

Global Trends in Cryptocurrency Regulation: An Overview

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Abstract. Cryptocurrencies have evolved into an important asset class, providing a variety of benefits. However, they also present significant risks, such as market volatility and the potential for misuse in illegal activities. These risks underline the urgent need for a comprehensive regulatory framework to ensure consumer protection, market integrity, and financial stability. Yet, the global landscape of cryptocurrency regulation remains complex, marked by substantial variations in regulatory frameworks among different countries. This paper aims to study these differences by investigating the regulatory landscapes across various jurisdictions. We first discuss regulatory challenges and considerations, and then conduct a comparative analysis of international regulatory stances, approaches, and measures. We hope our study offers practical insights to enhance the understanding of global trends in cryptocurrency regulation.

Keywords: Blockchain · Cryptocurrency · Regulation · Policy Analysis

1 Introduction

Cryptocurrencies, since their inception with Bitcoin in 2009, have emerged as a revolutionary asset class providing an alternative to traditional fiat currencies. Their advantages include enhanced transactional transparency, reduced processing times, and increased accessibility to financial services, particularly in underbanked regions. Over the years, the cryptocurrency market has experienced exponential growth, evolving into a significant component of the global financial ecosystem with a market capitalization of 1.6t USD³. This expansion reflects the growing integration of cryptocurrencies into the broader economy. However, despite their increasing popularity and the innovation they bring to financial services and beyond, cryptocurrencies are not without their risk. Major economies such as the European Union (EU)⁴ have issued warnings about the potential risks. These concerns range from their use in illicit activities, such as money laundering and financing of terrorism, to the risks of tax evasion, market manipulation, and market volatility. Such risks underscore the complex landscape within which cryptocurrencies operate, balancing their potential for innovation against the need for consumer protection and financial stability.

³ <https://coinmarketcap.com/charts/>, accessed on Jan 20, 2024.

⁴ See EU financial regulators warn consumers on the risks of crypto-assets.

Given these considerations, understanding how different countries implement the regulatory framework for cryptocurrencies becomes crucial. Currently, the global regulatory landscape remains fragmented, with countries adopting stances ranging from outright bans to recognizing cryptocurrencies as legal tender.

In this paper, we explore the global regulatory landscape for cryptocurrencies, assessing the approaches implemented by countries worldwide. The main contributions of this paper are outlined as follows:

- We identify the principal challenges in regulating cryptocurrencies that arise from their characteristics and risks inherent to the underlying blockchain technology. We also discuss key considerations that necessitate regulatory attention.
- We examine the cryptocurrency regulatory frameworks across all countries and propose a comprehensive taxonomy to classify the regulatory stances, approaches, and measures implemented by countries worldwide. Through our analysis, we observe significant variations in regulatory progress and find that cryptocurrencies remain unregulated in at least 71 countries at the time of writing.
- We explore how various jurisdictions are navigating the challenges and opportunities presented by cryptocurrencies. Differences in regulatory approaches among key global players are highlighted, along with their implications.

2 Related Work

The regulation of cryptocurrencies has received extensive attention within the academic community. Numerous studies offer an overview of cryptocurrency regulation. For example, Blandin *et al.* [1] provided a comparative analysis of the current regulatory landscape of cryptoassets in 23 jurisdictions. Cumming *et al.* [2] analyzed the Securities and Exchange Commission (SEC)'s initial and subsequent statements on Initial Coin Offerings (ICOs) to highlight the challenges of applying existing legal frameworks to a rapidly evolving crypto space. Meizquita *et al.* [3] studied the diverse perspectives and interests that influence each country's decision-making process in adopting specific regulatory frameworks. The primary distinction between this study and earlier ones lies in the scope of analysis. While the earlier studies selectively focused on regulations in specific countries, our research extends to examining cryptocurrency regulatory frameworks across all countries. Additionally, we develop a comprehensive taxonomy to systematically categorize and compare the regulatory stances, approaches, and measures implemented by countries worldwide.

3 Background

3.1 Blockchain, DLT and DeFi

Blockchain is a decentralized ledger technology that records transactions across multiple nodes to ensure the integrity and security of a data record without the need for a central authority. It organizes data into consecutive blocks that are

cryptographically linked and immutable, thereby providing a verifiable transaction history. As of the latest update, Ethereum stands as the leading blockchain platform, boasting a Total Value Locked of 30b USD⁵.

Distributed Ledger Technology (DLT) represents a broader category. Indeed, a universally accepted definition of DLT does not exist⁶. Broadly, DLT refers to a digital system that records asset transactions across multiple locations simultaneously without a centralized authority or data storage. DLT enables peer-to-peer transactions and supports diverse applications beyond cryptocurrencies, such as supply chain management and identity verification.

Decentralized Finance (DeFi) [4] is a financial system built on blockchain technology that allows for financial transactions without centralized intermediaries, using smart contracts on networks such as Ethereum. Cryptocurrencies are integral to DeFi, serving both as assets and as mechanisms for various activities, including lending, borrowing, and Decentralized Exchanges (DEXs) trading.

3.2 Cryptocurrency Premier

Definitions The term *cryptocurrency* is often associated with concepts such as *cryptoassets*, *digital assets*, *digital currency* and *virtual currency*.

Digital Asset. The SEC defines digital asset as an asset that is issued and/or transferred using DLT, which includes but is not limited to virtual currencies⁷. Digital assets can be securities, currencies, properties, or commodities⁸.

Cryptoasset. While no universally accepted definition of cryptoasset exists, they are broadly understood as digital representations of value or contractual rights, secured through cryptography⁹. Powered by DLT, these assets can be electronically stored, transferred, or traded¹⁰. In other words, a cryptoasset is a digital asset that uses cryptography to secure its functionality.

Virtual Currency. Virtual currency represents a digital form of value serving as a medium of exchange, a unit of account, and/or a store of value. It is a subset of digital assets without legal tender status in any jurisdiction [5].

Digital Currency. Digital currency is a subset of digital assets with legal tender status. It is a tokenized, digital representation of a sovereign currency. It may be distributed by monetary authorities or entities backed by central bank money [6].

Cryptocurrency. Cryptocurrency refers to a math-based, decentralized convertible virtual currency that is protected by cryptography [5]. It can be a subtype of digital currency or virtual currency, depending on its legal tender status.

Crypto Market Trends. At the time of writing, there are over 8,000 cryptocurrencies in circulation, boasting a combined market capitalization of approx-

⁵ <https://defillama.com/chain/Ethereum>, last accessed on Jan 11, 2024.

⁶ See section 2.9 of CP19/3: Guidance on Cryptoassets.

⁷ See The Division of Examinations' Continued Focus on Digital Asset Securities.

⁸ See Digital Assets and SEC Regulation.

⁹ See section 2.4 of CP19/3: Guidance on Cryptoassets.

¹⁰ See Article 3 of the Markets in Crypto-assets (MiCA) Regulation.

imately 1.6t USD and a daily trading volume of 63b USD¹¹. BTC, ETH and USDT rank as the top three most actively traded cryptocurrencies. According to Statista, until Oct 2023, the global landscape features 1,492 active exchanges, with a split of 62% Centralized Exchanges (CEXs) and 38% DEXs. As of 2023, the global cryptocurrency market has seen substantial growth, with the number of crypto users surpassing 420m and the availability of 84m crypto wallets worldwide. The advent of cryptocurrency has unveiled various opportunities, such as trading and lending for both individuals and businesses, transcending traditional financial paradigms. It enhances financial market and payment system infrastructures, facilitating more efficient and secure transactions [7].

4 Major Crypto Incidents and Regulatory Responses

The cryptocurrency market, despite offering innovation and financial inclusion opportunities, has also witnessed numerous high-profile incidents.

Mt. Gox Hack. In 2014, Mt. Gox, once the world’s largest Bitcoin exchange, filed for bankruptcy following the theft of approximately 850,000 BTC, valued at around 450m USD at the time [8, 9]. This incident highlighted the security vulnerabilities within cryptocurrency exchanges and the need for enhanced regulatory oversight. In response, Japan, where Mt. Gox was based, enacted new legislation in 2017 to regulate cryptocurrency exchanges. The Payment Services Act¹² was revised to require exchanges to implement stronger security measures, maintain adequate reserves, and undergo annual audits.

Bitfinex Hack. In 2016, Bitfinex, a prominent cryptocurrency exchange, suffered a security breach that resulted in the loss of 120,000 BTC, worth about 72m USD then. This incident prompted a broader discussion on the security protocols of crypto exchanges and the necessity for regulatory intervention. Following the hack, the Commodity Futures Trading Commission (CFTC) fined Bitfinex for operating an unregistered exchange and for inadequate security measures¹³, pushing for tighter security standards across the industry.

FTX Collapse. The collapse of FTX [10–12] in Nov 2022 marked one of the biggest failures in the industry’s history. The downfall began when CoinDesk reported concerns about the financial health of Alameda Research, a trading firm closely tied to FTX, revealing that a large portion of its balance sheet was held in FTT, the native token of FTX. This revelation led to a crisis of confidence among investors and users of the exchange, prompting a liquidity crunch as many attempted to withdraw their funds simultaneously. The core of FTX’s collapse was attributed to a mix of factors, including the lack of clear separation between exchange operations and trading activities. The regulatory response to the FTX collapse was significant. The U.S. Department of Justice,

¹¹ <https://coinmarketcap.com/charts/>, accessed on Jan 20, 2024.

¹² Payment Services Act, Japan.

¹³ See CFTC Orders Bitcoin Exchange Bitfinex to Pay \$75,000 for Offering Illegal Off-Exchange Financed Retail Commodity Transactions and Failing to Register as a Futures Commission Merchant.

the SEC, and the Bahamas’ Financial Crimes Investigation Branch investigated the exchange and its executives for potential violations of financial regulations. **Terra-Luna Crash.** The collapse of Terra (LUNA) and its stablecoin TerraUSD (UST) in May 2022 started when UST began to lose its peg [13–15]. This destabilization was exacerbated by the interconnectedness of UST with LUNA through a mechanism that was supposed to maintain UST’s peg to the dollar by allowing the exchange of UST for LUNA and vice versa. Key factors contributing to the collapse included the high yield of 19.5% offered by the Anchor to UST depositors. The situation escalated when large withdrawals from Anchor preceded a bank run, with UST depegging from the dollar and LUNA’s price collapsing, leading to a “death spiral” where LUNA’s supply inflated dramatically while its price plummeted to near zero. Regulatory responses to the crash have focused on scrutinizing stablecoins. The UK HM Treasury (HMT) announced plans to regulate stablecoins as part of financial services legislation¹⁴. The Financial Conduct Authority (FCA) has also set out proposals for its regulation of fiat-backed stablecoins¹⁵, indicating a shift towards more stringent oversight.

Tornado Cash (TC) Sanctions. TC operates as a decentralized smart contract on the Ethereum blockchain, designed to enhance transaction privacy by mixing cryptocurrencies to obscure their origin, destination, and counterparties. Despite its potential for legitimate use, TC has been criticized for facilitating money laundering by mixing the proceeds of cybercrimes. TC was implicated in laundering over 7b USD worth of cryptocurrency since its inception in 2019, including substantial amounts linked to North Korean state-sponsored hacking group Lazarus Group and other illicit activities such as the Harmony Bridge Heist and the Nomad Heist. The U.S. Treasury’s Office of Foreign Assets Control sanctioned TC on Aug 8, 2022¹⁶, marked a significant action against a blockchain mixer [16]. The sanctions were implemented under Executive Order 13694¹⁷, aimed at combating the use of cryptocurrencies in illegal activities.

These significant incidents in the crypto market underscore the inherent risks and regulatory gaps. They have sparked significant regulatory actions, highlighting the urgent need for a more robust regulatory framework.

5 Challenges in Cryptocurrency Regulation

Regulating cryptocurrencies presents distinctive challenges due to their unique attributes and risks closely tied to the underlying blockchain technology. This section investigates the key challenges that demand regulatory attention.

C1: Blockchain Scalability vs Cryptocurrency Financial Inclusion. Cryptocurrencies hold significant potential to enhance financial inclusion, as emphasized by discussions in [17, 18]. They offer alternative access to financial services

¹⁴ See Update on plans for the regulation of fiat-backed stablecoins.

¹⁵ See DP23/4: Regulating Cryptoassets Phase 1: Stablecoins.

¹⁶ See U.S. Treasury Sanctions Notorious Virtual Currency Mixer Tornado Cash.

¹⁷ See 3 CFR 13694 - Executive Order 13694 of April 1, 2015..

for unbanked and underbanked populations, challenging traditional banking systems' exclusionary practices [17]. However, cryptocurrencies face challenges to widespread adoption. Despite the rising market capitalization of cryptocurrencies, their market value remains small compared to the traditional financial markets [19, 20]. This discrepancy is largely attributed to blockchain scalability issues. For example, Bitcoin and Ethereum can handle 7 and 20-30 transactions per second, yet they encounter significant consensus delays [21–25]. The limited transaction processing capacity and extended confirmation times directly impact cryptocurrency adoption rates and financial inclusion. Moreover, the modest adoption of cryptocurrency markets implies that regulatory motivation may be lessened. Regulators might perceive the costs of implementing and enforcing regulations on the cryptocurrency market as outweighing the benefits, given the market's current size and level of financial inclusion.

C2: Blockchain Pseudonymity vs User Privacy. The pseudonymous feature of blockchain technology [26, 27], while crucial for user privacy, significantly complicates the regulation of cryptocurrencies, especially in the context of combating fraudulent activities. Various countries have intensified efforts to tackle fraud and other illegal endeavors associated with cryptocurrencies, enacting specific laws and empowering regulatory bodies to oversee and mitigate such risks. For example, through agencies such as SEC and CFTC, the U.S. has implemented regulations targeting fraudulent activities in the cryptocurrency space.

However, the inherent pseudonymity of blockchain transactions poses a substantial challenge to regulatory efforts [20, 28]. While transactions are recorded on a public ledger, they are linked to cryptographic addresses rather than personal identities. This level of anonymity complicates regulatory efforts to combat money laundering, fraud, and other illicit activities, as identifying the individuals behind transactions can be exceedingly difficult without infringing on privacy rights. The pseudonymity characteristic of blockchain not only hinders the identification and prosecution of fraudulent activities but also raises concerns about the balance between effective regulation and the protection of user privacy.

C3: Blockchain Decentralization vs Legal Accountability. The decentralized nature of blockchain technology, a foundational aspect that drives the innovation and security behind cryptocurrencies, presents significant challenges for regulatory oversight and legal accountability. This decentralization means that unlike traditional financial systems, which have clear hierarchies and regulated entities, blockchain networks operate without a central authority. This structure complicates regulatory efforts to enforce compliance and accountability. For instance, in the case of fraudulent activities or disputes, pinpointing responsibility within a decentralized network can be exceedingly difficult.

There is no single entity or group that regulators can hold accountable in the same way they would with traditional financial institutions. This challenge is starkly illustrated by the infamous Decentralized Autonomous Organization (DAO) hack [29], which occurred in Jun 2016. The DAO was an innovative venture capital fund built on the Ethereum blockchain, designed to operate on smart contracts without any central authority. However, it became the target of

a major exploit that led to the theft of approximately 3.6m ETH. The absence of a central authority complicated the legal response to the incident. The challenge for regulators is to develop mechanisms that can enforce legal accountability within these decentralized systems, ensuring that while blockchain's innovative and open nature is preserved, a framework is also in place to protect participants.

C4: Blockchain Cross-border Nature vs Jurisdictional Issues. The cross-border nature of blockchain technology poses challenges to the legal regulation of cryptocurrencies across different countries. This global characteristic leads to a patchwork of regulatory approaches, with some nations opting for stringent controls while others adopt a more laissez-faire stance.

Such disparities can result in regulatory arbitrages [30], which become evident as businesses and individuals seek to exploit these differences by basing their operations in jurisdictions with more favorable regulatory environments. For example, in response to the stringent regulations imposed by countries where ICOs are heavily scrutinized, many projects have chosen to launch their ICOs in jurisdictions with more lenient regulatory environments. Countries such as Switzerland and Singapore have emerged as popular destinations for ICOs, thanks to their accommodating legal frameworks. Bores *et al.* [31] suggests that the costs associated with moving between different exchanges and legal territories are comparatively minimal. This strategic relocation allows projects to bypass the rigorous compliance requirements found in stricter jurisdictions, potentially leading to a regulatory race to the bottom. Therefore, the significance of international cooperation and the pursuit of harmonized regulation grows ever more critical.

6 Cryptocurrency Regulation: Key Considerations

In light of the challenges discussed earlier regarding cryptocurrency regulation, we present a series of questions that warrant the attention of regulators.

Q1: Should cryptocurrencies be regulated? Regulators must weigh the advantages and disadvantages of regulating cryptocurrencies. Ensuring their inclusion within regulatory frameworks could enhance consumer protection and promote financial stability. Conversely, overregulation could hinder innovation and impede financial inclusion. Striking the right balance is crucial to harness the benefits of cryptocurrencies while mitigating potential risks.

Q2: Should regulators adapt existing frameworks or develop new ones? Adapting existing frameworks may facilitate regulation but could lead to ill-fitting rules. Conversely, creating bespoke regulations tailored to cryptocurrencies may ensure a more precise approach but could be time-consuming and resource-intensive. The choice impacts the effectiveness of regulatory efforts.

Q3: Who are the primary targets of cryptocurrency regulation? Regulators must identify whether they focus on the technology, users, service providers, or specific activities within the cryptocurrency ecosystem. This decision takes on heightened significance, particularly within the context of the decentralized crypto market, which operates without the presence of financial intermediaries.

Q4: What are the approaches for cryptocurrency regulation? The quest for viable strategies in cryptocurrency regulation revolves around the overarching objective of regulators to attain “*same risk, same regulatory outcomes*”. This principle seeks to ensure that cryptocurrencies, bearing risks similar to traditional financial instruments, are subject to regulatory measures that correspond proportionately. In pursuit of this goal, regulators must devise strategies that align the regulatory framework for cryptocurrencies with their risk profiles and functions, striving for parity in regulatory standards and oversight between these digital assets and traditional financial instruments.

7 Global Regulatory Landscape

In this section, we first retrieve a list of countries (and regions) from World Population Review. We then manually investigate the regulatory framework of each country by reviewing related laws, regulations, official guidelines from regulatory bodies, government announcements, and news reports. Finally, we develop a comprehensive taxonomy to classify and compare their regulatory stances, approaches, and measures towards cryptocurrencies.

7.1 Classification of Regulatory Stances and Measures

We categorize the regulatory stance of a given country into one of the following categories: *(i) General Ban*: All activities related to cryptocurrencies are prohibited; *(ii) Partial Ban*: Some activities related to cryptocurrencies are prohibited; *(iii) Restrictive Regulation*: Cryptocurrency-related activities are subject to stringent regulations to mitigate potential risks; *(iv) Supportive Regulation*: The country regulates cryptocurrency-related activities while fostering the development of the crypto market; *(v) Concerned*: There is no specific regulation on cryptocurrencies, but there are expressed concerns regarding potential risks; *(vi) Laissez-faire*: Cryptocurrencies remain unregulated; *(vii) Legal Tender*: Cryptocurrencies are recognized as legal tender; *(viii) No information*: There is no available information concerning the regulatory stance of the given country.

If a country has implemented regulation for cryptocurrencies, we further categorize its regulatory approach into one of the following three categories: *(i) Existing Framework*: The country integrates cryptocurrency regulations within its existing legal and regulatory framework; *(ii) New Framework*: The country establishes a new, bespoke regulatory framework specifically designed for cryptocurrencies; *(iii) Hybrid Approach*: The country employs a combined strategy, leveraging both existing legal structures and introducing new regulations.

We further explore the regulatory measures adopted by countries worldwide, including Anti-Money Laundering (AML)/Counter-Terrorist Financing (CTF), ICOs, exchanges, taxation, stablecoin, Non-fungible Tokens (NFTs), and DeFi. For each measure, we classify a country’s regulatory status into one of three categories: *(i) Regulated*, *(ii) Unregulated*, *(iv) Not Applicable*, *(iv) Unclear*.

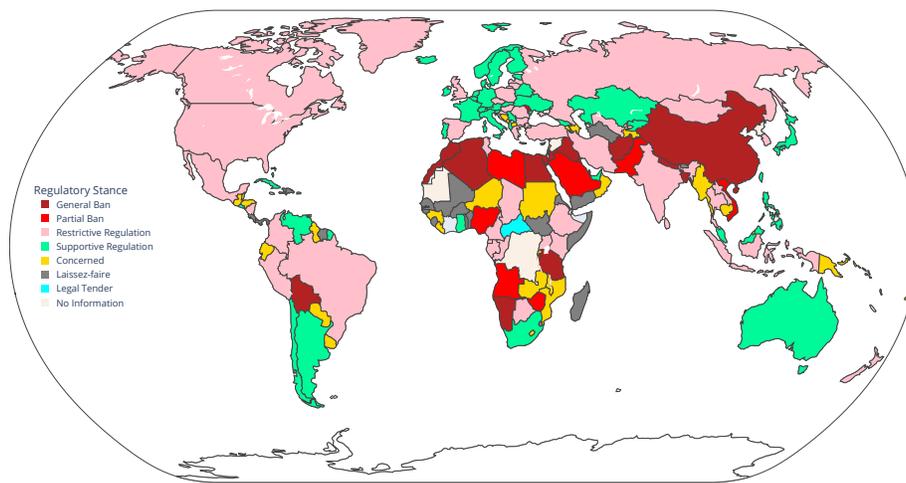


Fig. 1: Overview of the Global Cryptocurrency Regulatory Landscape.

7.2 Overview of the Global Regulatory Landscape

We provide a visualization of our classification of regulatory stances in Figure 1. It is evident that there is a substantial variation in the regulatory attitudes towards cryptocurrencies across different countries. We observe that 58 (27.4%) countries have adopted a supportive stance towards cryptocurrency regulation, indicating a strong desire to foster innovation. Four (1.9%) countries, such as El Salvador, have even recognized cryptocurrencies as legal tender, suggesting a growing recognition of the potential benefits and opportunities presented by cryptocurrencies. Nevertheless, 14 (6.6%) countries have implemented a general ban on cryptocurrencies, while nine (4.2%) countries have enacted partial bans. This reflects profound concerns regarding the risks cryptocurrencies pose, including their potential to facilitate financial crimes, disrupt monetary policy, and compromise economic stability. 46 (21.7%) countries have adopted restrictive regulations, aiming to mitigate potential risks and ensure a secure financial environment. These measures include stringent compliance requirements and specific legal frameworks designed to protect consumers, prevent fraud, and combat money laundering and terrorism financing.

Interestingly, we note that cryptocurrency remains unregulated in at least 71 countries. Specifically, 37 (17.5%) countries have merely expressed concerns about the risks associated with cryptocurrencies, while the remaining 34 (16.0%) have adopted a laissez-faire approach, choosing not to intervene or regulate the crypto sector. This hands-off approach can lead to a lack of consumer protection, where investors may face heightened risks without any safeguarding measures or legal recourse in case of fraud or market manipulation. Furthermore, the absence of regulation can lead to regulatory arbitrage, where entities exploit the discrepancy in regulatory landscapes across different jurisdictions to bypass

stringent regulations by operating in or transacting with entities in less regulated countries, potentially undermining the efforts of more regulated nations.

We further analyze the regulatory approaches of countries that implement cryptocurrency regulations. We observe that 20 of these countries have integrated cryptocurrency regulation within their existing legal frameworks, adapting traditional financial laws to encompass the unique characteristics of cryptocurrencies. Meanwhile, 40 countries have developed bespoke frameworks specifically tailored for the regulation of cryptocurrencies, reflecting a recognition of the need for specialized rules to address the novel challenges and opportunities they present. Additionally, 48 countries have adopted hybrid approaches, suggesting a balanced effort to ensure regulatory efficiency.

Regulatory Measure	AML/CFT	Taxation	Registration	ICO	StableCoin	NFT	DeFi
# Participating Countries	102	87	101	74	39	0	0
% Participating Countries	48.1%	41.0%	47.6%	34.9%	18.4%	0%	0%

Table 1: Global Adoption of Regulatory Measures.

We then investigate the specific regulatory measures enacted by various countries. Table 1 shows that reveals that 48.1% of the countries are actively taking steps to incorporate cryptocurrencies into their AML/CTF regime. In addition, 41% of countries have developed tax frameworks specifically for cryptocurrencies. We also discover that 47.6% of countries have implemented the registration requirement for crypto service providers and 34.9% of countries have established regulations for ICOs. However, only 18.4% of countries have established regulations specifically targeting stablecoins. Moreover, although countries such as the UK and U.S. have shown interest in incorporating NFTs and DeFi into their regulatory frameworks, no nation has established regulations specifically tailored to NFTs or DeFi. This regulatory gap may attract illicit activities, such as wash trading [32, 33] and money laundering [34, 35] in the NFT and DeFi domains.

8 Case Study

Section 7 provides an overview of the regulatory landscape across all countries. To better understand the variation in regulatory progress worldwide, this section proceeds to study the regulatory landscape within selected economies.

8.1 United States

In the U.S., legislative bodies and regulators have yet to establish a framework tailored to cryptocurrencies that directly equates to the traditional regulation seen in securities or commodities markets. They mainly apply existing financial

regulations to cryptocurrencies. Cryptoassets may be categorized as securities or commodities based on their functionalities and the context of their use.

The Securities Exchange Act regulates cryptocurrencies by evaluating whether they meet the definition of “security” or “investment contract”¹⁸, particularly through the application of the Howey Test¹⁹. If a cryptocurrency is deemed to offer an investment opportunity where profits are expected to be derived from the efforts of others, it may be considered a security and thus fall under the SEC’s jurisdiction. In fact, the SEC has initiated enforcement actions against cryptocurrency issuers for not registering their cryptocurrencies as securities, emphasizing regulatory compliance. In Dec 2020, the SEC sued Ripple Labs²⁰, claiming Ripple raised over 1.3b USD via unregistered securities offerings through XRP sales starting in 2013. Ripple contended that XRP was a cryptocurrency and did not need securities registration. However, the SEC has taken a firm stance on XRP, categorizing it as a security and not a currency. This case highlights regulatory efforts to bring cryptoassets under traditional securities law.

Under the Commodity Exchange Act, the CFTC regulates cryptocurrencies deemed as “commodities”, focusing on futures, swaps, and derivative contracts tied to digital assets. The CFTC’s jurisdiction encompasses the oversight of trading platforms, ensuring market integrity, preventing manipulation, and protecting investors in commodity-linked cryptocurrency markets. The CFTC has actively pursued legal actions and regulatory oversight against several cryptocurrency firms. In Sep 2015, the CFTC engaged in regulatory action against Coinflip²¹, the entity behind the Derivabit platform, which facilitated trading in Bitcoin options and futures. This regulatory step reinforced the CFTC’s position on considering Bitcoin and other similar digital currencies as “commodities”. Aitan Goelman, the CFTC’s Director of Enforcement, commented that “While there is a lot of excitement surrounding Bitcoin and other virtual currencies, innovation does not excuse those acting in this space from following the same rules applicable to all participants in the commodity derivatives markets”²². In Oct 2020, the CFTC took action against BitMEX²³, a prominent cryptocurrency exchange, accusing it of operating an unregistered trading platform. The allegations included failing to implement required AML measures.

Overall, the regulatory actions and disputes between the SEC, CFTC, and cryptocurrency companies imply regulatory ambiguities surrounding the classification of cryptocurrencies. These cases underscore the lack of clear regulatory guidelines for cryptocurrencies, leading to debates on whether they should be treated as securities, commodities, or a new asset class. These disputes under-

¹⁸ See Section 3 of the Securities Exchange Act of 1934.

¹⁹ See Framework for ‘Investment Contract’ Analysis of Digital Assets.

²⁰ See SEC Charges Ripple and Two Executives with Conducting 1.3 Billion Unregistered Securities Offering.

²¹ See The CFTC’s Actions in the Derivatives Markets for Digital Assets.

²² See CFTC Orders Bitcoin Options Trading Platform Operator and its CEO to Cease Illegally Offering Bitcoin Options and to Cease Operating a Facility for Trading or Processing of Swaps without Registering.

²³ See The CFTC’s Actions in the Derivatives Markets for Digital Assets.

score the need for clearer regulatory guidelines to distinguish between different types of cryptocurrencies and their corresponding regulatory obligations.

8.2 European Union

The EU initially approached the regulation of cryptoassets through a series of directives and regulations aimed at integrating these cryptoassets within the existing regulatory frameworks. The Markets in Financial Instruments Directive II (MiFiD II) mainly regulates cryptoassets considered “financial instruments” (e.g., transferable securities)²⁴. The amended Anti-Money Laundering Directive V introduces the AML and CTF regimes for cryptoasset providers, including the custodial wallet providers and providers engaged in exchange services between virtual currencies and fiat currencies. Certain types of cryptoasset may also fall within Electronic Money Directive II if qualified as e-money, or Payment Services Directive II if used as a medium for executing payment services. Nevertheless, since individual Member States can interpret derivatives at their discretion, the regulation remains unharmonized, leading to legal uncertainties across the EU [36]. Moreover, the existing regulatory framework captures only a subset of cryptoassets. This left investors vulnerable to risks, especially in areas outside the scope of consumer protection laws.

To address such regulatory gaps, in May 2023, the Markets in Crypto-Assets (MiCA) regulation²⁵ was enacted. MiCA introduces a harmonized regulatory framework for cryptoasset markets across the EU. MiCA covers cryptoassets that are not regulated by existing financial services legislation²⁶. For example, it covers three types of cryptoassets: (i) Asset-reference tokens that stabilize their value by referencing the values of one or more assets; (ii) E-money tokens that stabilize their value by referencing the value of a single fiat currency; (iii) Other crypto-assets (e.g., utility tokens). MiCA applies to cryptoasset issuers and Cryptoasset Service Providers, who must acquire authorizations from the National Competent Authority in the respective member states. MiCA covers various activities, such as the issuance, offering to the public, and admission to trading of cryptoassets. Along with MiCA, the Transfers of Funds Regulation, published in Jun 2023, introduced new rules on the information on originators and beneficiaries accompanying transfers of cryptoassets²⁷.

To summarize, the EU initially approached cryptoassets with caution, integrating them into existing financial frameworks to manage risks. Over time, recognizing the need for a more tailored approach, the EU shifted towards establishing a unified and harmonized regulatory environment.

²⁴ See Section C of Annex I, MiFiD II.

²⁵ Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on markets in crypto-assets.

²⁶ For example, MiCA does not cover security tokens, which would qualify as transferable securities under MiFiD II.

²⁷ Regulation (EU) 2023/1113 of the European Parliament and of the Council of 31 May 2023 on information accompanying transfers of funds and certain crypto-assets.

8.3 United Kingdom

The UK’s approach to cryptoasset regulation involves the incorporation of existing regulatory frameworks. In 2018, the “Cryptoassets Taskforce (CATF)” was formed, comprising the FCA, the Bank of England, and HMT²⁸. The CATF notes that the crypto market presents both new opportunities and potential challenges. It recommends that decisive measures be implemented to mitigate the risks of cryptoassets that fall within existing regulatory frameworks. In Feb 2023, the HMT released a consultation paper entitled “Future Financial Services Regulatory Regime for Cryptoassets”. This document outlines the government’s plan to integrate the regulation of cryptoassets into the existing Financial Services and Markets Act (FSMA) framework²⁹. The government adopts “technology agnostic” approaches and values the principle of “same risks, same regulatory outcomes” in terms of regulating the crypto market and the traditional financial market³⁰. Hence, developing a standalone bespoke regime outside of the FSMA framework would risk creating an uneven playing field between cryptoasset companies and traditional financial institutions. As shown in Table 3, the existing framework applicable to cryptoassets regulation mainly encompasses (i) FSMA 2023³¹ (including Regulated Activities Order (RAO) 2001³² and Financial Promotion Order (FPO) 2023³³), (ii) the AML/CTF regulations 2017³⁴, (iii) the Payment Service Regulations (PSRs) 2017, and (iv) Electronic Money Regulations (EMRs) 2011. In fact, the FSMA contains several provisions that amend the existing regimes to explicitly accommodate the regulation of cryptoassets. For example, amendments to the FSMA allow for the explicit inclusion of cryptoassets within the RAO and FPO regime³⁵.

The Consultation defines four types of cryptoassets, including security tokens, exchanges tokens, utility tokens, and NFTs (See Appendix A). Some of these tokens fall within the existing regulatory framework. For example, security tokens fall within the regulatory framework, as they provide rights and obligations akin to “specified investments”³⁶ as set out in the RAO. While exchange tokens and utility tokens generally remain unregulated, if they meet the definition of e-money, they will fall within the scope of EMRs³⁷. Furthermore, these tokens are subject to the PSRs if used to facilitate regulated payment services³⁸.

²⁸ See Cryptoassets Taskforce.

²⁹ See section 2.1 of Future financial services regulatory regime for cryptoassets: Response to the consultation and call for evidence.

³⁰ See section 1.12 of Future financial services regulatory regime for cryptoassets: Consultation and call for evidence.

³¹ Financial Services and Markets Act 2023.

³² The FSMA 2000 (Regulated Activities) Order 2001.

³³ The FSMA 2000 (Financial Promotion) (Amendment) Order 2023.

³⁴ The Money Laundering, Terrorist Financing and Transfer of Funds (Information on the Payer) Regulations 2017.

³⁵ See section 69 of FSMA 2023.

³⁶ See Part III of RAO.

³⁷ See section 3.7 of PS19/22: Guidance on Cryptoassets.

³⁸ See section 3.54 of CP19/3: Guidance on Cryptoassets.

In fact, the HMT pursues a “phased approach” to regulating cryptoassets. In Phase 1, the government intends to regulate fiat-backed stablecoins. Under the RAO regime, UK-based stablecoins issuers and custodians should seek authorizations from the FCA³⁹. The payment transactions in relation to fiat-backed stablecoins by firms in the UK will be brought within the scope of the PSRs⁴⁰. In addition, FSMA 2023 also introduces digital settlement assets to address payment stablecoin⁴¹. In Phase 2, the regulation will be extended to other categories of cryptoassets. Broader cryptoasset activities, such as issuance, lending and borrowing, leverage, and exchange activities, will be brought into the regulatory perimeter⁴². Cryptoasset businesses registered under the AML/CTF regime will not receive automatic authorization for cryptoasset activities during Phase 1 or 2. Such firms need to obtain authorization under FSMA or PSRs⁴³.

To summarize, the UK’s regulatory approach towards cryptoassets has evolved to be both inclusive and prudent, aiming to adapt its existing legal frameworks to the unique facets of cryptoassets. The phased approach allows for gradual integration into the financial landscape, maintaining a balance between fostering innovation and ensuring consumer protection and market stability.

8.4 China

China’s approach to regulating cryptocurrencies has been characterized by a series of stringent measures aimed at controlling the associated risks.

In 2013, the People’s Bank of China (PBC), along with five other departments, issued the “Notice on Preventing Bitcoin Risk”, the first official document to address the legal status of cryptocurrencies in China⁴⁴. It declared that Bitcoin does not hold the same legal status as a currency and prohibited financial and payment institutions from engaging in Bitcoin-related transactions. This notice aimed to protect the yuan’s status and prevent money laundering.

The rapid rise of ICOs as a method for funding cryptocurrency projects prompted the Chinese government to take further action. In 2017, the PBC, along with seven other departments, released an announcement that outright banned ICOs in China. The “Announcement on Preventing Risks of Token Issuance Financing” labeled ICOs as an unauthorized fundraising tool that may involve financial fraud, illegal issuance of securities, and other criminal activities⁴⁵. This move was aimed at protecting investors from risky ventures.

In response to the resurgence of speculative trading in cryptocurrencies, in 2021, the PBC and ten other departments issued a more comprehensive notice.

³⁹ See section 2.24 of DP23/4: Regulating Cryptoassets Phase 1: Stablecoins.

⁴⁰ See section 2.4 of Update on Plans for the Regulation of Fiat-backed Stablecoins.

⁴¹ See section 86 of FSMA 2023.

⁴² See section 1.16 of Future financial services regulatory regime for cryptoassets: Response to the consultation and call for evidence.

⁴³ See section 3.9 of Future financial services regulatory regime for cryptoassets: Response to the consultation and call for evidence.

⁴⁴ See Notice on Preventing Bitcoin Risk.

⁴⁵ See Announcement on Preventing Risks of Token Issuance Financing.

The “Notice on Further Preventing and Handling the Risks of Speculation in Virtual Currency Transactions” reinforced the ban on cryptocurrency trading⁴⁶. This document highlighted the government’s stance on cryptocurrencies as not being recognized as legal tender and reiterated the prohibition of their use. The notice also targeted cryptocurrency mining, declaring it an illegal activity.

Through these key policy documents, it is evident that the Chinese government maintains a strict and evolving stance on cryptocurrency regulation. From the initial measures to prevent Bitcoin risks to the comprehensive prohibition of ICOs and further banning cryptocurrency transactions and mining activities, China’s regulatory policies have become progressively clear and strengthened.

8.5 India

India’s regulatory stance can be described as a complex and evolving trajectory, marked by periods of skepticism, regulatory ambiguity, and gradual acceptance.

The initial phase of India’s approach towards cryptocurrencies can be traced back to 2013, when the Reserve Bank of India (RBI) issued its first cautionary advice⁴⁷ to the Indian public about the risks associated with trading in Bitcoin and other digital currencies. This period was marked by a significant degree of uncertainty, as the RBI highlighted concerns related to volatility and the potential use of cryptocurrencies for illicit activities. The absence of any formal regulatory framework left the market in a state of limbo, with investors and operators navigating a grey area of legal and financial risks.

The situation took a more definitive turn in Apr 2018, when the RBI directed all regulated financial institutions to cease dealing with individuals or businesses transacting in cryptocurrencies, effectively cutting off banking services to the crypto sector⁴⁸. However, in Mar 2020, the Supreme Court overturned the RBI’s ban, citing the disproportionate nature of the regulatory response⁴⁹. This decision was hailed as a significant victory for the crypto sector in India, signaling a potential shift towards a more accommodating regulatory environment.

The contradictory stances of different Indian regulatory bodies lead to a complex and uncertain environment for investors and businesses in the crypto space. This inconsistency has not only impacted the operational realities of crypto businesses but has also influenced investor sentiment and market stability. The ongoing uncertainty necessitates a balanced and clear regulatory framework.

9 Discussion

Through the analysis of cryptocurrency regulations across different jurisdictions, we observe significant variations. Some have outright banned cryptocurrency ac-

⁴⁶ See Notice on Further Preventing and Handling the Risks of Speculation in Virtual Currency Transactions.

⁴⁷ See RBI cautions users of Virtual Currencies.

⁴⁸ See Statement on Developmental and Regulatory Policies.

⁴⁹ See India’s top court strikes down RBI banking ban on cryptocurrency.

tivities, while others supported innovation. Some have applied existing regulations, whereas others established bespoke frameworks. This finding emphasizes the urgent need for international cooperation and harmonized regulation.

India’s regulatory journey underscores the need for consistency and collaboration among regulatory agencies to avoid conflicting directives and ensure cohesive policy implementation. From the U.S. experience, the importance of clear legal definitions and the establishment of distinct responsibilities for regulatory bodies emerge as critical for avoiding jurisdictional overlaps and ensuring effective regulation. The UK’s gradual, phased approach to crypto regulation highlights the benefits of allowing the market and stakeholders to adjust over time, avoiding sudden disruptions. The EU’s exploration into a new regulatory framework for cryptocurrencies illustrates the attempt to harmonize crypto regulation with existing financial systems. In essence, cryptocurrency regulation should be tailored to reflect the country’s unique circumstances and market dynamics.

In addition, our study identifies a notable absence of explicit regulation for NFTs worldwide, a concerning observation given their unique attributes and associated risks. The lack of regulatory oversight could inadvertently facilitate illegal activities [33]. Therefore, we argue that the regulation of NFTs should not be overlooked. Regulators across the globe should actively engage in devising effective regulatory measures to regulate the NFT market.

Furthermore, we discover that DeFi remains largely unregulated. For instance, MiCA states that “Where crypto-asset services are provided in a fully decentralized manner without any intermediary, they should not fall within the scope of this Regulation”. MiCA appears to exclude DeFi from its regulation, yet the term “fully decentralized” is exceedingly ambiguous, leading to the question of how decentralized a platform must be to qualify as fully decentralized? This vague regulatory stance may stem from the inherent complexities of regulating DeFi. However, considering the unique risks and characteristics of DeFi, we believe that regulators should adopt a clearer stance towards its regulation.

10 Conclusion

This paper explores the global regulatory landscape for cryptocurrencies. Through classification and analysis of the regulatory stances, approaches, and measures implemented by various countries, we highlight the diversity in global regulatory developments. This underscores the importance of international cooperation and the pursuit of harmonized regulations. In addition, we discover that cryptocurrencies still remain unregulated in at least 71 countries at the time of writing. Moreover, we observe that no jurisdictions have established specific regulatory frameworks for NFTs or DeFi. Our findings indicate that further research and policy attention are needed to address such regulatory gaps. We hope this paper can provide practical insights that contribute to a better understanding of the global trends in cryptocurrency regulation.

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A Cryptoasset Taxonomy in the UK

The Consultation paper “Future Financial Services Regulatory Regime for Cryptoassets” defines four types of cryptoassets.

Exchange Tokens are a type of cryptoasset that utilizes technology such as DLT for recording or storing data, and are neither issued nor guaranteed by a central bank or any central authority. ETH and BTC are examples of exchange tokens. Sub-types include *stablecoins*, *asset-reference tokens* and *algorithmic tokens*. Stablecoins aim to achieve stability by being pegged to a more stable asset or a basket of assets, such as fiat currency. Asset-reference tokens reference their value in relation to commodities (i.e., commodity-linked tokens) or other cryptocurrencies (crypto-backed tokens). Algorithmic tokens aim to achieve price stability primarily through an algorithm that adjusts their supply in response to changes in demand and the value of supporting cryptoassets.

Utility tokens are cryptoassets that grant digital access to a particular service or application. Unlike security tokens, they do not confer rights or entitlements typically associated with securities, such as ownership or equity, and are not intended to be used as a payment method. Sub-types include governance tokens (protocol voting) and fan tokens (membership voting).

Security tokens are cryptoassets that already fulfill the criteria for a specified investment as defined under the RAO, and are therefore subjected to regulation.

NFTs are cryptoassets that represent ownership or proof of authenticity of specific items or pieces of content using DLT.

Some of these tokens may meet the definition of *e-money tokens*, which are tokens that represent a monetary value stored in electronic form, allowing users to make payments with them. If so, they may fall within the scope of EMRs. In addition, the UK government does not treat stablecoins as a separate category of cryptoasset but includes them in its existing framework.

B Supplementary Tables

Document	Year	Authorities	Regulated Activities	Link
Transfers of Funds Regulation	2023	The EP and the Council	◊ CASPs are required to collect and disclose data on cryptoassets transfers	TFR
Anti-Money Laundering Directive V	2018	The EP and the Council	◊ Due diligence, disclosure, data reporting, etc.	AMLD5
Payment Services Directive II	2015	The EP and the Council	◊ Payment services	PSD2
Markets in Financial Instruments Directive II	2014	The EP and the Council	◊ Off-exchange and OTC trading, disclosure and reporting, etc.	MiFID2
Electronic Money Directive II	2009	The EP and the Council	◊ E-money issuance, distribution, redemption, etc.	EMD2
Markets in Crypto-Assets Regulation	2023	The EP and the Council	◊ Public offerings, the admission to trading, provision of services, market abuse prevention, etc.	MiCA
Digital Finance Package	2020	DG FISMA	◊ Legislative proposals on cryptoassets	DFP
FinTech Action Plan	2018	DG FISMA	◊ Concerns on crypto risks	FAP

Table 2: Cryptoasset Regulation In The EU.

Document	Year	Authorities	Regulated Activities	Link
Financial Services and Markets Act	2023	FCA, PSR	◊ Investment, trading, issuance, payment, financial promotion, etc.	FSMA
The AML/CTF Regulations	2017	FCA	◊ Customer due diligence, disclosure, reporting, etc.	AML/CTF
Payment Services Regulations	2017	FCA	◊ Payment	PSR
Electronic Money Regulations	2011	FCA	◊ Issuance, management of E-Money	EMR
Regulating Cryptoassets Phase 1: Stablecoins	2023	FCA	◊ Stablecoin issuance, payments, custody, etc.	DP23/4
Update on Plans for the Regulation of Fiat-backed Stablecoins	2023	HMT	◊ Stablecoin issuance, payments, custody, etc.	HMT Stablecoin
Future financial services regulatory regime for cryptoassets	2023	HMT	◊ crypto issuance, payment, exchange, investment, lending and borrowing, leverage, custody activities.	HMT Cryptoassets
PS19/22: Guidance on Cryptoassets	2019	FCA	◊ Crypto issuance, payment, exchange, investment management, financial advising, etc.	PS19/22
Cryptoassets Taskforce	2018	HMT, FCA, BoE	◊ Laying out the path to establish regulatory approach to cryptoassets and DLT	Taskforce

Table 3: Cryptoasset Regulation In The UK.