

EVOLUTION OF THE INSTITUTIONAL STRUCTURE OF PRIVATE MONEY IN THE FORM OF CRYPTOCURRENCIES – DEVELOPMENT MODELS AND CONTROVERSY WITH HAYEK'S

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We think that the evolution of the institutional structure of private money (in the form of cryptocurrencies) at the present stage, is substantially similar to the analogous evolution of the Internet in the mid and late 1990s, which took place against the background of the formation of various concepts and Internet companies and the parallel bubble of dot-com companies (Dot-com bubble). It was the rapid drop in the shares of most companies in the early Internet market that eventually revealed the players who had fundamental ideas and products aimed at changing the established consumption model and transforming the entire economy towards the digital economy as part of the third industrial revolution. Today's cryptocurrency market is represented by more than 7,000 different currencies, 99%¹ of which, according to some cryptoinvestors, will disappear, just as many Internet companies disappeared in the early 2000s. However, the remaining ones in the coming decades may radically change technological and monetary landscape of the world economy, implementing the fourth industrial revolution concept into reality. Within the framework of the article, we set ourselves the task to analyze the most interesting and promising projects of the crypto industry that have fundamental products in various financial areas and which in the future, after the next round of growth and fall of cryptocurrencies, will remain 1% of fundamentally successful projects. It's also interesting to note, that with the creation of the first cryptocurrency in the form of bitcoin, Hayek's "private money" concept face a risk of becoming an outdated concept. With bitcoin emission becomes decentralized, we have no issuer, no reserves in other currencies, there is no possibility to reduce or regulate the money supply (all this is possible for private money, in addition, their owners may have legal obligations). In this sense, bitcoin is not private money, but something more, and we can say that all users / miners become co-owners of bitcoin. Thus, in addition to the evolution of the technologies themselves and the models of operation of cryptocurrencies, there is another fundamental question – will the cryptocurrencies follow the path of further evolution through the Hayek's and Rigel's tradition of "private" money (with a central issuer) or through "people's" money (with decentralized emission as in bitcoin)?

¹ Ripple's plan for 2020 bloomberg aired 11/5/2019 10:pm EST (<https://www.youtube.com/watch?v=ZvSZTfAkgYk> – Access Date: 29.08.2020).

Keywords: institutional structure; private money; cryptocurrency; people's money; narrative economy

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ЭВОЛЮЦИЯ ИНСТИТУЦИОНАЛЬНОЙ СТРУКТУРЫ ЧАСТНЫХ ДЕНЕГ В ФОРМЕ КРИПТОВАЛЮТ – МОДЕЛИ РАЗВИТИЯ И ПОЛЕМИКА С ПОЗИЦИЕЙ ХАЙЕКА

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Эволюция институциональной структуры частных денег в форме криптовалют на современном этапе, по нашему мнению, существенным образом схожа с аналогичной эволюцией интернета в середине и конце 1990-х годов, которая происходила на фоне формирования различных концепций и интернет-компаний и параллельного пузыря доткомов (*Dot-com bubble*). Именно стремительное падение акций большинства компаний раннего интернет-рынка в итоге выявило игроков, которые имели фундаментальные идеи и продукты, направленные на изменение устоявшейся модели потребления и трансформации всей экономики в направлении цифровой экономики в рамках третьей промышленной революции. Сегодняшний рынок криптовалют представлен более чем 7000 различных валют, 99% из которых по мнению ряда криптоинвесторов исчезнут, также, как и исчезли интернет-компании пустышки в начале 2000-х годов, однако оставшиеся радикальным образом в ближайшие десятилетия могут изменить как технологическую, так и монетарную среду мировой экономики, реализуя уже четвертую промышленную революцию. В рамках статьи мы ставим перед собой задачу проанализировать наиболее интересные и перспективные проекты крипто-индустрии, которые имеют фундаментальные продукты в различных финансовых сферах и которые в будущем, после очередного витка роста-падения криптовалют останутся тем 1% фундаментально-успешных проектов. Но как ни парадоксально, с появлением биткоина – первой настоящей криптовалюты, «частные деньги» Хайека рискуют стать устаревшей концепцией: эмиссия становится децентрализованной, у нас нет эмитента, нет резервов в других валютах, нет возможности для сокращения или регулирования денежной массы (все это возможно для частных денег, к тому же их владельцы могут нести юридические обязательства). В этом смысле биткоин не частные деньги, а нечто большее, можно сказать, что все пользователи/майнеры становятся совладельцами биткоина. Таким образом, кроме эволюции самих технологий и моделей работы

криптовалют, наблюдается другое фундаментальное перепахье – пойдут ли криптовалюты по пути дальнейшей эволюции через Хайковскую и Риглевскую традицию «частных» денег (с центральным эмитентом) или же путем «народных» денег (с децентрализованной эмиссией).

Ключевые слова: институциональная структура; частные деньги; криптовалюта; народные деньги; нарративная экономика

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I. Some discourse about the theory of money

The appearance of money is a natural process that is the result of the division of labor and important characteristic of any civilization development. Changes in the economic activity conditions create preconditions for the payment methods evolution. In its development, money goes through stages from commodity equivalents to systems based on trust. In domestic and foreign literature, a significant amount of research has been devoted to the evolution of money, for example: Belyaev M. (2014), Vlasov A. (2012), Yefimov V. (2020), Krugman P. (2013), Menger K. (2005), Rothbard M. (2010), Sviridov O. (2004), Jesus Huerta de Soto (2008), Hayek F. (1996; 2011), Hülsmann J. (2000), Zakharova (2019).

The history of the evolution of the institution of money, regardless of its form - private, quasi-private, public (fiat), primitive or electronic - is united by one most important element – trust. This is due to the fact that since the time of primitive tribes, the institution of money, like any exchange transaction, has been a purely social interaction with at least two people. Without whom the very essence of money, exchange, and any transactions lose any social and economic meaning.

Thus, we can say that trust is essentially a derivative function of the very act of exchange (social interaction) between at least two people - the more trust we have, the faster and with lower transaction costs for both parties the exchange will take place and vice versa.

This thesis is also supported by a number of studies, as Vaz and Brown in their works emphasized that trust is important for ensuring people's confidence in conducting economic exchanges, especially when there is a risk of opportunistic behavior (Vaz, Brawn, 2020). And therefore, even despite the fact that historically humanity has used a huge number of different "artefacts" as units of exchange (shells, cigarettes, gold, bitcoins) – their "success" in the social sense was in the social acceptance and trust of the people who used them, and not the characteristics of the exchange tool itself.

Money continuously changed its form, forming the corresponding institutions of monetary circulation: the transition from barter to gold coins and paper money to electronic money led to a complete change in the existing structure of monetary circulation. Information technology makes it possible to reach an increasing number of users. The emergence of cryptocurrencies (new types of payments based on cryptographic technologies on the principle of a peer-to-peer decentralized network) can be perceived as an attempt to reduce possible external interference and improve security.

II. Private money

The theory of private money was first touched upon by the American economist E. Rigel and later developed by the representative of the Austrian economic school F. Hayek. According to Hayek, the private money theory "had no historical precedents". So for the last 40-years this theory was perceived by the mainstream economist as a theory that was not possible to be implemented in the real sector, and only now it is actively discussing again from the beginning of the 2010s, thanks to the appearance of the first cryptocurrency in the world – bitcoin.

Cryptocurrencies can serve as a practical embodiment of Friedrich Hayek's theory of private money. He assumed that the bank would be able to issue «private» currency through

the provision of loans. Initially, the main form of the issue should be sale, carried out in the usual way or at auctions. And after the market is established, the currency will be released into circulation through ordinary banking operations (Hayek, 1996, p. 64). Similar examples could be seen in the history of Europe (Scotland, France) in the early modern era and during the emergence of banking in the United States, when there were independent private banks that issued partial reserve paper dollars. At any time, the owner of a paper dollar bill could come to the bank and exchange it for precious metals: gold or silver. If the bank carried out too active emission without increasing the collateral, when exchanging its “own” dollar for “foreign” ones issued by other banks – this will lead to rate drop that could be below par. So, in modern times, the system proposed by F. Hayek was put into practice using modern information technologies despite the seeming cumbersomeness and sluggishness.

Initially, the creation and use of the first cryptocurrency “Bitcoin” were in the nature of an experiment. The purpose of this experiment was to confirm the possibility of creating a decentralized peer-to-peer network using cryptographic methods, while transactions between participants had to be anonymous and contain the impossibility of cancelling or changing.

The first created bitcoins have had no exchange value for a year since their creation in January 2009. They were used by developers, programmers and cryptography enthusiasts, generating bitcoins and transferring to each other for the purpose of experimenting to optimize the network code and explore the possibilities of the new system.

Currently, there is no unified consensus in the academic community about the role and position of cryptocurrencies in the classification of payment types. Simultaneously with the evolution of payment types and the emergence of new payment instruments, the old one did not disappear completely, but only occupied their more highly specialized niche. There are three main approaches to the question of the cryptocurrencies position in the modern money circulation system:

1. Cryptocurrencies are one of the varieties of electronic money.
2. Cryptocurrencies are the result of a fundamentally new stage in the development of monetary circulation.
3. The status of cryptocurrencies has not been determined, but they are rather a financial instrument with a high conversion rate than an instrument of payment.

In this context, numerous disputes regarding the possibility of using private money (in the form of cryptocurrencies) and other derivative financial instruments based on blockchain technology as money, are not constructive in general – the final decision will be made by economic agents despite the opinion of central monetary institutions.

Attempts to determine the “fundamental” value of cryptocurrencies have been extremely popular among the investment, financial and academic community over the past few years, given the speed of their spread among both retail and institutional investors. For example, the world’s most famous “value” investor and CEO of Berkshire Hathaway, Warren Buffett, continues to negatively view bitcoin as an asset or investment direction in this industry, considering cryptocurrencies to be an illusion (Buffett, 2019).

Most traditional theoretical models fail to explain why these virtual currencies can have any value if not supported by the central bank or national government, however, the fact is that the past 10 years have provided a lot of evidence that a non-sovereign currency, such as Bitcoin can acquire and hold meaningful, stable value (Brummer, 2019).

Thus, we return to the previous problem of “trust”, in which the essence and characteristics of the money-artifact we use is often not so important, in contrast with social interaction and the trust that it forms during the act of exchange in the social environment. Speaking of trust in cryptocurrencies, we should also point out the trust in the entire system of exchanges which is based on them – i.e. the system of

rules underlying their functioning. There is volatility among specific cryptocurrencies, but in general, an increasing number of people are beginning to trust them. It is the technical features – the rules that determine the methods of interaction that become the competitive advantages of various cryptocurrencies. “Money is a social institution, which is nothing more than a set of rules” – cryptocurrencies disclose this thesis by presenting only a set of rules.

III. Decentralized finance and “people’s money”

The concept of private money proposed by Hayek in the 1970s was embodied in the history twice: the first time in the heyday of private banks in the United States in 1820–1860s, and the second time with the creation of cryptocurrencies with an independent (from the government) issuing center. But paradoxically, with the creating of bitcoin – the first real cryptocurrency, the theoretical concept of “private money” becomes irrelevant: the emission mechanism becomes decentralized, we have no issuer, no reserves in other currencies, there is no way to reduce or regulate the money supply (private money has these instruments exist in full, moreover, their owners may have legal obligations). From this point of view, cryptocurrencies in bitcoin model are not «private» money, but something more than that. In case of bitcoin all users and miners become co-owners, simultaneously using, issuing money and taking part in monetary policy.

By analogy with the theory of “private money”, we propose the new concept of “people’s money”² based on decentralized finance (abbreviated form – DeFi). In the modern financial sector, the following products can be classified as decentralized finance: decentralized cryptocurrencies, decentralized payment services, decentralized fundraising, decentralized contracts (Chen, Bellavitis, 2020, pp. 5–6). Decentralized finance combines qualities such as decentralization, innovation, interoperability, cross-border, and transparency (Chen, Bellavitis, 2020, pp. 2–4).

Decentralized finance concept is impossible without several key modern technologies, expressed by the acronym ABCD (AI, Blockchain, Cloud and Data) – artificial intelligence, blockchain (including distributed ledgers and smart contracts, cloud technologies and data (including big ones) (Zetzsche, Arner, Buckley, 2020, pp. 5–7).

In the concept of «people’s» money, only a part of decentralized finance will be used – decentralized cryptocurrencies without an emission center. A significant part of modern cryptocurrencies does not act as a pure type of payment, but is used for any other purpose, which means that we also cannot consider them as pure money. Also controversial is such a part of cryptocurrencies as cross-borderless: should the private currencies of the future necessarily be global, or can they exist within national borders? The answer to this question lies in trust in the operation rules and the results of competition between users / owners of cryptocurrency.

Thus, we can formulate a general conceptual definition of people’s money – it is money, the issue and use of which is carried out in an autonomous, independent and decentralized system, in which actions are authorized by each individual user of the decentralized network.

If in the concept of private money, competition occurs between emission centers (regardless of whether the Central Bank is a private company or the creator of a cryptocurrency), and supply and demand for the issued units are impersonal market forces, then for people’s money it is assumed that a wide range of personally interested users will be included – co-owners, jointly participating in the creation and use of cryptocurrency.

So, we can distinguish two ways for the further evolution of cryptocurrencies: the way of “private” money (with a central issuer) and the way of “people’s” money (with decentralized

² In tribute to Hayek F., we propose to name the decentralized cryptocurrencies with “folksgeld” (gem. people’s money).

emission). In the first case, the issuer of the cryptocurrency acts as an analogue of the central bank and has the ability to conduct its own monetary policy. This is directly related to the stability of the exchange rate: it can be regulated, but within wide limits, or freely floating, but in any case, the issuer is able to influence it.

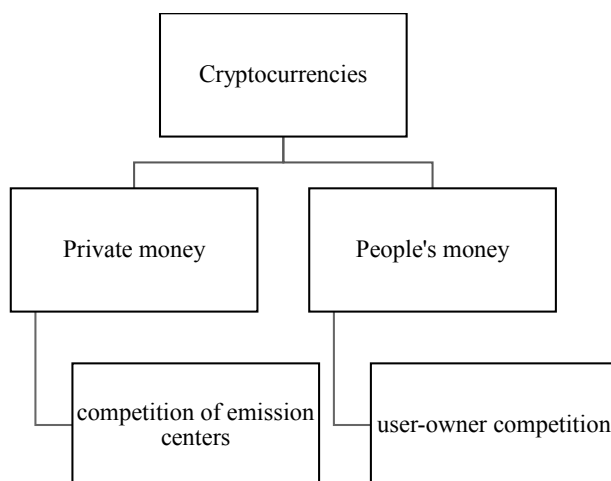


Fig. 1. Conceptual division of cryptocurrency subspecies
Source: compiled by the authors

In this case, government agencies can also issue their own cryptocurrencies, however, turning private money into nothing more than a metaphor. Conversely, the behavior of a cryptocurrency without a central issuer is determined in the absence of a targeted policy – the key factor here is trust.

Table 1

Conceptual framework of private and people’s money

	Private money	People’s money	Decentralized finance
The form	centralized cryptocurrencies, electronic and fiat money	decentralized cryptocurrencies	decentralized cryptocurrencies, payment services, contracts decentralized fundraising
Emission	centralized	decentralized	depending on the financial product
Use as a payment instrument	payment instrument	payment instrument	depending on the financial product

Source: compiled by the authors.

IV. Existing cryptocurrencies

At the end of 2017, a sharp rise and then a similar decline in the cryptocurrency market forced many investment companies like Morgan Stanley (Rooney, 2018), as well as analysts and investors, to give up cryptocurrencies, comparing them exclusively with the dot-com bubble (Lowrey, 2017; Belvedere, 2017; Russolio, 2018). In our opinion, a comparison of the institutional structure of the cryptocurrency and private money market with a bubble at an early stage of the development of the Internet market is one of the closest parallels, which are similar in numerous characteristics, such as a new unknown technology, a large number of new market participants with promising ideas and sky-high promises, and low interest rates (Goodnight, Green, 2010), which spurred demand for risky assets.

However, an important point that has been overlooked in the analogy with the Internet bubble is that after 99% of the disappeared companies, there remained such as Amazon, Google, Yahoo, etc. – companies that, since the history of their appearance, have tried to create fundamentally new products in the digital sphere, improve existing consumption patterns and consumer experience (Bariso, 2019), creating new business models in many business sectors that have revolutionized the global economy in the 21st century as part of the third industrial revolution.

The same situation, in our opinion, is observed in the cryptocurrency market at the present stage, which is represented by completely different projects, in different fields and areas of application, just like the Internet at one time. The blockchain technology - on which almost all cryptocurrencies are based on, itself is not a product, but only a technological basis for creating new products and business models. So, it's very important to identify this 1% of successful projects, by analyzing the most promising from a fundamental point of view, cryptocurrencies and their ecosystems, which will become new major players within the framework of the fourth industrial revolution and the digital economy.

For the analysis, we selected several cryptocurrencies from the top 15 by their capitalization (table 2), and the emphasis was on projects with significantly different parameters, from different areas of application (game industry, interbank transfers, anonymous payments, etc.) and focusing on various areas of implementation of blockchain technology in the real sector of the economy.

Table 2

The most popular cryptocurrencies and their main characteristics

Name / Ticker	Place in the top 20 by capitalization (on 02.02.2020)	Scope of implementation
Bitcoin (BTC)	1	The world's first blockchain-based cryptocurrency launched in 2008. It is considered the «gold» standard of cryptocurrencies, and by mid-2020 it has the largest capitalization, as well as the number of active users. Despite the obsolescence of the protocols and technology of the cryptocurrency, which is reflected in the increase in the speed of processing transactions, it is still used by many investors as «digital gold»
Ethereum (ETH)	2	Ethereum – it is a peer-to-peer network of virtual machines that any developer can use to run distributed applications (Dapps). Ethereum's goal is to create an alternative protocol for building decentralized applications.
Ripple (XRP)	3	It is a digital currency system in which transactions are verified based on consensus between network participants, rather than through the mining process that is used by bitcoins, which rely on blockchain ledgers
Tether (USDT)	7	The digital token, backed by fiat currency, provides individuals and organizations with a reliable and decentralized method of exchanging value using a familiar unit of account. Tokens are asset-backed and run on blockchain technology, plus there are built-in consensus systems for transactions in less volatile currencies and assets. In order to ensure accountability and ensure the stability of the exchange price, the company proposes a method of maintaining a single reserve ratio between a cryptocurrency token called “pegs” and its associated real-world asset, fiat currency ³

³ Tether (2016). Fiat currencies on the Bitcoin blockchain. (<https://tether.to/wp-content/uploads/2016/06/TetherWhitePaper.pdf> – Access Date: 29.08.2020).

End of table 2

Name / Ticker	Place in the top 20 by capitalization (on 02.02.2020)	Scope of implementation
Cardano (ADA)	10	A cryptocurrency that uses proof of stake protection with mathematically proven effectiveness called the Cardano Settlement Layer, as well as the Cardano Computation protocol suite. When designing, the company paid attention to the social nature of cryptocurrencies. Therefore, the cryptocurrency was divided into two levels, for accounting and machine computing ⁴
TRON (TRX)	12	Tron – is a decentralized blockchain-based protocol that aims to create a worldwide free entertainment system using blockchain technology and distributed storage. The protocol allows each user to freely publish, store and own data. The advantage of using Tron encryption is that you empower artists and content creators to own their content
Monero (XMR)	14	Monero is the leading cryptocurrency with a focus on private and censored transactions. Monero uses cryptography to protect the sending and receiving addresses and the amount of transactions. Monero transactions are confidential and untraceable. Monero cannot get spoiled by participating in previous transactions. This means Monero will always be accepted without the risk of censorship ⁵

Source: compiled by the authors.

The main framework of the project is not to find or identify the “only” cryptocurrency-leader from various cryptocurrencies, like bitcoin, which led to the creation and growth of the entire private currency market in the period 2009–2017, but to highlight and emphasize the technological and methodological differences between different “digital (crypto) business models”. Nevertheless, some of these diametrically opposed models that exist today will eventually become the fundamental defining pillars of the new digital financial market in the framework of the fourth industrial revolution (Table 3).

Table 3

Key characteristics and basic models of building cryptocurrency systems at the present stage

Token Creation
<i>Fixed</i>
Tron, Cardano, Ripple
<i>Rise up to Cap</i>
Bitcoin, Monero
<i>Rise Indefinitely</i>
Ethereum
<i>Varies to maintain peg</i>
Tether
Token Distribution / Validation
<i>Proof-Of-Work</i>
Bitcoin, Ethereum, Monero
<i>Run on top of Proof-Of-Work systems</i>
Tron (on top of Ethereum), Tether (on top of Bitcoin)
<i>Validators selected</i>
Ripple
<i>Proof-Of-Stake</i>
Cardano

⁴ Why we are building Cardano. Cardano Foundation (<https://whycardano.com/ru/> – Access Date: 29.08.2020).

⁵ What is Monero (XMR)? Monero (<https://web.getmonero.org/get-started/what-is-monero/> – Access Date: 29.08.2020).

End of table 3

Voting
NEO, EOS, Stellar (new token distribution)
Token Demand Target Market
General
Bitcoin, Ethereum, Monero, Tether
Business-Orientated
Cardano, Ripple
Token Function
Transaction
Monero, Ripple
Hybrid
Bitcoin, Ethereum, Cardano
Applications
Tron, Ethereum Classic
Anonymity / openness of completed transactions
Full data transparency
StablyCoin
Partial anonymity
Bitcoin
Complete anonymity
Monero
Smart contracts support
Ethereum, NEO, EOS
Availability/ lack of an emission center (centralized / decentralized emission model)
Centralized
Ripple, Stellar, Iota, Litecoin
Decentralized
Bitcoin
Payment transaction speed
Network
Network availability
Ethereum, Ripple (RippleNet), EOS (EOS.IO), Stellar, NEO, TRON Network
Network non-availability
Bitcoin, Litecoin,
Block time (approximate)
less than 1 second
EOS, Ripple
less than 1 minute
Litecoin, Ethereum, Stellar, NEO,
more than 1 minute
Bitcoin

Source: compiled by the authors.

V. Conclusion

Bitcoin has proven to be a breakthrough conceptual idea, but its technical implementation makes it cumbersome and possibly unusable in the future. Using the concept of «people's money», as opposed to «private money», will allow us to consider cryptocurrencies in the context of state monetary policy – as a way of nationalizing cryptocurrencies.

We cannot find a single approach to the process of implementing cryptocurrencies in the society: it can be “coins” accrued to each resident of the country for participation in the compulsory health insurance, or as an unconditional basic income, or as a full-fledged

monetary unit used in parallel with existing ones, but in any case, a large-scale transition to “popular” cryptocurrencies with a decentralized emission center is impossible without addressing two issues: power and trust. States, central banks or individual centers that carry out emission, by the force of economic and non-economic coercion, are persuaded to use the current monetary units.

On the other hand, how can a new concept earn enough credibility to be distributed to a significant number of users? Most likely, this cannot be done without the participation of the state or the resulting undermining of trust in existing money of a wide range of stakeholders. Not just trust, but trust and power – these are the components that determine the value of money.

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