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## **How Can Cryptocurrency and Blockchain Technology Play a Role in Building Social and Solidarity Finance?**

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## Contents

|  |    |
|--|----|
| Abstract.....  | ii |
| Acronyms .....   | ii |
| Introduction .....   | 1  |
| A Primer on Cryptocurrency .....   | 1  |
| The nature, stability and security of Bitcoin tokens .....               | 2  |
| Is Bitcoin money?.....   | 3  |
| Perceived risks: Volatility and safety .....                             | 3  |
| Regulation, tax and accounting .....                                     | 4  |
| Narratives of cryptocurrency empowerment .....                           | 4  |
| Remittances (and small-scale international trade).....                   | 5  |
| As a quasi-bank account for the “unbanked” .....                         | 6  |
| Counter-narratives .....   | 7  |
| Techno-Colonial Solutionism from Above? .....                            | 8  |
| Forking Critique: Alternative Cryptocurrencies.....                      | 9  |
| Blockchain 2.0 Technology .....  | 11 |
| Techno-Libertarian Evangelism? .....                                     | 12 |
| The Emancipatory Potential: Collaboration at Scale?.....                 | 13 |
| Individualistic vs communitarian readings of blockchain technology ..... | 15 |
| The everyday pragmatics of decentralized blockchains .....               | 16 |
| Recommendations for Further Research .....                               | 17 |
| References .....   | 18 |
| Websites .....   | 18 |
| Books and articles.....  | 18 |

## Abstract

The decentralized digital currency Bitcoin—and its underlying “blockchain” technology—has created much excitement in the technology community, but its potential for building truly empowering social and solidarity-based finance has yet to be tested. This paper provides a primer on the basics of Bitcoin and discusses the existent narratives about the technology’s potential to facilitate remittances, financial inclusion, cooperative structures and even micro-insurance systems. It also flags up potential points of concern and conflict; such as the tech-from-above “solutionism” and conservative libertarian political dynamics of some of the technology start-up community that surrounds Bitcoin. As a way of contrast the paper considers “blockchain 2.0” technologies with more overtly communitarian ideals and their potential for creating “cooperation at scale”. It concludes with suggestions for future research.

## Author

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## Acronyms

|               |  |
|---------------|--|
| <b>DAO</b>    | Decentralized autonomous organizations                   |
| <b>ICT4D</b>  | Information and Communication Technology for Development |
| <b>IT</b>     | Information technology                                   |
| <b>PIN</b>    | Personal identification number                           |
| <b>SSF</b>    | Social and solidarity finance                            |
| <b>UNRISD</b> | United Nations Research Institute for Social Development |
| <b>US</b>     | United States  |

## Introduction

The rise of Bitcoin has been ambivalently received by many in international development circles. The cryptocurrency is based on collaborative open source principles and peer-to-peer networks that suggest a commitment to social solidarity and mutual aid, but Bitcoin's image has become associated with speculators, profit-driven entrepreneurs, market-fundamentalist libertarians and technology fetishists (Yelowitz and Wilson 2015). The “scene” or community around Bitcoin seemingly has little connection to the gritty social reality of many in poorer countries. The frequently aggressive rhetoric within the community, as well as the inequality of access and wealth within the system, seems—at first glance—to clash with the ideals of those in social and collaborative economy movements.

Despite this, the question of whether Bitcoin can be harnessed to empower marginalized communities and build new means of solidarity-based finance remains unanswered. This paper sketches out the contours of some key issues that social and solidarity finance practitioners should consider when thinking about cryptocurrency technology. It is intended to provide a primer on the basics of Bitcoin, and to flag up existent narratives on the technology's potentials and limits.

First, it considers claims made by Bitcoin proponents concerning the positive role Bitcoin can play as a tool of financial inclusion, or as a tool to build new systems of property rights in countries with unstable governance. It also considers technical and political critiques of these claims.

Second, the paper looks at the attempts to design new cryptocurrencies—such as Faircoin—based on explicitly cooperative and social justice principles.

Third, the paper considers the emergent wave of “blockchain 2.0” innovation, in which the underlying “blockchain” technology of Bitcoin is expanded into realms like share issuance and micro-insurance. The original Bitcoin community made much out of the “trustless” nature of the technology (Miscione and Kavanagh 2015)—the fact that it does not rely on trusted central intermediaries—but newer groups are expanding the vision into one of trust-enabling decentralized cooperatives, or “distributed collaborative organizations”.

## A Primer on Cryptocurrency

To understand the Bitcoin system, it is useful to sketch out the similarities and differences with the normal bank-run electronic payments system. In the normal system:

1. A person has an account number at a bank.
2. They have a way of proving that they control that account number—for example, a PIN code.
3. The bank, in turn, has a data record of how much money is attributable to that account number, thereby keeping score of the person's money on a private internal database or ledger.
4. The person can then use an electronic communications system to identify themselves to their bank as the authentic account holder, and can request for the money associated with their account number be transferred to someone else's account at a different bank.

5. This then spurs the bank to edit their ledger of accounts—changing the person’s score—and to tell the recipient’s bank to do the same. The process is a little more complex than this, but in effect the money moves via a series of private databases being edited.

The normal bank payments system thus works by a limited set of private intermediaries editing private databases that they control, and then informing the account holders that the transactions have occurred (e.g. “Your new balance, recorded in our datacentres, is £1,240”).

The Bitcoin system—like the normal bank payments system—is intended to move monetary tokens between people through the changing of account entries on databases, but it has two immediate differences. First, the database that is used to record payments between people is public, rather than the privately held account databases of the normal banking system. Second, the intermediaries that change that database are a decentralized network of people (“miners”) running special Bitcoin software, rather than banks running their own private software systems.<sup>1</sup>

Thus, the Bitcoin system, at its most simple, consists of a widely distributed, and highly visible, public ledger (or database)—colloquially referred to as the blockchain—that people can use to record transactions of digital tokens between themselves. The database thus keeps score of their tokens on the system in a highly public and transparent<sup>2</sup> way.

In the Bitcoin system:

1. A person wishing to make a payment has a public address (akin to an account number).
2. They have a way of controlling that public address through the use of a private key (roughly akin to a PIN number)
3. They then use an electronic communications system (the internet) to identify themselves to the Bitcoin network, and request that digital tokens—associated with their public address—be moved to someone else’s public address.
4. This then occurs by a change made to the blockchain ledger by a set of participants colloquially known as miners.<sup>3</sup> It is beyond the scope of this paper to describe the exact means by which this happens, but the process involves the miners using their computing power to validate the transactions.
5. The two parties who control the public addresses can then see these changes, proving that the tokens have moved from one address to the other.

### ***The nature, stability and security of Bitcoin tokens***

Note that all the Bitcoin system actually does is enable digital tokens to be moved between participants, with the help of miners who volunteer their computer power to move the tokens around. Whether such digital tokens are perceived to have value or not

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<sup>1</sup> For a detailed technical description of the Bitcoin system, see Antonopoulos 2014.

<sup>2</sup> Much media attention on Bitcoin has focused on the fact that people can anonymously transact using the system, which seems to run counter to the claim of transparency. Note though, that the means by which such anonymous transactions are achieved is through the use of a highly transparent public ledger. All transactions on the system can be seen by everyone, but attributing a specific person’s identity to any particular transaction is difficult.

<sup>3</sup> These miners can be thought about as a decentralized network of clerks who check to see that participants actually have the funds they claim to have, and who then record a change to the decentralized blockchain ledger. In a bank, the same task would be undertaken by checking to see that someone’s account balance had enough in it to make a payment, and then changing their balance to make that payment.

is a separate, and more complex, issue. Some of the first questions that have been asked about bitcoins are:

- What is the nature of these tokens? Are they money? Where does their value come from?
- Is this perceived value stable, or prone to volatility?
- Is the system safe, or prone to hacks and fraud?

### *Is Bitcoin money?*

When addressing the first question, it is important to note that our normal money is also just tokens—whether in a digital form or in a symbolic paper or metal form—which people move around either by editing databases (electronic money) or by literally handing over the symbolic physical representation (cash). The construction of the perceived value of the euro or the yen is a historical process involving deep cultural and political dynamics.

The value of a US dollar is underpinned by enormous network effects, the fact that hundreds of millions of people implicitly agree that the tokens represent value and the fact that the tokens are deeply anchored in a vast real economy. The fact that so many people are interdependently locked into usage of such tokens makes it incredibly difficult for anyone to deny their perceived value, and if they do so they will tend to find themselves excluded from economic life. To get such tokens into such a central economic position does not come easily—it involves deep interplays between state power, central banks, commercial banks, institutions that protect property title, and the redeemability of legal tender to pay taxes and other debts—but once a monetary standard is established it is very difficult to dislodge.<sup>4</sup>

Bitcoin, by contrast to a token like the South African rand, has no geographically and politically discreet real economy in which it is dominant. It thus does not tend to be a primary unit of pricing in any economy—very few vendors explicitly price their goods in terms of Bitcoin as a unit of account—and it is also not widely perceived as a means of exchange. Thus, while it has the potential to be a currency unit, in practice few people actually use, or perceive, Bitcoin as money in a traditional sense.<sup>5</sup>

This has led some national authorities to characterize it as a digital asset rather than a currency. In this sense it bears some resemblance to gold, which similarly has ambiguity as to whether it should be perceived as an asset or as a form of money. For now, though, it suffices to say that (i) Bitcoin is a digital token that can be moved between parties, and (ii) the token has market value in terms of major national currencies (the token can be exchanged for dollars, pounds and other currencies) and (iii) it is sporadically used—albeit often in small amounts—in exchange for real world goods and services.

### *Perceived risks: Volatility and safety*

The question of what underpins Bitcoin tokens' perceived value—and the related question of its price in terms of fiat currencies—is beyond the scope of this paper.<sup>6</sup> It suffices to say for now that when Bitcoin first started it was seen by many as a mischievous, subversive, and slightly mysterious, experiment, rather than a serious

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<sup>4</sup> We do see situations in which these token systems break down as a result of institutional distress, as in the case of the Zimbabwe dollar's disintegration through hyperinflation from the late 1990s.

<sup>5</sup> For discussions about whether Bitcoin is money, see Yermack 2015; Selgin 2015; Weber 2014; Lo and Wang 2014; and Bergstra and Weijland 2014.

<sup>6</sup> For more on this topic, see Cheah and Fry 2015; Polasik et al. 2015; Hayes 2015; and Ciaian et al. 2015.

commercial instrument. The digital tokens went through a fetishization process in which they began to get imbued with imagined value by a small, dedicated group of evangelists, who in turn paved the way for speculators to get involved, and for media outlets to run stories (Glaser et al. 2014). This in turn opened up the tokens' usage to more ordinary people, business owners and entrepreneurs. Today, perhaps the most we can say is that the digital tokens have a perceived value contingent upon their specialized usage among specialized communities, and that the construction of this perceived value is an ongoing process that develops as more players get involved.

One key element of this, though, is that—in contrast to locked-in state currency systems—the perceived value (as measured in terms of other currencies) has fluctuated greatly over time. This volatility creates a chicken-and-egg scenario: if more people got involved, the value of the tokens would stabilize, because the larger the user base, the less influence any one user would have in influencing the price.<sup>7</sup> But many people shy away from using Bitcoin because of the volatility.

Another perceived risk that keeps people away is the fact that the Bitcoin system has been subjected to various security breaches, mostly involving third-party services—like exchanges where you can buy bitcoins in exchange for fiat currencies—but also involving hacks of private computers where people have Bitcoin “wallets”, the software they use to interact with the system. It is important to note, however, that as the community around Bitcoin has matured and expanded, the security standards have steadily increased.<sup>8</sup> Many new markets are initially subject to cowboy or rogue operators who gradually get pushed out by more formal actors over time.

### *Regulation, tax and accounting*

Lastly, it is important to point out that within cryptocurrency scholarship and practice, there are a number of ongoing debates concerning how Bitcoin should interface with mainstream regulatory, legal and tax regimes in different jurisdictions. This includes practical questions on:

- how to tax Bitcoin transactions (including VAT and income tax);<sup>9</sup>
- how to account for Bitcoin in formal financial statements;<sup>10</sup> and
- how to regulate it: is a provider of Bitcoin services a financial services company, for example?<sup>11</sup>

All three of these strands involve a question of how to categorize Bitcoin. Taxation, accounting and regulation can shift depending on whether it is seen as a currency, an

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