

# Development, purpose and main uses of cryptocurrencies

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**Abstract.** This study focuses on cryptocurrencies. At the beginning it explains what cryptocurrency is, its main features and main areas of its significance for the economy. In this section it deals with the possibility of cryptocurrency one day replacing traditional money, trading opportunities cryptocurrencies offer, possibility to finance a business with digital coins and its availability to people without the access to banking services. A brief overview of cryptocurrency history and a definition of the technology of blockchain are also provided. The practical part of the thesis is analysing cryptocurrencies Bitcoin, Ethereum and Litecoin. Firstly, these are described in terms of their origin, emission, circulation, price development and process of mining. Secondly, the impact of selected factors on the price fluctuation of selected cryptocurrencies is evaluated using statistical methods and econometric models. The analysis showed the cryptocurrency prices are more dependent on the internal factors such as the transaction volume, transaction fee, total supply, demand and hashrate, than on the external factors such as interest rates, exchange rates, stock prices and the price of gold.

**Keywords:** Cryptocurrency; Bitcoin; Ethereum; Litecoin; Blockchain.

## 1. Introduction

Cryptocurrencies are a new financial phenomenon that has gained a lot of recognition in the past decade. Digital money with decentralized network of users brings a lot of interesting new opportunities to our current financial system. In recent years, more and more people are getting involved with trades with cryptocurrencies and the network of users is growing. Moreover, some people believe the system underlying these virtual currencies – blockchain- is the next big thing and will revolutionize the economy in the future.

This research offers a theoretical background of this problematic including an overview of the most important features of cryptocurrency. These characteristics best describe the benefits this phenomenon brings to the financial system. Firstly, decentralization is something that the current payment systems lack. Going through several middle men rises the processing time of a transaction as well as the transaction fee. Their digital form and cryptographic coding results in higher security in compare with fiat currencies. The benefit of anonymity and accessibility from any place in the world with internet connection and the implications of the fact that some cryptocurrencies have a finite supply are also mentioned. In 2008, the global financial industry crashed. Perhaps propitiously, a pseudonymous person or persons named Satoshi Nakamoto outlined a new protocol for a peer-to-peer electronic cash system using a cryptocurrency called

bitcoin. Cryptocurrencies (digital currencies) are different from traditional fiat currencies because they are not created or controlled by countries (Don Tapscott and

Alex Tapscott 2016). The developers are constantly working on improvements. With the rising number of cryptocurrencies, some of them tend to differ in their key aspects.

Its similarities with fiat currencies raise an interesting question – could cryptocurrencies someday replace it? We answer this question using the basic functions of money, which cryptocurrency currently cannot completely fulfil, especially due to its volatility. Other uses of digital currency include trading, crowd funding and allowing the third world countries with restricted access to financial services to participate.

In addition the study objectives and methods used to elaborate our own analysis, described in the final chapter. Factors from both internal and external environment of cryptocurrencies and their impact on price development of Bitcoin, Ethereum and Litecoin are analyzed. Using correlation coefficients and regression models we determine existing relationship between these factors and each of the mentioned cryptocurrencies respectively. The main objective of the research is to review the benefits and main uses of cryptocurrency and analyse its price development, focusing on the factors influencing this development. Determining these factors and emphasizing their impact can serve as forecasting tool. Following changes in these factors in the future can help make more

precise predictions and facilitate trading decisions of cryptocurrency users.

Blockchain can be defined through DLT – distributed ledger technology, designed to record and share data across a network. This network is simultaneously managed and controlled within the network by its users. Blockchain utilizes cryptography, therefore, data need to be decoded before verified and only after that a new block is created [1]. According to Aimee Vo, blockchain is database architecture of records on a public ledger containing all transactions that have been executed and shared among participating parties [2]. These transactions are verified by the majority of users represented by computers or “nodes” in the network. Once the majority confirms the correctness of the transaction, it is recorded into the block and it cannot be changed [3]. Blockchain consist of blocks linked together in a chain. It uses a hash algorithm, an algorithm designed to transform output, however small or large data, into a hash function. Hash is a series of numbers and letter representing the transaction or any other data in the cryptographic entry. Each block contains following information: 1. Data – the information encrypted in the block 2. Previous hash – the hash value of the previous block 3. Hash – the hash value of the current block (Cybrosis) There are two types of blockchain – permissionless and permissioned blockchain. Permissionless blockchain is opened for anyone to join and add transactions to the ledger without the need to be approved. It is decentralized and it only requires the relevant software to be installed in order to join. This type of blockchain runs the majority of existing cryptocurrencies such as Bitcoin or Litecoin. [4] On the other hand, permissioned blockchain consists of nodes that had to be approved by the administrator of the network. It is considered to be more secure, since identities of users are easily verifiable but at the same time it fails to be decentralized in this aspect. The decentralized nature of transactions remains, no third party is needed to validate the transactions. [5]

We established that cryptocurrencies, for now, are not able to replace traditional currency. Their main significance is in trading, buying and selling crypto on special online platforms. It is also possible to exchange fiat currency for digital currency at these platforms. Crypto trading is similar to Forex (foreign exchange market) where the fiat currencies are traded every day. An advantage of online exchanges is that in order to join the trading community, one does not have to mine the currency. They can be divided into two categories – centralized and decentralized. Centralized exchanges, for example Coinbase or Binance ensure the protection of the funds via several security measures, and on the other hand, decentralized exchanges, such as IDEX or Bitshare, execute exchanges via smart contracts, putting more focus on the protection of users identity. However, without the central authority, losing the private key could make the funds irretrievable [6]

As we mentioned in the cryptocurrency definition, one of the unique attributes is the availability anywhere in the world. With only a cell phone and internet connection, anyone can be a part of the Bitcoin network, sending funds across borders within minutes. There is up to 2 billion of

people without the access to banking services worldwide, majority living in the developing countries. In some countries less than 15% of individuals have bank accounts [7]. This technology remarkably increases economic freedom, a very important concept concerned with factors such as starting a business, owning property, currency stability and more. Nations on the top of the economic freedom list have higher incomes, life expectancy, literacy, less corruption, peace and better environmental laws among other things. [8] Today, with smartphones, the cryptocurrency “banking” services are easily accessible via mobile apps to anybody. However, financial inclusion does not end there. Even financing small size businesses in poor countries, where banks are reluctant to lend money to such projects, are for the first time able to get funds. It is safe to assume that cryptocurrency can raise the quality of life in the third worlds countries significantly in the upcoming years [9]. If we consider the issue in the context of Central Asia, this region represents a somewhat limited and variably regulated environment in terms of the cryptocurrency market. For instance, in Uzbekistan, it is prohibited to trade crypto assets without being officially registered as a licensed broker or operator. This reflects the government's intention to strictly regulate the field of digital finance.

In contrast, a different situation can be observed in Kyrgyzstan. The National Bank of the Kyrgyz Republic announced that by 2025, the digital som had been introduced into circulation. This initiative marks an important step toward developing the country's digital financial system and establishing a modern payment infrastructure.

Kazakhstan, on the other hand, is currently one of the most active countries in the region supporting the crypto industry. Within the framework of the “Astana International Financial Centre,” a special legal environment has been created to carry out operations with crypto assets. Moreover, cryptocurrency mining activities are carried out under a licensing system and are subject to state taxation.

The main goal of the research is to review the most important uses of cryptocurrency and analyze its price development. As mentioned, cryptocurrency has many specific features differentiating itself from fiat currencies. This study aims to point out the areas of the economic and financial sector that most benefit from these specific features. Moreover, looking closely at its development, factors with potentially significant influence on the price fluctuations are selected. By analyzing each of these factors, the relationship between the price and the respective factor and their significant to the price development are assessed.

## 2. Methodology

In this chapter, the selected data for the analysis, reasons why these were selected and provide the list of sources from which they were obtained is explained. In addition, the full procedure of the analysis with tools used to make conclusions is provided. In order to complete the main goal of the thesis, a review of the most significant features

of cryptocurrencies is enclosed in the theoretical part. In case of the price fluctuations, these are caused by changes in supply and demand.

Several factors such as internal governance of the cryptocurrency, economic changes and political factors, which represent or strongly influence the market forces are analyzed. For this analysis, 9 factors were selected, divided as follows:

1. Internal factors: factors directly linked to the given currency.

- Transaction volume
- Total currency in circulation
- Transaction fee - Google trends (internet searches)
- Hashrate

2. External factors: factors outside the scope of the cryptocurrency.

- United States interest rate
- USD/EUR exchange rate
- S&P index 500 - Gold price

Monthly time series data are used for the time period of 3 years from 2020 to 2023, giving all together 36 observations. All parameters are quantitative. Data for prices in US dollars of Bitcoin, Ethereum and Litecoin together with transaction volumes, usd/eur exchange rates, and S&P index 500 were obtained from <https://finance.yahoo.com/>, total currency circulation information from <https://blockchair.com>, <https://etherscan.io> and <https://www.quandl.com>. From <https://bitinfocharts.com> moving charts we use data on transaction fees and hash rate. Source of the information on google searches is <https://trends.google.com/>, gold prices historical data were obtained from <https://goldprice.org/> and USA interest rate from <https://data.worldbank.org/>.

### 3. Results

In this chapter, the influence of various factors on the price of Bitcoin, Ethereum and Litecoin is analyzed. We attempted to use regression analysis to create a complex model with all factors included; however, this model and its coefficients were not significant. Therefore, we analyze each factor separately.

Microsoft Excel was used for all calculations and analysis as well as to create all charts. At first, price charts of each coin from collected price data were created.



Fig. 1 Bitcoin price (US dollars) 2020-2023 (source: own elaboration)



Fig. 2: Litecoin price (US dollars) 2020-2023 (source: own elaboration)

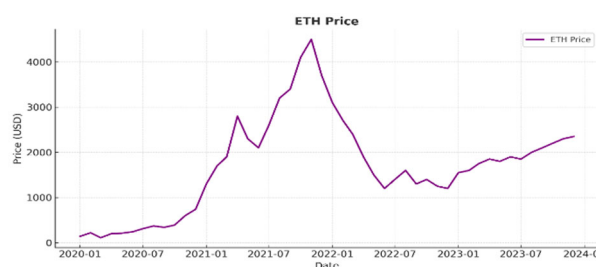


Fig. 3: Ethereum price (US dollars) 2020-2023 (source: own elaboration)

These charts are then compared with data on internal and external factors from the same time period. Excel tools such as average, correlation and regression analysis are used to determine the relationship between crypto prices and selected factors. Each factor is analyzed separately for Bitcoin, Litecoin and Ethereum and the results are compared. Using correlation coefficient we determine whether there is a linear (non-linear) relationship between the parameters. Values of the correlation coefficients in range from -

0.25 to 0.25 are evaluated as weak to none relationship between given parameters. Values from -0.6 to -0.25 and 0.25 to 0.6 indicate medium relationship and remaining values close to 1 (-1) stand for strong linear relationship between the parameters.

Linear regression models are used to clarify the strength of the relationship (R<sup>2</sup>) and interpret the impact of the change in the explanatory variable to the respective prices of the digital currencies. The model can be considered as statistically significant when the significance F value is less than 0.05 which is the universal significance level. Moreover, all estimated parameters' P-values must be less than 0.05 as well. In case of factors that has shown weak linear relationship we ran the log log linear regression analysis. This econometric model, if significant, returns average values for parameters in %. In some cases this model proved to be more significant. The type of regression model used to determine the average change on variables is specified for each factor respectively.

In addition, we provide graphical evidence of the relationships between factors and prices calculated with the above mention methods to better illustrate the trends.

## 4. Conclusion

To sum up, this study deals with the main characteristics, uses and price analysis of cryptocurrencies. The literature review describes cryptocurrency as a new type of decentralized digital money based on cryptography, available to all people with access to internet. The history of cryptography used for financial purposes dates back to 1980, however, cryptocurrency as such came to existence in 2008 when Bitcoin was introduced. Bitcoin was the first cryptocurrency and to this day it is the most popular and most traded one. Many cryptocurrencies followed, trying to copy the triumph Bitcoin achieved, some more successful than others. Ethereum, originally designed for development purposes, became the second most popular cryptocurrency, introducing entirely new features to the phenomenon. Decentralization is probably the most distinctive feature when it comes to comparing cryptocurrency to regular money we use on daily basis. The fact that the whole network can be run by its users only, without the need for a third party, is possible through the use of blockchain technology. All of the transactions made with the specific cryptocurrency are stored in blocks and verified by the users. This revolutionary technology is finding its use outside the financial sector as well, for example is car industry or voting.

In conclusion, the analysis supported by the literature review proves the cryptocurrencies are not ready to replace fiat currencies and they serve better as assets traded on the exchanges, especially due to their high volatility. The fluctuations in prices are caused by a number of internal and external factors, some of which we analysed in the practical part of the thesis. However, the unique way the cryptocurrency is able to facilitate transactions offer opportunities to join the financial market even for people without the access to banking services and with the constant development of technology the cryptocurrencies could one day overcome the obstacles on the way to replace traditional money.

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