and its associated value are visible to anyone with access to the system. Each node, or user, on a blockchain has a unique 30-plus-character alphanumeric address that identifies it. Users may choose to remain anonymous or provide proof of their identity to others. All transactions occur between blockchain addresses which reveals the identity of the user.
4. *Irreversibility of Records*: Once a transaction is entered in the database and the accounts are updated, the records cannot be altered because they are linked to every transaction record that came before them, creating a chain effect. Some blockchains have computational algorithms and approaches which are deployed to ensure that the recording on the database is permanent and chronologically ordered so that no single user can alter a transaction once it is completed. This ensures that it is available to everyone on the network.
5. *Computational Logic*: The logic behind blockchain is that it acts as a digital ledger. The digital nature of the ledger means that blockchain transactions can be tied to existing computational logic and can be programmed, hence eliminating human errors. This allows users to set up algorithms and rules that automatically trigger transactions between nodes.

3. Promoting Blockchain

Globally, and recently, promoters of blockchain technology in finance want to bypass the third parties involved in the flow of financial claims from one party to another. Some promoters of blockchain technology in finance emphasize that it allows the transfer of financial claims in a trustless manner because such transfers rely solely on computer codes and not institutions controlled by humans (Wall, 2018). This means that the financial intermediation process will no longer be controlled by humans, but by written computer codes.

The promoters, often called disruptors, and their representatives have entered the financial market of many countries including Nigeria, persuading companies and governments through the financial system regulator to allow blockchain in the financial market to allow users of finance bypass third parties involved in business activities with the promise of cost savings, low interest rates on loan, zero interest rates and higher payment efficiency – if full migration to blockchain technology in finance is achieved.

Other supporters of blockchain technology in finance argue (i) that blockchain technology in finance can create a working financial system which do not require an 'environment of trust' both for the users and providers of finance; and (ii) that blockchain technology in finance can eliminate the financial institutions involved in the financial intermediation process, hence, its potential to revolutionise finance.

Financial markets today rely on trust because an environment of trust is crucial for financial intermediation. Most trade deals and investments in stocks, equity, bonds rely on trust. Any event or human behaviour that is capable of eroding trust in the existing payment systems can send panic across all counterparties in the financial system and can have devastating effects if lenders withdraw funding from the market. A bank with a robust balance sheet and another bank that has sufficient capital can both collapse the next day if shareholders and depositors have a reason to believe their capital and deposits are no longer safe with banks. If this happens, there will be a 'run on the bank' both from investors, creditors and depositors. This describes the importance of trust in financial system. However, one of the great benefits of blockchain is that it does not rely on an environment of trust. This is the greatest selling point for blockchain in finance.

4. Regulatory Concern

Generally, financial system regulators want full control of the rule-making process and the enforcement process in all financial system regulation matters. There is the possibility that financial system regulators can permit blockchain finance if they have:

- (i) the full authority to set blockchain rules,
- (ii) the right to veto against existing blockchain codes that are unfavourable to any party,
- (iii) the power to enforce the rules, update the rules, and change the rules when necessary

Currently, blockchain technology in finance does not give financial system regulators full control of the blockchain coding process, the rule-making process and the enforcement process in blockchain finance. In fact, some blockchains only allow a single entity (which may be a regulator or moderator) to either control the enforcement/ruling process or the coding process but this entity cannot directly control both the rule-making process and the coding processes in blockchain technology at the same time, due to the nature of blockchain as distributed networks.

Here are some questions that financial system regulators worry about and want to understand regarding blockchain technology in finance. These questions are limited to issues in the blockchain finance that we find to be particularly significant.

- Who will make the rules in blockchain financing? Is it regulators? Anyone? Or, some vetted members of the blockchain community?
- Why do blockchain rules change for individual blockchains rather than being fixed?
- Who loses when individual blockchains are changed unexpectedly? Does changing the rules unexpectedly lead to financial loss to users who are unaware of the changes?
- Will equity and fairness be maintained if the end-users of blockchain finance do not know how to code or create blockchains?

- What is the profit margin made by the creators of a successfully executed blockchain? Will such margin be fair or excessive?
- Do we really want to hand over control of our finances to computers?
- What is the worse-case loss or scenario that could occur if a system-wide blockchain financial system collapse or fail?
- Who will bear the full cost of creating a new blockchain to meet a tailored need if existing blockchains cannot meet the tailored need – is it the client, user or the provider? And why?
- Since blockchain networks are a “garbage in garbage out” system, who will ensure that inputs into blockchain networks are of high quality?
- If a blockchain protocol is updated after 60 per cent of blockchains users have agreed to it, will such update or action be unfair to the remaining 40 per cent who do not support updating the blockchain protocol?
- How do you identify bad users and stop them from infiltrating the blockchain network?
- Who decides whether a proposed change in the code of a blockchain is needed?
- Blockchains need to evolve over time in response to changing needs hence the need to change the rules underlying individual blockchains. But who will govern the frequency of the change in blockchain rules for individual blockchains?
- Some blockchains are public and do not require permission to edit its coding contents. How would users be protected from bad actors who seek to exploit a permission-less blockchain network that allows anyone to write the codes?
- Some blockchains are encrypted and do require permission to edit its coding contents. What are the criteria for granting permission?
- In the event of fraud, can external investigators obtain access to encrypted blockchain networks for investigation without cost?

5. Conclusion

The current proposed blockchain governance ideas resist the need for a central authority to regulate a blockchain-based financial system. Rather, it favours the input and collaboration of multiple users and stakeholders for blockchain governance. Blockchain governance does not rely on a central authority such as the Central Bank who is a key stakeholder in financial markets and financial systems. This will be its biggest challenge and might be a major reason why many Central Banks have rejected blockchain finance in their financial system. Countries

like U.S, Nigeria, Uganda and Spain have banned regulated banks from engaging in bitcoin and blockchain transactions in order to prevent any negative externality that might arise which could put depositor's money at risk. Yet, blockchain technology in finance is becoming an important innovation and disruption which cannot be resisted for too long.

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