Center for Governance and Markets at the University of Pittsburgh Virtual Seminar on **Digital Governance – 30/9/2020**

seminar moderated by Eric Alston of the University of Colorado and co-organized by Alston, Martin Weiss, Ilia Murtazashvili, and Marcela Gomez

Capitalism after Satoshi:

Economic organization of a digital economy

RMIT Blockchain Innovation Hub

Jason Potts

BIH on digital governance

Capitalism After Satoshi

Journal of Entrepreneurship and Public Policy; 2019; Vol ahead-of-print(ahead-of-print);

Chris Berg, Sinclair Davidson, Jason Potts

purpose the purpose of this paper is to explore the long-run economic structure and economic policy consequences of wide-spread blockchain adoption. design/methodology/approach the approach uses institutional, organisational and evolutionary economic theory to predict consequences of blockchain innovation for economic structure (dehierarchicalisation) and then to further predict the effect of that structural change on the demand for economic policy. findings the paper makes two key predictions. first, that blockchain adoption will cause both market disintermediation and organisational dehierarchicalisation. and second, that these structural changes will unwind some of the rationale for economic policy developed through the twentieth century that sought to control the effects of market power and organisational hierarchy. research limitations/implications the core implication that the theoretical prediction made in this paper is that wide-spread blockchain technology adoption could reduce the need for counter-veiling economic policy, and therefore limiting the role of government. originality/value the paper takes a standard prediction made about blockchain adoption, namely disintermediation (or growth of markets), and extends it to point out that the same effect will occur to organisations. it then notes that much of the rationale for economic policy, and especially industry and regulatory policy through the twentieth century was justified in order to control economic power created by hierarchical organisations. the surprising implication, then, is that blockchain adoption weakens the rationale for such economic policy. this reveals the long-run relationship between digital technological innovation and the regulatory state ... Show Less

tieth Century | Economic Structure | Wide Spread | Long Run

Altmetric 7 PlumX Metrics Friday, October 04, 2019

PERSPECTIVE ARTICLE

Front. Blockchain, 31 January 2020 | https://doi.org/10.3389/fbloc.2020.00002

Proof of Work as a Three-Sided Market

Chris Berg*, Sinclair Davidson and Jason Potts

Blockchain Innovation Hub, RMIT University, Melbourne, VIC, Australia

Blockchain technology is the distributed ledger technology underlying Bitcoin and other cryptocurrencies. We apply Oliver Williamson's transactions cost analysis to a proof of work blockchain consensus mechanism. Blockchains reduce the costs of opportunism, but are not "trustless." We show that blockchains are trust machines. Blockchains provide for three-sided bargaining that convert energy-intensive computation into economically-valuable trust in a proof of work context.

The Governance of Blockchain Dispute Resolution

Darcy W. E. Allen,* Aaron M. Lane,** & Marta Poblet***

Blockchain technology acts as infrastructure for self-executing smart contracts. Because contracts are incomplete and some parties are opportunistic, these new contracting possibilities create dispute resolution challenges. For instance, will smart contracts be recognized, and any disputes resolved, within the existing territorial courts? In this Article, we first map some institutional governance possibilities for contracting parties (e.g. mediation, private arbitration, and courts) to create a Dispute Resolution Possibility Frontier (DRPF). Second, we provide case studies of emerging blockchain-based dispute resolution mechanisms. Blockchain-based smart contracts create a source of new disputes requiring resolution, but also can serve as a technology that facilitates new methods of dispute resolution, including for disputes arising from traditional legal contracts. Contracting parties will subjectively make tradeoffs for their most effective dispute resolution mechanism, and the costs of dispute resolution will change over time through a process of institutional innovation.

CONTENTS

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Introduction

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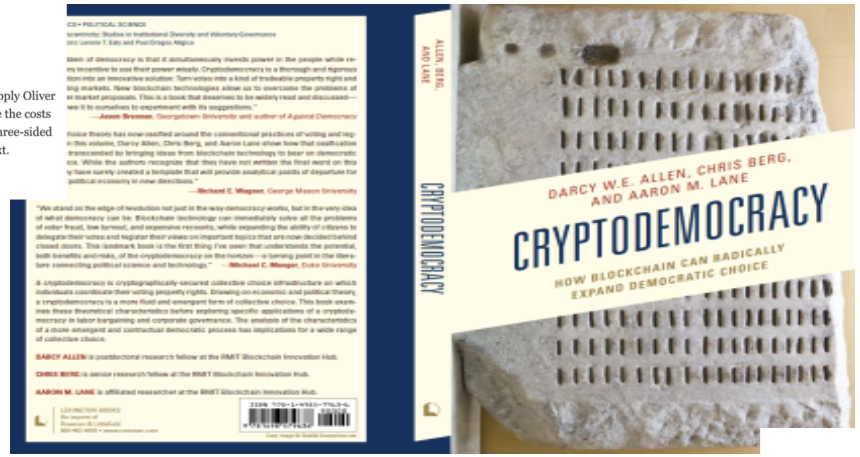
Cryptodemocratic Governance of Special Economic Zones

Darcy W.E. Allen
RMIT Blockchain Innovation Hub

Aaron M. Lane
RMIT Blockchain Innovation Hub, RMIT Graduate School of Business and Law



Rev Austrian Econ (2020) 33:363–374
https://doi.org/10.1007/s11138-018-0423-6

CrossMark

Cryptodemocracy and its institutional possibilities

Darcy W. E. Allen[1] · Chris Berg[1] · Aaron M. Lane[2] · Jason Potts[1]

Published online: 11 July 2018

Abstract Democracy is an economic problem of choice constrained by transaction costs and information costs. Society must choose between competing institutional frameworks for the conduct of voting and elections. These decisions over the structure of democracy are constrained by the technologies and institutions available. As a governance technology, blockchain reduces the costs of coordinating information and preferences between dispersed people. Blockchain could be applied to the voting and electoral process to form

PEER REVIEWED RESEARCH

OPEN ACCESS
ISSN Online: 2516-3957
ISSN Print: 2516-3949
https://doi.org/10.31585/jbba-3-1-(8)2020

Blockchain Governance: What We Can Learn from the Economics of Corporate Governance

Darcy W. E. Allen and Chris Berg
RMIT Blockchain Innovation Hub, RMIT University, Australia

Correspondence: darcy.allen@rmit.edu.au

Received: 20 February 2020 **Accepted:** 16 March 2020 **Published:** 30 March 2020

Abstract

Understanding the complexities of blockchain governance is urgent. The aim of this paper is to draw on other theories of governance to provide insight into the design of blockchain governance mechanisms. We define blockchain governance as the process by which stakeholders (those who are affected by and can affect the network) exercise bargaining powers over the network. Major considerations include the definition of stakeholders, how the consensus mechanism distributes endogenous bargaining power between those stakeholders, the interaction of exogenous governance mechanisms and institutional frameworks, and the needs for bootstrapping networks. We propose that on-chain governance models can only be partially utilised because of the existence of implicit contracts that embed expectations of return among diverse stakeholders.

Keywords: *Blockchain Governance, Institutional Cryptoeconomics, Economics of Blockchain, Corporate Governance*

Constitutional Political Economy (2020) 31:188–204
https://doi.org/10.1007/s10602-020-09303-9

ORIGINAL PAPER

Check for updates

Blockchains and constitutional catallaxy

Alastair Berg[1] · Chris Berg[1] · Mikayla Novak[2]

Published online: 27 February 2020

Abstract

The proposition that constitutional rules serve as permanent, fixed points of interaction is challenged by the existence of contestable rule amendment and the emergence of de facto authority. This observation not only applies to conventional political constitutions, but to the fundamental rules which govern interactions by numerous people using new forms of technology. Blockchain technology aims to coordinate action in a world of incomplete information and opportunism, but the governance arrangements in blockchain protocols remain far from settled. Drawing upon recent theoretical developments regarding constitutional change, we interpret changes to the fundamental working rules of blockchain protocols as central to the

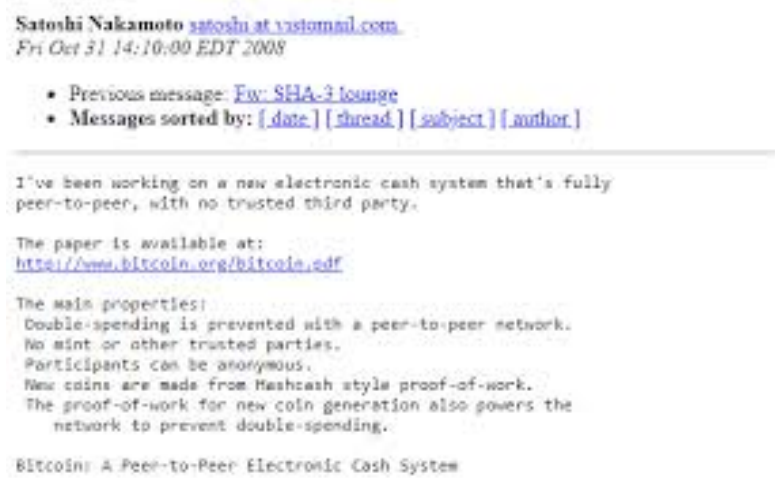
Markets eat Feudalism

Blockchains eat Corporatism

Markets (*decentralised coordination mechanism*) eat Feudalism (*centralised coordination mechanism*)

Blockchains (*decentralised coordination mechanism*) eat Corporatism (*hierarchical coordination mechanism*)

Blockchain = decentralized economic mechanism



Satoshi Nakamoto satoshi at vistomail.com
Fri Oct 31 14:10:00 EDT 2008

- Previous message: Fw: SHA-3 lounge
- **Messages sorted by:** [date] [thread] [subject] [author]

I've been working on a new electronic cash system that's fully peer-to-peer, with no trusted third party.

The paper is available at:
http://www.bitcoin.org/bitcoin.pdf

The main properties:
Double-spending is prevented with a peer-to-peer network.
No mint or other trusted parties.
Participants can be anonymous.
New coins are made from Hashcash style proof-of-work.
The proof-of-work for new coin generation also powers the network to prevent double-spending.

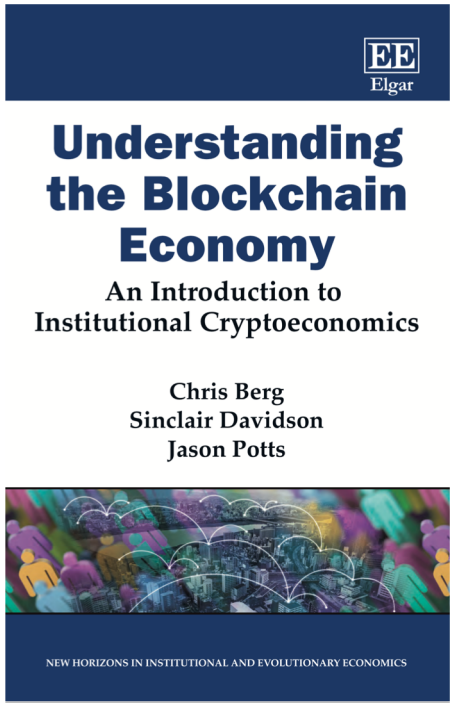
Bitcoin: A Peer-to-Peer Electronic Cash System

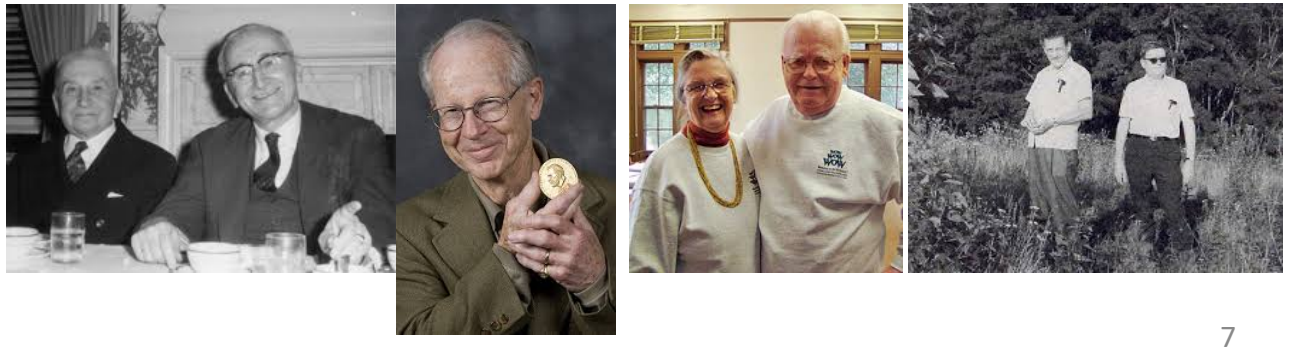
Cryptoeconomics = mechanism design of blockchains

a.k.a. tokenomics, cryptoeconomic systems

Institutional cryptoeconomics =

blockchain +
Austrian economics +
new institutional economics +
public choice theory





Blockchain = Institutional technology

Journal of Institutional Economics

Article Metrics

Volume 14, Issue 4 August 2018 , pp. 639-658

Blockchains and the economic institutions of capitalism

SINCLAIR DAVIDSON [a1], PRIMAVERA DE FILIPPI [a2] [a3] and JASON POTTS [a1]

https://doi.org/10.1017/S1744137417000200 Published online: 18 January 2018

Blockchain = Web3

Web1	internet of data	**Messages**: email, file sharing
Web2	social internet	**Communities**: mobile, social media, apps
Web3	**internet of value**	**Economic Institutions:** cryptocurrency, smart contracts, registries, assets & NFTs, SSI, Dapps, DExs, DAOs, DeFi

Blockchain = economic infrastructure
(for next gen digital technologies)

Blockchain = economic utilities

- Water & Energy Utilities
- Transport Utilities (roads, rail and ports)
- Communications Utilities

facilitating production and transactions

blockchain

- **Money and Public finance**
- **Registers and Registries Courts and Law**
- **Public Administration and Regulation**
- **Public Safety and Defense**

maintenance and protection of property

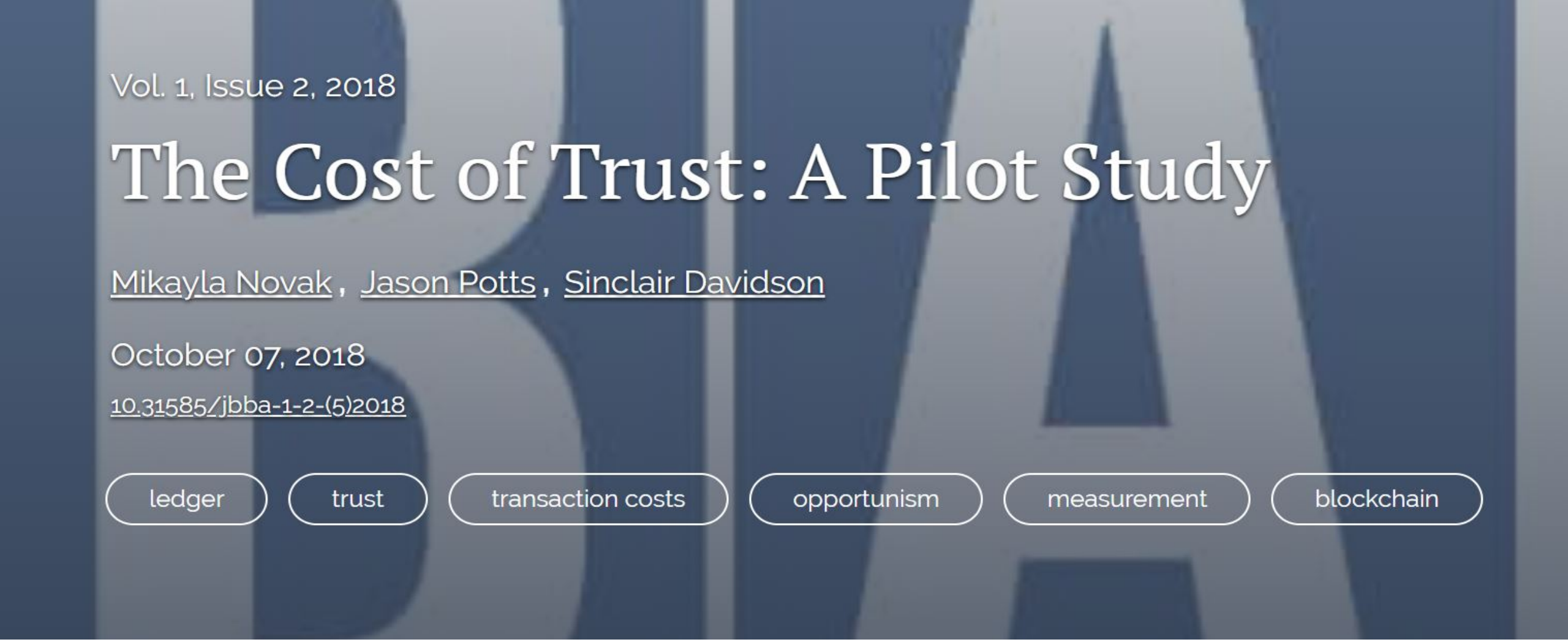
Blockchains are a Coasean transactional revolution

an institutional technology that reduces transactions costs by lowering costs of trust, verification & networking and resolving problems of opportunism

Blockchains are a Hayekian administrative revolution

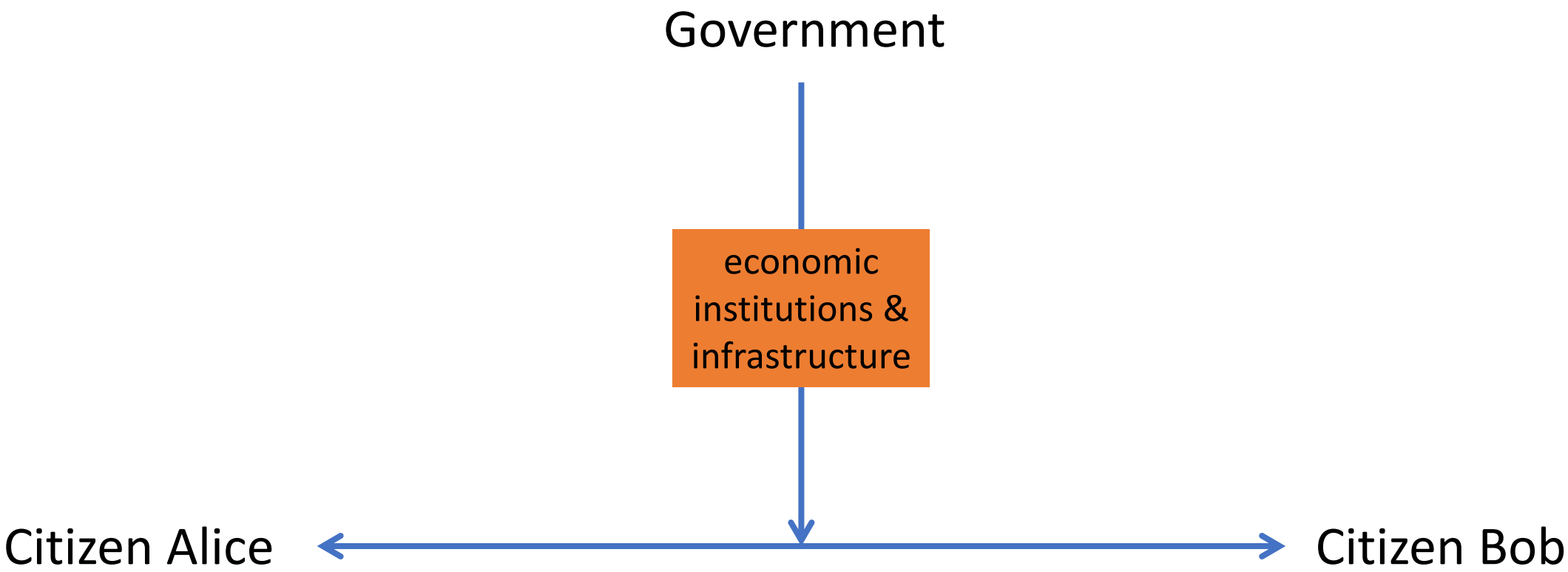
Ledgers \ Economies	*Centralised*	*Decentralised*
Centralised	Lange's computer socialism	Hayek's distributed capitalism 
Decentralised	Owen's pre-Marxist communalism	Blockchains and the cryptoeconomy

Blockchains (institutional technology) automate the **manufacture of trust** (institutional output, economic input)


Vol. 1, Issue 2, 2018
The Cost of Trust: A Pilot Study
Mikayla Novak, Jason Potts, Sinclair Davidson
October 07, 2018
10.31585/jbba-1-2-(5)2018
ledger
trust
transaction costs
opportunism
measurement
blockchain

35%

North, D. (1990) *Institutions, Institutional Change and Economic Performance*



manufacturing trust

PERSPECTIVE ARTICLE
Front. Blockchain, 31 January 2020 | https://doi.org/10.3389/fbloc.2020.00002

Proof of Work as a Three-Sided Market

Chris Berg*, Sinclair Davidson and Jason Potts

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Introduction

Miner

Alice ← → Bob

Blockchain industrialises trust

Decentralised project governance

- Cryptocurrency
- NFTs
- AMMs, DeFi
- stablecoins

Governance tokens

Constitutional and operational collective decision-making:
Ownership distribution (airdropped capital), Codebase upgrades and forking, Treasury management, fee schedules,

The price of writing rules has fallen

THE JOURNAL OF FINANCE • VOL. XLIII, NO. 3 • JULY 1988

Corporate Finance and Corporate Governance

OLIVER E. WILLIAMSON*

ABSTRACT

A combined treatment of corporate finance and corporate governance is herein proposed. Debt and equity are treated not mainly as alternative financial instruments, but rather as alternative governance structures. Debt governance works mainly out of rules, while equity governance allows much greater discretion. A project-financing approach is adopted. I argue that whether a project should be financed by debt or by equity depends principally on the characteristics of the assets. Transaction-cost reasoning supports the use of debt (rules) to finance redeployable assets, while non-redeployable assets are

Asset Specificity	Rules Based: Yes	Rules Based: No
Yes	Tokens	Equity
No	Debt	Money

- **Tokens are not debt** because can finance Specific Assets
- **Tokens are not equity** because rules based
- **Tokens are not money** because rules based not discretion based

- Tokens are a market based financial instrument that can finance Specific Assets – **Dequity**
  - Rules based means is more like debt
  - Asset specificity means is more like equity

historical significance of blockchain?

- Consider the historical dynamic of the supply and demand for policy

Capitalism after Satoshi

Blockchains, dehierarchicalisation, innovation policy, and the regulatory state

Chris Berg, Sinclair Davidson and Jason Potts
RMIT University, Melbourne, Australia

Received 15 March 2019
Revised 26 July 2019
Accepted 21 August 2019

Abstract

Purpose – The purpose of this paper is to explore the long-run economic structure and economic policy consequences of wide-spread blockchain adoption.

Design/methodology/approach – The approach uses institutional, organisational and evolutionary economic theory to predict consequences of blockchain innovation for economic structure (dehierarchicalisation) and then to further predict the effect of that structural change on the demand for economic policy.

Findings – The paper makes two key predictions. First, that blockchain adoption will cause both market disintermediation and organisational dehierarchicalisation. And second, that these structural changes will unwind some of the rationale for economic policy developed through the twentieth century that sought to control the effects of market power and organisational hierarchy.

Research limitations/implications – The core implication that the theoretical prediction made in this paper is that wide-spread blockchain technology adoption could reduce the need for counter-veiling economic policy, and therefore limiting the role of government.

Originality/value – The paper takes a standard prediction made about blockchain adoption, namely disintermediation (or growth of markets), and extends it to point out that the same effect will occur to organisations. It then notes that much of the rationale for economic policy, and especially industry and regulatory policy through the twentieth century was justified in order to control economic power created by hierarchical organisations. The surprising implication, then, is that blockchain adoption weakens the rationale for such economic policy. This reveals the long-run relationship between digital technological innovation and the regulatory state.

Keywords Institutions, Capitalism, Blockchain, Economic evolution

Paper type Research paper

1. Introduction

In total, 10 years after Satoshi Nakamoto released the Bitcoin White Paper, and invented the blockchain, we are now beginning to understand the consequences of this innovation[1]. We argue that the consequences of Satoshi's vision extend well beyond a transformation of the technology of private money and payments, or even of bootstrapped digital value platforms based on smart contracts and distributed autonomous organisations (DAOs) (Swan, 2015; Catalini and Gans, 2018; Casey and Vigna, 2018; de Filippi and Wright, 2018; Van Rijmenam and Ryan, 2018; Werbach, 2018) but, more broadly, to a fundamental transformation of the economic institutions of capitalism.

Capitalism works differently after Satoshi. This paper seeks to explain why that is so; through a descriptive endogenous model of the governance of technology and economic growth. Our core insight is that trust is the foundational resource of any economy, and institutions that can engender trust facilitate extensive economic cooperation and therefore value creation.

Markets are well-understood drivers of economic value, but they rely on the trust embodied in organisations (firms) and are supported by government institutions that provide money, and enforce property rights and the rule of law. Economists since Adam Smith have long understood that high-quality institutions are the primary drivers of economic growth and wealth (North, 1990).

Trust is an input into economic cooperation and in economic theory has usually been understood as being exogenously provided. Institutions, however, are social technologies;

Journal of Entrepreneurship and Public Policy

2045-2101
DOI 10.1108/JEPP-03-2019-0012

Capitalism after Satoshi

1. New technologies drive economic growth
2. Economic growth pushes toward hierarchy
3. Hierarchy induces welfare and regulatory policy
4. Blockchain technology dissolves hierarchy

More promise, less hierarchy

- **Marx & Schumpeter** both predicted the rise of **hierarchy** as an outgrowth of industrial innovation.
- Both worried this became **monopoly and collapse**

Early 20C = + demand for **welfare policy** (due to negative social effects of hierarchy)

Late 20C = + demand for **innovation policy** to offset welfare/industry policy

Disintermediation – more markets, less hierarchy

- Coasean effect – tokenisation, DeXs, DeFi drive growth of markets and networks
- Ostrom/Buchanan effect – DAOs etc drive growth of commons and clubs

- blockchain **weakens corporatism**
- fewer **public policy reactions** to corporatism = reduced **demand for corrective policy**
- less regulatory policy = more freedom, innovation

THIS IS THE **HISTORICAL SIGNIFICANCE** OF BLOCKCHAIN

economic infrastructure are rules

these **rules** can be low cost, targeted and precise

Targeted, precision governance

- Growth of voluntary associations – clubs, commons
- Greater variety and choice in projects and groups – better matching
- Value chain governance = Industry utilities = special jurisdictions

- Lower cost of **experimental governance**
- Lower cost of temporary governance – **pop-up economies**

- Reduced harm from **governance externalities**: Fewer ‘civilian casualties’, less ‘collateral damage’

Benefits of lower cost governance 1

Can **add governance** where previously there was command

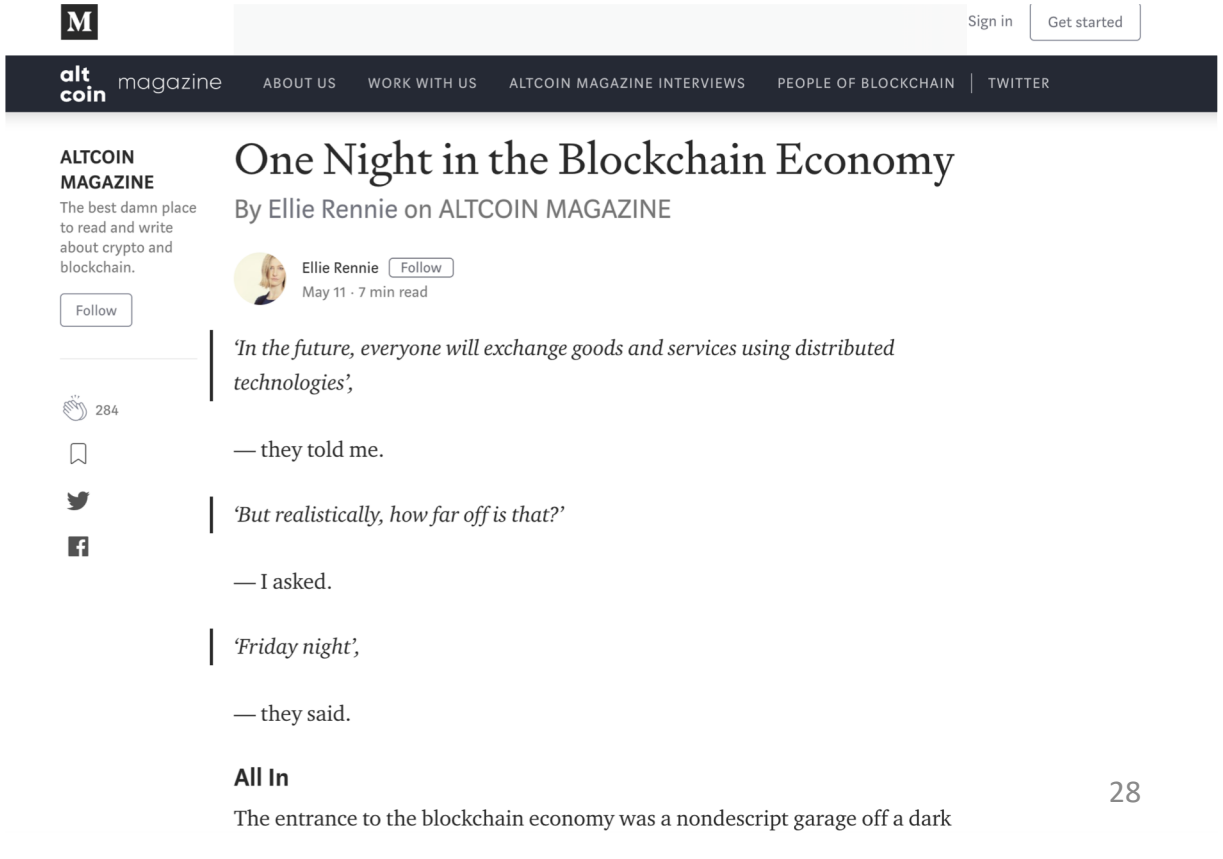
‘Put a governance token on it’

Benefits of lower cost governance 2

pop-up economies

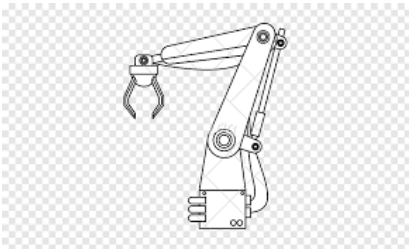
Burner wallets

Self-sovereign blockchains



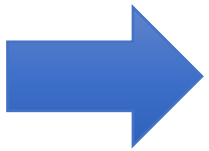
More institutional Tech = less human politics

1. first-wave automation: machines made things / replace humans



2. second-wave automation: machines make decisions / govern humans

FIRST WAVE AUTOMATION



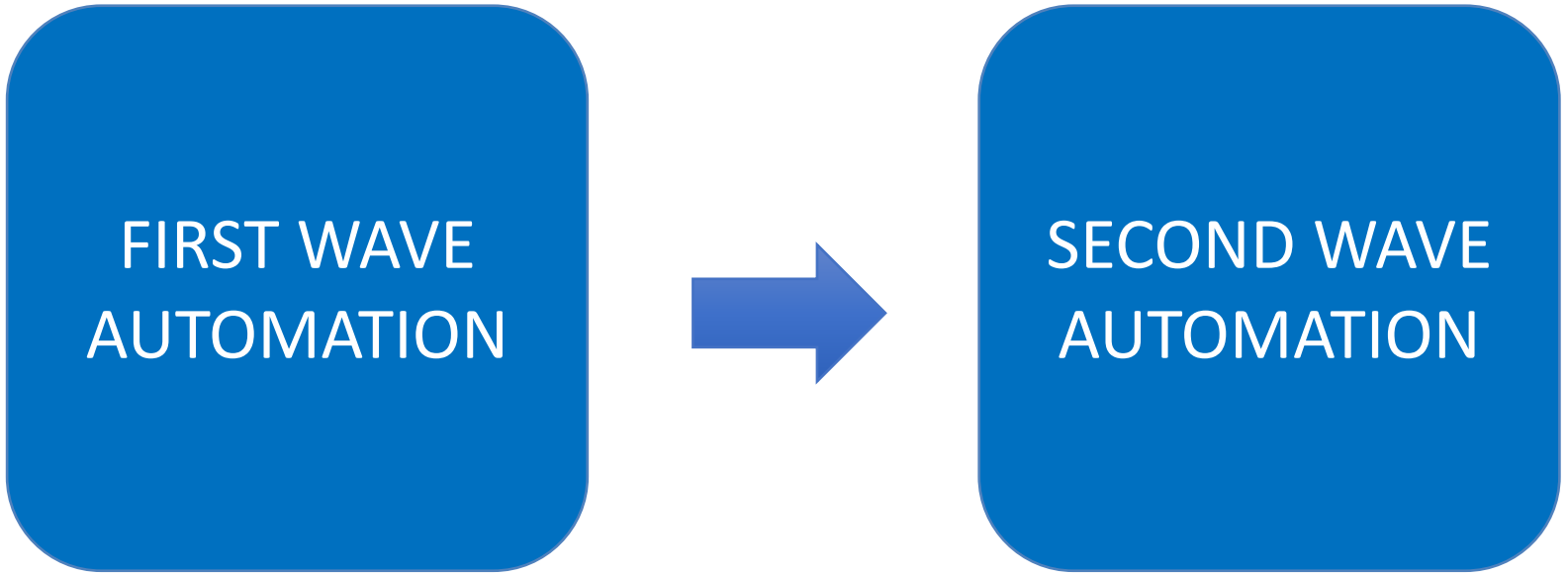
SECOND WAVE AUTOMATION

1804 – now

Industrial revolution
Machines, engines, power
Cybernetics, Robotics

seeds in 1970s/80s

Distributed autonomous systems
Hardware & software Protocols
Blockchain, AI/ML, 5G, IoT, VR,



Machines **replace** humans

Machines **govern** humans

[Satoshi, trying to solve problem of how to move money into distant future for cryogenic reanimation]

blockchain = technical solution to incentivize distributed human action through code to solve consensus problem in electronic money

[realising that was a particular solution to a general class of problem]

blockchain = institutional technology for ad hoc governance infrastructure

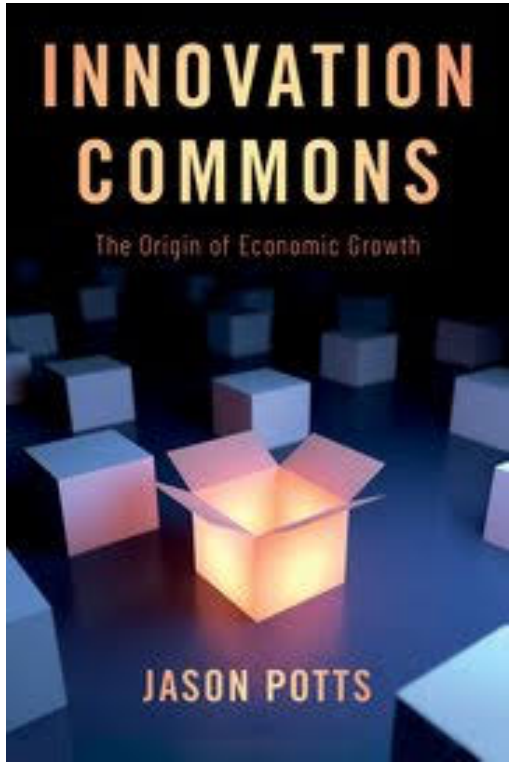
Markets eat Feudalism

- Hayek – because efficient use of local information
- Hurwicz, Buchanan, et al – because rules for decentralized coordination

Blockchains eat Corporatism

- Because automation of trust reduces transaction costs, opportunism – so **markets work better**

But rules-based governance protocols also works better because of efficient use of local information


INNOVATION
COMMONS
The Origin of Economic Growth
JASON POTTS


AMERICAN INSTITUTE FOR ECONOMIC RESEARCH
THE NEW
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OF
FREEDOM
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