

## SECTION 1.

### ECONOMIC THEORY, MACRO- AND REGIONAL ECONOMY

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## GLOBAL CRYPTOCURRENCY MARKET

***Annotation:** This study delves into the intricate dynamics of the global cryptocurrency market, exploring the interplay between technological advancements and evolving consumer behaviors on a worldwide scale. Through a comprehensive analysis of blockchain technology and the digital economy, the research brings clarity to the global implications of cryptocurrency adoption, emphasizing the transformative potential of digital assets in reshaping financial systems across diverse economic and cultural contexts. By examining the influence of cybersecurity threats and market trends on a global level, the study provides valuable insights for stakeholders navigating the complexities of the global cryptocurrency landscape.*

**Introduction.** The material values, regulatory frameworks, and technological architecture of the global economy are in a perpetual state of evolution, shaped by a complex interplay of factors. Tangible values, encompassing societal norms, consumer preferences, and environmental considerations, continually shift in response to cultural changes, economic trends, and geopolitical events. These values not only influence consumption patterns but also drive demand for certain products and services, prompting businesses to adapt their strategies accordingly.

Meanwhile, regulatory frameworks, comprising laws, policies, and international agreements, are subject to constant review and adjustment. Governments and supranational organizations regularly enact new regulations or revise existing ones to address emerging challenges.

Moreover, the technological architecture of the global economy undergoes relentless innovation and transformation. Breakthroughs in fields like artificial intelligence, blockchain, and renewable energy continually reshape industries, creating new opportunities and disrupting traditional business models.

In the past, central banks have traditionally centralized the management of currency in nearly every jurisdiction, wielding control over its issuance, regulation, and circulation [1]. This

centralized approach undeniably offers certain advantages, such as ensuring stability, standardization, and compliance with regulatory frameworks. However, it also carries inherent drawbacks, including susceptibility to political influence, inefficiencies in decision-making, and limited innovation.

Nevertheless, it's crucial to acknowledge that social norms, often emerging organically and independently of legal mandates, play a significant role in shaping the adoption and use of new technologies. Throughout history, transformative inventions such as radio and the Internet have revolutionized societies also due to the organic evolution of social behaviors and expectations surrounding these innovations.

Similarly, the emergence of cryptocurrencies represents a contemporary example of technological advancement intersecting with social dynamics. Cryptocurrencies, facilitated by cutting-edge blockchain technology, challenge traditional notions of currency and financial intermediation.

In today's world, digitalization has left its mark on nearly every aspect of the economy. This transformation has given rise to new markets, communication methods, and ways of organizing production and services. The active push toward digitalization has not only crafted a detailed digital profile of individuals but also sparked shifts in worldview [1]. Alongside traditional tangible assets, intangible digital assets like intellectual property now hold significant value. These digital goods and services are traded in a global marketplace without geographical limitations, predominantly consumed and utilized within digital spaces. Consequently, transactions are expedited, facilitating swift communication and delivery between buyers and sellers, all conducted using fiat currency and banking infrastructure.

Given these circumstances, the adoption of cryptocurrencies and blockchain technologies has emerged as a strategic response to the evolving landscape of the global economy. Cryptocurrencies represent a hallmark of the digital economy, governed by algorithms grounded in objective mathematical principles [1]. Their decentralized nature, overseen by the system itself, offers enhanced stability against external interference. Furthermore, cryptocurrencies boast the potential to mitigate transaction costs and serve as an internationally accessible means of exchange, benefiting all parties involved. Despite inherent technical challenges such as slower transaction processing and system stability risks, various nations are already exploring digital currencies and blockchain technology.

Among the diverse array of cryptocurrencies in circulation worldwide, a select few have emerged as dominant players, driving the bulk of the market capitalization. Notably, Bitcoin, Ethereum, DASH, Monero, and NEM have established themselves as leaders in terms of growth and adoption, collectively commanding a significant share of the total cryptocurrency market capitalization, amounting to approximately 91% [2].

**Analysis.** Cryptocurrencies are typically classified into three main groups: bitcoin, altcoins, and tokens [3]. Bitcoin, often regarded as the pioneer in the field, serves as a decentralized digital currency and a store of value. Altcoins, like Litecoin, Ethereum, and Ripple, offer alternatives to Bitcoin, each with distinct features and purposes. While some altcoins share similarities with Bitcoin, others employ different consensus mechanisms to cater to specific user preferences. Tokens, unlike cryptocurrencies like Bitcoin and altcoins, do not have their own blockchain but are instead built on existing blockchain platforms such as Ethereum. They are primarily used within decentralized applications (Dapps) for various purposes such as governance, service access, or asset ownership representation [3]. Tokens are further categorized into product tokens, payment tokens, platform tokens, and security tokens. Payment tokens, including Bitcoin and Dogecoin, serve as alternative currencies and payment methods. Platform tokens, exemplified by Ethereum and NEO, facilitate transactions within blockchain networks and often offer benefits like fee discounts and governance rights. Product tokens, such as Binance Coin (BNB) and GAS, can be exchanged for specific products or services within their ecosystems. Security tokens, like KuCoin

Shares (KCS), are subject to regulatory oversight and represent ownership stakes or entitlements to future cash flows. The cryptocurrency market encompasses thousands of digital assets, with the top cryptocurrencies typically including Bitcoin, Ethereum, Ripple, Bitcoin Cash, and EOS. Litecoin and Stellar also hold significant positions within the market, distinguished by factors such as supply, transaction speed, and consensus mechanisms. Cryptocurrency exchanges play a crucial role in facilitating the trading, buying, and selling of digital assets. Platforms like Binance, Coinbase, and Cex.io offer a wide range of services, allowing users to convert fiat currencies into cryptocurrencies and vice versa. Some exchanges issue their own native tokens, providing users with benefits such as fee discounts and governance rights, thus promoting engagement within their ecosystems.

Cryptocurrency transactions rely predominantly on blockchain technology, cryptocurrency exchanges and wallets, and cryptocurrency mining [3].

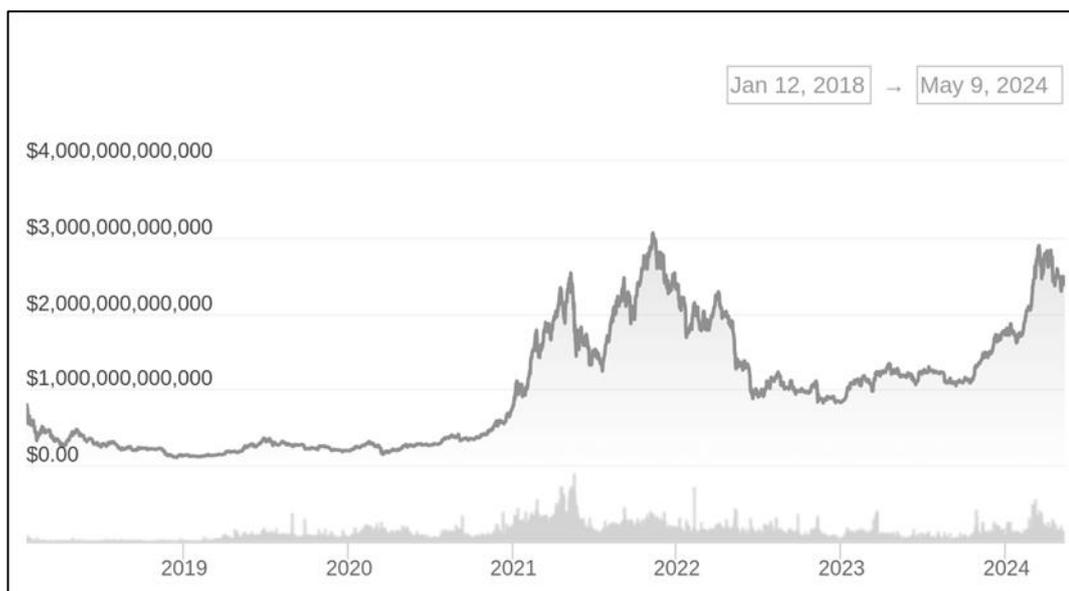
Cryptocurrency mining involves a public network where individuals, known as miners, use specialized equipment, software, bandwidth, and electricity to solve complex online transaction problems. Bitcoin's system requires substantial computational power for mining. Miners are rewarded with newly created bitcoins, which they can then withdraw from the currency. Besides mining, bitcoins can be obtained through alternative methods. Additionally, free software enables the conversion of fiat currencies to bitcoins and vice versa.

Blockchain technology, alongside mining, is pivotal in cryptocurrency creation. It operates as a decentralized platform, facilitating transactions and data processing without intermediaries. Transactions are executed through a distributed chain of blocks stored on a secure ledger, ensuring permanence and anonymity. Cryptocurrencies are stored in secure wallets and processed within the blockchain, with each block timestamped and distributed across a decentralized ledger, saving all transaction details from start to finish.

Exchanges and wallets play crucial roles in cryptocurrency transactions. A basic transaction typically involves the amount of bitcoins exchanged, the recipient's wallet address, and the sender's private key for verification. Unlike traditional currency transactions, there is no central authority involved. However, similar to traditional currency markets, cryptocurrency values are subject to fluctuation due to various economic factors, such as mining costs, exchange platforms, sales regulations, and internal policies [3]. Bitcoin, created by Nakamoto, was the pioneering peer-to-peer electronic currency. It operates as a chain of encrypted transactions secured by hash keys. Owners utilize private and public keys for transmitting transactions and digital signatures to verify authenticity. A cryptocurrency represents a foundational application of blockchain technology, preceding smart contracts and Dapps. Blockchain networks are categorized as public, private, or consortium.

If we want to understand the economic stability of a cryptocurrency it requires a nuanced assessment beyond its coin price. Instead, market capitalization emerges as a critical determinant, calculated by multiplying the number of available coins by their current price. This metric, typically denominated in USD, offers insights into a cryptocurrency's profitability and overall market position. A cryptocurrency's market capitalization is an essential indicator, with a cap exceeding \$10 million often considered indicative of a robust market presence [4]. This figure encapsulates the collective value of all coins in circulation and reflects the level of investor confidence and market activity surrounding a particular cryptocurrency. Moreover, market capitalization provides a valuable lens through which to analyze market share dynamics. In the context of cryptocurrencies, market share refers to the portion of the digital currency market controlled by a specific cryptocurrency. While traditional market share typically denotes a company's total sales within an industry, in the cryptocurrency realm, it serves as a measure of dominance within the broader market. Bitcoin, as the pioneering cryptocurrency, has historically held a dominant market share. However, the landscape has evolved, with the emergence of alternative cryptocurrencies, or altcoins, challenging Bitcoin's hegemony. These altcoins, while

initially comprising a smaller share of the market, have gradually gained ground, diversifying the cryptocurrency ecosystem. The interplay between Bitcoin and altcoins is evident in the fluctuating market share dynamics observed over the years.



**Fig. 1 Market capitalization of cryptocurrency between 2018 and 2024**

*Source: CoinGecko. Total Crypto Market Cap Chart [5]*

Between 2018 and 2019, the largest decline and the smallest advancement occurred in November, with a decrease of \$139.8 million. This period likely witnessed market volatility and uncertainty, possibly influenced by regulatory developments and market sentiment (Figure 1).

Moving forward to the period from 2020 to 2021, there was a noticeable increase in October 2020, amounting to \$368.1 million. This uptick suggests renewed investor confidence and positive market developments during that time (Figure 1).

A more significant surge in market size occurred from early 2021 to mid-2021, with May 2021 marking a notable peak at USD 2.47 billion (Figure 1). This substantial increase could be attributed to various factors, including heightened institutional interest, increased adoption, and significant market developments.

The peak of growth was observed towards the end of 2021, reaching \$2.9 billion, indicating a period of significant expansion and bullish market sentiment. However, this peak was followed by a significant decline in July 2022, amounting to \$877 million, possibly signaling a correction and a cooling-off period after a period of rapid growth (Figure 1).

In the years following 2022 and 2023, the market size remained relatively stable, indicating a period of consolidation or stability. However, from the middle of 2023 onwards, there was a notable upswing, which reached its pinnacle in March 2024 at \$2.8 billion (Figure 1). This resurgence may be attributed to renewed investor interest, favorable market conditions, and significant advancements within the cryptocurrency ecosystem.

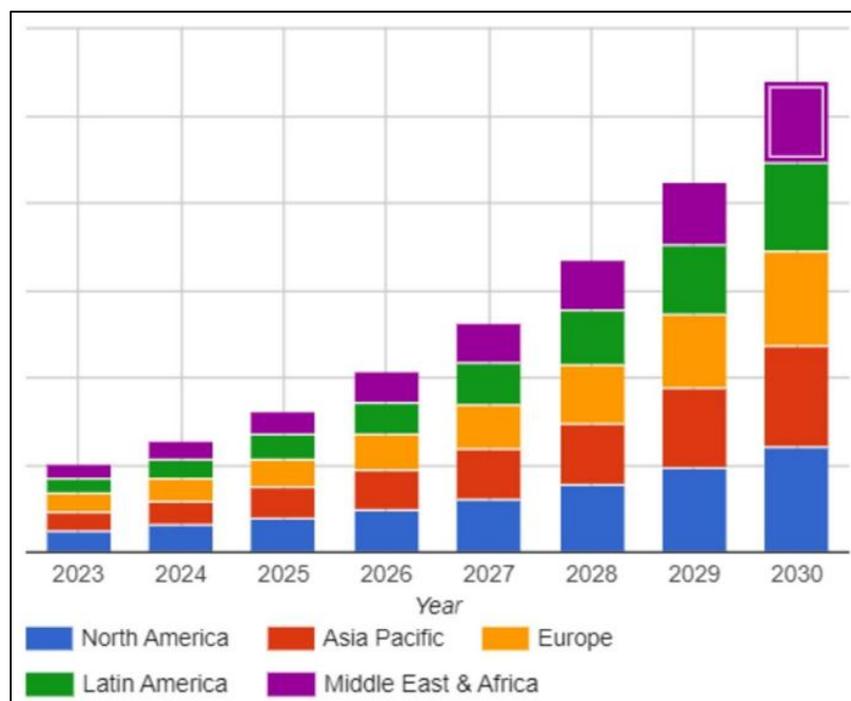
Talking further, cryptocurrency markets are experiencing dynamic growth across various segments. In 2022, Bitcoin asserted its dominance, comprising over 36.0% of global revenue [6]. This trend is expected to continue as Bitcoin Exchange Traded Funds (ETFs) enter the market, such as the notable influx of USD 207 million into Canada's Purpose Bitcoin ETF in May 2022. Ethereum, serving as a platform for decentralized applications, is also poised for significant expansion, driven by the increasing adoption of smart contracts and efficiency improvements introduced by Ethereum 2.0.

Exchange software emerged as a leader in 2022, commanding over 32.0% of global revenue, facilitating seamless cryptocurrency-to-fiat conversions [6]. Ongoing advancements in exchange

software, exemplified by Openware Inc.'s launch of OpenDAX3 in March 2021, are expected to further propel segment growth. Concurrently, the wallet segment anticipates substantial growth, driven by the rising adoption of cryptocurrency wallets for secure asset management. Initiatives like Robin Hood's beta version of cryptocurrency wallets, introduced in January 2022, underscore the industry's commitment to user-friendly solutions.

Mining remains a dominant force, constituting over 74.0% of global revenue in 2022 [6]. Businesses are investing in crypto miner farms, exemplified by Enegix's 180 megawatt Bitcoin mining facility in Kazakhstan. The transaction segment is poised for rapid expansion, fueled by the increasing demand for high-performance services like Wallet as a Service (WaaS) solutions. Collaborations such as Crypto APIs and Sepior's partnership highlight efforts to provide secure digital wallets for cryptographic transactions to businesses.

The hardware segment reigned supreme in 2022, commanding over 82.0% of global revenue [6]. This dominance is fueled by advancements such as faster processing speeds and lower power consumption in cryptocurrency miners. The entry of numerous businesses into the bitcoin mining hardware market, leveraging graphics processing units for enhanced efficiency, is expected to drive significant industry growth. Conversely, the software segment anticipates the highest growth rate, fueled by the escalating demand for cryptocurrency exchange and mining software. These solutions are pivotal for managing the burgeoning data volumes generated by cryptocurrencies and meeting the surging demand for crypto wallets and exchange platforms worldwide.



**Fig. 2 Global cryptocurrency market size, billion USD**

*Source: Skyquest. Global Crypto Currency Market Insights [7]*

As we analyzed the global cryptocurrency market experienced steady growth in 2021 even though declining in 2023. In 2024 was shown relief and later growth trajectory is projected to continue robustly, with the market forecasted to surge to USD 13.19 billion by 2030, indicating a compound annual growth rate (CAGR) of 12.5% during the forecast period spanning from 2024 to 2030 (Figure 2).

This expansion can be attributed to various factors such as increasing adoption of cryptocurrencies as alternative investments, growing acceptance of digital currencies by mainstream financial institutions, and advancements in blockchain technology, which continue to enhance the security and efficiency of cryptocurrency transactions.

Additionally, regulatory clarity and frameworks are likely to play a pivotal role in shaping the market landscape, providing both stability and opportunities for innovation within the cryptocurrency ecosystem. One of the primary drivers of this growth is the increasing utilization of distributed ledger technology (DLT), particularly blockchain, which underpins most cryptocurrencies. DLT offers unparalleled transparency, security, and efficiency in recording and verifying transactions, making it a foundational technology for the cryptocurrency ecosystem.

Moreover, the adoption of cryptocurrencies for international money transfers is expected to accelerate industry growth. Cryptocurrencies facilitate cross-border transactions with reduced fees and faster settlement times compared to traditional banking systems. As a result, more individuals and businesses are turning to cryptocurrencies as a cost-effective and convenient solution for remittances and international payments.

Additionally, the evolving regulatory landscape, characterized by greater clarity and acceptance of cryptocurrencies in many jurisdictions, is likely to further stimulate market expansion. Regulatory frameworks that provide a conducive environment for innovation and investor protection can foster confidence and attract institutional capital into the cryptocurrency market.

Cryptocurrencies are also influenced by various economic factors, including speculation, algorithm trust, spending power, money laundering concerns, demographic variables, and the push-pull-mooring framework. Factors such as high interest rates and economic uncertainty drive investors away from traditional markets, while factors like high returns and technological innovation attract individuals to cryptocurrency markets.

Consumer perception and behavioral factors also play a significant role in the adoption and usage of cryptocurrencies. Consumers expect cryptocurrencies to be user-friendly, safe, and secure, with minimal volatility and high profits in a short period. However, adoption has been limited due to factors such as ease of use, price stability, and governance.

Behavioral and environmental uncertainties contribute to consumer hesitancy in adopting cryptocurrencies, particularly in developing countries where familiarity with the technology is lower. Factors such as trust, perceived usefulness, and ease of use also influence individual adoption. Cultural perceptions also play a role, with consumers in developing countries associating Bitcoin with terms like 'hacking', 'inconvenient', and 'safety', leading to a sense of alienation and reluctance to switch from traditional currencies.

In contrast, consumers in developed countries are more accepting of cryptocurrencies, associating them with 'virtuality' and 'value'. However, prevalent adoption is observed mainly in developed economies due to factors like fear of losing money, limited access to financial services among poor citizens, and risk aversion. Understanding these economic dynamics is crucial for promoting widespread adoption and usage of cryptocurrencies across diverse economic and cultural context.

Navigating the risks inherent in the global cryptocurrency market also demands a comprehensive understanding. Cryptocurrencies, while promising decentralization and financial sovereignty, bring forth a range of risks that investors, regulators, and enthusiasts must carefully consider.

At the core of these risks lies volatility. Prices can fluctuate wildly within short spans, driven by various factors such as market state, regulatory actions, or technological advancements. While volatility can offer lucrative trading opportunities, it also exposes investors to significant losses if not managed wisely.

Adding to the complexity is the regulatory uncertainty surrounding cryptocurrencies. Governments worldwide are still grappling with how to classify and regulate these digital assets, leading to confusion of rules and conflicting interpretations. Sudden changes in regulatory policies or repressions can deeply impact cryptocurrency prices.

Moreover, cybersecurity threats loom large over the cryptocurrency market. Exchanges and wallets, being prime targets for hackers, are vulnerable to attacks due to the potential for substantial financial gains and the irreversible nature of transactions. High-profile hacks and

security breaches have underscored the importance of robust cybersecurity measures for safeguarding digital assets.

Additionally, legal and compliance risks also loom large. Engaging with cryptocurrencies may subject individuals and businesses to tax implications, anti-money laundering (AML) regulations, and know-your-customer (KYC) requirements. Non-compliance with relevant laws and regulations could result in fines, legal consequences, or reputational damage.

**Conclusion.** Cryptocurrencies represent a significant technological advancement intersecting with social dynamics. The adoption of cryptocurrencies and blockchain technologies is a strategic response to the evolving landscape of the global economy, driven by factors such as digitalization, the rise of intangible digital assets, and the transformation of traditional financial systems.

The cryptocurrency market is experiencing dynamic growth across various segments, with Bitcoin asserting dominance and altcoins carving out their niche. Despite Bitcoin's enduring prominence, the market share has witnessed a decline as altcoins diversify and compete within the market.

Consumer perception and behavioral factors play a crucial role in the adoption and usage of cryptocurrencies. Factors such as ease of use, price stability, governance, trust, perceived usefulness, and cultural perceptions influence individual adoption. Understanding these economic dynamics is essential for promoting the widespread adoption and usage of cryptocurrencies across diverse economic and cultural contexts.

Looking ahead, the future of cryptocurrencies appears promising, with immense potential to transform financial systems and drive inclusive economic growth on a global scale. As the market matures and regulatory frameworks evolve, cryptocurrencies are poised to become integral components of the global economy, offering efficient solutions for cross-border transactions, remittances, and international payments. Embracing this digital revolution with foresight and innovation will be crucial in realizing the full transformative potential of cryptocurrencies in shaping the financial landscape of tomorrow.

Also, navigating the risks in the global cryptocurrency market necessitates a balanced approach that combines opportunity with wisdom. While the potential rewards can be tempting, investors should proceed carefully and conduct thorough due diligence. Understanding the complexities and uncertainties inherent in this growing asset class is essential for mitigating risks and making informed investment decisions.

For sure, the global cryptocurrency market is a complex and evolving ecosystem influenced by technological innovation, social dynamics, market trends, and consumer behavior. As cryptocurrencies continue to reshape the financial landscape, stakeholders must adapt to the changing environment, address regulatory concerns, and consider cultural nuances to foster widespread acceptance and utilization of digital currencies.

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