Economics of token-based projects

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Dr. Christian Jaag
Matthias Hafner
Agenda

1. Introduction
2. Platform economics
3. Monetary economics
4. Application
5. Discussion
About cryptecon

Who we are

- Blockchain research and consulting since 2013
- Advice to large enterprises and start-ups worldwide
- Division of swiss economics
- Co-operation with academia

What we do

- Economic mechanisms in Blockchains
- Economics of Blockchain applications
- Analysis of Token Economies

How we do it

- Numerical simulations
- Game theoretical analysis
- Financial modelling
About us

Dr Christian Jaag
Founder & Counsel

Christian Jaag is the founder and Director of the Center for Cryptoeconomics. He is also a Managing Partner with Swiss Economics and Lecturer at École polytechnique fédérale de Lausanne. He advises corporate and public-sector clients on strategic issues pertaining to blockchain technology and cryptoeconomics. After his studies in St.Gallen (HSG) and Paris (ESCP) he received a Ph.D. in Economics and Finance. He was a visiting scholar at the Economics department of Rutgers University.

Matthias Hafner
Project Manager

Matthias Hafner focuses on competition and regulatory economics and is head of the unit Blockchains and Cryptocurrencies at Swiss Economics. In addition, he has expertise in statistics, behavioral economics and experimental economics. After he got his master’s degree in Economics from the University of Zurich Matthias worked for the Swiss Competition Commission. Amongst others, he was involved in cases of horizontal and vertical agreements, abuse of dominance, mergers, damage claims and price regulations.
Platform economics
A platform is an institution that facilitates interactions between groups by reducing search costs.
Platforms create multi-sided markets
Each multi-sided market includes a platform
Network effect: the higher number of one group the higher the utility of the platform for the other group (at least in one direction).
A platform becomes more valuable for one group if number of individuals of the other group increases (at least in one direction).
<table>
<thead>
<tr>
<th>Platform types</th>
<th>Non-Transaction</th>
<th>Transaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matching Service-based</td>
<td>• Dating apps</td>
<td>• Airbnb</td>
</tr>
<tr>
<td></td>
<td>• Real estate platforms</td>
<td>• Amazon</td>
</tr>
<tr>
<td>Audience-Providing Subsidy based</td>
<td>• Newspapers</td>
<td>• Youtube</td>
</tr>
<tr>
<td></td>
<td>• Other media</td>
<td>• Facebook</td>
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</tbody>
</table>
Example: Dating app

Platform cannot observe whether the transaction was successful
Both groups exert a positive externality on each other
Usage fees which are different for the two groups
Example: Airbnb

Platform can observe whether the transaction was successful.
Both groups exert a positive externality on each other.
Fee per transaction which are different for the two groups.
Example: Media (newspaper, TV, radio) I

Platform cannot observe whether the transaction was successful. Mainly readers/viewers/listener exert a positive externality on advertisers (not vice versa).
Mainly readers/viewers/listener exert a positive externality on advertiser (not vice versa)
Main decisions

Pricing
- Price type
- Price level
- Subsidy

Information
- Review system
Pricing I

\[ D_A = u_A(N_B) - F_A \]
\[ D_B = u_B(N_A) - F_B \]

\( D \): Demand for the platform

\( u \): Utility of the interaction with the other group

\( N \): Number of individuals in the other group

\( F \): Fee to access the platform
Pricing II

Group A’s demand increases the more individuals of Group B are on the platform (vice versa).
Utility (e.g. $u_A(N_B)$) of the platform may be different for different groups.
Balancing demand from both groups is crucial for the success of the platform.
Solution: different access prices for the two groups.
→ Subsidy for group with higher price elasticity of demand.

\[
D_A = u_A(N_B) - F_A \\
D_B = u_B(N_A) - F_B
\]
Pricing III

Factors affecting the price elasticity of demand:

• Substitutes on the market (+)
• Homogeneity of the traded goods (+)
• Search costs (-)
• Multihoming: Possibility and costs to be active on multiple platforms (+)

\[ D_A = u_A(N_B) - F_A \]
\[ D_B = u_B(N_A) - F_B \]
Information

• Platforms often include review systems
• Reason: Asymmetric information
  – Individuals have limited knowledge about the quality of the transaction (pre- and/or post-transaction)
• Review systems constitute a platform themselves
• Should a platform implement a review system itselfs?
  – Is asymmetric information present?
  – Is it for the groups costly to use other review systems outside of the platform?
  – Do individuals frequently interact on the platform?
  – Is there a lag between the deal and the interaction?
## Summary

<table>
<thead>
<tr>
<th>Topic</th>
<th>Considerations</th>
<th>Decisions</th>
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</thead>
<tbody>
<tr>
<td><strong>Pricing</strong></td>
<td>• Possibility to observe transactions</td>
<td>• Usage fee vs. price per transaction</td>
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<tr>
<td></td>
<td>• Group’s utility of the interaction</td>
<td>• Subsidy</td>
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<tr>
<td></td>
<td>• Outside options for the groups (multihoming)</td>
<td>• Price level</td>
</tr>
<tr>
<td></td>
<td>• Homogeneity of the product</td>
<td></td>
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<tr>
<td><strong>Additional services</strong></td>
<td>• Asymmetric information</td>
<td>• Review system</td>
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<td></td>
<td>• Lag between signing the contract and the transaction</td>
<td>• Incentive system</td>
</tr>
<tr>
<td></td>
<td>• Frequency of interaction</td>
<td></td>
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Monetary economics
Main objectives

Initial Fundraising

Platform success

Token success
<table>
<thead>
<tr>
<th>Monetary autonomy</th>
<th>Money supply</th>
<th>Currency acceptance</th>
<th>Platform price setting</th>
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<tbody>
<tr>
<td>Use your own token?</td>
<td>Discretionary vs rule-based monetary policy</td>
<td>Exclusivity vs diversity</td>
<td>Fixed vs variable price</td>
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<tr>
<td>Managed or variable exchange rate</td>
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</tbody>
</table>
## Monetary autonomy

<table>
<thead>
<tr>
<th>Why use your own coin</th>
<th>Why not</th>
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<tbody>
<tr>
<td>Raise money (revelation of consumer demand)</td>
<td>Danger of artificially restricting demand for platform services</td>
</tr>
<tr>
<td>Decentralized remuneration for platform services</td>
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<tr>
<td>Reduced transactions cost through native token usage for platform pricing</td>
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</tbody>
</table>
Discretionary vs rule-based monetary policy

Government of money supply
(Maximum supply, total current supply, circulating supply)

<table>
<thead>
<tr>
<th>Managed (e.g. fixed) exchange rate</th>
<th>Discretionary</th>
<th>Rule-based</th>
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</thead>
<tbody>
<tr>
<td>Need for «institutional» trust</td>
<td>Strong commitment; high revenues in initial fundraising</td>
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<td>Possibility of stablecoin without full reserves</td>
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</table>

<table>
<thead>
<tr>
<th>Free exchange rate</th>
<th>Discretionary</th>
<th>Rule-based</th>
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</thead>
<tbody>
<tr>
<td>Weak commitment; flexibility for future fundraising</td>
<td>Strong commitment; high revenues in initial fundraising</td>
<td></td>
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</tbody>
</table>
### Currency acceptance

<table>
<thead>
<tr>
<th>Exclusivity</th>
<th>Diversity</th>
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<tbody>
<tr>
<td>Direct link between token value and platform success</td>
<td>Flexibility in trading off platform and token success</td>
</tr>
<tr>
<td>Weakening of platform; strengthening of token</td>
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<tr>
<td>Example: Bitcoin as payment network</td>
<td>Example: Binance</td>
</tr>
</tbody>
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Platform price setting

Variable price

Token as accepted currency

Flexibility in platform price setting

Fixed price

Token as a voucher

Forgone growth opportunities? (depending on monetary policy)

Price of the platform service ~ value of the token
Fisher's equation of exchange

\[ M \cdot V = T \cdot P \]

- **M**: total amount of money in circulation
- **V**: velocity of money; average frequency with which a unit of money is spent
- **T**: real value of transactions
- **P**: price of transactions
# Token supply and demand

<table>
<thead>
<tr>
<th>Supply</th>
<th>Demand</th>
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<tbody>
<tr>
<td>Maximum supply</td>
<td>Transaction motive</td>
</tr>
<tr>
<td>Total supply</td>
<td>• Staking</td>
</tr>
<tr>
<td>Circulating supply</td>
<td>• Payment channels</td>
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<tr>
<td></td>
<td>Portfolio motive</td>
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</tbody>
</table>
Examples
Figure 1: Structure of the Verasley economy

- **Creators**
  - Return on investment (VERA)
  - Awareness (VERA)

- **Investors**
  - Money supply

- **Sponsors**

- **Advertisers**

- **Viewers**
  - Content
  - Attention

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Figure: cryptecon
“A key goal for Verasity in 2019 is getting video publishers onboard. To facilitate this, we are developing integrations with many industry-leading tools like JW Player to allow publishers to quickly and easily start using Verasity technology and therefore increase demand for VRA.”

“JW Platform & JW Player (Bits on the Run) is a leading full-service video hosting, management, and analytics solution. By integrating Verasitys Video Rewarded Player into JW Player, publishers who use JW Player can now quickly and easily add VRA rewards into their offering through an SDK.”
Verasity: Our contribution

Review and input for the Whitepaper

Explanation and formalization of the activities of the different groups in economic terms (incl. the interaction between platform and monetary economics)

Advice on minting mechanism
  • Game-theoretical analysis of incentives on the platform and numerical simulation based on assumptions
Discussion
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