

Economic Simulation of Cryptocurrencies and Their Control Mechanisms: Open Review

Michael R. Mainelli,^{*†} Matthew Leitch,[‡] Dionysios Demetis[§]

Reviewers: Reviewer A, Reviewer B, Reviewer C

Abstract. The final version of the paper “Economic Simulation of Cryptocurrencies and Their Control Mechanisms” can be found in Ledger Vol. 4 (2019) 48-64, DOI 10.5915/LEDGER.2019.130. There were three reviewers involved in the review process, none of whom have requested to waive their anonymity at present, and are thus listed as A, B, and C. After initial review by Reviewers A and B (1), it was determined that the submission required significant revisions. The authors subsequently submitted a revised manuscript, which was sent out for review again to Reviewer A, who provided comments (2A), to which the authors responded (2B) and made revisions. As Reviewer B was no longer available, the again revised manuscript was sent to Reviewer A and a third reviewer, Reviewer C, who both provided more feedback (3A). The authors responded (3B) and provided another revised manuscript. Reviewers A and C differed in their responses to the revised manuscript (4), and an editorial decision was made to move forward with publication. The authors made subsequent changes in line with both reviewer and editorial feedback, and the submission was moved to publication. Authors’ responses, where included, are bulleted for clarity.

1. Review (First Round)

Reviewer A:

This paper considers an agent-based simulation environment for studying the dynamic behaviour cryptocurrencies.

The paper begins with some informal and lightly referenced musings on the nature of

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money and cryptocurrencies.

The economic model underlying the simulations is then described using a high-level narrative description, but without any detail that would allow for reproduction. It is clear from the list of 15 important features of cryptocurrencies that the model does not support that the model is very preliminary and lacks realism.

The implementation of the model is presented without adequate detail to enable its reproduction. This is described as an "R script" with a "wide range of parameters." The R script does not appear to have been made available so its quality is impossible to assess.

The results appear to consist of the presentation of a few random walks through the simulation space. The simulations are not replicated and there are no confidence intervals.

There appears to be a focus on a model where users purchase newly minted coins. The far more common case of continuously mined coins seems not to be considered in any sort of detail:

"If new cryptocurrencies were to be mined continuously rather than purchased from the mint then the effects would depend on many features of the system."

The main conclusion seems to be that the model is sensitive to "assumptions about agents decision making and other factors". This is arguably common knowledge.

Overall given the poor scientific quality of the manuscript, a total lack of reproducibility of the results, and a lack of insightful results I would recommend its rejection.

Reviewer B:

The paper uses an agent-based economic model to simulate the early period of a cryptocurrency in an effort to create guidelines for the development of future cryptocurrency. General Comments:

0. The research question is not clear. What the authors try to achieve with this simulation exercise is not clear. There is not precisely defined research question(s). Indeed, the paper lacks of clear objectives.

1. The introduction about the role of money in economic systems is misleading and incomplete. "Money is a technology that communities use to trade debts across space and time." is a bold statement that does not find confirmation in the reality of our economic systems. Instead, a statement like "Money is a technology that communities use also to trade debts across space and time" is a statement that finds solid confirmation in our economic systems because we do not use money only to transfer obligations but also to transfer property rights. The introduction is plenty of these misunderstandings and unclear conceptualizations. For example, the sentence "Governments create and destroy fiat currencies at will through borrowing and taxation. By managing the level of tax debts in

the economy, both up and down, governments create credit that facilitates trade and exchange.” is not true unless in autarchies like or dictatorships. In developed economies, money is created by Central and commercial banks. Moreover on the monetary aspects of crypto currencies I refer the authors to: Tasca, Paolo, The Dual Nature of Bitcoin as Payment Network and Money (February 29, 2016). VI Chapter SUERF Conference Proceedings 2016/1 "Cash on Trial" by Christian Beer, Ernest Gnan and Urs W. Birchler.

2. Some assumptions to the economic model made in Section 4 are questionable. For example, the fact that in the same economy the same good can be priced differently generating a bargain, implies a violation of the law of one price.

3. The assumptions (1)-(15)in Section 4 are valid or not? It is not clear because it is not clear the objective of this study. According to the objective some assumptions can be irrelevant. I have the suspect that most of those mentioned here are irrelevant.

4. In Section 5 I expected to see the model formalized in mathematical terms. The lack of a mathematical formalism makes impossible the understanding of the model. It is also impossible to understand the model and asses the robustness of the results without knowing the parameters. What is the input? What the output? For these reasons, all the figures don't tell much to the readers.

To summarise, I think this is a very brave exercise and I encourage the authors to pursue in this path. However, this is a very preliminary version of the paper and it is not acceptable for publication in the current format.

2A. Review (Second Round)

Reviewer A:

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

No

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

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.:

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

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

Bottom 50%

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

This paper presents an agent-based simulation model of a cryptocurrency ecosystem consisting of merchants, customers and market makers, together with two control mechanisms apparently designed to stabilise the value of a cryptocurrency.

The idea of performing an experiment of this kind seems a good one, and the general choice of methodology - i.e. agent-based simulation - also seems appropriate. The choice of actors in the ecosystem also seems appropriate.

However, the presentation, justification and reproducibility of the details of the simulation methodology come across as poor. These could be improved in a number of ways:

- While there is some attempt to specify the details of the model, the description is not complete, there is little by way of intuitive justification of the many assumptions, and reproducibility is poor. It is said for example that the number of purchases "made by each customer on average is distributed in the shape of a Zeta function." What is a Zeta function? So far as I can tell it's a complex function usually used in number theory, so how it is applicable to model a discrete quantity is not clear. And what parameters are used? Functions are presented for the updating of merchant and customer sentiment. But there is no explanation of how these are justified. There is mention of "buzz factors" as a critical component of these formulae but no explanation of how these are computed or sourced. The number of purchases made by a customer is "approximately Poisson" being arbitrarily capped. Why? Goods are said to be "chosen at random" which seems like a very vague description of a stochastic process.
- Some kind of architecture diagram would be helpful in understanding the ecosystem actors and their interactions.
- No link is provided to any source code or reference implementation so it is impossible for readers to confirm the results or run their own experiments.
- The first control mechanism proposed i.e. offering freshly minted cryptocurrency at a fixed price (in fiat terms) seems like a bizarre concept in a free market. It is also not clear why miners would accept less for their coins than they could obtain in the free market.
- Equally, the idea that market makers have freedom to adjust exchange rates to whatever they please while maintaining their financial viability is a little odd. Thus, it is not clear

why the proposed mechanism would be any more successful or sustainable than e.g. the European Exchange Rate Mechanism

- Simulations like these are known to be vulnerable to dramatic changes in the output given just a slight perturbation of the input - a function of emergent behaviour in complex systems. This issue is not addressed.

Overall, I have the impression of a paper that presents a very interesting and relevant idea, but fails to satisfactorily execute on the corresponding experimentation. I would urge the authors to address the issues described above and resubmit their paper.

2B. Authors' Response to Second Round

Reviewer A:

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

No

- We have not been able to find another paper doing what we have done.

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

- We are reporting relatively early work to study how economic control mechanisms might be tested through simulation. (We are now working on a far more sophisticated simulation but it is complex work that will take time to complete. We would like to report the results from our earlier work as encouragement to others to look at this problem.)

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

Yes

- No change made.

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

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

- The response to this is in the responses to detailed comments below.

Please assess the article's quality of presentation.:

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

- The response to this is in the responses to detailed comments below.

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

Bottom 50%

- Again, in the detail.

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

This paper presents an agent-based simulation model of a cryptocurrency ecosystem consisting of merchants, customers and market makers, together with two control mechanisms apparently designed to stabilise the value of a cryptocurrency.

- A correct summary. The mechanisms are intended to stabilize the value of the currency and this was explained in the abstract. To reinforce this we have mentioned it more explicitly in the body of the article in two places.

The idea of performing an experiment of this kind seems a good one, and the general choice of methodology - i.e. agent-based simulation - also seems appropriate. The choice of actors in the ecosystem also seems appropriate.

- No changes made.

However, the presentation, justification and reproducibility of the details of the simulation methodology come across as poor. These could be improved in a number of ways:

- Responses are to the detail below.

- While there is some attempt to specify the details of the model, the description is not complete, there is little by way of intuitive justification of the many assumptions, and reproducibility is poor.

- In the first version there were 6 pages devoted to explaining the model, with mathematical formulae for most mechanisms. The details of an agent model tend to mean there is more to explain than with a simple mathematical model. In this case we have modelled transactions with real goods as well as the more usual speculative exchange activity.

- We have reviewed the specification for opportunities to provide brief justifications where they might be helpful and for possible gaps in the explanation. As a result, several additional explanations have been made.
- We have also added a warning that the explanation is quite lengthy and offered the source code at the start of the specification text.

It is said for example that the number of purchases "made by each customer on average is distributed in the shape of a Zeta function". What is a Zeta function? So far as I can tell it's a complex function usually used in number theory, so how it is applicable to model a discrete quantity is not clear.

- In response to the specific issues mentioned: We have now described this as a Zipf law with s being a parameter of the model, and explained the calculation in detail.

And what parameters are used?

- s is a parameter than can be varied within the model, now explained.

Functions are presented for the updating of merchant and customer sentiment. But there is no explanation of how these are justified.

- The text now explains that, in the absence of an empirically accurate model of decision-making, we have created a system of functions to generate behavior with sensible, realistic characteristics. These are not likely to be all the characteristics needed and will not be well calibrated. Some more detailed justification is also provided.

There is mention of "buzz factors" as a critical component of these formulae but no explanation of how these are computed or sourced.

- We have now explained that the buzz factor was held constant throughout the experiments reported.

The number of purchases made by a customer is "approximately Poisson" being arbitrarily capped. Why?

- This is now more accurately and correctly described as binomially distributed.

Goods are said to be "chosen at random" which seems like a very vague description of a stochastic process.

- The phrase has been replaced with 'chosen randomly with equal probability'.

- Some kind of architecture diagram would be helpful in understanding the ecosystem actors and their interactions.

- There are customers, merchants, a mint, and an exchange. The customers buy from the merchants and both use the exchange. This seems quite straightforward. The daily cycle is explained in order.
- No link is provided to any source code or reference implementation so it is impossible for readers to confirm the results or run their own experiments.
- A link to the source code in R is now offered at the start of the specification section.
- The first control mechanism proposed i.e. offering freshly minted cryptocurrency at a fixed price (in fiat terms) seems like a bizarre concept in a free market. It is also not clear why miners would accept less for their coins than they could obtain in the free market.
- The control mechanism is not bizarre and – in a disguised form – is already used in some cryptocurrencies and could be used more in future.
 - Also, the agents in the simulation are not necessarily miners and miners awarded coins can of course sell them on the exchange. It is the mint, not the miners, that is issuing the coins.
 - We have added new explanation and justification of this mechanism and explained that there very well might not be miners in a future cryptocurrency that is a price-competitive payment system.
- Equally, the idea that market makers have freedom to adjust exchange rates to whatever they please while maintaining their financial viability is a little odd. Thus, it is not clear why the proposed mechanism would be any more successful or sustainable than e.g. the European Exchange Rate Mechanism
- There is no attempt to fix the exchange rate, so comparison with the ERM would be confusing.
 - Market makers do not have much discretion, but they are participants in the market and can choose to be over- or under-reactive. Their stock of cryptocurrency provides a kind of buffer that can smooth the market price but not limit it. This has been explained further in the text.
- Simulations like these are known to be vulnerable to dramatic changes in the output given just a slight perturbation of the input - a function of emergent behaviour in complex systems. This issue is not addressed.
- In section 4 we discussed the problem of markets being unpredictable at length, even mentioning that they may be ‘chaotic’ and we hope that our models reflect this reality.

Overall, I have the impression of a paper that presents a very interesting and relevant idea,

but fails to satisfactorily execute on the corresponding experimentation. I would urge the authors to address the issues described above and resubmit their paper.

- We have revised the paper with clearer explanations, and agree that this is an interesting and relevant idea – though difficult to do.
- Separately we continue with a much more ambitious programme of work to develop a more realistic simulation that will be open to anyone to use, online, at no cost.

3A. Review (Third Round)

Reviewer A

In this paper, the authors propose two mechanisms which they conjecture might help to stabilise cryptocurrency values: selling freshly minted cryptocurrency at a controlled price and controlling the rates at which market makers adjust exchange rates. While these mechanisms have some intellectual appeal, it seems the first mechanism is not a common feature of modern cryptocurrencies and the second is likely to be beyond the control of any cryptocurrency operator unless they also own an exchange. Consequently the applicability of the suggested techniques may be limited.

Main comments:

- A paper on the same topic seems already published by the same authors, see Michael R. Mainelli, M. Leitch, Dionysio Demetis. Economic Simulation of Cryptocurrencies. Capco Institute Journal of Financial Transformation #47, April 2018, see:

<https://www.capco.com/-/media/CapcoMedia/Capco-Institute/Journal-47/CapcoJournal47MainelliPrintv11.ashx>

The authors should make it clear how the present paper is distinct from the already published one.

- It is stated that the source code of the simulation can be downloaded at the URL: <https://www.longfinance.net/publications/journal-papers/economic-simulation-of-cryptocurrencies/abm.R> This turns out not to be the case, greatly hampering reproducibility and rendering it impossible for an interested reader to resolve vaguenesses and ambiguities in the prose.

- It seems the authors are trying to implement mechanisms which might help to stabilise the value of cryptocurrencies although the mechanisms are not actually in use in cryptocurrency markets today and the authors make no attempt to relate the two mechanisms they do propose to the mechanisms used in currently-available stable coins.

- There seems to be no rationale for numerous "magic number"-like settings in the simulation model or for the form of the update of the merchant and customer sentiment

- Many aspects of the methodology are vague e.g. "Participants then judge the probability of CC rising or falling by considering a linear function of the exponentially weighted moving average of daily changes in six variables."

Other queries/comments:

"distributed in the shape of a Zipf law with s being a parameter in the model" - so what is s exactly?

"...where s is the merchant's sentiment towards the cryptocurrency" - a little confusing to overload s in this way

"Each merchant's cash pot is directly proportional to its number of goods offered and its highest price of a good offered..." - how can the cash pot be directly proportional to two different quantities simultaneously? Do you mean it is proportional to product of these quantities or something else?

"...should respond to the merchant's view..." do you mean "...should correspond to the merchant's view"?

"...the recency factor..." -> the recency factor?

"...they have to choose between buying more on the exchange and buying freshly minted CC..." - do you mean "mining freshly minted CC"?

"...Without this control they are suitable only for speculation and have a role similar to online poker." - in what sense are the roles of cryptocurrency and online poker aligned?

Reviewer C

The paper presents an interesting crypto-currency (CC) simulation with the purpose of testing the stability as a currency. The authors argue that for CC to become a replacement of a currency there should be a control mechanism that gives stability to the exchange rate. In this study the authors study, using simulation, two control mechanisms: One is to offer freshly minted CC at a fixed Price and the second one is to use a rule-based price.

The results of the paper are interesting, in short, the controls are needed. Simulation is in my opinion a good way to argue this.

Regarding the organization of the paper and the content, the authors describe very broadly the paper in the beginning, lacking to emphasize the contribution of the paper as a scientific study in the abstract and the introduction. To give an example, it takes until page 8 to discover the two control mechanisms used for the study and only until the conclusion to understand that a control mechanism in CC is needed. In my opinion this should be

mentioned in the introduction (as it is on the abstract) briefly for people to understand and feel interested in reading the content.

In the conclusions, it is always a good idea to summarize what the study did and in short how did you achieve the results that lead to the conclusions. Many researchers don't have the time to go through all the paper and this is a good way to motivate them to dig into if the study is of their interest.

Regarding the simulation as a method, to give the study more credibility the authors should mention their previous studies in the field, such as the recent publication of “Economic Simulation Of Cryptocurrencies” published in the “Journal of Financial Transformation”. I found this by the link added on the report with the source code (that doesn't work). This is particularly important to describe the difference of both studies and at the same time the connection of both simulations (are they the same? Or differ?).

In addition to the simulation, the hardest part of a simulation is to evaluate the validity of the model and verify the correctness. It is worth to have a section to discuss this, specially since you make a lot of assumptions on how the people behave while using CC.

3A. Authors' Response to Third Round

Reviewer A

In this paper, the authors propose two mechanisms which they conjecture might help to stabilise cryptocurrency values: selling freshly minted cryptocurrency at a controlled price and controlling the rates at which market makers adjust exchange rates. While these mechanisms have some intellectual appeal, it seems the first mechanism is not a common feature of modern cryptocurrencies and the second is likely to be beyond the control of any cryptocurrency operator unless they also own an exchange. Consequently the applicability of the suggested techniques may be limited.

- Having done a significant amount of further work on designing a much more flexible and realistic simulator, we have made changes to the stated purpose of this paper. We now say the main purpose is to illustrate and explore the potential value of simulation as a means of testing economic control mechanisms for cryptocurrencies.
- Having said that, the mechanisms tested with this more rudimentary simulator are ones we think have a very good chance of being important ones in future.
- We have also made a small change to point out that future cryptocurrencies with good economic control built in are likely to be different from current designs, which have proved poorly controlled

Main comments:

- A paper on the same topic seems already published by the same authors, see Michael R. Mainelli, M. Leitch, Dionysio Demetis. Economic Simulation of Cryptocurrencies. Capco Institute Journal of Financial Transformation #47, April 2018, see: <https://www.capco.com/-/media/CapcoMedia/Capco-Institute/Journal-47/CapcoJournal47MainelliPrintv11.ashx> The authors should make it clear how the present paper is distinct from the already published one.

- That paper was written and published while waiting for a response from Ledger. The Ledger paper is a much more technically detailed paper with tests of control mechanisms rather than just illustrations of their effects.

- It is stated that the source code of the simulation can be downloaded at the URL: <https://www.longfinance.net/publications/journal-papers/economic-simulation-of-cryptocurrencies/abm.R>

This turns out not to be the case, greatly hampering reproducibility and rendering it impossible for an interested reader to resolve vaguenesses and ambiguities in the prose.

- The source code would be made available if this paper is published by Ledger.
- The text is detailed and clear, but for very minor points now corrected.

- It seems the authors are trying to implement mechanisms which might help to stabilise the value of cryptocurrencies although the mechanisms are not actually in use in cryptocurrency markets today and the authors make no attempt to relate the two mechanisms they do propose to the mechanisms used in currently-available stable coins.

- The mechanisms are not ones already used because we are thinking about how to shape future cryptocurrencies so that they might work as money on a sustained basis. A brief point has been made to emphasize this and stable coins are now briefly mentioned.

- There seems to be no rationale for numerous "magic number"-like settings in the simulation model or for the form of the update of the merchant and customer sentiment

- The situation is explained in the sentence that reads: “In the absence of an empirically based model of merchant decisions in this area, a system of functions was chosen to give merchant decision-making some realistic characteristics.”

- Many aspects of the methodology are vague e.g. "Participants then judge the probability of CC rising or falling by considering a linear function of the exponentially weighted moving average of daily changes in six variables."

- The methodology has been explained in great detail. The sentence quoted in the reviewer's comment is supported by about two pages of material including text, formulae, and tables.

Other queries/comments:

"distributed in the shae of a Zipf law with s being a parameter in the model" - so what is s exactly?

- The sentence that follows immediately explains this: "That is, the price of each good offered by each merchant is calculated from the highest priced good by dividing by the good's number raised to the power s ."

"...where s is the merchant's sentiment towards the cryptocurrency" - a little confusing to overload s in this way

- Yes, but there is a good reason for each being ' s '.

"Each merchant's cash pot is directly proportional to its number of goods offered and its highest price of a good offered..." - how can the cash pot be directly proportional to two different quantities simultaneously? Do you mean it is proportional to product of these quantities or something else?

- The product of these. Text altered to make this clearer.

"...should respond to the merchant's view..." do you mean "...should correspond to the merchant's view"?

- No, 'respond' is the appropriate word. We are not necessarily saying that should be the only driver.

"...the recently factor..." -> the recency factor?

- Typo corrected.

"...they have to chose between buying more on the exchange and buying freshly minted CC..." - do you mean "mining freshly minted CC"?

- No. We mean they can buy more freshly minted. This is one of the two control mechanisms being tested.

"...Without this control they are suitable only for speculation and have a role similar to online poker." - in what sense are the roles of cryptocurrency and online poker aligned?

- If a cryptocurrency is not practical as a payment mechanism and as an 'asset' represents nothing of value and nothing that adds value, then it has no use other

than making some people rich at the expense of others in a contest of skill, nerve, and luck.

- In that sense, it is like poker, but perhaps with less skill. We have added a brief explanation after the mention of poker.

Reviewer C

The paper presents an interesting crypto-currency (CC) simulation with the purpose of testing the stability as a currency. The authors argue that for CC to become a replacement of a currency there should be a control mechanism that gives stability to the exchange rate. In this study the authors study, using simulation, two control mechanisms: One is to offer freshly minted CC at a fixed Price and the second one is to use a rule-based price.

- Having done a significant amount of further work on designing a much more flexible and realistic simulator, we have made changes to the stated purpose of this paper. We now say the main purpose is to illustrate and explore the potential value of simulation as a means of testing economic control mechanisms for cryptocurrencies.
- Having said that, the mechanisms tested with this more rudimentary simulator are ones we think have a very good chance of being important ones in future.

The results of the paper are interesting, in short, the controls are needed. Simulation is in my opinion a good way to argue this.

- Our simulation does not reinforce the need for controls. That need is clear from the track record of past cryptocurrencies. We are searching for ways to solve the economic control problems.

Regarding the organization of the paper and the content, the authors describe very broader the paper in the beginning, lacking to emphasis the contribution of the paper as a scientific study in the abstract and the introduction. To give an example, it takes until page 8 to discover the two control mechanisms used for the study and only until the conclusion to understand that a control mechanism in CC is needed. In my opinion this should be mentioned in the introduction (as it is on the abstract) briefly for people to understand and feel interested in reading the content.

In the conclusions, it is always a good idea to summarize what the study did and in short how did you achieve the results that lead to the conclusions. Many researchers don't have the time to go through all the paper and this is a good way to motivate them to dig into if the study is of their interest.

- We have briefly stated the main purpose in the abstract and second paragraph of the introduction. The identity of the controls tested is much less important than the idea of using simulation to test control mechanisms.

Regarding the simulation as a method, to give the study more credibility the authors should mention their previous studies in the field, such as the recent publication of “Economic Simulation Of Cryptocurrencies” published in the “Journal of Financial Transformation”. I found this by the link added on the report with the source code (that doesn’t work). This is particularly important to describe the difference of both studies and at the same time the connection of both simulations (are they the same? Or differ?).

- That paper was written and published while waiting for a response from Ledger. The Ledger paper is a much more technically detailed paper with tests of control mechanisms rather than just illustrations of their effects.

In addition to the simulation, the hardest part of a simulation is to evaluate the validity of the model and verify the correctness. It is worth to have a section to discuss this, specially since you make a lot of assumptions on how the people behave while using CC.

- It is not possible to validate the model against real data because the cryptocurrency simulated is a hypothetical one and, for good reasons, not similar to an existing cryptocurrency. We now allude to this difficulty.

4. Review (Final Round)

Reviewer A

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

No

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

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

Important references are missing

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.:

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

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

Bottom 50%

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

This paper considers an agent-based simulation environment for studying the dynamic behaviour of cryptocurrencies.

Whilst I agree with the authors that this is a potentially useful exercise, there are a number of weaknesses in the paper:

- a) While (some of) the relevant formulae describing the model are reported, the choices behind many aspects of the model (consumer behaviour, merchant behaviour) and the parameterisation thereof seem arbitrary. There seems to be no connection to real-world market dynamics, limiting the applicability of the results.
- b) The implementation of the model is described as an "R script" but this is not actually available.
- c) Some parameter names in the model are overloaded (e.g. s as the parameter of the Zipf distribution and also as a sentiment indicator), and there is no definition or justification of concepts such as the "buzz factor", which is inexplicably kept constant throughout the experiments.
- d) The references are rather dated and only one has a date post 2016. Nevertheless recent years have seen relevant work e.g.
<https://link.springer.com/article/10.1007/s11403-015-0168-2>
<https://royalsocietypublishing.org/doi/full/10.1098/rsos.170623>
- e) Relationship to related work by the authors on the same topic is not explained, nor is their own related work cited.

Given these weaknesses and the limited insights offered up by the paper, I recommend its rejection.

Reviewer C

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.:

As a reviewer of a previous version, I have seen improvement in the comments

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 50%

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

The paper presents an interesting crypto-currency (CC) simulation with the purpose of testing the stability as a currency. The authors argue that for CC to become a replacement of a currency there should be a control mechanism that gives stability to the exchange rate. In this study the authors study, using simulation, two control mechanisms: One is to offer freshly minted CC at a fixed Price and the second one is to use a rule-based price.

The results of the paper are interesting, in short, the controls are needed. Simulation is in my opinion a good way to argue this.

The topic is even more relevant nowadays due to the increase in popularity and scams of crypto currencies.

The paper has improved it's quality and has addressed the previous comments



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