

**Czech University of Life Sciences Prague**

**Faculty of Economics and Management**

**Department of Languages**



## **Bachelor Thesis**

**The future of cryptocurrencies in the global economy**

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# **BACHELOR THESIS ASSIGNMENT**

Lola Atabekova

Business Administration

Thesis title

**The Future of Cryptocurrencies in the Global Economy**

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## **Objectives of thesis**

This thesis aims to explore the future of cryptocurrencies in the global economy. The paper will analyze potential future trends and developments, evaluate challenges and opportunities presented by cryptocurrencies for traditional financial systems and institutions, and determine the best regulatory frameworks and policies governing cryptocurrencies.

## **Methodology**

The theoretical part will consist of a descriptive analysis: analyzing the role of cryptocurrency in the global economy, its functions, and initial purposes. This paper will also evaluate research regarding the advantages and disadvantages of cryptocurrency.

In the practical part, a comparative analysis will be conducted between countries that have adopted cryptocurrency and those that have rejected it. The purpose of this analysis is to examine how the economies of these countries have been affected based on their acceptance or rejection of cryptocurrencies. This comparison will provide insights into the potential future of cryptocurrencies in the global economy.

## The proposed extent of the thesis

30-40 pages

## Keywords

Cryptocurrency, economy, decentralization, transparency, adaptation of cryptocurrency, regulatory frameworks

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## Recommended information sources

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## **Declaration**

I declare that I have worked on my bachelor thesis titled "The Future of Cryptocurrencies in the Global Economy" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break any copyrights.

In Prague on 30.11.2023

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### **Acknowledgment**

I would like to thank Jared Daniel Jacques for his suggestions and advice during my work on this thesis, as well as my parents and friends for supporting and believing in me.

# The Future of Cryptocurrencies in the Global Economy

## **Abstract**

This work aims to explore the potential future of cryptocurrency in the global economy through an analysis of its impact on the economies of individual countries. A secondary goal is to identify favorable regulations within the crypto industry.

The theoretical part will encompass a descriptive analysis examining the role of cryptocurrencies in the global economy, their functions, and initial objectives. Potential future trends and developments will be analyzed, and the challenges and opportunities presented by cryptocurrencies for traditional financial systems and institutions will be assessed.

In the practical part, the author will conduct a case study comparing two countries. A comparison will be made between Japan, which has positive regulations regarding cryptocurrency, and China, which has restricted cryptocurrencies. Additionally, the author will perform a SWOT analysis to evaluate internal and external factors that may influence the outcomes of different regulatory strategies.

The author concludes that adopting a balanced regulatory approach is crucial for the cryptocurrency market. Overly strict regulations can impede market growth and have adverse effects on the economy, while a complete ban may also result in unfavorable consequences. However, at present, it is challenging to determine the substantial impact of cryptocurrency adoption or rejection since the market is relatively young.

**Keywords:** Cryptocurrency, economy, decentralization, transparency, adaptation of cryptocurrency, regulatory frameworks

# Budoucnost Kryptoměn v Globální Ekonomice

## Abstrakt

Tato práce si klade za cíl prozkoumat potenciální budoucnost kryptoměny v globální ekonomice prostřednictvím analýzy jejího dopadu na ekonomiky jednotlivých zemí. Sekundárním cílem je identifikovat příznivé regulace v rámci kryptoprůmyslu.

Teoretická část bude obsahovat deskriptivní analýzu zkoumající roli kryptoměn v globální ekonomice, jejich funkce a výchozí cíle. Budou analyzovány potenciální budoucí trendy a vývoj a budou posouzeny výzvy a příležitosti, které kryptoměny představují pro tradiční finanční systémy a instituce.

V praktické části autor provede případovou studii srovnávající dvě země. Bude provedeno srovnání mezi Japonskem, které má pozitivní regulace týkající se kryptoměn, a Čínou, která kryptoměny omezila. Dále autor provede SWOT analýzu k vyhodnocení vnitřních a vnějších faktorů, které mohou ovlivnit výsledky různých regulačních strategií.

Autor dochází k závěru, že přijetí vyváženého regulačního přístupu je pro trh s kryptoměnami klíčové. Příliš přísné předpisy mohou bránit růstu trhu a mít nepříznivé dopady na ekonomiku, přičemž úplný zákaz může mít také nepříznivé důsledky. V současnosti je však obtížné určit podstatný dopad přijetí nebo odmítnutí kryptoměny, protože trh je relativně mladý.

**Klíčová slova:** Kryptoměna, ekonomika, decentralizace, transparentnost, adaptace kryptoměny, regulační rámce

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## 1. Introduction

The contemporary significance of cryptocurrency is experiencing rapid expansion. Divergent perspectives emerge, with some individuals perceiving it as a global gateway to financial opportunities and a catalyst for economic equity. Conversely, some regard it as a potential threat to the global economy, expressing concerns regarding its inherent vulnerabilities. A notable concern revolves around the perceived resemblance of cryptocurrencies to a Ponzi scheme, as their value hinges on the willingness of participants to attribute significance to them. However, the foundation of public trust in the contemporary financial system and fiat currency equally hinges upon confidence in the governing state.

The author's decision to explore this dissertation topic is grounded in the anticipation that cryptocurrencies will experience continuous growth, steering clear of the attributes typically associated with speculative bubbles. Drawing a parallel with the transformative impact of the Internet, the author contends that, despite initial skepticism, societal reliance on the Internet has become widespread.

## 2. Objectives and Methodology

This thesis aims to explore the future of cryptocurrencies in the global economy. The paper will analyze potential future trends and developments, evaluate challenges and opportunities presented by cryptocurrencies for traditional financial systems and institutions, and determine the best regulatory frameworks and policies governing cryptocurrencies.

**Methodology:** The theoretical part will consist of a descriptive analysis: analyzing the role of cryptocurrency in the global economy, its functions, and initial purposes. This paper will also evaluate research regarding the advantages and disadvantages of cryptocurrency.

In the practical part, a comparative analysis will be conducted between countries that have adopted cryptocurrency and those that have rejected it. The purpose of this analysis is to examine how the economies of these countries have been affected based on their acceptance or rejection of cryptocurrencies. This comparison will provide insights into the potential future of cryptocurrencies in the global economy.

The author computes correlation coefficients using the Pearson correlation coefficient formula, as depicted below:

$$r = \frac{\sum(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum(X_i - \bar{X})^2 \sum(Y_i - \bar{Y})^2}}$$

Furthermore, the author computes t-test associated with the correlation coefficient using the formula provided below:

$$t = \frac{r_{xy}\sqrt{1-n}}{\sqrt{1-r^2}}$$

Finally, the author conducts a SWOT analysis to evaluate both internal and external factors that could influence the outcomes of various regulatory approaches.

### 3. Theoretical part

#### 3.1. Evolution of money

Money has always been a part of human history. The evolution of means of exchange can be observed from the use of barter systems to contemporary financial systems. For many millennia, the primary method of attaining desired goods or services was through natural exchange or barter, involving exchanging goods or services between parties on mutually beneficial terms, where both parties found satisfaction. The inefficiency of this system led to the transition to commodity money, where more universally accepted commodities such as livestock, grains, salt, and the like were used as a medium of exchange (Beattie, 2022).

A fascinating historical turn occurred when the inhabitants of the remote island of Yap adopted a unique form of commodity money in the form of monumental stone discs known as Rai stones. Crafted from limestone, these stones held significant value in the Yapese society. Despite their immobility and bulkiness, Rai stones were considered an effective medium of exchange. The logistical challenges posed by their considerable weight and size necessitated a collective agreement to conduct transactions through verbal agreements, eliminating the need for physically moving these enormous stones.

In 2019, archaeologist Scott M. Fitzpatrick and Stephen McKeon, a finance professor at the University of Oregon, proposed a theoretical connection between the historical use of Rai stones and the contemporary emergence of cryptocurrencies. The theory posits that both systems rely on a common foundation of collective trust. By accepting Rai stones as a medium of exchange, the people of Yap, it is argued, wholeheartedly trusted the commitments of their community members to uphold a mutually agreed-upon value. This historical example sheds light on people's inclination to collectively believe in the effectiveness of non-traditional monetary instruments (Walton, 2022).

As economic development unfolded, barter systems and commodity money gradually took a backseat. Around 600 BCE, the Lydians commenced the minting of the first official currency – coins. Coins, characterized by their standardized form and inherent divisibility, facilitated a more convenient mode of exchange. Metal coins possessed five crucial attributes of money: portability, durability, divisibility, fungibility, and limited supply. Thanks to these characteristics, coinage quickly disseminated worldwide as an organized medium of exchange (Lewis, 2020).

The evolution of currency persisted with the emergence of paper banknotes, marking a departure from currencies backed by commodities, and introducing the concept of paper currency detached

from intrinsic value. The first genuine banknotes were only created in Stockholm in 1661. However, banks began to incur losses as they issued an excessive quantity of banknotes, whose value equated to the worth of the paper on which they were printed. Similar mistakes were repeated in other countries, including France, the United States, and China. Banknotes found greater success in England when, in 1821, the United Kingdom established the gold standard, pegging the currency to the precious metal at a fixed price.

Initially, banknotes merely represented the value of gold held in a bank, and the owner of the gold could exchange the note for a specific quantity of the metal at any time. However, with the evolution of the banking system and the global economy, the gold standard system became obsolete. During the Great Depression in England, there was widespread panic as people started exchanging their paper money for gold, leading to the Bank of England facing the threat of gold depletion. Subsequently, in 1931, Britain ceased using the gold standard, and other countries followed suit, with the United States, for instance, definitively abandoning it in 1973. This marked the inception of the significance of fiat money. Consequently, the current monetary system is underpinned solely by people's trust in the government. Fiat money is anything recognized as legal tender by mutual agreement and does not always have to be issued by the government (Lewis, 2020).

### **3.2. Cryptocurrency creation**

The trajectory of historical development bears witness to recurring patterns in the evolution of money. Changes within financial systems unfold as a responsive mechanism to emerging societal needs, inconveniences within existing monetary frameworks, and notably, during periods of global crises. During these critical junctures monetary systems and economies undergo transformations in pursuit of optimal solutions.

The onset of the Great Recession in 2007-2009 was a product of the intricate interplay of factors within the global economy. Originating in the U.S. housing market, the crisis swiftly evolved into a global phenomenon, impacting financial institutions, global trade, and even sovereign debts of nations. The housing market bubble in the U.S., formed due to the provision of subprime mortgages, acted as a catalyst for a series of events. The rapid escalation of housing prices and the widespread issuance of mortgages created an illusion of stability and prosperity. However, with changes in the Federal Reserve's interest rates and a reassessment of risks, this bubble burst, as many subprime borrowers struggled to meet their mortgage payments. The collapse of financial institutions, such as Lehman Brothers, exposed systemic issues in the global financial system. The

bundling of thousands of mortgage loans into securities led to the spread of toxic assets, triggering a cascading effect of bankruptcies and a credit crisis. President George Bush introduced the concept of "too big to fail," seeking assistance from the U.S. government to prevent a global financial meltdown. Subsequently, global trade plummeted, unemployment surged, and highly indebted countries faced sovereign debt crises. Europe found itself in a financial tempest, requiring support from the European Union and the International Monetary Fund (Rodini, 2022).

The Great Recession revealed vulnerabilities in the global economy and underscored the imperative for more effective financial system regulation. The financial crisis sowed widespread distrust in society towards banks, governments, and other influential institutions. Now, the world was in search of new solutions. Amidst the prolonged shadow of the most severe economic crisis in recent generations, a revolutionary new form of currency was quietly being developed. In this context, Bitcoin emerged as a kind of magical solution, seemingly designed to address the issues that were the root causes of the financial crisis. In an official document issued by an anonymous individual or group, known as Satoshi Nakamoto and now universally recognized as "the creator of Bitcoin," the digital currency, known as Bitcoin, and the fundamental technologies upon which it is based were introduced for the first time (Wang, 2018).

However, the roots of digital currencies extend back to the 1980s, long before Bitcoin captured public attention. In 1983, David Chaum, an American cryptographer, proposed a revolutionary idea of electronic money. Chaum devised "blinding formulas" and a token currency that could be safely and confidentially transferred between individuals, a concept strikingly similar to contemporary cryptocurrencies. Despite DigiCash, his company, facing bankruptcy in 1998, its ideas and encryption tools laid the foundation for future digital currencies.

Similarly, Nick Szabo's Bit Gold, characterized by a decentralized approach, and Wei Dai's B-money, an attempt to create an anonymous electronic cash system, exerted influence in the early cryptocurrency realm but, unfortunately, both initiatives did not achieve sustained success. Concurrently, Hashcash, formulated in the mid-1990s as a countermeasure against email spam and Distributed Denial of Service (DDoS) attacks, showcased a proof-of-work algorithm that foreshadowed fundamental aspects of contemporary cryptocurrencies. Collectively, these individuals contributed to the development of Bitcoin, the trailblazer that transformed how we perceive and interact with money in the era of digital technologies (Reiff, 2022).

### 3.3. Concepts of cryptocurrencies

Understanding cryptocurrencies requires grasping several key concepts that differentiate them from conventional forms of money.

Cryptocurrency represents a decentralized form of digital currency, grounded in blockchain technology, and safeguarded by cryptographic measures. Unlike traditional currencies such as the US dollar or the euro, cryptocurrencies are not issued by any central authority like a government or a bank. The value of cryptocurrency is also distinct in that it is not governed or supported by any central entity. This departure from centralization renders them potentially resistant to government interference or manipulation.

Most cryptocurrencies available today are constructed on blockchain technology. Blockchain functions as a decentralized database with a peer-to-peer network that monitors, organizes, and serves as a secure repository for transactions. These transactions encompass various activities such as the purchase, sale, and transfer of cryptocurrencies (Chinaza & Miracle, 2023).

In the genesis of cryptocurrency by its enigmatic creator, Satoshi Nakamoto, the foundational principles that underpin Bitcoin's philosophy become apparent. Firstly, at its core, Bitcoin is driven by a vision of financial empowerment and inclusivity, acting as a transformative force in global finance. Secondly, aligning with libertarian ideals, Bitcoin advocates for individual freedom, minimal government intervention, and the right to privacy. This commitment is reflected in the pseudonymous nature of Bitcoin transactions, affording users an unprecedented level of anonymity within financial systems. Finally, Bitcoin fundamentally challenges the existing monetary paradigm by operating independently of physical assets or national economies. With its finite supply of 21 million bitcoins, Bitcoin stands in stark contrast to traditional currencies, immune to the influence of the money-printing mechanism and challenging the norms of government control and monetary policies (Melanion Capital, 2023).

#### 3.3.1 Understanding the technical side

In the chapter dedicated to the evolution of money, the author highlights the resemblance between Rai stones, used as a means of exchange on the Micronesian island of Yap, and modern cryptocurrencies. As cryptocurrency is built on blockchain technology, a parallel can be drawn between the financial system of the Yap Island and the distributed blockchain ledger itself. Rai stones, similar to Bitcoin, gained high value due to perceived scarcity and the difficulty of their

extraction. This similarity extends beyond value to the challenge of transportation, making them rare and valuable, as well as fostering public trust.

For a better understanding of the comparison, envision Rai stone currency in the center of a Japanese village. Transactions involving these stones did not necessitate physical movement; instead, exchanges were recorded in an oral ledger supported by communal trust. Similar to the modern blockchain, this system operated based on the trust of the entire community, with transactions and facts documented in oral tradition.

In contrast to the contemporary financial system, where trust is typically associated with institutions and leaders, Rai stone currency relied on public trust in oral tradition. It was crucial to maintain this trust and belief in the system among all community members. Notably, both Rai stones and Bitcoin depend on decentralized crowd trust. While blockchain code is immune to direct human interference, the system's efficiency hinges on trust in the security of this code. In the event of a breach, such as hacking or norm alterations, the value of cryptocurrency may decrease even below that of Rai stones in their era (Finance Magnates, 2021).

## **Cryptography**

The underlying security of modern cryptocurrencies, including Bitcoin, lies in the application of cryptography. Cryptography plays a pivotal role in ensuring the integrity, confidentiality, and authenticity of transactions within the blockchain network. As the author delves into the technical aspects of cryptocurrency, the focus shifts to the cryptographic mechanisms that safeguard the decentralization and trustworthiness of these digital assets.

Cryptography involves the examination and application of methods for securely transmitting encoded messages or data between two or more parties. The sender encrypts the message to conceal its content from a third party, and the receiver decrypts it to restore its intelligibility.

Cryptocurrencies leverage cryptography to ensure that transactions are both anonymous and secure, eliminating the need for trust in the process. This means that conducting secure transactions does not require any prior knowledge about the other party, and there is no reliance on intermediaries such as banks, credit card companies, or governments.

Bitcoin, along with other cryptocurrencies like Ethereum, utilizes public-key cryptography. The Bitcoin network assigns a private key (essentially a highly secure password) to each user, generating a corresponding public key through cryptographic processes. Sharing your public key

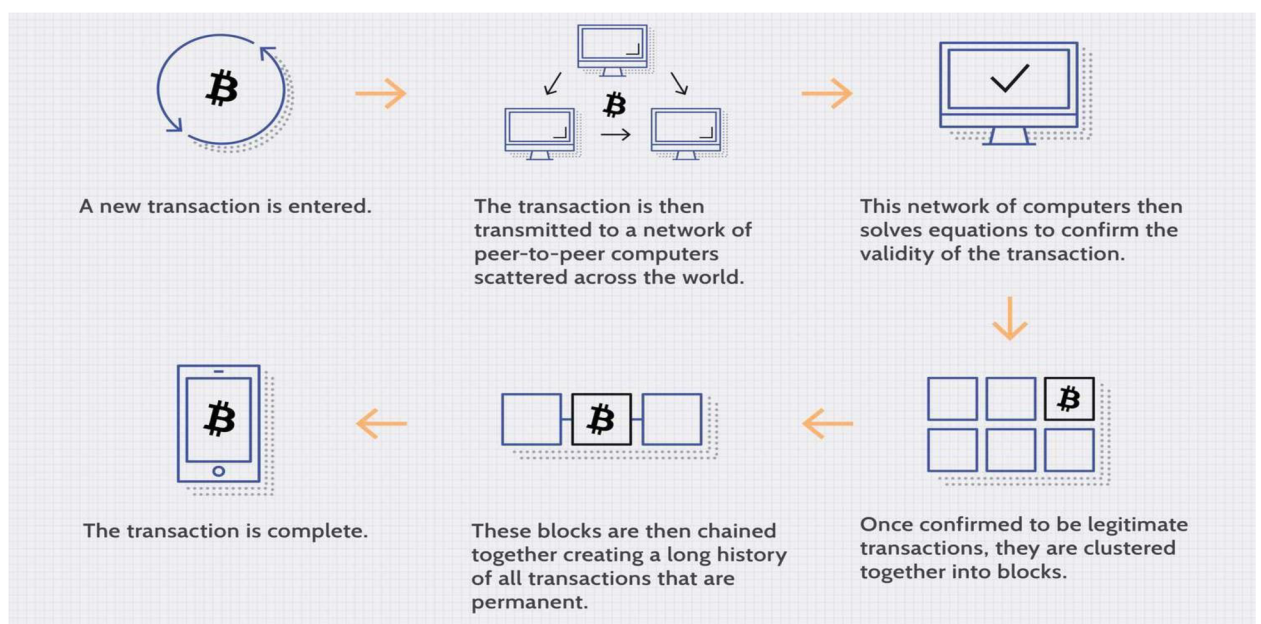
enables others to send you bitcoins, while access to these funds necessitates the use of the private key. The public key is derived from the private key through a process called "hashing," making it practically impossible to reverse and deduce the private key from the public key. As the public and private keys are interconnected, the network recognizes the ownership of bitcoins as long as the user possesses the private key.

The absence of intermediaries in Bitcoin transactions results in their irreversibility, a deliberate feature to address the double-spending problem without the need for a customer service recourse as seen in credit card companies. Complementing this, the Bitcoin blockchain functions as a decentralized ledger, meticulously recording and continuously validating transactions across all computers in the network (Coinbase, 2023).

### **Blockchain technology and Mining**

Blockchain is a technology designed to establish decentralized and reliable databases. The fundamental components of blockchain include blocks, each containing information about transactions or other data, and a hash, a unique numerical value generated based on the block's data to ensure data integrity. As new information, such as transactions or contracts, is gathered into a block, it undergoes hashing, creating a chain of blocks linked through the hash of the previous block. The process involves users initiating transactions, submitting them to the network through relevant applications, and the confirmation of transactions, which varies depending on the specific blockchain.

**Figure 1, Blockchain mechanism**



Source: Investopedia, 2023



Decentralization is a key aspect, with copies of the blockchain stored on numerous nodes distributed throughout the network. Mechanisms like proof of work or other consensus algorithms are employed to confirm transactions and achieve agreement among network participants. The encryption of data and the use of proof of work contribute to the immutability of information in the blockchain.

Moving on to mining, in many blockchain networks, a consensus mechanism known as Proof of Work involves miners validating transactions and creating new blocks. Mining, as the process by which miners use computational power to solve complex mathematical problems, is crucial for adding new blocks to the blockchain. Once a block is filled with transactions, it undergoes hashing, and miners compete to solve a cryptographic puzzle associated with the block's data. The first miner to solve the puzzle is rewarded with newly minted cryptocurrency and transaction fees. Mining contributes to the confirmation of blocks, with the successfully mined block added to the blockchain. Other nodes in the network verify the validity of the new block, confirming consensus and securing the integrity of the blockchain (Hayes, 2023).

### **3.4. Advantages**

Having elucidated the decentralized, secure, and transparent nature of cryptocurrencies in preceding discussions, attention now shifts towards exploring the additional benefits they offer to the economy. Beyond these foundational attributes, cryptocurrencies exhibit transformative potential in various economic domains, influencing elements such as financial inclusion, employment opportunities, and resistance to inflation. Navigating through subsequent discussions, a comprehensive understanding of the broader positive impact that cryptocurrencies can exert on the economic landscape shall emerge.

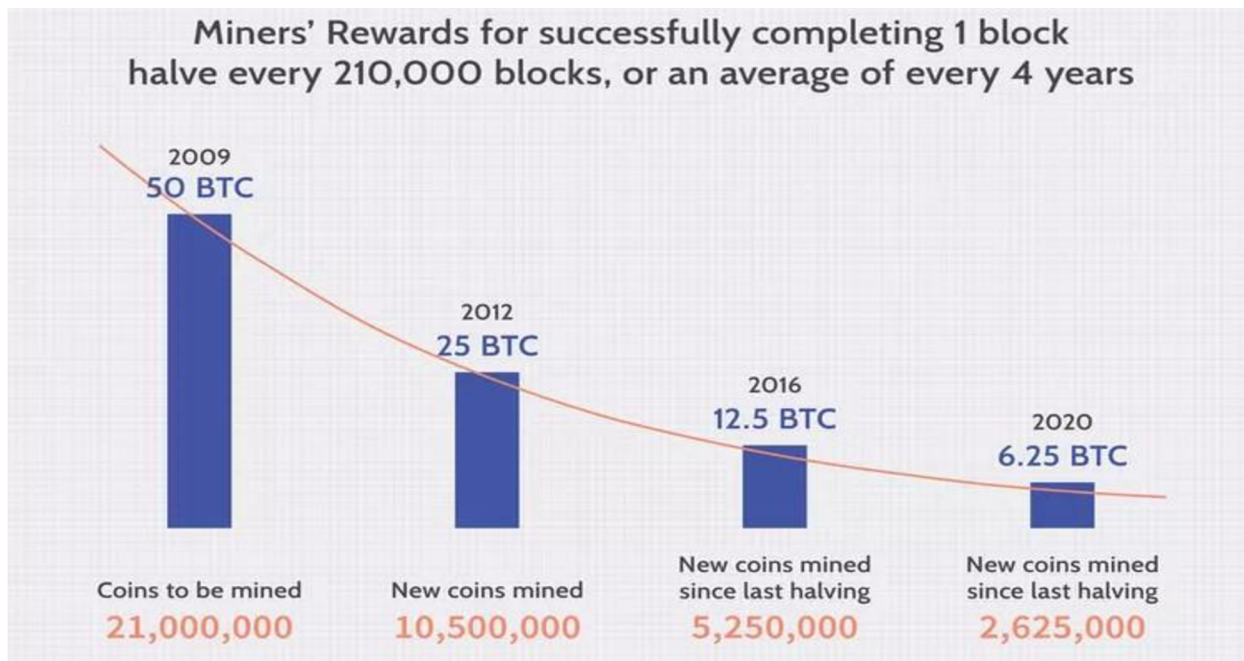
#### **Scarcity**

Bitcoin undergoes a process known as "halving" every four years, during which the reward granted to miners is halved until the maximum limit of 21 million bitcoins is nearly reached, anticipated around the year 2140. This unique mechanism contributes to Bitcoin's distinctive characteristics, rendering it a scarce and resilient asset against inflation.

Despite its digital nature, Bitcoin possesses inherent limitations preventing limitless creation of it. The essence of its value proposition lies in verifiable scarcity, grounded in two fundamental concepts within the Bitcoin protocol. Firstly, the absolute cap of 21 million bitcoins defines the

total supply. Secondly, the halving concept dictates a 50% reduction in the issuance of new bitcoins every four years.

**Figure 2, Halving reduction**



Source: Investopedia, 2023

In the initial months of 2020, the virtual mining process resulted in the addition of 12.5 new bitcoins to the network approximately every 10 minutes. However, in May of the same year, a scheduled halving event occurred, leading to a 50% reduction in the reward granted to miners. Consequently, the reward per block was adjusted from 12.5 bitcoins to 6.25 bitcoins. This reduction trend is set to continue, reaching approximately 3.125 in 2024 and persisting until the entire supply is exhausted. The deliberate reduction in bitcoin issuance through halving enhances the likelihood of an increase in Bitcoin's value, contingent on sustained demand. This contrasts sharply with fiat currencies, prone to decline in value over time due to inflation.

In its role as a digital asset, Bitcoin is often likened to gold, sharing the attributes of value and scarcity that resist inflation. Unlike gold, Bitcoin's digital nature enables global transactions with ease, and its precise scarcity is transparent and verifiable. While gold mining discoveries remain unpredictable, Bitcoin's finite supply of 21 million, with less than 2.5 million remaining as of late 2020, establishes a known and controlled supply schedule (Coinbase, 2023).

The predictable and controlled nature of Bitcoin's supply, coupled with the decentralization of its network, contributes to increased economic stability. As Bitcoin becomes more widely recognized

and adopted, its role as a store of value may enhance financial resilience for individuals and contribute to a more robust global economic landscape.

### **Financial inclusion**

The importance of financial inclusion in addressing poverty cannot be emphasized enough. Cryptocurrencies are emerging as a practical solution to crucial financial challenges in the developing world, with the potential to provide billions of people access to banking tools and the global economy. This transformative shift is observable as private and central banks worldwide are rapidly adopting blockchain technology, and cryptocurrencies are gaining widespread acceptance, particularly in developing nations.

Venezuela serves as a striking example, where hyperinflation and currency devaluation have led to a growing demand for cryptocurrencies like bitcoin. These digital assets have become common forms of payment, allowing Venezuelans to protect their assets, acquire essentials, and participate in international trade. Beyond promising economic change, the nascent blockchain technology also holds potential for political and social transformation, offering a lifeline to some of the world's most impoverished populations (Making prosperity, n.d.).

The impact of cryptocurrencies goes beyond bypassing traditional financial systems. With over two billion people globally lacking access to bank accounts, cryptocurrencies, leveraging blockchain's distributed ledger technology, offer a solution. In nations grappling with poverty, corruption, inflation, and political instability, cryptocurrencies could serve as a means for individuals to access fundamental financial tools. Humanitarian efforts, such as the UN's World Food Program, are leveraging cryptocurrencies like Ethereum to send funds to refugees who lack access to banks but possess mobile phones, thereby easing financial exclusion and assisting displaced individuals in rebuilding their lives (World food programme, 2017).

The potential of cryptocurrencies to combat financial inequality and foster a more inclusive economy in developing nations is extensive. As blockchain technology continues to evolve, its capacity to bring about political, economic, and social change becomes increasingly evident. For the world's "unbanked," cryptocurrencies offer a promising future, with the potential to lift billions out of poverty, replace corrupt financial systems, encourage innovation and entrepreneurship, and create a world where everyone has access to the essential building blocks for financial stability and economic growth.

## **Cross-border payments**

Traditional cross-border transactions have long been plagued by inefficiencies, high costs, and prolonged settlement times, leading to a pressing need for innovation. From overcoming the limitations of traditional banking systems to providing a more inclusive and accessible financial infrastructure, the potential impact of cryptocurrencies on cross-border transactions is nothing short of revolutionary.

BitPesa, established in 2013, is a digital foreign exchange and payment platform that utilizes blockchain settlement to significantly reduce costs and expedite business payments to and from frontier markets. Originally focused on simplifying remittance payments for Kenyans in the UK, BitPesa has since expanded its customer base, with approximately two-thirds engaged in business-related transactions, as reported in the company's official statistics from 2015.

Traditional cross-border fund transfers via services like Moneygram or Western Union involve the exchange of the sender's currency for US dollars and subsequent conversion into the recipient's local currency, incurring substantial fees and unfavorable conversion rates. Leveraging blockchain technology, particularly Bitcoin, BitPesa mitigates these costs, offering organizations the easiest, quickest, and most cost-effective means to handle cross-border payments for suppliers, distributors, employees, and the broader workforce.

BitPesa enables businesses and individuals to accept various forms of customer payments, including digital currencies like M-Pesa. Notably, deposits to local or international bank accounts can be processed on the same day, a significant improvement over the 2–5 days required by traditional services like the Western Union.

Research from MIT suggests that M-Pesa alone has lifted approximately 2% of Kenyan households out of poverty, highlighting the potential broader impact of platforms like BitPesa. In regions with constraints on accessing the US dollar, such as Nigeria, and in hyper-inflated economies like Zimbabwe, blockchain adoption becomes particularly beneficial. Workers in these economies are now better positioned to access and contribute to the global economy, aligning with the concept of 'Constant Connectivity,' challenging traditional banking sector norms that prioritize slow transactions for security and logistical reasons (Vohra, 2020).

### 3.5. Potential developments

#### **Smart contracts**

In the landscape of technological innovation, smart contracts, a pivotal feature of blockchain technology, are emerging as powerful tools to enhance efficiency and foster economic growth. A smart contract functions as an automated and self-executing code intended to perform predetermined actions specified in an agreement or contract. It acts as a digital agreement where transaction rules are defined, and all involved parties automatically comply with these rules, instilling a high level of confidence. Beyond cryptocurrency, smart contracts find applicability in diverse sectors like logistics, transportation, trade, finance, education, and healthcare, transforming these industries through the adoption of blockchain technology. The adaptable nature of smart contracts makes them a powerful tool for improving efficiency and security in various interactions and transactions across different sectors (Hacioglu, 2019).

Therefore, there is a growing trend in the utilization of blockchain technology within the healthcare sector. Blockchain technology in healthcare offers significant benefits by providing a specialized infrastructure for the secure storage and sharing of health data. Moreover, it plays a pivotal role in establishing a cost-effective public data partnership. This empowers individuals, healthcare providers, insurance companies, and other entities within the healthcare system to grant access to comprehensive health records, including genomics, lifestyle, and medical history, by utilizing specific passwords (Swan, 2015).

According to the McKinsey report, an imaginative and more effective application of health data has the potential to yield a recovery of over 300 million USD, equivalent to around 8% in savings for national health expenditures (Manyika et al., 2011).

Many academics and institutional reports agree that blockchain technology can lead to cost savings. However, there is a lack of empirical studies explaining exactly how these savings will happen. Even though there's no concrete evidence yet, it seems promising, and there's a need for more research to understand the specific ways in which blockchain could bring about economic benefits.

#### **ICO**

The term "ICO" stands for "initial coin offering," representing a formerly prevalent mechanism for securing capital in the early stages of cryptocurrency projects. This fundraising approach involves a blockchain-based startup creating a specific quantity of its native digital tokens, which

are then offered to early investors, typically in exchange for established cryptocurrencies like bitcoin or ether (Frankenfield, 2022).

One of the distinctive advantages of ICOs lies in the global reach and extensive distribution of potential investors. The geographical boundaries that typically constrain traditional fundraising methods are transcended, allowing a substantial portion of the global population to invest in the company, subject to minimal geographic restrictions. The convenience of wire transfers from diverse locations facilitates the influx of millions of dollars in cryptocurrency within minutes, circumventing potential delays imposed by conventional banking systems. The expeditious nature of fundraising in ICOs enables rapid access to capital, facilitating the establishment of early-stage traction for the company. Furthermore, ICOs empower companies to secure substantial funds at an exceptionally early stage of their development. This ability to amass significant capital during the nascent phases of a venture can be a critical factor in accelerating growth and fostering innovation within the cryptocurrency sector.

Investors engaging in ICOs can realize a multitude of benefits, each contributing to the attractiveness of this fundraising method.

Firstly, the potential for a vast network, particularly if the token launch occurs on a prominent blockchain such as Ethereum, adds considerable value. The association with a well-established network enhances capital appreciation potential for the ICO. Secondly, a distinctive advantage for investors is the limited regulations associated with ICOs, particularly in their earlier stages. Thirdly, the transparency of fund utilization is another noteworthy aspect of ICO investments. There exists the potential for implementing escrow mechanisms to verify the proper allocation of funds post-ICO. Lastly, ICO investments present an innovative means of deploying capital, offering a hedge against political and economic shocks (Merre, 2019).

As the world of cryptocurrencies keeps changing, the impact of Initial Coin Offerings on fundraising methods is an ongoing topic of exploration and examination. It's important to note that the cryptocurrency space comes with various risks and challenges, a discussion that the author will delve into in the next chapter. This recognition highlights the need for a thorough understanding of both the potential advantages and the complex challenges of the cryptocurrency landscape.

### 3.6. Challenges

#### **Price volatility**

Volatility refers to the degree of variation in the price of a financial instrument, such as a cryptocurrency, over a specific period. It is a statistical measure that quantifies the extent of price fluctuations and indicates the degree of risk associated with an asset. In the context of cryptocurrencies, volatility is a key characteristic that distinguishes them from traditional assets like stocks or fiat currencies. High volatility implies that the price of a cryptocurrency can experience significant and rapid changes within a short timeframe, while low volatility suggests more stable and gradual price movements.

Several factors contribute to the volatility of cryptocurrencies:

#### 1) Bitcoin supply and demand

The prices of most commodities are predominantly shaped by the principles of supply and demand. Similarly, Bitcoin's market value is primarily influenced by the quantity of coins in circulation and the prevailing willingness of individuals to pay for them. The cryptocurrency is intentionally constrained to a maximum of 21 million coins. As the circulating supply approaches this limit, the likelihood of prices escalating increases.

Forecasting the price implications when this limit is reached is challenging. Once the cap is reached, there will be no further profits from mining Bitcoin. With major financial players vying for ownership amid a diminishing supply, the price of Bitcoin is expected to fluctuate in response to the actions they undertake (Morgan Stanley, 2023).

#### 2) Investor Dynamics

As Bitcoin's scarcity intensifies, driven by a surge in demand, the cryptocurrency's popularity continues to grow. Over the long term, wealthier investors tend to retain their Bitcoin holdings, creating a hurdle for those with fewer resources to enter the market. According to the National Bureau of Economic Research, by the close of 2020, one-third of all Bitcoins were held by the top 10,000 investors (Makarov & Schoar, 2021).

The actions of significant investors, particularly Bitcoin whales with holdings of a minimum of 10 million BTC, play a role in the observed volatility of the Bitcoin market. The method by which these whales would divest their substantial holdings into fiat currency without adversely impacting Bitcoin's market price remains uncertain. A sudden sell-off by these influential investors could set





fluctuations. Despite the waning impact of Musk's tweets on prices throughout the year, the broader significance of celebrities and social media underscores the current absence of comprehensive regulation and maturity in the crypto market. The trajectory of the market likely involves increased regulatory measures and innovative developments, which could potentially diminish the influence of celebrity endorsements. Nevertheless, the cryptocurrency market continues to demonstrate its potential, attracting genuine investors and substantial institutional capital (Oosterbaan, 2021).

## **Security**

Cryptocurrency is often perceived as a potential panacea for addressing global challenges and bridging existing gaps. Unfortunately, the advent of new technologies also brings with it the inevitability of malevolent actors seeking to exploit them for nefarious purposes. It is essential to recognize that while cryptocurrencies offer promising solutions, the potential for misuse by certain individuals remains a serious concern. Furthermore, the dynamic nature of technological advancements necessitates continual vigilance and proactive measures to mitigate the risks associated with illicit activities within the realm of cryptocurrency. As the landscape evolves, a comprehensive understanding of the multifaceted aspects surrounding cryptocurrency is imperative to navigate the delicate balance between innovation and security.

While the use of data anonymization tools is crucial for safeguarding users' personally identifiable information (PII), these tools can also be exploited by entities engaging in illegal activities. In 2011, the Silk Road emerged to facilitate illicit drug transactions online while ensuring the anonymity of sellers and buyers through anonymization techniques.

Silk Road employed both data anonymization technology and a feedback trading system to create a secure environment for drug traders. Accessible only through the Tor network, designed to anonymize user data online, Silk Road provided a shield against unwanted surveillance, allowing users to conduct illegal transactions confidently without fear of their IP addresses being traced. Silk Road transactions exclusively used Bitcoin, a widely adopted digital currency with a public ledger accessible to legal authorities. To enhance privacy, dark wallets were introduced to encrypt and obscure Bitcoin transactions, providing an additional layer of anonymity for Silk Road participants (Frankenfield, 2021).

The downfall of Silk Road occurred in 2013 when the FBI, informed about the hidden marketplace, took decisive action to permanently shut down the site. In the process, they seized over 144,000 bitcoins (then valued at \$34 million) and apprehended numerous individuals involved in the

platform, including its founder, Ross Ulbricht. Ulbricht had amassed approximately \$80 million in commissions from the illicit transactions conducted within Silk Road (U.S. Attorney's Office, 2013).

While the utilization of cryptocurrencies in cross-border payments presents notable advantages, it also introduces the risk of being exploited for financing terrorism. A United Nations official interviewed by Bloomberg revealed a concerning trend: crypto-financed terror attacks have likely quadrupled in the past few years. Svetlana Martynova, a senior legal officer at the United Nations Counter-Terrorism Committee Executive Directorate, indicated that a couple of years ago, only 5% of terrorist attacks were associated with crypto financing or digital assets. Presently, there is a growing concern that this figure may have risen to approximately 20%.

The scale of crypto-related criminal activities has seen a substantial increase, reaching a record \$14 billion in blockchain transactions last year. This figure, reported by blockchain research firm Chainalysis, represents almost double the amount recorded in 2020, which stood at \$7.8 billion. This alarming surge underscores the urgent need for robust regulatory measures and international cooperation to address the potential misuse of cryptocurrencies for illicit purposes, particularly in the context of financing terrorism (Singh, 2022).

### **Ecological impact**

The process of mining, particularly for proof-of-work cryptocurrencies like Bitcoin, requires substantial computational power. This demand for computing resources has led to an upsurge in energy consumption, often derived from non-renewable sources, contributing to environmental degradation. The ecological footprint of cryptocurrency transactions has become a subject of heightened scrutiny.

According to findings presented by the United Nations University and Earth's Future journal, in the time span from 2020 to 2021, the global energy consumption by the Bitcoin mining network reached 173.42 Terawatt hours. This signifies that if Bitcoin were considered a sovereign nation, its energy usage would have ranked 27th globally, surpassing countries like Pakistan with a population exceeding 230 million. To counterbalance this environmental impact, the planting of 3.9 billion trees would be necessary (United Nations University, 2023).

Efforts to address the ecological impact of cryptocurrencies involve exploring more sustainable technologies, such as proof-of-stake consensus mechanisms, which require significantly less

energy. Additionally, the development of eco-friendly cryptocurrencies and the promotion of responsible mining practices are crucial steps toward mitigating the environmental damage caused by the crypto industry.

### **Cryptocurrency catastrophes**

FTX, once the third-largest cryptocurrency exchange by volume, stands out as a significant catastrophe in the crypto market. Its downfall not only led to a decrease in Bitcoin's value but also triggered a chain reaction that resulted in the bankruptcy of several prominent companies. While some argue that FTX's failure was a major setback, early cryptocurrency investors point to the infamous Mt. Gox collapse as an even more disruptive event, causing one of the lengthiest bear markets in crypto history.

Both FTX and Mt. Gox, being well-established players, had profound repercussions on the overall state of the cryptocurrency market. Numerous individuals suffered financial losses, and investor confidence plummeted.

Mt. Gox, a Tokyo-based decentralized cryptocurrency exchange that operated from 2010 to 2014, experienced a rise in prominence that attracted the attention of hackers. They successfully stole up to \$850,000 worth of Bitcoins from the exchange. Subsequently, Mt. Gox had to halt customer withdrawals and trading operations. The root cause was identified as transaction malleability, an inherent bug enabling hackers to divert bitcoins directly from the exchange's wallet. Despite filing for bankruptcy protection in the US in March 2014, Mt. Gox ceased operations in 2014, leaving many clients without refunds for their losses.

FTX, founded by Sam Bankman-Fried in 2018, rapidly ascended to become the third-largest crypto exchange by volume within two years. At its zenith, the platform served over a million users and facilitated trading for more than 300 cryptocurrencies. However, a series of events culminated in its collapse.

The unraveling began when it was revealed that Alameda Research, a crypto hedge fund owned by SBF, held billions of dollars in FTX's native token, FTT, using it as collateral for loans. This overleveraging left both Alameda and FTX vulnerable to a decline in FTT's value. Furthermore, Binance, the world's largest crypto exchange, decided to divest its FTT holdings, causing widespread panic among FTX users who began withdrawing their funds. The situation worsened when Binance backed out of a potential deal to acquire FTX. Finally, in November 2022, FTX

filed for bankruptcy due to a liquidity crunch with an estimated \$9 billion in customer funds missing from the exchange (CNBC, 2023).

In conclusion, the collapse of Mt. Gox and FTX underscores the vulnerability of even the most established players in the cryptocurrency market. These incidents not only had immediate and severe consequences for investors but also cast long shadows over the industry, eroding trust and confidence. The challenges faced by Mt. Gox, and the rapid rise and fall of FTX serve emphasizing the need for robust security measures and regulatory oversight to ensure the stability and resilience of the evolving crypto landscape.

### **3.7. Regulatory framework**

Crypto-assets serve various purposes, both financial and non-financial, although their current applications are primarily concentrated in the financial sector. Despite being smaller than the traditional financial sector, the combined market capitalization of all crypto-assets exceeded \$1 trillion as of February 2023, signifying growth. Consequently, regulatory attention has intensified, with authorities seeking to comprehend the potential advantages and risks for established businesses, financial stability, integrity, and the prevention of illicit finance and consumer protection issues (World economic forum, 2023).

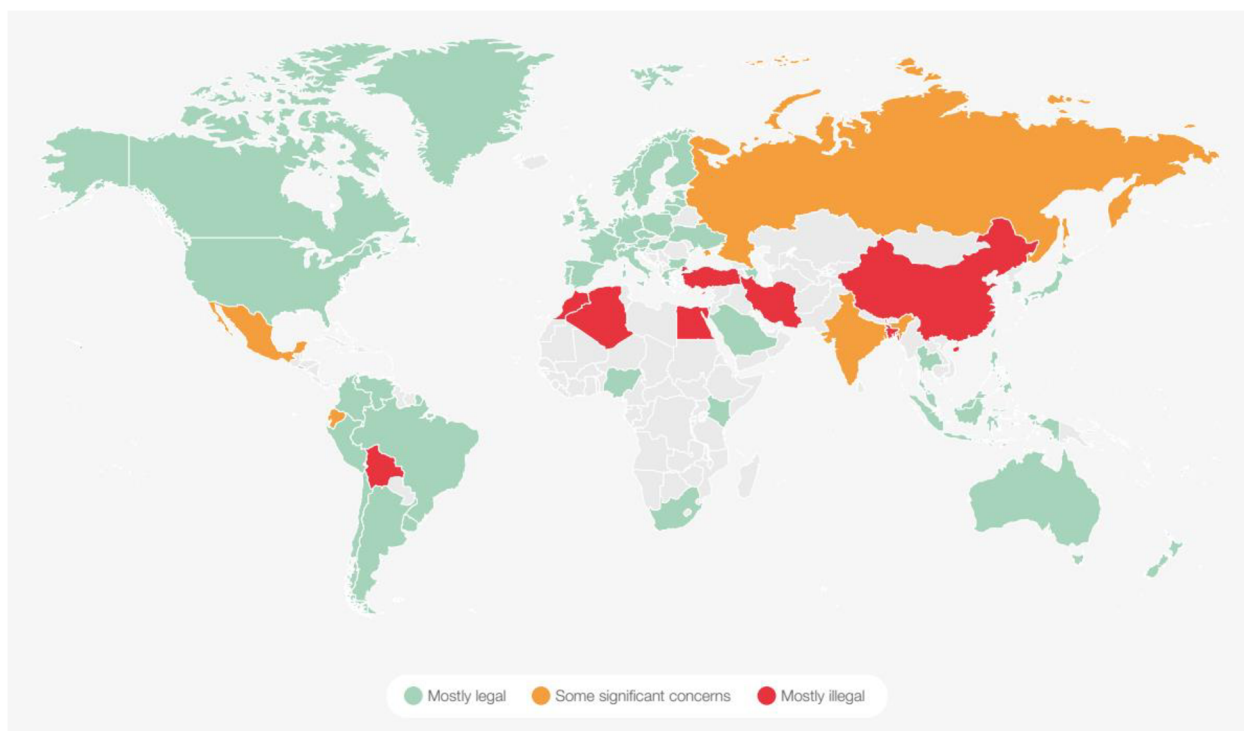
The industry experienced a seismic event in 2022 when a "stablecoin" collapsed and the subsequent downfall of major crypto exchanges, prompting robust reactions from both regulators and users.

The Financial Stability Board (FSB) put forth a set of recommendations and a framework for the international oversight of crypto assets and global stablecoin arrangements. The FSB emphasizes the need for national authorities to possess and deploy the necessary tools, powers, and resources to effectively regulate and supervise the expanding crypto and stablecoin market. In this vein, companies involved in crypto and stablecoins are expected to comply with comprehensive regulatory standards, encompassing robust governance and risk management structures, as well as secure protocols for collecting, storing, safeguarding, and reporting data. Global stablecoin arrangements are urged to adhere to stringent trust and transparency obligations, encompassing aspects such as redemption rights, stabilization mechanisms, and specific requirements regarding the composition and quality of reserve assets (PwC, 2022).

Moreover, the Financial Action Task Force (FATF) updated its standards in 2018 to incorporate virtual assets and service providers into measures against money laundering and counter-terrorism financing. Nevertheless, the decentralized nature of crypto assets, spanning international borders, poses a formidable challenge for their regulation, supervision, and enforcement. To grapple with these challenges, regulatory models for global financial entities and proposed frameworks for BigTechs could provide insights into managing some of these cross-border risks. However, in the absence of a unified global framework, national approaches may offer a practical alternative (P. Bains et al., 2022).

Regulatory strategies have diverged significantly regarding the status of the crypto environment across multiple jurisdictions. For instance, a distributed ledger technology (DLT)-based crypto token might be labeled a "virtual asset" in one jurisdiction, a "crypto token" or even a "virtual digital asset" in another and could be prohibited in a third. This has prompted calls for a global, coordinated approach to defining and regulating crypto-assets (Adrian, 2021).

**Figure 4, Cryptocurrency regulations by country**



Source: Thomson Reuters, 2022

The macroeconomic effects of cryptocurrency will be heavily influenced by the specific regulatory approach adopted.

### **“Wait and see” scenario**

A "wait and see" approach to regulation offers benefits such as providing regulators with the time needed to accurately understand and assess emerging trends, allowing markets to mature organically, fostering innovation in a less restrictive environment, maintaining flexibility to adapt to evolving circumstances, avoiding unintended consequences through careful observation, promoting global harmonization by learning from international regulatory approaches, facilitating thorough cost-benefit analyses, and encouraging public input and engagement for more inclusive decision-making (World economic forum, 2022).

### **Banning**

Some nations have opted to impose restrictions or outright bans on the use of cryptocurrencies as a regulatory strategy, a path that has already been taken by certain countries. Prohibiting the use of cryptocurrency is seen as a regulatory approach that may support a central bank's maintenance of monetary sovereignty. Another frequently cited motive for countries choosing to ban cryptocurrency is the desire to curb illicit activities within the darknet economy.

Nevertheless, issues related to criminal activities in the realm of cryptocurrency persist during the on-and-off ramp stages, with the current approach primarily relying on the implementation of know-your-customer (KYC) and anti-money-laundering (AML) measures.

Furthermore, implementing a ban carries the risk of pushing activities into hidden or covert channels. According to certain economists, nations that prohibit cryptocurrencies are essentially creating a barrier, akin to how countries establish firewalls on the internet. While governments can declare the use of cryptocurrency against the law, they lack the ability to completely prevent individuals from accessing the bitcoin network and engaging in transactions unless they take the extreme measure of shutting down the entire internet (World economic forum, 2022).

### **Regulatory adoption**

A clear regulatory landscape is expected to foster innovation, attract more companies to the sector, and prove particularly beneficial for countries aiming to draw in investment and skilled professionals. This regulatory clarity is likely to mitigate the negative impacts associated with currency substitution, as policymakers can proactively address such issues and prevent large capital outflows through effective regulation.

The crypto space is witnessing rapid innovation, giving rise to new concepts like NFTs (non-fungible tokens) and the metaverse. Cryptocurrencies are becoming the preferred transactional medium for DeFi, decentralized autonomous organizations (DAOs), NFT economies, and the growing metaverse. Projections for the global macroeconomic value of the metaverse range from \$1 trillion within three years to \$20 trillion within a decade, indicating its potential as a significant economic and financial environment. If these metaverse-generated funds are substantial and transferred outside, it may have an aggregate demand effect, contributing to overall economic growth (World economic forum, 2022).

On the environmental front, the Ethereum Foundation research team is actively working on technical updates to transition Ethereum from Proof of Work (PoW) to Proof of Stake (PoS), with the potential to reduce Ethereum's energy consumption by over 99%. This shift, along with similar considerations in other crypto-assets, offers the possibility of market-driven incentives for renewable energy and carbon-negative blockchain initiatives, aligning with climate objectives within the crypto industry (Chow, 2022).

### 3.7.1. Japan

Japan stands out globally for its proactive stance on cryptocurrency regulation. In April 2017, the Payment Services Act (PSA) officially recognized Bitcoin and other virtual assets as legal property. Since then, Japan has been a pioneer in cryptocurrency regulation, continuously updating and refining its regulatory framework.

The country has implemented various changes, such as replacing the term "virtual currency" with "cryptoasset" to provide clearer guidelines for the regulation of cryptocurrency exchanges and trading platforms. Additionally, Japan has enforced Anti-Money Laundering/Countering the Financing of Terrorism (AML/CFT) obligations, Know Your Customer (KYC) checks, and recordkeeping standards to ensure the transparency and security of cryptocurrency exchanges. Currently, Japan is actively working on establishing guidelines for applying the "Cryptocurrency Travel Rule" to virtual asset service providers (VASPs) within its borders, aiming to further enhance regulatory measures and maintain a secure environment for investors (Sanction Scanner, 2023).

Japan's commitment to stringent regulation stems from past challenges. Notably, in 2014, the infamous hacking incident at MtGox, the largest Bitcoin exchange at the time, resulted in the loss of 800,000 Bitcoins. Subsequently, in 2018, Coincheck, another Tokyo-based crypto exchange,

suffered a theft of \$500 million worth of NEM blockchain coins. These incidents underscored the necessity of robust regulatory measures. (Bambysheva, 2023).

Despite global financial turmoil, Japan demonstrated resilience during the collapse of FTX in November, which exposed an \$8.7 billion deficit. Sheila Warren, CEO of the Crypto Innovation Council, noted Japan's indifference to international drama and emphasized that the country had already navigated such challenges. FTX Japan, amidst the crisis, allowed verified account holders to continue withdrawing funds. As of February 21st, FTX Japan reported that nearly 10,000 individual and corporate clients had withdrawn a total of 23.4 billion yen (\$175.4 million) in crypto assets and fiat funds. This successful outcome is considered a triumph for Japanese financial regulators and their stringent regulations designed to safeguard consumers in the volatile realm of cryptocurrencies (Bambysheva, 2023).

Moreover, Japan boasts a remarkable adoption rate of over 10% in the crypto market, which positions it as a leader in embracing digital currencies. This widespread acceptance is driven by a tech-savvy population, comprising over 100 million people, who have demonstrated a keen interest in exploring new financial technologies.

The combination of high crypto adoption, a pro-technology culture, and a mature market makes Japan an appealing destination for investors and big companies. This attraction is not just limited to domestic players but extends globally, with companies like Amber Group actively seeking entry into the Japanese market. The CEO of Amber Group, Michael Wu, aptly describes Japan as having a "digitally native, highly educated, and high-income population," making it an ideal target for digital finance businesses (Clynch, 2022).

As more companies enter the market, there is a potential for increased tax revenue, further supporting government initiatives and public services. Japan's approach has the transformative wave is expected to usher in a new era characterized by innovation, job creation, and robust economic growth.

### 3.7.2. China

China, once a prominent global center for Bitcoin trading and mining, underwent a significant transformation in its approach to cryptocurrencies. The nation's leadership, faced with the challenge of managing the rising popularity of digital currencies and their potential impact on the stability of the national fiat currency, implemented a series of regulatory measures. During the period of 2016 to 2017, the cryptocurrency mining industry witnessed substantial expansion,



fueled by increasing interest in anonymity and the prospect of value appreciation in digital currencies. To address concerns about cryptocurrencies undermining the value of the national currency, the Chinese government responded by prohibiting initial coin offerings (ICOs) in 2017 (The State Council, The People's Republic of China, 2017).

In a strategic shift in 2019, China opted to embrace blockchain technology for official record-keeping purposes, particularly in areas such as fraud prevention and food safety. Concurrently, the government initiated the development of a state-backed digital currency known as the Digital Currency Electronic Payment (DCEP). However, in a significant development in September 2021, the government escalated its regulatory stance by banning all non-government-approved cryptocurrencies (Lewis, 2020).

This prohibition resulted in the forceful closure of cryptocurrency exchanges, compelling investors to hastily withdraw their assets to personal wallets. Notably, the decision by Changpeng Zhao, the creator of Binance, to relocate the exchange out of China in 2017 proved to be a strategic and prescient move. Ding Feipeng, the director of Beijing Liantong Law Firm, emphasized that irrespective of the location or staffing of virtual currency-related businesses, if they continued to serve Chinese users, they would be subjected to the same spectrum of criminal penalties (Adejumo, 2021).

In response to the regulatory crackdown, several cryptocurrency companies announced the cessation of services for individuals in China, implementing IP address blocks. This announcement also had repercussions for Chinese citizens employed by such companies abroad, as their roles were now deemed illegal and subject to potential prosecution. The evolving regulatory landscape in China underscored the challenges faced by the cryptocurrency industry and the government's commitment to assert control over the use and trading of digital assets within its borders (Brooke, 2021).

The ban has resulted in the loss of opportunities for Chinese citizens and businesses operating in the cryptocurrency space, forcing them to cease operations or relocate to more crypto-friendly jurisdictions. The closure of crypto exchanges and the restriction on related services have not only affected the domestic industry but also had a cascading effect on global cryptocurrency markets. The sudden withdrawal of Chinese participation has contributed to increased market volatility and uncertainty. While the ban has brought about a more controlled environment for the Chinese

government, it has also raised concerns about stifling innovation and limiting economic opportunities associated with the burgeoning cryptocurrency sector.

However, in September 2022, a legal professional contended that notwithstanding China's nationwide prohibition on cryptocurrencies, the nation's legal framework could safeguard individuals holding cryptocurrencies in instances of theft or breaches. Substantiating this viewpoint, a Shanghai court officially acknowledged Bitcoin as virtual property in May 2022, consequently reinforcing legal protections for cryptocurrency within China (Yahoo Finance, 2023).

This progression underscores the persistent disparity between China's regulatory directives and the judicial understanding of virtual assets, indicating a potential shift in the country's stance towards cryptocurrencies (Medium, 2023).

## 4. Practical part

The comparative analysis in the practical section of this research paper focuses on Japan and China. The selection of Japan and China for this analysis is underpinned by various considerations.

Firstly, both nations have adopted distinct approaches to the incorporation and oversight of cryptocurrencies. Japan, as an early adopter, has embraced cryptocurrencies and assumed a proactive regulatory stance. It has earned recognition as one of the most cryptocurrency-friendly nations, characterized by a supportive regulatory framework and widespread cryptocurrency adoption. Conversely, China has adopted a more cautious approach, instituted stringent regulations, and prohibited initial coin offerings (ICOs) and cryptocurrency exchanges.

Secondly, Japan and China are significant players in the global economy. China, ranking as the world's second-largest economy with a GDP of \$14.72 trillion as of 2022, and Japan, the third largest with a GDP of \$5.06 trillion in the same year, both house major technology and financial corporations (The World Bank, 2022). Consequently, their decisions and actions regarding cryptocurrencies carry substantial implications for the global growth and adoption of the industry.

In this research, a correlation analysis will be conducted to investigate the relationship between cryptocurrency market and key macroeconomic indicators - Gross Domestic Product (GDP), Foreign Direct Investment (FDI), and the employment rate. The choice of these indicators for the analysis is strategic for several reasons:

### 1) Exchange rates

“According to analysts, the concentration of Bitcoin's valuation in Japan has been identified as a potential catalyst for fostering GDP growth. Conversely, China has implemented rigorous regulatory measures pertaining to digital currencies, precipitating a substantial reduction in the proportion of yuan-bitcoin trade. This decline is particularly noteworthy given the extended period during which yuan-bitcoin transactions dominated the market” (Cheng, 2018). Therefore, the author suggests that the exchange rates of BTC/JPY and BTC/CNY may serve as indicators within the cryptocurrency market, affording their potential impact on macroeconomic indicators in Japan and China.

## 2) GDP Indicator:

The crypto industry's influence on GDP is multifaceted, impacting various aspects of economic activity. Despite being a relatively new sector, its rapid expansion and growing market capitalization signify a fresh arena for economic endeavors and value generation. The current global market capitalization for cryptocurrency, standing at \$1.13 trillion, reflects a substantial year-on-year change of 13.03%. Notably, Bitcoin (BTC) holds a market cap of \$540 billion, representing 48.0% dominance. Concurrently, Stablecoins contribute \$123 billion, constituting 10.95% of the overall crypto market capitalization (Global Cryptocurrency Market Cap Charts, 2023).

## 3) FDI Indicator:

The expansion of the cryptocurrency market has had a notable impact on the Foreign Direct Investment (FDI) index, influencing it through the generation of substantial wealth for early cryptocurrency investors. Traditional financial entities, hedge funds, and significant market actors are progressively integrating cryptocurrencies into their portfolios. This strategic shift underscores a growing acknowledgment and confidence among institutional investors in the inherent value of digital assets. This institutional involvement not only contributes to the cryptocurrency market's growth but also has a cascading effect on the broader economy, as reflected in the FDI index.

## 4) Employment Rate Indicator:

The employment rate is a key indicator chosen for its reflection of the transformative impact of cryptocurrencies on the job market. The advent of cryptocurrencies has given rise to a multitude of new professions and career paths, demanding unique skills and expertise. This evolution in the employment landscape is evident in the significant increase in job postings related to blockchain and cryptocurrency on platforms like LinkedIn. The diverse skill set required, ranging from blockchain developers to legal advisors specializing in crypto regulations, underscores the industry's demand for specialized professionals. The growing employment in the sector contributes to household income and consumer spending, which are essential components of GDP.

This analysis will be distinctly conducted for Japan, characterized by a friendly regulatory framework towards cryptocurrencies, and for China, where regulations prohibit their widespread use. A positive correlation implies a symbiotic relationship, suggesting that as cryptocurrency market increases, the economic indicators follow suit, signifying a robust economy. Conversely, a negative correlation suggests an adverse impact on the economy. A neutral correlation, indicating no significant relationship, implies that the cryptocurrency market has minimal influence on the

economy, irrespective of the country's acceptance or rejection. Ultimately, the research aims to determine whether a favorable regulatory approach, as exemplified by Japan, correlates with a more advantageous economic outcome, contributing valuable insights for policymakers. Understanding these dynamics may influence the future of cryptocurrency globally, as other countries may adopt similar regulations that prove to be advantageous.

#### 4.1. Case study Japan

To begin with, the author analyzes the correlation between the exchange rate and GDP growth rate. The period for this investigation ranges from 2015 to 2022. Table 1 represents the dataset used for the analysis.

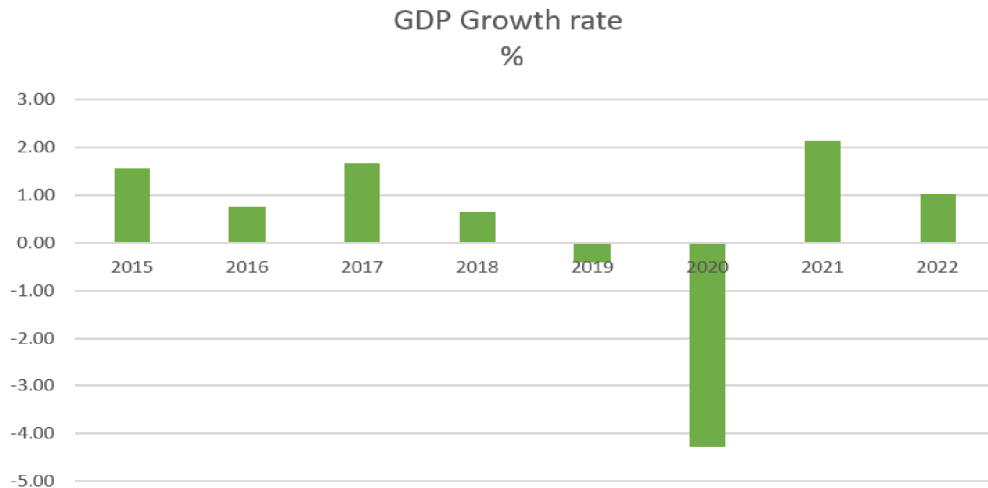
**Table 1, Dataset for the GDP growth rate**

Year	GDP Growth rate %	Exchange rate (BTC/JPY)
2015	1.56	32371.93
2016	0.75	59393.85
2017	1.68	386252.91
2018	0.64	889168.13
2019	-0.40	767181.60
2020	-4.28	1118284.16
2021	2.14	5012430.71
2022	1.03	3840421.77

Source: Statista and Yahoo Finance, 2023

The negative growth rates in 2020, such as the -4.28%, reflect the economic challenges and contractions experienced by many countries around the world during the pandemic. Governments implemented various measures, including lockdowns and social distancing, which had significant effects on economic activities, trade, and overall growth.

**Figure 5, GDP growth rate**



Source: own processing

In examining the GDP growth chart for Japan, an upward trajectory is evident in the year 2017. This notable positive shift prompts consideration of various factors that may have contributed to this economic upswing. One potential aspect that could be associated with this positive trend is the official recognition of Bitcoin as legitimate property during that year. It is important to underscore that this observation is preliminary, and any purported relationship should be examined through correlation analysis due to the complexity of factors influencing GDP.

**Table 2, Correlation analysis**

Correlation
0.232288
p value
0.579874

Source: own processing

While there is a weak positive correlation between GDP growth rate and the exchange rate, the lack of statistical significance (as indicated by the high p-value) suggests caution in making strong conclusions about the relationship based on the current data. The non-significant correlation suggests the complex influence of multiple factors on GDP, with the cryptocurrency market playing a relatively minor role.

The author considers Direct Investment (FDI) as the second variable and analyzes its correlation with exchange rate.

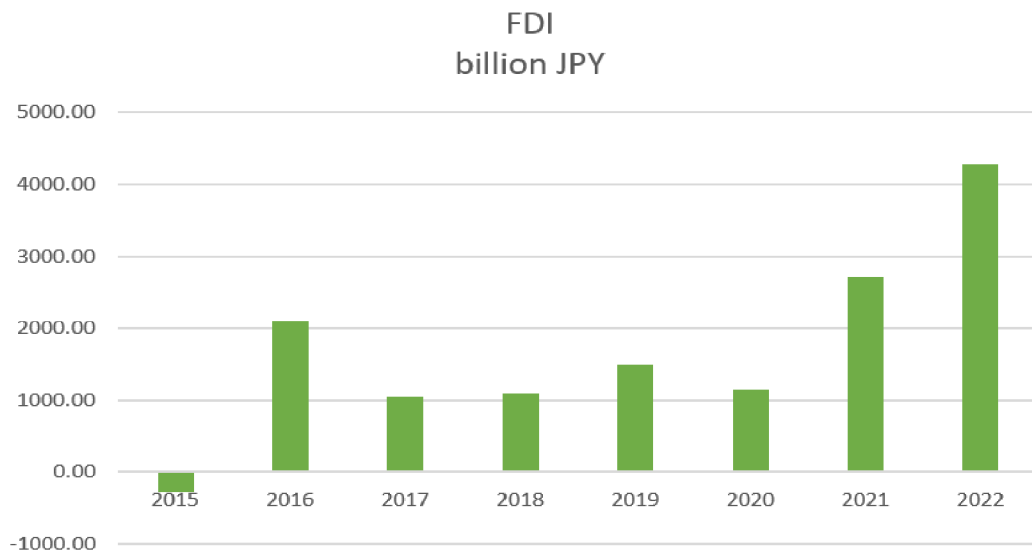
**Table 3, Dataset for FDI**

Year	FDI billion JPY	Exchange rate (BTC/JPY)
2015	-272.36	32371.93
2016	2104.24	59393.85
2017	1049.54	386252.91
2018	1098.99	889168.13
2019	1498.89	767181.60
2020	1142.33	1118284.16
2021	2707.56	5012430.71
2022	4277.70	3840421.77

Source: Statista and Yahoo Finance, 2023

In 2015 FDI was -272.36 billion JPY. A negative value might indicate a net outflow of investment, meaning that more money left the country than entered.

**Figure 6, FDI net inflow**



Source: own processing

The data shows fluctuations in FDI over the years, with some years experiencing substantial increases and others seeing decreases.

**Table 4, Correlation analysis**

Correlation
0.754115
p value
0.0306485

Source: own processing

The data suggests a moderately strong positive correlation between FDI in Japan and the exchange rate of Bitcoin to Japanese Yen. This means that, on average, as FDI increases, the exchange rate of Bitcoin to Japanese Yen tends to increase as well, and vice versa.

The final indicator to be examined is the employment rate.

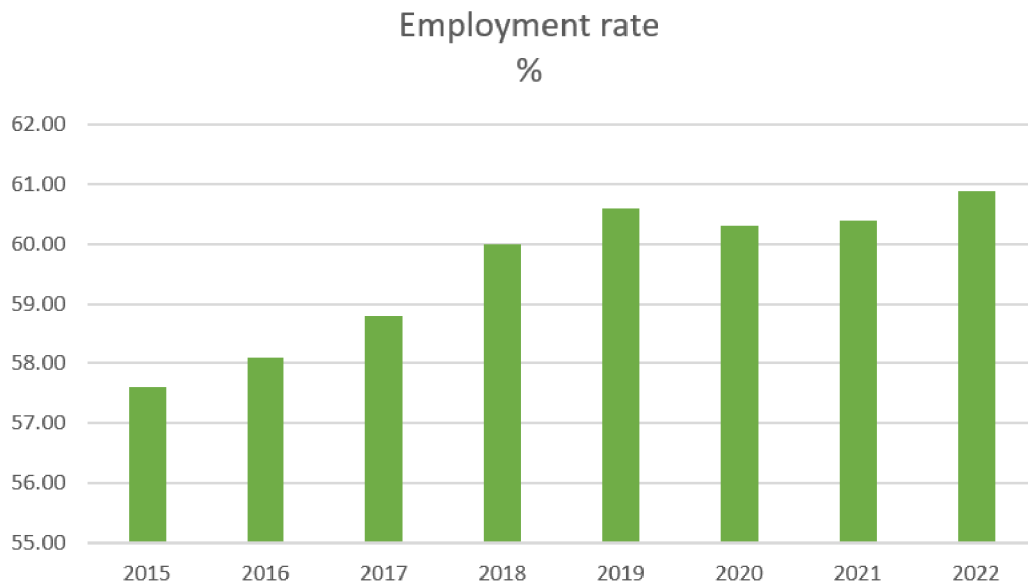
**Table 5, Dataset for the Employment rate**

Year	Employment rate %	Exchange rate (BTC/JPY)
2015	57.60	32371.93
2016	58.10	59393.85
2017	58.80	386252.91
2018	60	889168.13
2019	60.60	767181.60
2020	60.30	1118284.16
2021	60.40	5012430.71
2022	60.90	3840421.77

Source: Statista and Yahoo Finance, 2023

The data suggests a general upward trend in the employment rate over the specified years, with some minor fluctuations.

**Figure 7, Employment rate**



Source: own processing

This positive shift indicates improvements in the labor market and increased employment opportunities during this period.



**Table 6, Correlation analysis**

Correlation
0.651519
p value
0.080074

Source: own processing

The data indicates a moderately strong positive correlation between the employment rate and the exchange rate. However, the p-value suggests that this correlation is not statistically significant, and caution is needed when drawing conclusions about the relationship.

#### 4.2. Case study China

The author examines the correlation between the exchange rate and the growth rate of Gross Domestic Product (GDP). For China The investigation spans the period from 2015 to 2022 as well. Table 1 serves as the dataset employed for the analysis. By 2019, there was a more noticeable slowdown with a growth rate of 5.95%. The year 2020 saw a significant drop to 2.24%, likely due to the global challenges, including the COVID-19 pandemic. However, there was a remarkable rebound in 2021, marked by an 8.45% growth rate, possibly reflecting recovery efforts.

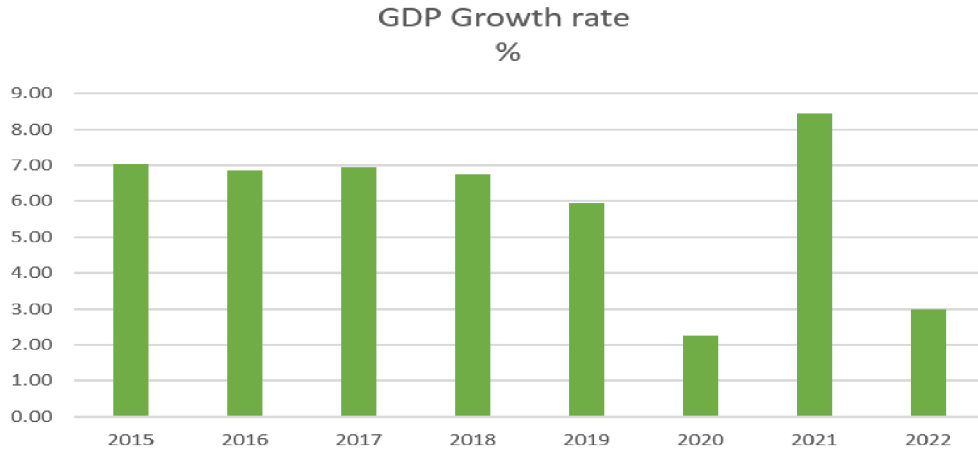
**Table 7, Dataset for the GDP growth rate**

Year	GDP Growth rate %	Exchange rate (BTC/CNY)
2015	7.04	1676.29
2016	6.85	3632.60
2017	6.95	21659.19
2018	6.75	52784.01
2019	5.95	48940.79
2020	2.24	72310.21
2021	8.45	293998.78
2022	2.99	199970.83

Source: Statista and Yahoo Finance,2023

In Figure 8, the author presents the growth of the GDP in time.

**Figure 8, GDP growth rate**



Source: own processing

These variations in GDP growth rates offer insights into the economic performance and resilience of the entity over the analyzed period.

**Table 8, Correlation analysis**

Correlation
0.014852
p value
0.972157

Source: own processing

The ban on cryptocurrencies in China in 2017, which included the prohibition of ICOs and the closure of domestic cryptocurrency exchanges, likely had an impact on the provided data. The increased regulatory scrutiny may have contributed to heightened volatility in Bitcoin prices on Chinese exchanges, potentially influencing the BTC/CNY exchange rate. Furthermore, the ban could have broader economic implications, affecting businesses within the cryptocurrency sector and potentially impacting overall GDP growth rates. However, the weak correlation coefficient between GDP growth rates and Bitcoin exchange rates, as indicated by the provided data, suggests that the ban might not have a strong direct correlation with the economic performance of the entity. It's crucial to note that correlation does not imply causation, and other factors not considered in this analysis may have contributed to the observed trends.

The author considers Direct Investment (FDI) as the second variable and analyzes its correlation with exchange rate.

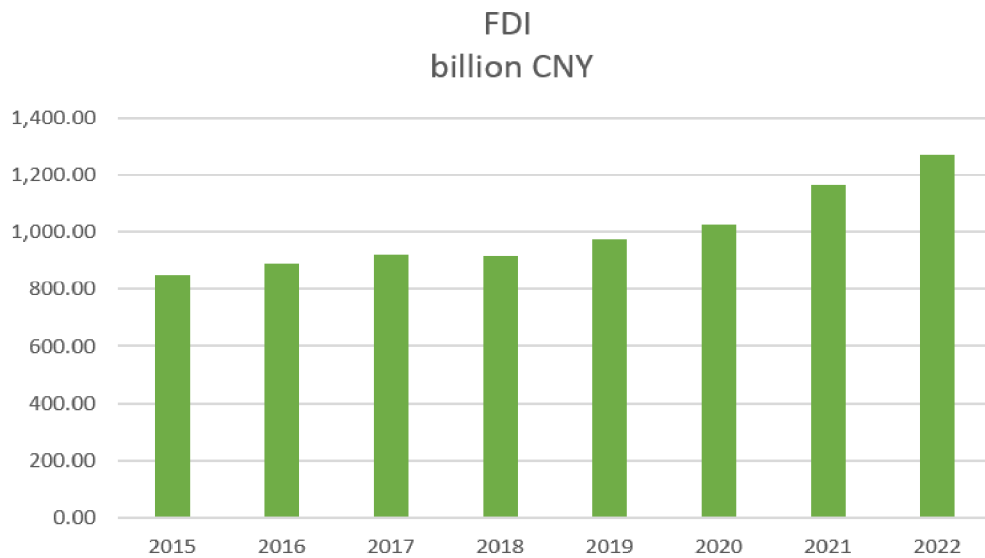
**Table 9, Dataset for the FDI**

Year	FDI billion CNY	Exchange rate (BTC/CNY)
2015	851.90	1676.29
2016	888.95	3632.60
2017	922.08	21659.19
2018	916.99	52784.01
2019	975.94	48940.79
2020	1,029.13	72310.21
2021	1,165.39	293998.78
2022	1,273.27	199970.83

Source: Statista and Yahoo Finance, 2023

The data shows a general increasing trend in Foreign Direct Investment over the years, with fluctuations in certain years. Higher FDI values generally indicate increased confidence from foreign investors in the economic opportunities of the entity.

**Figure 9, FDI net inflow**



Source: own processing

The data suggests a favorable environment for foreign investors in the entity during the given period.

**Table 10, Correlation analysis**

Correlation
0.886402
p value
0.003360

Source: own processing

The positive correlation despite China's crypto industry ban in 2017 could be attributed to several factors. The recognition of Bitcoin as virtual property by a court in 2022 could potentially influence FDI in several ways. This legal recognition may reduce uncertainty and legal risks associated with Bitcoin ownership, potentially making it a more attractive asset for international investors. As a result, this legal clarity could positively impact FDI by fostering a more favorable environment for businesses and investors utilizing Bitcoin within the jurisdiction.

The third indicator to be examined is the employment rate.

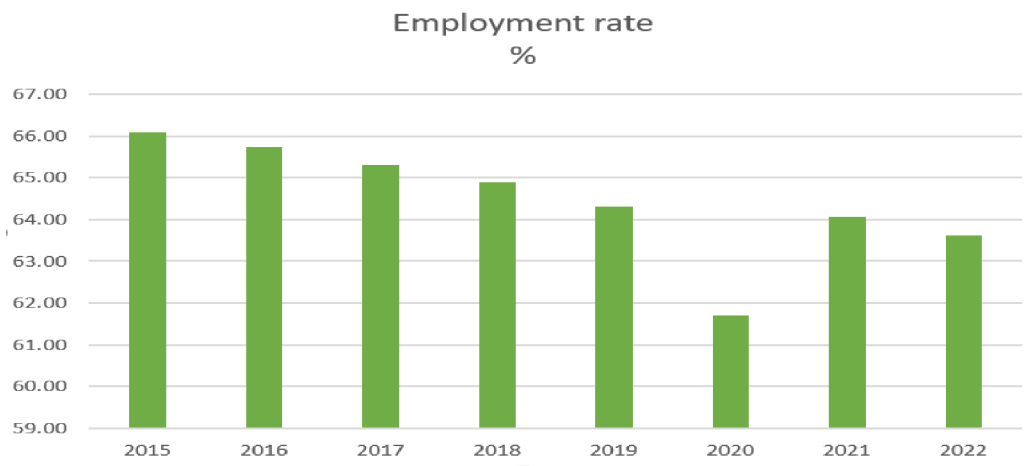
**Table 11, Dataset for the Employment rate**

Year	Employment rate %	Exchange rate (BTC/CNY)
2015	66.08	1676.29
2016	65.74	3632.60
2017	65.30	21659.19
2018	64.89	52784.01
2019	64.31	48940.79
2020	61.71	72310.21
2021	64.06	293998.78
2022	63.63	199970.83

Source: Statista and Yahoo Finance, 2023

There's a decline in the employment rate from 2015 to 2020, possibly influenced by economic factors such as global economic conditions, technological changes, or policy shifts.

**Figure 10, Employment rate over time**



Source: own processing

**Table 12, Correlation analysis**

Correlation
0.435206
p value
0.281171

Source: own processing

The positive correlation indicates a moderate positive relationship between the two variables. However, the p-value is relatively high, suggesting that this correlation is not statistically significant.

### **4.3. SWOT Analysis**

The date was constrained due to the youth of the cryptocurrency market. It was not possible to compare China's indicators before and after the ban since China implemented the ban in 2017, and the available data in the public domain begins from late 2014. Moreover, numerous factors can influence the economy, making a comparison of these macro-indicators a limited analysis.

In addition to the statistical analysis, the author will conduct a comparative SWOT analysis based on a comprehensive review of the literature. This approach aims to enhance the accuracy of results.

#### **Japan**

##### **Strengths:**

- Japan's early and proactive approach to cryptocurrency regulation since 2017 has established a clear legal framework, fostering a sense of security and legitimacy in the market.
- The commitment to consumer protection demonstrated during the FTX crisis showcases Japan's dedication to maintaining a trustworthy and secure environment for investors, enhancing market confidence.
- Japan's crypto-friendly regulatory environment makes it an attractive destination for global investors and companies, potentially fostering economic growth and innovation within the cryptocurrency space.

##### **Weaknesses:**

- Historical challenges with major hacking incidents, such as MtGox and Coincheck, have created concerns about the security of crypto exchanges, necessitating ongoing efforts to enhance cybersecurity measures.
- The rapidly evolving nature of the crypto space requires Japan to continuously update its regulations, posing a challenge in keeping pace with technological advancements while maintaining an effective regulatory framework.
- There is a risk of overregulation stifling innovation, as stringent rules may impede the development of new technologies and business models within the cryptocurrency and blockchain sector.

**China:**

**Strengths:**

- China's active embrace of blockchain technology for official record-keeping signals a commitment to exploring the benefits of distributed ledger technology in various sectors.
- The development of the Digital Currency Electronic Payment (DCEP) reflects China's efforts to innovate in the digital currency space, potentially providing economic advantages and reshaping financial transactions.
- The recognition of Bitcoin as virtual property by a Shanghai court provides legal clarity, potentially paving the way for a more nuanced regulatory approach.

**Weaknesses:**

- China's strict ban on non-government-approved cryptocurrencies limits the scope for decentralized innovation and potentially stifles economic opportunities in the crypto space.
- The forceful closure of cryptocurrency exchanges has led to a loss of opportunities for businesses and investors, impacting the development of the cryptocurrency market.
- China's withdrawal from the global crypto market has increased market volatility, raising concerns about the stability of the cryptocurrency landscape.

**Figure 11, SWOT Analysis**

	<b>Japan</b>	<b>China</b>
<b>Strengths</b>	Proactive regulation	Embracing blockchain technologies
	High resilience to crypto crisis	Developing DCEP
	Attracting investors	Recognizing bitcoin as virtual property
<b>Weaknesses</b>	Hacking incidents	Banning cryptocurrency
	Evolving crypto space	Lossing job opportunities
	Overregulation impact	Increasing global volatility
<b>Opportunities</b>	Increasing tax revenue with more companies entering the market	Potential positive shift in regulations
	Contributing to economic growth with DeFi and NFTs innovation	Economic benefits from DCEP
	Searching for renewable energy	Attracting investors in blockchain technology
<b>Threats</b>	Lossing investors due overregulation	Lossing economical benefits because of ban
	Vulnerability to hacking incidents	Unsertainty in regulations impacting investors confidence

Source: own processing

## 5. Results and Discussions

During the comparative static analysis conducted for Japan and China, it was identified that the most significant correlation between exchange rates and macroeconomic indicators is observed in the realm of investments. Despite the assumed positive shift in GDP and employment, the data did not confirm a significant impact of the crypto industry on the economy. However, it is important to note that investments related to cryptocurrencies indirectly contribute to attracting investors and foreign funds, which can have a positive effect on the money turnover in the country and, consequently, on the economy.

It is crucial to emphasize that the cryptocurrency market is relatively young, and therefore, making conclusive statements based on the selected static criteria for correlation analysis may be inappropriate. The SWOT analysis indicates that positive regulation of cryptocurrencies in Japan can have a positive impact on the economy, but the country becomes vulnerable to hacks and speculation. In the case of China, the loss of potential investments due to the ban on cryptocurrencies is offset by active development of blockchain technologies and the creation of its own digital currencies.

The analysis also underscores the importance of a balanced approach in regulating the cryptocurrency market. Overly strict laws can stifle market development and have negative implications for the economy, while a complete ban can also have adverse consequences.

### 5.1. Recommendations

The recommendations prioritize the development of a harmonized understanding, best practices, and standards at both the international and national levels, emphasizing the crucial role of cooperation between authorities and industry stakeholders. Japan serves as an example, demonstrating resilience during a crisis caused by the collapse of the FTX cryptocurrency exchange, attributable to its active regulatory policies and flexibility in responding to evolving circumstances. BThe collaboration between international organizations, regulators, and industry players, along with the engagement of civil society and users, is crucial for ensuring the responsible evolution of the crypto-asset space, promoting interoperability, enhancing security, and ultimately contributing to the long-term viability of this transformative technology.

## 6. Conclusion

In the modern world, the issue of regulating cryptocurrencies is gaining increasing importance, as these financial instruments have the potential to transform the global economic system. The emphasis is placed on the fact that cryptocurrencies, being an international phenomenon, require unified standards to prevent negative consequences.

It is important to note that the diverse use of cryptocurrencies can include illegal activities, such as creation of cyber threats or money laundering. In this context, an analogy can be drawn with the field of information security, where both creators of malicious programs and developers of antivirus software coexist. Similarly, in the world of cryptocurrencies, tools are being developed to enhance the financial sector, but this innovation also gives rise to negative aspects.

The evolution of technologies will continue, and bans will inevitably be unable to completely stop the development of cryptocurrencies. To prevent the creation of underground markets and their use in negative spheres, it is asserted that international standards and cooperation represent more effective methods of regulation.

Analyzing this work, the author believes that in the short term, it may yield positive results for the country's economy. This is expressed in the increase in the volume of money circulation, the creation of new jobs, and the indirect impact on economic development. It is particularly important to emphasize that cryptocurrencies can be beneficial in developing countries, where they serve as an alternative to a not yet fully formed national financial sector.

However, when assessing the long-term perspective of cryptocurrency development, it should be acknowledged that this industry is a relatively young market, and more significant consequences of its influence will likely become clear over time. The answer to the question of the future of cryptocurrencies remains the subject of further research, requiring careful monitoring and adaptation of legislation in accordance with changes in the technological and financial landscape.



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### List of abbreviations

AML - Anti-Money Laundering

AML/CFT - Anti-Money Laundering/Countering the Financing of Terrorism

BTC - Bitcoin

CNY - Chinese Yuan

DAOs - Decentralized Autonomous Organizations

DCEP - Digital Currency Electronic Payment  
DLT - Distributed Ledger Technology  
DDoS - Distributed Denial of Service  
FATF - Financial Action Task Force  
FDI - Foreign Direct Investment  
FSB - Financial Stability Board  
GDP - Gross Domestic Product  
ICO - Initial Coin Offering  
JPY - Japanese Yen  
KYC - Know Your Customer  
NFTs - Non-Fungible Tokens  
PoS - Proof of Stake  
PoW - Proof of Work  
PSA - Payment Services Act  
VASPs - Virtual Asset Service Providers