

# What Diplomacy in the Ancient Near East Can Tell Us About Blockchain Technology: Open Review

Author: Chris Berg<sup>†\*</sup>

Reviewers: Reviewer A, Reviewer B

**Abstract.** The final version of the paper “What Diplomacy in the Ancient Near East Can Tell Us About Blockchain Technology” can be found in Ledger Vol. 2 (2017) 55-64, DOI 10.5915/LEDGER.2017.104. There were two reviewers who responded, neither of whom have requested to waive their anonymity at present, and are thus listed as A and B. After initial review (1A), the author submitted a revised submission and responses to Reviewer B (1B). The revised submission was reviewed once again by Reviewer B, who gave further notes (2A). The author responded with further emendation and responses (2B), after which it was determined that the author had adequately and substantively addressed all concerns, thus completing the peer-review process. Authors’ responses are bulleted for clarity.

## 1A. Review, Initial Round

### Reviewer A:

*Does this paper represent a novel contribution to cryptocurrency or blockchain scholarship?:*

Yes

*If you answered "yes" to the previous question, in one sentence, describe in your own words the novel contribution made by this paper:*

It links blockchain with institutional economics. Blockchain appers as a key technology dimishing intermediation costs

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*Is the research framed within its scholarly context and does the paper cite appropriate prior works?:*

Yes

*Please assess the article's level of academic rigor.:*

Good (not excellent but a long way from poor)

*Please assess the article's quality of presentation.:*

Good (not excellent but a long way from poor)

*How does the quality of this paper compare to other papers in this field?:*

Top 20%

*Please provide your free-form review for the author in this section.:*

I find the paper very interesting and highly new. It is very well focussed on the topic and it opens new lines of research.

I want to remark the proper links that the author establishes between the new institutional economics and the blockchain technology. The author correctly claims that blockchain technology would diminish intermediate costs, improving trust between unknown agents. This fact is crucial for the way in which blockchain technology can change the future construction of institutions and diplomacy protocols.

Minor remarks: I recommend to include the basic reference of Freeman and Lipsey when the author mentions the General Purpose Technology issue (pag. 2)

**Reviewer B:**

*Does this paper represent a novel contribution to cryptocurrency or blockchain scholarship?:*

Not sure

*Is the research framed within its scholarly context and does the paper cite appropriate prior works?:*

Yes

*Please assess the article's level of academic rigor.:*

Unsatisfactory (better than poor but a long way from excellent)

*Please assess the article's quality of presentation.:*

Good (not excellent but a long way from poor)

*How does the quality of this paper compare to other papers in this field?:*

Top 50%

*Please provide your free-form review for the author in this section.:*

# General

The paper draws an interesting analogy between the constraints of the blockchain and the norms that coordinated diplomacy in the ancient near east. However, the main problem is that “protocol” is never explicitly defined. Does it refer to the vast class of rules and norms that facilitate social action?—in which case it’s somewhat puzzling to choose these two elements of the class for comparison. Or is it the subset of that class that’s concerned with ensuring the integrity of communications? Are the various points of analogy intended to define a protocol (i.e. “a protocol is an institution that solves these particular problems”)? Is it a synonym for “institution” or a narrower category? Does it matter that diplomatic protocol can be easily breached but the blockchain protocol (in general) cannot?

Without an explicit definition of protocol, the analogy between the blockchain and ANE diplomacy is somewhat impressionistic. The paper connects the two on a number of points of similarity, but there’s no explicit protocol concept to connect those points of similarity to each other under a general framework.

Some of the points of analogy are more convincing than others, but I suspect that being explicit about the meaning of protocol will entail revising or discarding some of some of them, particularly the analogy between mining and costly signaling (on which see below). Of course, on the other hand, it might also suggest additional analogies. I can be convinced that they are meaningful, but it requires more than just the observation of similarity: it requires a theory of protocols from which you can show that the analogies are more than superficial.

This is the reason for my answer of "not sure" for the question "Does this paper represent a novel contribution to cryptocurrency or blockchain scholarship?" I expect the answer to that question to be clearer once the conceptual framework is more articulated.

# Conceptual

I’m not convinced there’s a relevant distinction between “general purpose technology” and

“institutional technology.” Did steam power, electricity, and the semiconductor not also create new economies in the same way that the blockchain did? This distinction seems peripheral to the paper’s argument anyway, so it may suffice to say that you follow the approach of Davidson, De Filippi, and Potts in regarding the blockchain as an institutional technology, rather than contrasting it against the notion of a general purpose technology.

Section 2, opening paragraphs: there’s a large literature on the origin of writing in the ANE, so I would be wary of taking the Sumerians’ own story at face value. My impression is that there’s a consensus that writing was mainly developed for internal administrative use rather than for foreign relations (see for example Lamberg-Karlovsky, “To Write or Not To Write”). Still, it may be enough for your purposes that the Sumerians themselves regarded diplomacy as sufficiently important to locate the origin of writing there.

Page 4, on blockchain mining as ritual: I am skeptical of this analogy. The paragraph on ritual would benefit from a reference to signaling theory, since that’s what it’s describing without using the term. Iannacone, “Sacrifice and Stigma” is one that’s particularly relevant to the question of costly rituals. Bitcoin mining is costly, yes, but it’s not clear that the costliness is a signal of anything. The disanalogy is also indicated by the fact that no such cost need be borne at all in a proof-of-stake system.

Section 3 is rather vague. I take it to be exploring the question of the costs and benefits of hierarchy versus contract, and you’ve cited the relevant papers on that question (Williamson, and to a lesser extent Djankov), but it’s not clear to me what the argument is. Based on its position after the previous sections I would suppose that it means to argue that blockchains and diplomatic protocols both alter the relative costs so as to make contract preferable to hierarchy on the margin, but this could be stated more clearly and explored in more depth on both sides of the analogy.

#### # Minor points of clarity and style

Page 1, paragraph 2: “...saw the construction of a complex international system.” Perhaps “a complex system of international relations?” As it is, it’s unclear what sort of system you mean (political, economic, etc). until the following paragraph.

The introduction bounces around from thought to thought between (and sometimes within) paragraphs, for example between the first two paragraphs on page 2. Some reorganization and/or connective tissue may be warranted in order to give it a clear narrative flow.

Page 2, paragraph 3: “...the transaction costs of cooperation...” The costs of cooperation, in a game theoretic sense, aren’t usually thought of as transaction costs, but as the risk of the other party defecting. One might in principle assimilate defection risks to transaction costs, but it’s certainly not obvious (at least to me), and it would be an unnecessary digression. Do you mean the defection risk of cooperation after all, or something like the transaction costs of exchange, or both?

Page 2, paragraph 3: “...databases, game theory, and...” Game theory is a good tool to

analyse the blockchain, but the blockchain doesn't "use" game theory in the same way as it uses the other items in the list.

Page 4, paragraph 3: changes -> chances.

## 1B. Author's Response

### Reviewer B:

#### # General

The paper draws an interesting analogy between the constraints of the blockchain and the norms that coordinated diplomacy in the ancient near east. However, the main problem is that "protocol" is never explicitly defined. Does it refer to the vast class of rules and norms that facilitate social action?—in which case it's somewhat puzzling to choose these two elements of the class for comparison. Or is it the subset of that class that's concerned with ensuring the integrity of communications? Are the various points of analogy intended to define a protocol (i.e. "a protocol is an institution that solves these particular problems")? Is it a synonym for "institution" or a narrower category? Does it matter that diplomatic protocol can be easily breached but the blockchain protocol (in general) cannot?

Without an explicit definition of protocol, the analogy between the blockchain and ANE diplomacy is somewhat impressionistic.

- I've put in a formal definition right up front in the first paragraph: "Blockchains are protocols which facilitate the coordination of 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), cultural (different languages, ethnicities or ideologies) or simply incentives that encourage opportunistic behaviour. A successful protocol creates a distributed system – or network - which agents enter or exit by adhering to the rules of the protocol."
- Base on this definition, to address Reviewer B's query - yes, the protocol is a subset of the class of institution, that is designed to facilitate secure communications.
- I've also revised the abstract to fit the definition used throughout the paper.

The paper connects the two on a number of points of similarity, but there's no explicit protocol concept to connect those points of similarity to each other under a general

framework.

Some of the points of analogy are more convincing than others, but I suspect that being explicit about the meaning of protocol will entail revising or discarding some of some of them, particularly the analogy between mining and costly signaling (on which see below). Of course, on the other hand, it might also suggest additional analogies. I can be convinced that they are meaningful, but it requires more than just the observation of similarity: it requires a theory of protocols from which you can show that the analogies are more than superficial.

This is the reason for my answer of "not sure" for the question "Does this paper represent a novel contribution to cryptocurrency or blockchain scholarship?" I expect the answer to that question to be clearer once the conceptual framework is more articulated.

### # Conceptual

I'm not convinced there's a relevant distinction between "general purpose technology" and "institutional technology."

- I've taken the reviewers advice and removed the distinction, simply saying that I follow an institutional cryptoeconomics approach. I've also extended the references to take account of new publications in the approach, as well as clarify that it derives from the transaction cost school of Coase and Williamson.

Did steam power, electricity, and the semiconductor not also create new economies in the same way that the blockchain did? This distinction seems peripheral to the paper's argument anyway, so it may suffice to say that you follow the approach of Davidson, De Filippi, and Potts in regarding the blockchain as an institutional technology, rather than contrasting it against the notion of a general purpose technology.

Section 2, opening paragraphs: there's a large literature on the origin of writing in the ANE, so I would be wary of taking the Sumerians' own story at face value.

- This has been clarified that we understand writing to have emerged in an administrative context but that the ancients told stories otherwise.

My impression is that there's a consensus that writing was mainly developed for internal administrative use rather than for foreign relations (see for example Lamberg-Karlovsky, "To Write or Not To Write"). Still, it may be enough for your purposes that the Sumerians themselves regarded diplomacy as sufficiently important to locate the origin of writing there.

Page 4, on blockchain mining as ritual: I am skeptical of this analogy. The paragraph on ritual would benefit from a reference to signaling theory, since that's what it's describing without using the term.

- I've sought to make the analogy in this part clearer. Both diplomatic ritual and mining are ritualistic costly signals following the Sacrifice and Stigma paper – I've included both that and some further references that clarify the relationship between ritual and costly signalling models. I've also addressed Reviewer B's objection that proof of stake approaches lack these features. But proof of stake without ritual fall afoul of the nothing at stake problem, which I've spelled out briefly in the appropriate paragraph.

Iannacone, "Sacrifice and Stigma" is one that's particularly relevant to the question of costly rituals. Bitcoin mining is costly, yes, but it's not clear that the costliness is a signal of anything. The disanalogy is also indicated by the fact that no such cost need be borne at all in a proof-of-stake system.

Section 3 is rather vague. I take it to be exploring the question of the costs and benefits of hierarchy versus contract, and you've cited the relevant papers on that question (Williamson, and to a lesser extent Djankov), but it's not clear to me what the argument is.

- I've clarified the argument in section 3. A number of changes made here – particularly in the first paragraph of the section, but the crux is the final sentence in the last paragraph: "The diplomatic protocol facilitated trust in an environment not otherwise conducive to decentralised exchange even when one actor was disproportionately powerful."

Based on its position after the previous sections I would suppose that it means to argue that blockchains and diplomatic protocols both alter the relative costs so as to make contract preferable to hierarchy on the margin, but this could be stated more clearly and explored in more depth on both sides of the analogy.

# Minor points of clarity and style

Page 1, paragraph 2: "...saw the construction of a complex international system." Perhaps "a complex system of international relations?" As it is, it's unclear what sort of system you mean (political, economic, etc). until the following paragraph.

- Change made

The introduction bounces around from thought to thought between (and sometimes within) paragraphs, for example between the first two paragraphs on page 2. Some reorganization

and/or connective tissue may be warranted in order to give it a clear narrative flow.

- The introduction has been substantially revised and restructured to provide more clarity and a more obvious way through them

Page 2, paragraph 3: "...the transaction costs of cooperation..." The costs of cooperation, in a game theoretic sense, aren't usually thought of as transaction costs, but as the risk of the other party defecting. One might in principle assimilate defection risks to transaction costs, but it's certainly not obvious (at least to me), and it would be an unnecessary digression. Do you mean the defection risk of cooperation after all, or something like the transaction costs of exchange, or both?

- Have removed the phrase "of cooperation" as it is unnecessary and has raised this complication.

Page 2, paragraph 3: "...databases, game theory, and..." Game theory is a good tool to analyse the blockchain, but the blockchain doesn't "use" game theory in the same way as it uses the other items in the list.

- I've removed game theory from the list to reduce confusion.

Page 4, paragraph 3: changes -> chances.

- Change made

## **2A. Review, Second Round**

### **Reviewer B:**

#### General

The paper is much improved. I can say with more confidence now that the paper makes an interesting contribution, namely the similarities between diplomatic procedure and blockchain rules as suites of methods to facilitate secure communication. Pending a few clarifying updates, and perhaps a structural change, I would be happy to recommend publication.

#### Structural



The main section on diplomacy in light of the blockchain takes for granted a lot of background knowledge about the blockchain. For example, technical terms like ‘metadata,’ ‘append-only,’ and ‘consensus engine’ are described, but never defined, and much of the diplomatic protocol is described in blockchain terminology without being explicitly connected to the operation of the blockchain. This may be fine for a blockchain-oriented journal whose readers are probably coming with that knowledge, but if you’re interested in a wider audience, it may be worth dividing this section into small subsections, each with an explicit parallel structure like “blockchain does this, ANE diplomacy worked this way, here’s why they’re similar.”

### Conceptual

Section 3 is clearer now, but I wonder if it wouldn’t make more sense from the Mesopotamian perspective rather than the Egyptian perspective. In addition to Egypt deciding whether to contract or dominate, the diplomatic protocol would also be relevant to the Mittani’s decision whether or not to trust Egypt, which (as you argue) had a long record of domination. Assuming, of course, these treaties weren’t made under the implied threat of domination.

### Minor points of clarity and style

Top of page 3: merged -> emerged  
Next paragraph: to who -> to whom

Page 3, “This fragmentary story underlined...”—unclear what the story has to do with the integrity of communications at this point. Did Sargon try to alter the letter?

Section 3, last few sentences of the first paragraph: hierarchies are defined in terms of contracts, but then “by contrast, Syrian-Mesopotamian relationships were contractual.” The contrast is also worded as if incomplete contracts are a distinctive feature of hierarchies. Are they not a problem with both arrangements?

## 2B. Author’s Response

### Structural

The main section on diplomacy in light of the blockchain takes for granted a lot of background knowledge about the blockchain. For example, technical terms like ‘metadata,’ ‘append-only,’ and ‘consensus engine’ are described, but never defined, and much of the diplomatic protocol is described in blockchain terminology without being explicitly connected to the operation of the blockchain. This may be fine for a blockchain-oriented journal whose readers are probably coming with that knowledge, but if you’re interested in a wider audience, it may be worth dividing this section into small subsections, each with an explicit parallel structure like “blockchain does this, ANE diplomacy worked this way, here’s why they’re similar.”

- I'm comfortable leaving this as is, if you are, given the specialised focus of Ledger. My intention is to spin some of the paper's research off into Medium or Coindesk etc. Happy of course to take your advice however.

### Conceptual

Section 3 is clearer now, but I wonder if it wouldn't make more sense from the Mesopotamian perspective rather than the Egyptian perspective. In addition to Egypt deciding whether to contract or dominate, the diplomatic protocol would also be relevant to the Mittani's decision whether or not to trust Egypt, which (as you argue) had a long record of domination. Assuming, of course, these treaties weren't made under the implied threat of domination.

- This is a useful suggestion but we are very constrained by the sources. I've added a further sentence on how Mittani could have trusted the Egyptian alliance, which also rebalances the focus towards the Mittani. But I don't want to go too far down the road to speculation. Please let me know if what I have done suits.

### Minor points of clarity and style

Top of page 3: merged -> emerged

- Fixed

Next paragraph: to who -> to whom

- Fixed

Page 3, "This fragmentary story underlined..."—unclear what the story has to do with the integrity of communications at this point. Did Sargon try to alter the letter?

- This has been clarified with a new reference that Sargon (likely) tried to change the letter

Section 3, last few sentences of the first paragraph: hierarchies are defined in terms of contracts, but then "by contrast, Syrian-Mesopotamian relationships were contractual." The contrast is also worded as if incomplete contracts are a distinctive feature of hierarchies. Are they not a problem with both arrangements?

- I've clarified that what is being referred to are relational contracts, emphasising that the distinction I'm making here is between hierarchical relationships and relational contracting relationships – simply describing something as a 'contract' (incomplete or otherwise) confuses the issue.



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