Blockchains as a tool to govern the creation of knowledge

Chris Berg

RMIT Blockchain Innovation Hub @chrisberg



RMIT Blockchain Innovation Hub

RMIT Blockchain Innovation Hub



Prof Jason Potts *Director*



Prof Julian Thomas



Prof Sinclair Davidson



Prof Asha Rao



A/Prof Ellie Rennie



A/Prof Marta Poblet Balcell



Dr Chris Berg



Dr Darcy Allen



Dr Mikayla Novak



sites.rmit.edu.au/blockchain-innovation-hub/

What I'm going to do today

- Explore why economists are excited about blockchain technology.
- Outline the ledger-centric view of the economy
- Explore the how blockchains might be used for academic publishing
- Present the outlines of what we're calling 'JournalCoin'



What is a blockchain?

- A blockchain is a decentralised, distributed ledger
- The challenge with a distributed ledger is ensuring everyone agrees what the ledger says



• In November 2008 'Satoshi Nakamoto' solved the consensus problem

4



So what is a blockchain?

Consensus over the contents of a **shared programmable ledger** through the use of **economic incentives.**

The token (the cryptocurrency) is **part** of those incentives.



Blockchain technology is in its infancy

- **Slow** (block confirmation times)
- **Expensive** (mining, transaction fees, storage requirements)
- Hard to scale (transaction times)
- Horrible consumer experience (exchanges, key storage)
- Unnecessary (there are simply better databases, trusted third parties aren't that bad)
- May destroy the planet (mining)





Or the institutional cryptoeconomics view...

- Blockchains are enormously successful proof of concept around distributed ledger technology
- We're applying a large body of economic thought to understand how ledgers and blockchains shape society



Ronald Coase Nobel, 1991



Oliver Williamson Nobel, 2009



Elinor Ostrom Nobel, 2009





So why are economists excited?

The economic problem:

How to coordinate economic activity when faced with distributed information, and positive transactions costs (including trust)?





So why are economists excited?

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

Economies



Ledgers matter

- A ledger is a tool for mapping and verifying agreed facts about relationships
- Ledgers are everywhere
 - Bitcoin has shown us that **money** is a ledger
 - **Property rights** are ledgers (see Hernando de Soto)
 - A firm is a ledger, structuring capital, labour and processes
 - The social security system is a ledger
 - Citizenship is ledger



Ledgers, writing, money, history





An economy is made of ledgers

When ledger technology changes, so does the world





The blockchain economy (economies)

• Blockchains are a tool for **creating new economies** – a new mechanism not just for facilitating trade but for building markets.

Money, value	(cryptocurrency, cryptoassets)
Rules	(code, protocols)
Contracts	(smart contracts)
Services	(Dapps)
Exchanges	(DX, Cross chain atomic swaps)
Monitoring	(hashes, Merkle trees, public blockchains)
Governance	(consensus, forking, on-chain cryptodemocracy,
Organization	(DAOs)
Security	(economic incentives)

13

• Blockchains are a new economic infrastructure



Blockchain as a technology of trust

LEDGER

ISSN 2379-5980 (online DOI 10.5915/LEDGER.2017.10

RESEARCH ARTICLE

What Diplomacy in the Ancient Near East Can Tell Us About Blockchain Technology

Chris Berg^{†*}

Abstract. A blockchain is an institutional technology—a protocol—that allows for economic coordination between agents separated by boundaries of possible mistrust. Blockchains are not the only technology in history to have these characteristics. The paper looks at the role of the diplomatic protocol at the very beginning of human eivilisation in the ancient near east. These two protocols—diplomatic and blockchain—have significant similarities. They were created to address to similar economic problems using similar mechanisms: a permanent record of past dealings, public and ritualistic verification of transactions, and game-theoretic mechanisms of reciprocity. The development of the diplomatic protocol allowed for the creation of the first international community and facilitated patterns of peaceful trade and exchange. Some questions about a generalised 'protocol economics' are drawn.

1. Introduction

Blockchains are protocols which coordinate economic activity. A protocol is an institution that facilitates trusted communication between agents separated by boundaries of possible mistrust—boundaries which can be technical (different operating systems and imperfect transmission networks), geographic (global distance), political (states and national borders), or cultural (different languages, ethnicities or ideologies). A successful protocol creates a distributed system—or network—which agents enter or exit by adhering to the rules of the protocol.

In this sense, blockchain protocols are one recent advance in a historical line of protocols that date back to the beginnings of written civilisation. The ancient near east between 2400 and 1200 BCE saw the construction of a complex system of international relations between a large number of proto-states. To give some sense of the size and complexity of this system, documents found in the Mari archive in Syria identify 160 separate kings in the region over a period of 30 years.¹

Scholars have been able to partly reconstruct the system via the discovery of libraries of clay tablets containing diplomatic letters, dispatch orders, and treaties. Sometime around 2340 BCE a letter was sent by the king of Ebla, a kingdom in today's northern Syria, to the king of Hamazi, an as-yet-undiscovered city or kingdom likely somewhere in northern Iraq². This is the first diplomatic letter which has been uncovered but certainly not the first instance of

[†] Chris Berg (christopherberg@rmit.edu.au) is a Postdoctoral Fellow at the School of Economics, Finance and

eting_and F-flow at the RM11 Blockchain Innovation Fluo, RM12 Univ *1Am8ajXSTp4CESsPvUW1VetxK33N9s2b36

- Permanent, censor-proof, indestructible, always on
- Absolute proof of publication date (particularly valuable for race-todiscovery in science or intellectual property claims)

Select a document that was previously signed



File hash registered on blockchain

Digital signature tied to Bitcoin address



Journals are governance systems

- We use journals to govern/control the creation and availability of new knowledge
- What sort of institution is a journal?



- Members of the (knowledge) club produce and consume its output
- Membership is voluntary
- Membership is restricted (who can contribute by writing or reviewing)

Jason Potts, John Hartley, Lucy Montgomery, Cameron Neylon & Ellie Rennie (2017): A journal is a club: a new economic model for scholarly publishing, *Prometheus*.



Journals are broken governance systems

- Journals are clubs but we treat them like **markets**:
 - Private companies publish and charge access to read, like traditional publishing.
 - But then they ask academics to provide quality assurance (peer review) for free??
 - And we dutifully put it on our CV under the words "professional service"??
 - And the government pays our salary to do this??
 - And pays the publisher to read what we've written??
 - And sometimes we (and taxpayers) pay the publisher to publish our work????





Journals are broken governance systems

- Journals are clubs but we treat them like **commons**:
 - New knowledge published freely online (open access, arXiv, SSRN etc.)
 - Peer review either 1) absent or 2) still slow, conservative, arbitrary
 - Oversupply of content
 - Undersupply of attention



Let's fix the incentives

- Right now the incentives in academic publishing are weak or perverse:
 - Promotions and rewards (provided by the university)
 - Guilt (provided by the editor)
 - Sense of duty (provided by the academics)
 - Cash (provided by everyone to the publisher)
- The blockchain consensus mechanism is a information creation and adoption consensus mechanism
 - Blockchains use tokens to incentivise good behaviour and punish bad behaviour

Introducing JournalCoin

- A RMIT Blockchain Innovation Hub project to bring:
 - 1. Transparency of the peer review
 - 2. Digital copyright authentication and verification
 - 3. Incentive and rewards mechanisms for peer review
 - 4. Incentives for reading, sharing, royalties for citations
- Tokenisation of incentives
 - Subscriptions paid in JournalCoin
 - Peer reviewers paid in JournalCoin
 - Citations or rankings rewarded in JournalCoin
 - Good behaviour (fast and useful peer reviews, article processing, clean copy, formatting supplied) rewarded in JournalCoin
 - o Royalties in JournalCoin





JournalCoin as an ecosystem





Economic infrastructure on the internet

- Blockchains are economic infrastructure on which new forms of social organisation can be built
- Academic publishing is a subset of a general problem that has afflicted publishing and the knowledge economy since the invention of the internet
- Internet 1.0
 - \circ Email, file sharing
- Internet 2.0
 - Social media, browser-based applications
- Internet 3.0
 - Internet of value and trust



Keep up to date with our work

http://sites.rmit.edu.au/blockchain-innovation-hub/

http://cryptoeconomics.com.au/

http://medium.com/@cryptoeconomics

http://chrisberg.org

Twitter:@BlockchainRMIT@cryptoeconomico@chrisberg@profjasonpotts



