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GLOBAL CRYPTO MARKETS AND FRAGMENTED U.S. REGULATORS: THE IMPACT OF THE SEC AND THE CFTC

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Abstract

Regulation of crypto is one of the most important topics on the agenda of administrative agencies and the U.S. Congress. Against the backdrop of extreme market volatility that undermines crypto ecosystems and puts investors at risk, policymakers struggle with achieving the dual objectives of protecting investors and promoting socially beneficial innovation. The first-order question in solving this puzzle is to determine which regulators can efficiently navigate crypto markets.

In this article, we aim to help policymakers design data-driven reforms on crypto and to contribute to the scholarship on financial innovation. Focusing on the unique fragmentation within U.S. financial regulation, we evaluate how the major regulators (the SEC and the CFTC) approach crypto and compare market reaction to the agencies' efforts.

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Both Commissions regulate crypto primarily via enforcement actions. Through enforcement, the Commissions transmit policy signals to crypto markets on a global scale. We demonstrate that investors react negatively to these efforts. Importantly, crypto markets exhibit a significantly more adverse reaction to SEC enforcement, calling into question the effectiveness of fragmented financial regulation in the context of financial innovations. Our results also suggest that commodity and derivatives regulation may be more suitable from the perspective of crypto markets.

We also hypothesize that it is erroneous to presume that crypto markets reject all formal law. Cryptoasset prices exhibit a more positive reaction to antifraud enforcement, indicating that market participants understand the value of integrity and that quality improvements may offset the identified negative effect of regulation.

Overall, we provide evidence supporting recent calls for reform from Congress and the White House and emphasize the need for a systematic reassessment of the balkanized regulatory framework in finance. While regulation and enforcement are generally viewed as costly events and generate a negative crypto market reaction, some types of regulation may have the potential to improve market quality with positive valuation implications.

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A. INTRODUCTION

Assets created, secured, and transmitted by using cryptography (*i.e.*, cryptoassets) are an economic innovation that steadily grew in popularity among enthusiasts, investors, consumers, and financial institutions for more than a decade. Today, as macroeconomic conditions have changed, the once-popular asset class has lost more than 50% of its value since its record highs in 2021. Yet, crypto markets are worth saving. To name a few of its economic benefits, crypto may provide better security than traditionally centralized financial systems, reduce the need to rely and expend resources on intermediaries in payments or capital raising, improve transaction speed, and decrease transaction costs. These technologies may give us productive, albeit disruptive and Schumpeterian, services and assets. Alas, they also spawn new risk nodes, including irrational behavior, excessive volatility, systemic risk, investor and consumer protection concerns, and fraud.

Against this backdrop of risks and rewards, policymakers struggle with achieving the dual objectives of protecting investors and promoting socially beneficial innovation. The first order question in solving this puzzle is to determine which regulators can effectively navigate these challenges. In this article, we aim to help policymakers design data-driven reforms on crypto and to contribute to the scholarship on innovation by empirically examining the uniquely fragmented U.S. approach to crypto.

To date, innovative crypto products have been regulated through the existing framework of financial regulation. The classic U.S. approach to financial regulation comprises securities, commodity, derivatives, and banking (and money transmitter) laws within the demesne of respective federal and state authorities.[i] In fact, the U.S. has more than a hundred relevant agencies in finance, forcing firms to comply "with a confluence of several legal regimes."[ii] Its "highly fragmented and arguably Balkanized structure of financial regulation… approaches creating a different regulator for every class of financial institution."[iii]

We revisit this jurisdictional balkanization and provide a systematic analysis of the two major regulators: the Securities and Exchange Commission ("SEC") and the Commodity Futures Trading Commission ("CFTC") (also the "Commissions"). Theory suggests that holistic, systems-based studies[iv] are crucial to the success of regulatory frameworks. In fact, macro-level leitmotifs are already embedded in regulatory philosophies on digital innovation in the European Union

and the United Kingdom.[v] Comparable comprehensive initiatives are slowly emerging in the U.S.

One germane example is President Biden's March 2022 Executive Order that "outlines[es] the first ever, whole-of-government approach to addressing the risks and harnessing the potential benefits of digital assets and their underlying technology."[vi] On the legislative side, in June 2022, Senator Lummis and Senator Gillibrand rolled out a major bipartisan overhaul of regulatory strategies, with the emphasis on securities, derivatives, and commodity market regulators, *i.e.*, the SEC and the CFTC.[vii] As recently as August 3, 2022, another bipartisan bill was introduced.[viii] If enacted, that reform would redistribute the jurisdiction of the Commissions, assign more responsibility to the CFTC, and provide better regulatory clarity.

We seek to provide empirical data for these comprehensive initiatives by juxtaposing the impacts of the Commissions on crypto markets and providing evidence for effective reform. There are currently no comparative studies on how the innovators and other recipients of legal rules react to the Commissions. Yet, the Commissions represent a considerable part of balkanized financial regulation in the U.S. and have markedly distinct philosophies.[ix] Both are exceptionally active regulators of crypto, overseeing overlapping classes of cryptoassets.[x]

Given that the Commissions have been regulating crypto primarily through enforcement, we hand-collect 116 enforcement events from April 2017 through November 2021 and examine market reaction to enforcement.[xi] Our cross-sectional analyses and event studies indicate that the global crypto market (to a surprising degree) is attuned and susceptible to enforcement actions initiated by the Commissions. In addition, market participants react differently to actions brought by the CFTC compared with enforcement initiated by the SEC.

Generally, cryptoasset prices exhibit a somewhat negative reaction to U.S.-led enforcement. Could it be because, as some commentators suggest, crypto markets are partially driven by money laundering, crime, and libertarian spirits?[xii] Our results, however, indicate that while markets perceive enforcement as an adverse event, they do not view antifraud actions in a similarly negative light. Crypto-market participants understand that fraud undermines market integrity. While crypto investors treat regulation (mainly, enforcement of pre-crypto securities statutes) as an unfavorable and costly event, these costs of regulation (in some cases) are offset by the benefits of improved market quality and integrity. The unfavorable reaction to regulation may thus be explained by *who* enforces substantive law (the CFTC or the SEC).

The paper proceeds as follows. Part B discusses financial innovation and regulatory fragmentation. It also explains the importance of the Commissions and their enforcement in the global world of crypto. Part C summarizes the Commissions' jurisdiction and outlines relevant statements and crypto-related actions. Part D discusses our contribution to the financial and economic literature on crypto regulation. Part E provides cryptoasset taxonomies and covers our sample data. Part F presents our empirical results, and Part G provides theoretical interpretations, with an emphasis on substantive law and enforcement methods. Part H concludes the article.

B. INNOVATION AND THE INTERNATIONAL ROLE OF THE COMMISSIONS

1. Traditional Regulatory Paradigms and Crypto

Innovations challenge existing regulatory paradigms and provoke constant debates on the need for reform.[xiii] Financial innovation, as Professor Romano explains, places us "in the realm of… radical uncertainty of not knowing the possible states of the world, let alone being able to assign probabilities to states."[xiv] By the same token, crypto, like other innovations, calls into question the regulatory status quo, generates uncertainties, and ultimately poses new epistemological challenges, asking regulators to deal with "unknown unknowns."[xv]

Despite these challenges, crypto innovations in the U.S. have been steadily regulated through the existing legal framework. (In this sense, crypto is not a lawless Wild West, contrary to some public statements.)[xvi] While some crypto-firms and fintechs (*i.e.*, financial technology firms) may attempt to operate outside regulatory perimeters, they "have not always been able to escape the scrutiny and oversight of financial regulation"[xvii] at one level or another.

Cryptoassets may be considered securities falling within the remit of the SEC; commodities implicating the bailiwick of the CFTC; or funds and value that substitute for currency, enabling payment and lending services and falling under bank and money transmitter regulation.[xviii] Sometimes, an asset may be both a commodity and a security.[xix] U.S. crypto regulation thus is as balkanized as U.S. financial regulation that applies to it. This is the classic U.S. approach to financial market regulation.[xx]

These realities suggest that it is essential to add to the scholarship on crypto innovations a more systemic perspective through the lens of several regulatory regimes. In this article, we focus on both commodity and securities regulation. There are two dimensions in our analysis: measuring inter-agency outcomes and assessing U.S.-led enforcement effect cumulatively.

2. Inter-Agency Differences

The first dimension of our analysis is to compare and juxtapose the effects of each Commission. Together, the Commissions represent a considerable chunk of the balkanized regulatory regime within the U.S. Despite previous calls for merging the agencies,[xxi] they remain separate independent regulators of the U.S. securities and derivatives markets.

Although being separate regulators, the Commissions pursue similar overarching goals of sound and safe regulation. The SEC's statutory objectives encompass protecting investors; maintaining fair, orderly, and efficient markets; and facilitating capital formation.[xxii] The CFTC's goals, painted with broad strokes, are "to promote the integrity, resilience, and vibrancy of the U.S. derivatives markets through sound regulation," ultimately serving as a "global standard for sound derivatives regulation."[xxiii] Both agencies assert their jurisdiction over the cryptoasset market, its infrastructure, and its participants and stand ready to further expand their reach.[xxiv]

Despite the similarities between their foundational objectives, it has been suggested that the CFTC and the SEC are fundamentally different agencies operating under contrasting philosophies, with the CFTC being more principles-based in its regulation[xxv] and more open to innovative experimentation. This evidently includes crypto products.[xxvi] The statutes that the Commissions enforce are also fundamentally distinct.[xxvii] As discussed further in this paper, the global crypto market distinguishes between the Commissions: the reaction is more negative in respect to enforcement of federal securities law by the SEC compared with enforcement of commodity and derivatives law by the CFTC.

3. Why Is U.S.-Led Enforcement Impactful?

The second dimension of this paper involves measuring investors' reaction to U.S.-led enforcement cumulatively. This line of inquiry is particularly important because U.S. regulators occupy a special place in global financial markets. U.S. markets serve as sizeable financial "chokepoints."[xxviii] As Professor Verdier argues, political economy triggers an interplay among national regulators, the financial industry, and great national powers, which ultimately shapes regulatory systems.[xxix] Viewed in this light, the U.S. CFTC and SEC are among the main agents of a great financial power (the United States) with its developed financial markets.[xxx]

The Commissions are active participants in the International Organization of Securities Commissions and engage in cross-border enforcement.[xxxi] Their enforcement divisions, as well as the Department of Justice with which the Commissions collaborate, have evolved into major international players.[xxxii] Enforcement naturally bolsters the central role of U.S. regulators in global financial

markets. It has even become their distinctive trademark. Verdier, Coffee, Jackson, Roe, and other scholars[xxxiii] underscore that U.S. regulatory agencies (particularly the SEC, which is larger than the CFTC) invest considerable resources in enforcement. The consequences of U.S-based enforcement are not contained within the national boundaries of the U.S.

In keeping with this philosophy, the Commissions have exhibited the same fervor by engaging in intensive and often extraterritorial enforcement in crypto markets.[xxxiv] Actions against major foreign crypto-exchanges, a global stablecoin, and developers illustrate this point.[xxxv] As powerful extraterritorial agencies, the Commissions have yet to lose a case against a crypto-firm, whether domestic or foreign. These international aspects of enforcement solidify the central position of these policymakers in inherently global crypto markets and motivate our analysis of enforcement as a means of transmitting policy signals, distributing information to innovators and other markets participants, and ordering economic systems.

C. THE TWO COMMISSIONS IN CRYPTO

1. The CFTC

The CFTC was first to assert its jurisdiction over cryptoassets and market participants engaged in cryptoasset trading.[xxxvi] As early as March 2014, the agency announced that it was considering regulating Bitcoin, and in 2015, in a first ever enforcement action against a crypto trading platform operating unregistered facilities for trading and processing bitcoin option, futures contracts, and swaps, the CFTC stated that virtual currencies were commodities.[xxxvii] The term "commodity" covers agricultural products,[xxxviii] "and all services, rights, and interests (except motion picture box office receipts . . .) in which contracts for future delivery are presently or in the future dealt in."[xxxix]

In 2016, the CFTC followed up with a major settlement with Bitfinex, which operated an online platform for exchanging and trading cryptocurrencies and failed to register as a futures commission merchant and a designated contract market.[xl] Once again, the CFTC repeated that "virtual currencies are encompassed in the definition and properly defined as commodities, and are therefore subject as a commodity to applicable provisions" of the Commodity Exchange Act ("CEA") and relevant regulations.[xli]

In addition to these early enforcement actions, the CFTC also released the Primers on Virtual Currencies (in 2017)[xlii] and on Digital Assets (in 2020),[xliii] as well as virtual asset guidance in 2020.[xliv] These statements declare that virtual currencies are commodities, a position that appears well-accepted (although not

unquestionable)[xlv] in part because several federal courts have supported the CFTC's view on virtual currencies and jurisdiction over crypto markets.[xlvi]

Many CFTC cases in our database fall into two categories: (1) impermissible derivatives transactions and violations of registration provisions applicable to derivatives market participants; and (2) market manipulation and fraud. This dichotomy is explained by the specifics of the jurisdiction of the CFTC in spot markets for commodities and derivatives markets.

Namely, spot markets are not subject to CFTC jurisdiction except instances of fraud or market manipulation. By contrast, regulatory jurisdiction of the CFTC does extend over transactions involving futures, options, and swaps. It is implicated with respect to derivatives contracts in virtual currencies, "or if there is fraud or manipulation involving a virtual currency traded in interstate commerce. Beyond instances of fraud or manipulation, the CFTC generally does not oversee 'spot' or cash market exchanges and transactions involving virtual currencies that do not utilize margin, leverage, or financing."[xlvii]

2. The SEC

The SEC joined the crypto-related enforcement fracas only in mid-2017, with a release of the Report of Investigation concerning The DAO, a crypto-based decentralized autonomous organization whose purpose was to seek capital contributions for further investment in revenue-generating projects. The Report described the application of securities law to "virtual organizations or capital raising entities that use distributed ledger or blockchain technology to facilitate capital raising and/or investment and the related offer and sale of securities."[xlviii] Using smart contracts (*i.e.*, computerized protocols to execute transactions) and reliance on code, as a threshold matter, do not shield transactions and conduct from the application of federal securities law and SEC jurisdiction.[xlix]

The jurisdiction of the SEC extends only over securities, securities markets, and their participants. Consequently, it was important to bring cryptoassets within the scope of the definition of securities. The DAO Report achieved this result by applying the decades-old *Howey* investment contract test[l] to the digital assets at issue and concluding that The DAO offered and sold investment contracts. The four-prong *Howey* test[li] has been consistently applied by the SEC to cryptoassets ever since. To clarify the application of the *Howey* test to crypto, the SEC staff also issued the 2019 Framework for "Investment Contract" Analysis of Digital Assets.[lii] At least two crypto-related court decisions, both from the Southern District of New York, supported this position of the regulator. [liii]

After it has been determined that an issuer is offering and selling securities, the issuer is subject to a variety of registration and reporting obligations under securities law.[liv] In addition to these primary markets for securities, SEC jurisdiction also covers secondary market trading and exchanges,[lv] as well as various market participants, including investment companies.[lvi] Several enforcement actions in our database implicate the Securities Exchange Act,[lvii] the Investment Company Act,[lviii] and the Investment Advisers Act[lix] and involve unregistered crypto-exchanges, broker-dealers, and investment companies.

For example, SEC enforcement actions have made it clear that crypto-exchanges are required to register with the SEC or seek exemption from registration, including being qualified and registered as an alternative trading system ("ATS"), pursuant to the Securities Exchange Act.[lx] In the most recent order, an unregistered crypto-exchange displayed an order book and provided facilities for order execution on its website, through the order book, and via encoded trading protocols.[lxi]

To conclude, first, the SEC has shaped its views on whether cryptoassets are securities by interpreting decades-old case law through enforcement actions and staff statements. In doing so, it has informed cryptoasset issuers that they must comply with the registration and reporting requirements of securities law. Second, using enforcement and statements, it has signaled that crypto market participants, such as exchanges and investment companies, must register with the SEC.

D. Empirical Research on Cryptoasset Regulation

In our study of how crypto markets react to commodity, derivatives, and securities law enforcement, we contribute to economic and financial literature on crypto in the following way. As of this writing, several studies have examined how cryptoasset markets react to the news of regulation or anticipated regulation but not to enforcement *per se*. Since there are no new U.S. regulations (instead, the Commissions heavily rely on enforcement), it is crucial to examine the effect of enforcement actions on crypto markets. In addition, this article focuses on cryptoassets that fall within the jurisdiction of both Commissions as securities, commodities (and derivatives), or both. These regulatory classifications encircle various types of tokens and coins.[lxii]

Overall, our analysis corresponds with the prior research demonstrating a negative market price reaction to the news of regulation, particularly securities law.[lxiii] Chokor and Alfieri, for example, find that the market reaction to regulatory news is negative and statistically significant, with a stronger negative reaction associated with securities law announcements. [lxiv] Koenraadt and Leung also

determine that the overall market reaction to regulatory news events is negative, particularly if the announcements are related to securities regulation and exchange trading. These findings comport with a study by Shanaev and coauthors who find that regulation of exchanges and issuances impacts cryptoasset prices.[lxv] Similarly, Auer and Claessens, using an event study approach and focusing on major cryptocurrencies such as Bitcoin, XRP, Ether, and others, find that regulatory news regarding a possibility of applying securities law to cryptoasset markets is associated with a strong adverse market impact.[lxvi]

The results of our study contribute to this prior work by showing a negative market reaction to enforcement actions as a distinct and prevalent regulatory method of the Commissions. Our nuanced examination of enforcement assesses the collective universe of cryptoassets categorized as both commodities and securities; and our results are in tune with the previous scholarship that suggests that crypto markets react particularly negatively to news events related to securities law.

We also contribute to the literature on the quality and liquidity of cryptoassets. For instance, Chokor and Alfieri's cross-sectional analysis demonstrates that cumulative market-adjusted returns are less negative for less liquid cryptocurrencies, cryptoassets with more information asymmetry, as well as smaller cryptoassets, suggesting that markets view possible regulation of those cryptoassets more favorably. We similarly find that more liquid assets tend to have a more negative reaction to the announcement of enforcement events. We also show that risky and volatile assets are more negatively affected by the announcements.

Our results are broadly consistent with Chokor and Alfieri's and Koenraadt and Leung's conclusions that events signaling increased regulation (in our case, enforcement actions) have a negative effect on cryptoasset valuations. We further confirm these conclusions by examining the price reaction of Bitcoin and Ethereum, *i.e.,* the two assets that are decentralized and constitute commodities according to the CFTC. Finally, we show that, even though crypto-investors perceive regulation via enforcement as a costly activity, this negative effect is offset by a more positive reaction to enforcement actions against fraudulent parties, *i.e.,* actions which contribute to better market quality and integrity.

E. SAMPLE DATA

1. Cryptoasset Classifications

The word "cryptoasset" may refer to cryptocurrencies, virtual currencies, coins, tokens, stablecoins, and non-fungible tokens, among others. From a

technological standpoint, coins may be called "native tokens," which indicates that they are intrinsic to their underlying blockchain, while other tokens are built on existing blockchains and in this sense are non-native.[lxvii] The SEC cumulatively refers to these assets as "digital assets," "issued and transferred using distributed ledger or blockchain technology, including, but not limited to, so-called 'virtual currencies,' 'coins,' and 'tokens.' "[lxviii]

Let us look at the specific terminology that may apply to different classes of cryptoassets. The first term is "cryptocurrency." The CFTC defines "cryptocurrency" (also "digital currency" or "virtual currency") "as a digital representation of value that functions as a medium of exchange, a unit of account, and/or a store of value, but does not have legal tender status in any jurisdiction."[lxix] Put another way, a cryptocurrency performs all or some of the three functions of *money* without being associated with a particular state. It is these virtual currencies that are often called coins or native tokens. Bitcoin is a good example of these cryptocurrencies.

Digital tokens are a broader category. The U.K. Financial Conduct Authority, for instance, sets forth the following classifications: e-money tokens, security or investment tokens, and utility tokens.[lxx] The E.U. has proposed a similar taxonomy and added to these three categories "asset-referenced" tokens.[lxxi] E-money and asset-referenced tokens are essentially stablecoins whose value is tied to commodities and/or currencies which can be either digital or non-digital assets.[lxxii] Finally, utility tokens are, generally, "a type of crypto-asset which is intended to provide digital access to a good or service, available on DLT [, *i.e.*, distributed ledger technology], and is only accepted by the issuer of that token."[lxxiii]

Our database covers enforcement actions instigated by the CFTC and the SEC against a variety of parties engaged in issuing, offering, rating, redeeming, and trading most of these diverse classes of assets. Following previous research that suggests that investor reactions to regulatory news do not differentiate between tokens and coins,[lxxiv] we include all types of cryptoassets in our enforcement database.[lxxv] Moreover, the CFTC and the SEC do not distinguish between these subclasses of cryptoassets and consider tokens and coins commodities and/or securities.

The crypto currency price data are extracted from CoinGecko (www.coingecko.com), which is one of the largest crypto price data aggregators. We extract daily prices, volume, and market capitalization of 2,397 liquid cryptoassets with a minimum market capitalization of $1 million at the end of the period (-45,-5) preceding the announcement of enforcement actions. We use these data to compute abnormal returns around the announcement dates of the enforcement actions, "normal" returns or pre-announcement returns unaffected by

the enforcement action, and volatility of pre-announcement returns as a measure of risk.

2. Enforcement data

Our sample of enforcement data consists of all actions initiated by the SEC and the CFTC between April 1, 2017, and November 1, 2021.[lxxvi] Although the DAO Report issued by the SEC[lxxvii] is widely regarded in the literature as the first clear policy statement on digital-asset securities, there were one crypto-related securities fraud case and one crypto-related trading suspension predating the Report.

We identify relevant cases by reviewing the Cyber Enforcement Actions database on the SEC's website,[lxxviii] and the CFTC cases reported on its website.[lxxix] We also manually search for cases on Bloomberg Law, Westlaw, and LexisNexis.[lxxx] Additionally, we examine Commissions' enforcement releases and annual reports. Each case is manually traced to dockets on Bloomberg Law, Westlaw, and LexisNexis.

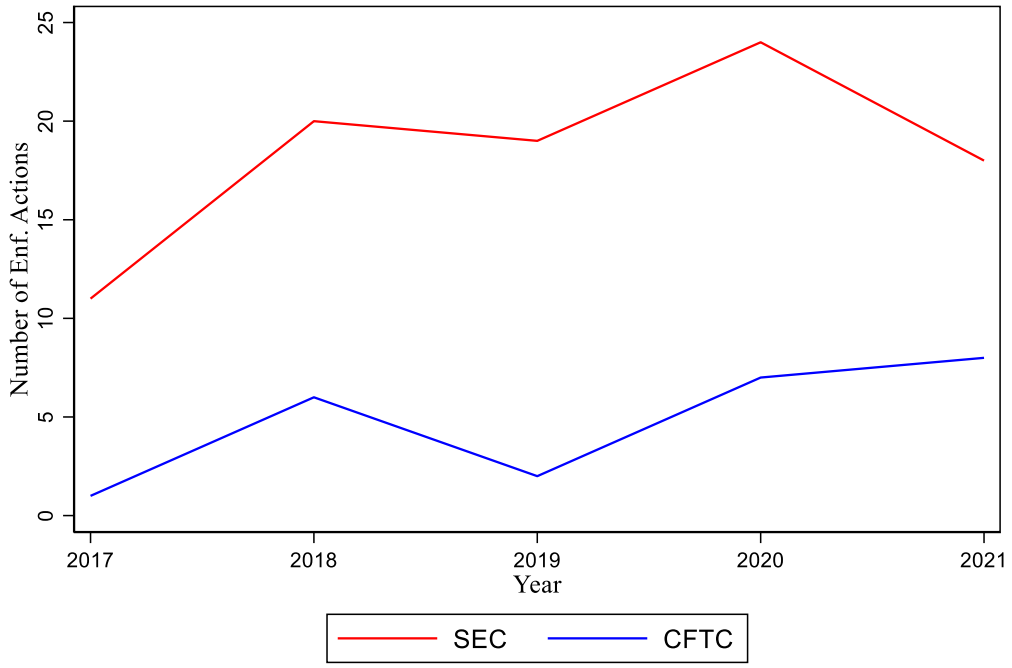
Further, we review all complaints, orders, litigation and settlement releases, and final decisions and collect information on the key enforcement action characteristics. Specifically, we collect information about the statutory provisions involved, settlements, penalties, and disgorgement. Further, we identify the defendant and respondent type by assigning them into the following categories:

- "Issuer," which, for simplicity, we refer to as "ICO issuer" although it also includes security token offerings and other types of cryptoasset offerings.
- "Exchange." Crypto-exchanges are online trading platforms listing tokens and coins for trading. Crypto-exchanges may also provide placement and vetting services, similar to those of investment banks, for projects seeking listing. Consequently, they may serve as gatekeepers enabling not only listing and trading but also offerings. Crypto-exchanges may be centralized or decentralized.[lxxxi] In the United States, many crypto-exchanges are registered as money transmitters with the states, and several are ATS registered with the SEC.[lxxxii]
- "Rating agency." Rating agencies in crypto are mainly unregistered platforms and firms providing opinions on the quality and ratings of cryptoassets and/or exchanges.
- "Broker-dealer." The term as used in this article includes not only security broker-dealers but also FCMs in commodity and derivatives markets.

- "Investment fund." The term covers investment companies and other funds in the crypto space.
- "Other" (*e.g.*, attorneys and promoters, including famous actors).

The final sample contains 116 enforcement actions, which include 27 CFTC actions and 89 SEC actions. Figure 1 demonstrates the temporal distribution of enforcement actions and shows a marked increase in enforcement activity by both agencies. The SEC actions increased from 5 in 2017 to 24 in 2020 and slightly declined after that. The CFTC actions increased from 1 in 2017 to 8 in 2021.

Figure 1. Enforcement Actions by Year



3. Summary Statistics

In Table 1 we provide summary statistics for the variables used in our analyses. In Panel A we report abnormal returns around the announcement dates of enforcement actions (*i.e.*, event dates). We employ a standard event study methodology to construct abnormal returns on date t=0 (event date) and cumulative abnormal returns over event windows (-1,0), (0,1), (-1,1) and (-3,3). This approach

is similar to that used by Joos and Leung,[lxxxiii] Chokor and Alfieri,[lxxxiv] and Koenraadt and Leung.[lxxxv] Incorporating additional pre- and post- event days into event windows allows us to account for early information leakage, slow incorporation of information into asset prices, and also correct for potential small errors in identification of the announcement date. Moreover, a wider event window (-3,3) allows us to determine the speed of information incorporation into returns.

We define enforcement action announcement by the date of the following actions taken by the SEC or the CFTC: 1) filing a complaint in a federal district court, 2) announcing an administrative enforcement action (*i.e.*, issuing an order instituting SEC cease-and-desist proceedings or instituting proceedings pursuant to the Commodity Exchange Act, often accompanied by a settlement), or 3) publication of a trading suspension. In three cases involving exchanges (Coinbase, Uniswap, and Terraform Labs), we use information about pending investigations and potential enforcement actions that was either leaked by the target (namely, Coinbase in a post)[lxxxvi] or revealed in media sources.

We compute abnormal returns by subtracting the expected (*i.e.*, normal) return from the event day raw return. Further, we calculate cumulative abnormal returns ("CARs") by adding up abnormal returns over the event window. The equation below illustrates the CAR methodology:

$$CAR = \sum_{t \in \tau} \left(R_t - \bar{R}_T \right) = \sum_{t \in \tau} \left(R_t - \frac{1}{\#(\mathrm{T})} \sum_{t' \in \mathrm{T}} R_{t'} \right)$$

where τ denotes the number of days in the event window affected by the enforcement action, uppercase T contains the days in the pre-event window, Rt is the return at t, R_T is the sample mean of pre-event to approximate the expected return. We define expected return by the average daily return during the pre-event window (-45,-5). The length of the window is short enough to minimize overlap with other enforcement actions. The event window ends 5 days before the event to ensure that pre-event information leakage does not affect the expected return.

The summary statistics for the pre-event and event cumulative abnormal returns are provided in Panel A of Table 1. We report returns over t=0 and periods over days (-1,0), (0,1), (-1,1), and (-3,3) event windows and average daily return during the pre-event period (-45,-5). The sample of announcement date abnormal returns contains 82,444 observations. Since the observations in our sample are not independent and the returns are correlated in the cross-section at the asset and event

time level, we cluster standard errors on those two dimensions. This reduces the degrees of freedom to the size of the smallest cluster (number of enforcement actions) and generates conservative t-statistics.

The global crypto market reaction to the announcement of enforcement actions by the U.S. regulators is negative regardless of the event window over which returns are measured. This result is consistent with other related studies' finding that crypto regulation is being generally perceived as a negative event by the market. However, it is interesting that *enforcement* actions of regulators in one market can so significantly move global cryptoasset values. This observation supports the theoretical arguments on the important international role of the U.S. SEC and the CFTC, which we examine in Part B of this article.

At the announcement date t=0, the one-day abnormal return (AR(0)) is economically small (-0.004) and statistically insignificant (t-statistic=-0.880). However, for the two-day window that includes day t=-1, we observe some information leakage. CAR(-1,0) is -0.016 and significant at 5 percent level with a t-statistic of -2.260. The three day CAR(-1,1) is marginally smaller at (-0.015) with a t-statistic of -1.870 suggesting that the effect of the enforcement action attenuates shortly after the announcement. The extended seven-day CAR(-3,3) of -0.014 and statistically insignificant also demonstrates that the effect is concentrated on days (-1,0), has limited pre-event leakage, and is not long-lived.

In Panel B, we provide summary statistics of cryptoasset characteristics. We use median daily market capitalization of each individual cryptoasset during the pre-announcement period (-45,-5) as a measure of size. We use medians rather than means because means are sensitive to high volatility of cryptoasset values. The average value is $812.185 million, and the median is significantly smaller, at $10.912 million. This is indicative of considerable size variation in the cryptoasset space where well-established large assets like Bitcoin or Ethereum coexist with thousands of small assets.

Similar to market capitalization, our measure of volume is the median daily value of the pre-event volume. The average of these median values is $85.985 million shares a day, while the median is only 0.447. This spread in the distribution of size and volume persists despite the exclusion of assets with less than $1 million in market capitalization at the end of the pre-event period (day=-5). Finally, the average total buy-and-hold return during the pre-event period is large and positive at 0.195. This value is affected by some well-performing assets and the median asset earns a small negative return of -0.011. The average and median volatility of pre-event daily returns is 0.097 and 0.082, respectively.

In Panel C we report several characteristics of enforcement actions, which are likely to affect the market reaction to their announcements. As already described in Figure 1, the majority of enforcement actions are initiated by the SEC (76.8 percent) with the rest coming from the CFTC. Roughly half of the enforcement actions (55.4 percent) involve some form of fraud. We define fraud actions as those dealing with fraudulent and manipulative behavior, including violations of Section 10 of the Securities Exchange Act and Rule 10b-5; Section 17 of the Securities Act; as well as Sections 6c, 6b, 4b, and 9 of the Commodity Exchange Act and Rule 180.1. Further, 63.5 percent of actions are registration violations, which mainly implicate Section 5 of the Securities Act; Sections 5 and 15 of the Securities Exchange Act; Section 7 of the Investment Company Act; and Sections 4(a), 4c, 4d, and 5h of the Commodity Exchange Act. Some actions involve both fraud and registration violations.

Most enforcement actions are focused on four large homogeneous groups of responders or defendants: ICO issuers (which include issuers not only in traditional ICOs but also in other types of cryptoasset offerings), brokers (including securities broker-dealers and futures commission merchants), exchanges, and funds, which account for nearly 86 percent of the sample. The remainder is spread across attorneys, promoters, rating agencies, and crypto-related firms (defined as firms whose business models include blockchain-related products and/or cryptoassets). The actions against ICO issuers dominate the sample at 43.4 percent, followed by brokers at 18.3 percent, exchanges at 13.8 percent, and funds at 10.2 percent. The average action has 2.884 respondents in administrative actions (or defendants in district court cases). The median is 2.000. The financial penalties consisting of fines, settlements, disgorgement awards, and pre-judgement interest average 41.88 million with a median of 0.543. A small percent of actions (3.4 percent) result in trading suspensions of securities of crypto-related firms and one ICO issuer.

In some of our robustness analyses we evaluate the effect of action visibility on the magnitude of the market reaction. We search for respondents' and defendants' names on Twitter over days (-1,1) relative to the action announcement and find that 74.3 percent of all actions have some form of coverage. Finally, in some cases, an agency may initiate separate actions against several respondents. This heightened regulatory activity is likely to attract more attention to the action. In 13.1 percent of enforcement actions there are other simultaneously initiated actions.

Table 1. Summary Statistics

This table reports summary statistics for variables used in the regression analyses. Panel A reports abnormal returns around enforcement action announcement dates. Panel B and Panel C report characteristics of cryptoassets and enforcement actions, respectively. In Panel A (unreported) standard errors in means tests are based on standard errors clustered at cryptoasset and event level.

Panel A. Filing and Decision Date Cumulative Abnormal Returns

	Obs.	Mean	t-stat.	St.Dev	P25	P50	P75	Min.	Max.
AR(0)	82340	-0.004	-0.880	0.100	-0.049	-0.005	0.034	-0.561	0.908
CAR(-1,0)	82340	-0.016**	-2.260	0.132	-0.082	-0.014	0.042	-0.934	1.000
CAR(0,1)	82340	-0.003	-0.430	0.126	-0.066	-0.006	0.052	-1.123	1.065
CAR(-1,1)	82340	-0.015*	-1.870	0.147	-0.097	-0.015	0.057	-0.460	0.609
CAR(-3,3)	82168	-0.014	-1.310	0.255	-0.143	-0.010	0.108	-1.744	2.344
Ave. Daily Ret.(-45,-5)	82340	0.006***	5.770	0.017	-0.005	0.003	0.013	-0.183	0.149

Panel B. Pre-Filing Cryptoasset Characteristics

	Obs.	Mean	St.Dev	P25	P50	P75	Min.	Max.
Market.Cap.(Mil)	82340	812.185	16589.230	3.456	10.912	48.231	1.000	1,145,912.000
Volume (Mil)	82340	85.986	1257.159	0.066	0.447	2.996	0.000	67,726.711
Total Ret.(-45,-5)	82340	0.195	0.839	-0.291	-0.011	0.388	-0.997	6.383
Volatility	82340	0.097	0.059	0.057	0.082	0.120	0.001	0.574

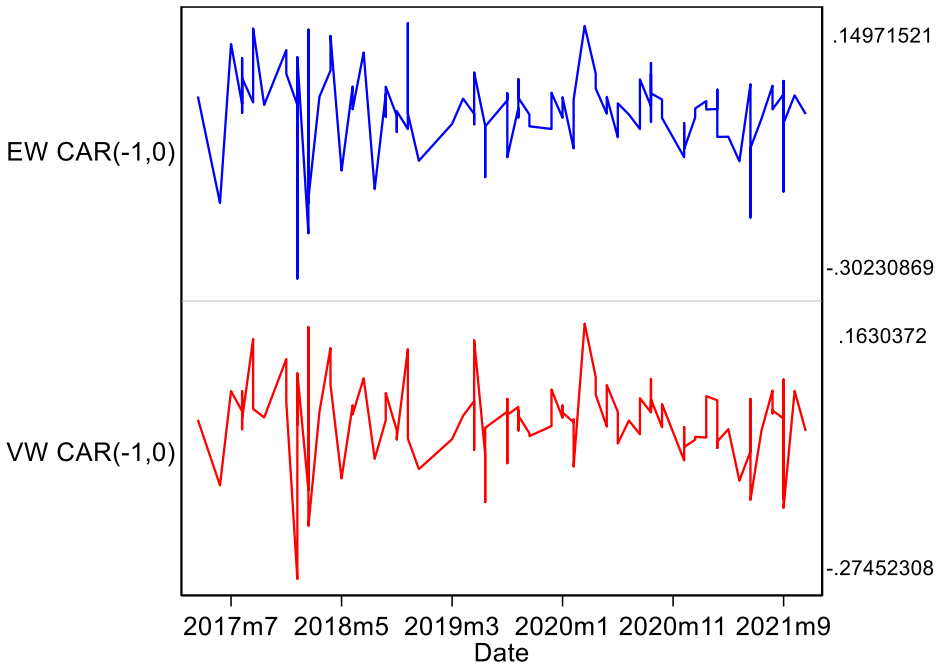
Panel C. Enforcement Action Characteristics

	Obs.	Mean	St.Dev	P25	P50	P75	Min.	Max.
SEC	82340	0.768	0.422	1.000	1.000	1.000	0.000	1.000
CFTC	82340	0.232	0.422	0.000	0.000	0.000	0.000	1.000
Fraud	82340	0.554	0.497	0.000	1.000	1.000	0.000	1.000
Registration	82340	0.635	0.481	0.000	1.000	1.000	0.000	1.000
Broker	82340	0.183	0.386	0.000	0.000	0.000	0.000	1.000
ICO Issuer	82340	0.434	0.496	0.000	0.000	1.000	0.000	1.000
Exchange	82340	0.138	0.345	0.000	0.000	0.000	0.000	1.000
Fund	82340	0.102	0.302	0.000	0.000	0.000	0.000	1.000
Other	82340	0.143	0.350	0.000	0.000	0.000	0.000	1.000
Number of Defendants	78888	2.884	2.341	1.000	2.000	3.000	1.000	12.000
Trading Suspension	78402	0.034	0.180	0.000	0.000	0.000	0.000	1.000
Total Penalties	57364	41.880	165.715	0.000	0.543	7.000	0.000	1242.500

Twitter	82340	0.743	0.437	0.000	1.000	1.000	0.000	1.000
Multiple Actions	82340	0.131	0.337	0.000	0.000	0.000	0.000	1.000

The main focus of our empirical analyses is to examine the global crypto market reaction to the announcement of enforcement actions by the U.S. regulators. In Figure 2 we visually examine the average equal-weighted and value-weighted CAR(-0,1) for all 116 actions aggregated to monthly level. Value-weighted returns are weighted by the market value of cryptoassets at t=-5 relative to the announcement date, which marks the end of the pre-event window. Rapid growth in the cryptoasset markets combined with the SEC's shift toward registration violations could have changed the direction and magnitude of market reaction to the enforcement actions during the sample period. However, we observe no directional change in either equal- or value-weighted returns. There is also no discernable size effect and value-weighted returns which are dominated by the returns of the two largest cryptoassets – Bitcoin and Ethereum – which behave in a way similar to equal-weighted returns. The only trend over our sample period is the attenuation of volatility in announcement returns. This suggests that the nature and the outcomes of enforcement actions may have become either more predictable or less impactful.

Figure 2. Announcement Returns by Year



F. EMPIRICAL RESULTS

1. Enforcement Action Characteristics and Market Reaction

The summary statistics demonstrate that the SEC and CFTC enforcement actions have a negative valuation effect for both the median and mean cryptoassets. In this section we explore the cross-sectional determinants of the reaction to the enforcement actions by focusing on the characteristics of both the enforcement actions and cryptoassets themselves. We begin by looking at the average market reaction for different types of enforcement actions. Specifically, we focus on the agency initiating the action and whether the violation constitutes fraud.[lxxxvii] These results are reported in Table 2.

Table 2. Market Reaction to Enforcement Action by Action Type.

This table presents average abnormal returns by enforcement type. Abnormal returns are returns adjusted by average daily return over days (-45, -5) relative to the filing date. First two columns report actions initiated by the SEC and CFTC. The third and fourth columns report actions involving fraud and non-fraud. The *t*-statistics are computed using standard errors corrected for clustering of observations by cryptoasset and event and are reported in parentheses below the estimates. ***, **,

* indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	SEC	t-stat	CFTC	t-stat	Fraud	t-stat	Non-fraud	t-stat
AR(0)	-0.008	-1.310	0.007	1.050	0.005	1.080	-0.015*	1.670
CAR(-1,0)	-0.018**	-2.060	-0.010	-0.960	-0.006	-0.610	-0.029***	-2.870
CAR(0,1)	-0.008	1.000	0.012	0.900	0.007	0.930	-0.014	-1.420
CAR(-1,1)	-0.018*	-1.970	-0.005	-0.310	-0.003	-0.320	-0.029**	-2.570
CAR(-3,3)	-0.015	-1.10	-0.010	-0.036	-0.005	-0.320	-0.025	-1.310

These comparisons show that the actions initiated by the SEC are met with a negative reaction regardless of the event window. Event windows (-1,0) and (-1,1) have the largest and statistically significant returns measuring -0.018 in both cases with respective t-statistics of -2.060 and -1.970. In contrast, market reaction to the actions initiated by the CFTC is small and either positive or negative; none of the returns is statistically different from 0. Further, in all cases, the SEC actions have more negative returns than the CFTC actions, which is consistent with the investors' negative view of application of securities law to crypto.

Finally, we examine fraud actions versus those involving other violations. While regulation is generally viewed as a costly event and generates a negative market reaction, some types of regulation may have the potential to improve market quality with positive valuation implications.[lxxxviii] We find that abnormal returns associated with fraud cases are positive for AR(0) and CAR(0,1) and are negative for the other three event windows. None of the fraud returns are statistically significant and distinguishable from zero. The non-fraud cases are markedly different with large negative returns, which are statistically significant for AR(0), CAR(-1,0) and CAR(-1,1). CAR(-1,0) and CAR(-1,1) are also economically large at -0.029. This suggests that while investors treat regulation (namely, enforcement of pre-crypto statutes) as an unfavorable and costly event for the crypto market, the cost of regulation in some cases is offset by the benefits of improved market quality and integrity.

To assess how cryptoasset and enforcement action characteristics affect the market reaction to enforcement actions, we estimate an OLS model on a dataset consisting of filing returns for 82,444 cryptoasset-enforcement action pairs. In the interest of brevity, we focus on AR(0), CAR(-1,0), and CAR(0,1). We control for the type of action and crypto characteristics that have been shown to explain cross-section of returns. Our cryptoasset controls include pre-event market capitalization, volume, buy-and-hold return, and volatility. In this dataset, the observations are correlated by the cryptoasset and event levels. This cross-sectional correlation violates the independence assumption of the test statistics and may overestimate the significance of market reaction in our analyses at the cryptoasset level (Brown and

Warner).[lxxxix] Therefore, we cluster the standard errors at the event- and cryptoasset-level by implementing the estimator of Correia.[xc]

2. Multivariate Analyses of Market Reaction

In Table 3 we show the effect of the enforcement action type on returns over days AR(0), CAR(-1,0), and CAR(0,1). For each return, we estimate three models which control for cryptoasset characteristics and enforcement action characteristics. We focus on the following enforcement action characteristics: SEC actions (*i.e.,* not CFTC actions) and fraud or registration violation. We estimate the effect of one action characteristic at a time to determine its independent effect. In two out of three models, SEC actions have a more negative statistically significant effect than CFTC actions. The SEC action return is -0.017 percent more negative than the return associated with CFTC actions (t-statistic is 1.9) in the AR(0) model. In the CAR(0,1) model, this effect is more economically meaningful at -0.024 with a t-statistic of 1.67.

Enforcement actions focused on fraud mitigate the negative reaction to enforcement actions, which is consistent with the view of regulation as improving disclosure and market quality. The strongest difference in returns between fraud and non-fraud cases is observed for AR(0) with the coefficient estimate of 0.018 with the t-statistic of 1.93. The coefficient estimates of fraud in the other two regressions are also positive and economically large (0.022 and 0.020, respectively) but the t-statistics of 1.63 and 1.55 fall slightly short of meeting traditional levels of statistical significance.

Further, registration violations do not have a strong market reaction. We include in the category *Registration* failures 1) to register securities under Securities Act Section 5 (in actions usually initiated against issuers of cryptoassets); 2) to register with the CFTC as a DCM, swap execution facility, or FCM under the Commodity Exchange Act; and 3) to register as a securities exchange or securities broker-dealer under the Securities Exchange Act.[xci] The objective of this category is to distinguish these violations from antifraud cases. We further separate out these markets participants and measure the reaction to actions against each of these categories in a separate model.[xcii]

For combined registration violations, the coefficients are negative in AR(0) and CAR(-1,0) regressions and small and positive in CAR(0,1) regression. None of the coefficients are statistically significant. These results also highlight the stronger differential effect of enforcement characteristics observed on day t=0 in AR(0); this effect is then diluted by the information coming out on days t=-1 and t=1. It is

reasonable that t=-1 information is incomplete or inaccurate and day t=1 return is affected by the new information unrelated to the enforcement action.

Lastly, cryptoasset characteristics have an effect in the individual cryptoasset's response to the enforcement action's announcement. We include a measure of pre-announcement market capitalization, daily trading volume, buy-and-hold return over pre-event window, and standard deviation of daily returns. Surprisingly, asset size has little effect on the market reaction to enforcements. Log(Market Capitalization) coefficients remain small and positive in eight out of nine regression and none of the coefficients are statistically significant or approach conventional levels of statistical significance. The coefficients in log transformed models of coefficients may be interpreted as a 1% change in market capitalization associated with a coefficient *1% change in announcement reaction.

We also find that more liquid assets tend to have a more negative reaction to the announcement as in all nine regressions the coefficients are negative, ranging from -0.001 to -0.002 and significant at least at 5 percent level or better. Similarly, assets with the largest pre-filing returns lose more value around the announcement. In AR(0) regressions, the coefficient is around -0.011 to -0.013, and in two-day regressions, they are approximately double those values. In eight out nine regressions, the coefficients are statistically significant. Finally, risky and volatile assets are more negatively affected by the announcements. Similar to returns, the magnitude of volatility coefficients in AR(0) regressions is approximately -0.111 to -0.117. This effect roughly doubles in two-day return regressions. In all cases, the effect is significant at a one-percent level. To summarize, investors view more liquid, better performing, and risky cryptoassets as more vulnerable to the regulation (through enforcement actions) after controlling for the agency initiating the action or type of enforcement.

Table 3. The Effect of Crypto and Enforcement Action Characteristics on Market Reaction.

This table presents OLS regression estimates of the relation between abnormal filing returns around the enforcement action filing date and enforcement action and cryptoasset characteristics. Abnormal returns are returns adjusted by average daily return over days (-45, -5) relative to the filing date. SEC is a binary variable equal 1 if the action is initiated by the SEC and 0 if the action is initiated by the CFTC. Fraud is a binary variable equal to 1 if the violation constitutes fraud and 0 otherwise. Registration is a binary variable equal to 1 if the action is targeting a registration violation and 0 otherwise. Twitter is a binary variable equal to 1 if the action is covered on Twitter and 0 otherwise. Multiple Actions is a binary variable equal to 1 if other crypto actions were files the same day and 0 otherwise. Log Market Capitalization (Volume) is a natural log of median daily cryptoasset's market capitalization (trading volume) during pre-filing period (-45,-5) during pre-filing period (-45,-5). Pre-filing return is cryptoasset return over pre-filing period (-45,-5). Volatility is standard

deviation of daily cryptoasset returns over pre-filing period (-45,-5). The *t*-statistics are computed using standard errors corrected for clustering of observations by cryptoasset and event and are reported in parentheses below the estimates. ***, **, * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	AR(0)			CAR(-1,0)			CAR(0,1)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SEC	-0.017*			-0.014			-0.024*		
	(-1.90)			(-1.13)			(-1.67)		
Fraud		0.018*			0.022			0.020	
		(1.93)			(1.63)			(1.55)	
Registration			-0.006			-0.019			0.001
			(-0.60)			(-1.46)			(0.10)
Log Mkt.Cap	0.000	0.000	0.000	0.000	0.000	-0.000	0.000	0.001	0.000
	(0.09)	(0.38)	(0.09)	(0.00)	(0.22)	(-0.08)	(0.13)	(0.36)	(0.19)
Log Volume	-0.001**	-0.001**	-0.001**	-0.002**	-0.002***	-0.002**	-0.001**	-0.002**	-0.001**
	(-2.10)	(-2.30)	(-2.01)	(-2.42)	(-2.74)	(-2.36)	(-2.02)	(-2.12)	(-1.98)
Pre-filing Ret.	-0.013*	-0.011	-0.013*	-0.031**	-0.029**	-0.032**	-0.028***	-0.026***	-0.027***
	(-1.74)	(-1.51)	(-1.75)	(-2.35)	(-2.21)	(-2.46)	(-2.95)	(-2.72)	(-2.82)
Volatility	-0.117***	-0.117***	-0.111***	-0.260***	-0.262***	-0.254***	-0.219***	-0.217***	-0.211***
	(-2.80)	(-2.76)	(-2.64)	(-3.33)	(-3.39)	(-3.35)	(-3.82)	(-3.73)	(-3.59)
Obs.	82340	82340	82340	82340	82340	82340	82340	82340	82340
R2	0.016	0.019	0.011	0.037	0.041	0.039	0.034	0.034	0.028

3. Enforcement Publicity Measures

So far, our analyses indicate that the current state of U.S. cryptoasset regulation through enforcement is viewed by the global markets as an unfavorable, albeit short-lived, event with the most negative reactions concentrated in the SEC actions and actions that have no substantive effect on market quality (*i.e.*, non-fraud actions). In the next table, we examine the effect of action visibility on the reaction to enforcement announcements. The strength and speed with which value-relevant content of a regulatory action is incorporated into asset values depends on the information being available to investors. Since the crypto-investor base is not only global but also heavily retail, it is unclear how any lack of media coverage may affect returns.

We conduct time-constrained searches of Twitter, a social media platform which retail investors use for financial information sharing, over days (-1,1) relative to the enforcement announcements using the names of respondents/defendants. This information is used to construct a binary variable for Twitter coverage. Additionally, in some cases multiple enforcement actions (which may be launched by the same agency against several entities) are initiated simultaneously. These actions may be more noticeable and perceived as a stronger signal of an agency's enforcement intent.

In Table 4 we estimate six models – two for each of the three return types – using a specification similar to that in Table 3. For each return, we estimate one model that combines *SEC* and *Fraud* variables. The second model adds publicity variables *Twitter* and *Multiple Actions*. Finally, all models have cryptoasset level controls for pre-event size, volume, return, and volatility. Similar to previous results, AR(0) models show the strongest difference in returns between SEC and CFTC cases and fraud and non-fraud actions. Both binary variables have statistically significant coefficients. In model 2, day t=0 abnormal return is -0.015 more negative for the SEC actions (t-stat.=1.96) and 0.016 less negative for actions disciplining fraud (t-stat.=1.75). These coefficients maintain their signs in all other models and are either statistically significant or close to significance.

Interestingly, neither measure of publicity is either strongly or convincingly related to announcement returns. For example, *Twitter* is positive in two out of three regressions and is not significant in any of them. *Multiple Actions* is negative in two models and has a negative coefficient of -0.024 with a t-statistic of 1.82, suggesting that the news of more rigorous enforcement negatively affects crypto prices over event days (0,1). Overall, our baseline results are not sensitive to proxies of publicity and our initial result of the negative SEC effect. Similarly, the non-fraud actions' effect continues to hold.

Table 4. The Effect of Enforcement Action Visibility on Market Reaction.

This table presents OLS regression estimates of the relation between abnormal filing returns around the enforcement action filing date and enforcement action and cryptoasset characteristics. Abnormal returns are returns adjusted by average daily return over days (-45, -5) relative to the filing date. SEC is a binary variable equal 1 if the action is initiated by the SEC and 0 if the action is initiated by the CFTC. Fraud is a binary variable equal to 1 if the violation constitutes fraud and 0 otherwise. Twitter is a binary variable equal to 1 if the action is covered on Twitter and 0 otherwise. Multiple Actions is a binary variable equal to 1 if other crypto actions were files the same day and 0 otherwise. Log Market Capitalization (Volume) is a natural log of median daily cryptoasset's market capitalization (trading volume) during pre-filing period (-45,-5) during pre-filing period (-45,-5). Pre-filing return is cryptoasset return over pre-filing period (-45,-5). Volatility is standard deviation of daily cryptoasset returns over pre-filing period (-45,-5). The *t*-statistics are computed using standard errors corrected for clustering of observations by cryptoasset and event and are reported in parentheses below the estimates. ***, **, * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	AR(0)		CAR(-1,0)		CAR(0,1)	
	(1)	(2)	(3)	(4)	(5)	(6)
SEC	-0.014*	-0.015*	-0.010	-0.005	-0.020	-0.028*
	(-1.69)	(-1.96)	(-0.85)	(-0.45)	(-1.46)	(-1.83)
Fraud	0.016*	0.016*	0.020	0.021	0.016	0.017
	(1.75)	(1.75)	(1.48)	(1.45)	(1.34)	(1.54)
Twitter		-0.003		0.004		0.016
		(-0.38)		(0.28)		(1.34)
Multiple Actions		-0.006		0.015		-0.024*

		(-0.66)		(1.02)		(-1.82)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	82340	82340	82340	82340	82340	82340
R2	0.022	0.022	0.042	0.044	0.038	0.041

4. Types of Defendants and Respondents and Market Reaction

We have observed a significant amount of variation in the types of respondents/defendants targeted by enforcement actions. The focus on a certain type of respondents or defendants may have implications for further regulatory activity. In Table 5, we study the effect of the respondent/defendant type on the announcement reaction. Similar to previous regressions, we use a specification with enforcement action characteristics (the respondent/defendant type) and cryptoasset controls. In all models, the errors are clustered at cryptoasset and date levels. We estimate these models for the entire sample (Models 1-3) and a subsample of SEC actions (Models 4-6).

Our key independent variables are dummy variables that capture the respondent/defendant type: *Broker*, *ICO Issuer*, *Exchange*, and *Fund*. Their coefficients will be estimated relative to the remaining category *Other* that consists of other multiple poorly represented parties. In many cases, these parties (promoters, attorneys, rating agencies, and crypto-related firms) are unlikely to have significant value implications for the cryptoasset market. Of these four categories, funds have the least negative reaction relative to the *Other* category and relative to exchanges, brokers, and ICO issuers. The coefficients alternate between positive and negative and are never statistically significant.

The most significant effect is observed for exchanges, which have a broad and critical impact on the trading of cryptoassets. The coefficients are significant in AR(0) and CAR(-1,0) models in the overall sample and in the SEC subsample, at a 5 percent level in both cases. The magnitude of the coefficients ranges from -0.044 to -0.060, and they are larger in the SEC regressions. Brokers and ICO issuers fall in the middle of the range with some statistically significant coefficients and some that are very close to statistical significance. Similar to the other models, these coefficients are more negative in the SEC action subsample. In summary, we find that the enforcement actions that have the potential for the most profound and costly effect on the largest number of crypto market participants are met with the most negative market reaction.

Table 5. The Effect of Respondent/Defendant Type on Market Reaction to Enforcement Actions.

This table presents OLS regression estimates of the relation between abnormal filing returns around the enforcement action filing date and the types of respondents/defendants targeted by the enforcement action. The first three models are estimated using the full sample; the last three columns are estimated using only SEC actions. Abnormal returns are returns adjusted by average daily return over days (-45, -5) relative to the filing date. Broker (ICO Issuer/Exchange/Fund) is a binary variable equal to 1 if the respondent or defendant is a broker (ICO issuer/exchange/fund) and 0 otherwise. Controls include Log Market Capitalization, Volume, Pre-filing Return and Volatility. Log Market Capitalization (Volume) is a natural log of median daily cryptoasset's market capitalization (trading volume) during pre-filing period (-45,-5) during pre-filing period (-45,-5). Pre-filing Return is cryptoasset return over pre-filing period (-45,-5). Volatility is standard deviation of daily cryptoasset returns over pre-filing period (-45,-5). The *t*-statistics are computed using standard errors corrected for clustering of observations by cryptoasset and event and are reported in parentheses below the estimates. ***, **, * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	All Actions			SEC Actions		
	AR(0)	CAR(-1,0)	CAR(0,1)	AR(0)	CAR(-1,0)	CAR(0,1)
	(1)	(2)	(3)	(4)	(5)	(6)
Broker	-0.019	-0.028*	-0.009	-0.044**	-0.046*	-0.040
	(-1.50)	(-1.73)	(-0.48)	(-2.18)	(-1.83)	(-1.25)
ICO Issuer	-0.019**	-0.029	-0.007	-0.023***	-0.033	-0.007
	(-2.45)	(-1.63)	(-0.63)	(-2.74)	(-1.61)	(-0.54)
Exchange	-0.044**	-0.050**	-0.033	-0.055**	-0.060**	-0.042
	(-2.09)	(-2.22)	(-1.45)	(-2.05)	(-2.09)	(-1.45)

Fund	0.001	-0.009	0.018	-0.015	-0.022	0.012
	(0.10)	(-0.46)	(0.69)	(-1.50)	(-0.91)	(0.46)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	82340	82340	82340	63201	63201	63201
R2	0.027	0.047	0.038	0.038	0.043	0.045

5. Are Bitcoin and Ethereum Special?

The cryptoasset market is dominated by the two largest assets – Bitcoin and Ethereum. For better perspective, the distribution of the entire cryptoasset market capitalization is highly skewed. For example, at the end of our sample period, the top two coins (Bitcoin and Ethereum) account for 57.68% of the entire market share, top 50 coins account for 90.10%, and top 130 coins account for 95.08%. Ethereum and Bitcoin also differ from the rest of the cryptoasset market in terms of their classification as commodities and not securities. As discussed in Part C, several district courts, as well as the CFTC itself, have held that Bitcoin is a commodity. While we are not aware of case law related to Ethereum, the CFTC has long stated that it is a commodity. CFTC Chair Behnam repeated this position in an interview with CNBC as recently as May 2022.[xciii]

In Table 6, we examine how these two largest cryptoassets respond to enforcement news. We repeat several of our prior analyses using the market reactions of these two cryptoassets to a sample of 116 enforcement actions. Overall, the statistical significance is much weaker, but the economic significance is similar to our prior results.

In Panel A, we replicate Table 2 for the sample of Bitcoin and Ethereum. Regardless of the type of enforcement, the abnormal returns are not consistently negative and never statistically significant. In Panel B, we replicate Table 3 and find evidence of statistically significant and negative SEC effect in AR(0) regression. The coefficient of SEC is negative in two other regressions. The coefficient estimate on fraud is positive but not significant, and the registration coefficient has a mix of positive and negative coefficients.

This weak effect is not surprising. As these two cryptocurrencies are well-established, decentralized, and global, investors may be viewing U.S. enforcement risk to Bitcoin and Ethereum as low. Finally, in Panel C, we replicate Table 5. Interestingly, Bitcoin and Ethereum also react negatively to enforcement actions

targeting exchanges and, to a lesser extent, brokers. The coefficient estimate on *Exchange* dummy is significant in all regressions and ranges from -0.047 to as large as -0.070. All coefficients of *Brokers* dummy are significant in two out of six regressions.

Table 6. Bitcoin and Ethereum Market Reaction to Enforcement Actions.

This table presents summary statistics and OLS regressions of the abnormal filing returns for Bitcoin and Ethereum. In Panel A we provide summary statistics for abnormal returns grouped by types of enforcement action. In Panels B and C we report OLS regressions of enforcement action announcement returns. Abnormal returns are returns adjusted by average daily return over days (-45, -5). SEC is a binary variable equal 1 if the action is initiated by the SEC and 0 if the action is initiated by the CFTC. Fraud is a binary variable equal to 1 if the violation constitutes fraud and 0 otherwise. Registration is a binary variable equal to 1 if the action is targeting a registration violation and 0 otherwise. Broker (ICO Issuer/Exchange/Fund) is a binary variable equal to 1 if the respondent or defendant is a broker (ICO issuer/exchange/fund) and 0 otherwise. Log Market Capitalization (Volume) is a natural log of median daily cryptoasset's market capitalization (trading volume) during pre-filing period (-45,-5) during pre-filing period (-45,-5). Pre-filing return is cryptoasset return over pre-filing period (-45,-5). Volatility is standard deviation of daily cryptoasset returns over pre-filing period (-45,-5). The *t*-statistics are computed using standard errors corrected for clustering of observations by event date and are reported in parentheses below the estimates. ***, **, * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A. Filing Date Cumulative Abnormal Returns by Action Type for Bitcoin and Ethereum

	SEC	t-stat	CFTC	t-stat	Fraud	t-stat	Non-fraud	t-stat
AR(0)	0.001	0.310	0.004	0.800	0.004	0.890	0.001	0.160
CAR(-1,0)	-0.000	-0.060	-0.004	-0.520	-0.001	-0.140	-0.003	-0.390
CAR(0,1)	0.004	0.620	0.008	1.100	0.006	1.020	0.004	0.610
CAR(-1,1)	0.002	0.250	-0.000	-0.050	0.002	0.180	0.000	0.040
CAR(-3,3)	-0.001	-0.050	-0.004	-0.300	-0.002	-0.140	-0.002	-0.180

Panel B. Determinants of Filing Returns for Bitcoin and Ethereum

	AR(0)			CAR(-1,0)			CAR(0,1)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SEC	-0.017*			-0.002			-0.019		
	(-1.72)			(-0.16)			(-1.37)		
Fraud		0.006			0.004			0.008	

		(0.73)			(0.28)			(0.65)	
Registration			-0.008			-0.013			0.002
			(-0.91)			(-1.02)			(0.14)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	232	232	232	232	232	232	232	232	232
R2	0.014	-0.003	-0.001	0.038	0.038	0.045	0.017	0.008	0.005

Panel C. The Effect of Respondent/Defendant Type on Market Reaction to the Filing.

	All Actions			SEC Actions		
	AR(0)	CAR(-1,0)	CAR(0,1)	AR(0)	CAR(-1,0)	CAR(0,1)
	(1)	(2)	(3)	(4)	(5)	(6)
Broker	-0.012	-0.036*	-0.013	-0.016	-0.040**	-0.020
	(-0.98)	(-1.89)	(-0.76)	(-1.26)	(-2.20)	(-0.99)
ICO Issuer	-0.016	-0.026	-0.015	-0.016	-0.026	-0.015
	(-1.62)	(-1.32)	(-1.01)	(-1.52)	(-1.28)	(-0.93)
Exchange	-0.047**	-0.069***	-0.049**	-0.047**	-0.070***	-0.050**
	(-2.38)	(-3.07)	(-2.32)	(-2.23)	(-2.90)	(-2.24)
Fund	0.004	-0.010	0.012	0.005	-0.010	0.017
	(0.35)	(-0.40)	(0.42)	(0.40)	(-0.37)	(0.60)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	232	232	232	208	208	208
R2	0.043	0.081	0.032	0.044	0.078	0.039

6. Penalties and Other Measures

Our last analysis zeroes in on the effect of disclosed or anticipated penalties on market reaction to enforcement actions. If the penalties are viewed as a potential regulatory cost that can affect other crypto market participants, it is interesting to

examine which components of penalties are affecting valuation of the crypto market.

In Table 7, we model the announcement reaction as a function of multiple penalties and cryptoasset characteristics as control variables. Our dependent variable continues to be the three types of announcement returns because in most actions announcement and completion dates coincide. In untabulated analyses, we have used completion date returns, which produced qualitatively similar results. The penalties consist of both financial and nonfinancial penalties and span a number of respondents/defendants to the binary indicators for officers charged, cease-and-desist orders, injunctions, trading suspensions, and court cases or administrative actions. We also include natural logs for financial penalties measures by disgorgement, fines, or settlements.

The effects of penalties are noisy across different return models, but, in general, trading suspensions are viewed as a positive development and settlements are associated with a more negative reaction. The significance of trading suspensions may be a spurious result because they affect only a small number of actions and typically very small firms. Many of those firms announced either that their business models concerned blockchain and crypto or that they would develop tokens. In CAR(0,1) model, we also observe significant coefficients on the number of respondents/defendants (positive), injunctions (negative), and court (positive). However, taken together, these findings do not paint a coherent picture of the penalties capitalized into the values of cryptoassets.

It is possible that the market reacts to an initial news of an enforcement action, which in itself is a clear signal of a more expansive regulatory approach. The SEC and the CFTC have an unbroken (so far) track record of success in crypto-related enforcement, which strongly suggests, *inter alia*, that once a case is initiated, some penalties are forthcoming. By contrast, specifics of ultimate penalties differ depending on cooperation of individual defendants and respondents, the facts of a case, and other factors, which make penalties less certain and quantifiable at the time of case filing.

Table 7. Market Reaction to Penalties

This table presents OLS regression estimates of the relation between abnormal filing returns around the enforcement action completion date and imposed penalties. Abnormal returns are returns adjusted by average daily return over days (-45, -5) relative to the decision date. Number of Resp./Def. is the number of defendants or respondents listed in the filing. Officers Charged is a binary variable equal to 1 is the officers/directors are charged and 0 otherwise. Court is a binary variable equal to 1 if the action is litigated and 0 if is administrative. Trading Suspension is a binary variable equal to 1 if the action results in a trading suspension and 0 otherwise. Log (Disgorgement,

Fine, Settlement) is the natural log of Disgorgement, Fine, or Settlement. Controls include Log Market Capitalization, Volume, Pre-filing Return and Volatility. Log Market Capitalization (Volume) is a natural log of median daily cryptoasset's market capitalization (trading volume) during pre-filing period (-45,-5) during pre-filing period (-45,-5). Pre-filing Return is cryptoasset return over pre-filing period (-45,-5). Volatility is standard deviation of daily cryptoasset returns over pre-decision period (-45,-5). The *t*-statistics are computed using standard errors corrected for clustering of observations by cryptoasset and event and are reported in parentheses below the estimates. ***, **, * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	AR(0)	CAR(-1,0)	CAR(0,1)
	(1)	(2)	(3)
Num.Resp./Def.	0.001	0.002	0.004**
	(0.59)	(0.66)	(2.16)
Officers Charged	0.002	0.003	0.008
	(0.17)	(0.17)	(0.65)
Court	0.002	-0.030	0.020*
	(0.20)	(-1.07)	(1.71)
Trade. Suspension	0.024	0.041	0.033
	(1.59)	(1.36)	(1.63)
Cease and Desist	-0.010	-0.022	0.010
	(-1.02)	(-0.96)	(1.06)
Injunction	-0.014	0.000	-0.042***
	(-1.16)	(0.01)	(-2.69)
Log Disgorgement	-0.000	0.000	-0.000
	(-0.39)	(0.44)	(-0.49)
Log Fine	0.000	-0.000	-0.001
	(0.05)	(-0.17)	(-0.51)
Log Settlement	-0.001*	0.000	-0.002**
	(-1.78)	(0.45)	(-2.28)
Controls	Yes	Yes	Yes
Observations	56878	56878	56878
R2	0.031	0.055	0.073

G. THEORETICAL INTERPRETATIONS

1. A Summary of the Results

To summarize our results, global crypto markets are sensitive to U.S.-led enforcement efforts, and that reaction is negative. It is particularly negative with respect to several categories of actors, such as issuers and developers of

cryptoassets, brokers, and (especially) crypto-exchanges. The markets also react differently to *who* enforces U.S. law: the SEC (in securities law enforcement actions) or the CFTC (in commodity and derivatives law enforcement). The SEC actions are met with a more negative market reaction. These effects, however, are weaker for Bitcoin and Ether, which are well-established, decentralized, and global cryptocurrencies. Both are classified as commodities and may be less sensitive to U.S. enforcement risks.

In addition, while crypto-investors view regulation through enforcement as a costly activity for the markets, this negative effect is offset by a positive reaction to antifraud actions which improve market integrity. An additional observation is that the volatility of the time series has decreased in recent years, suggesting that the nature and the outcomes of enforcement actions have become more predictable. In this Part, we consider several possible explanations.

2. Flawed Regulation or Imperfect Enforcement?

One line of scholarship to consider warns that regulation may stifle economic growth and innovation.[xciv] Not all regulation, however, is counterproductive. Properly designed rules may improve market integrity, correct market failure, foster future innovation,[xcv] protect consumers and investors, and reduce transaction costs such as information asymmetry and agency costs. Instead of a rejection of regulation and enforcement, our results should be interpreted as a signal from crypto markets that some regulatory efforts exhibit, metaphorically speaking, a low "goodness of fit." In the same vein, prior research demonstrates that regulatory proposals tailored specifically to crypto are associated with positive returns.[xcvi] An explicit need for updated *substantive* law and regulation may explain our results and a negative reaction to enforcement efforts based on pre-crypto statutory frameworks.

The next argument is that *enforcement* qua regulation is at its core imperfect. Admittedly, enforcement is an important tool maintaining the efficiency and integrity of commodities, derivatives, and securities markets. It may be described as an expedient device targeting fast-paced market developments (and market failure) that allows regulatory agencies to provide continuous oversight.[xcvii]

This use factor, however, does not explain and is irrelevant to the negative reaction of cryptoasset prices to enforcement, particularly SEC enforcement. One explanation is that since enforcement actions are not subject to the procedural safeguards of the Administrative Procedure Act, including public notice and comment process or cost-benefit analysis,[xcviii] it is possible that the original drafters and public commentators did not contemplate that a pre-innovation rule would

apply to a specific novel practice. This invokes the risk that the enforced rule could be unsuitable for the innovation.[xcix]

A related risk of enforcement actions is that regulatory staff are human beings with their cognitive and behavioral biases.[c] Their desire to protect market integrity and investors (which is the overarching mission of the Commissions)[ci] from the risks associated with a financial innovation may eclipse their willingness to assess the innovation from a broader perspective. A regulator, for instance, may find it hard to estimate the magnitude and frequency of violations within a large universe of transactions and may instead focus on "visible" benefits.[cii] For instance, scholarly accounts of fraud in the early cryptoasset offerings ranged anywhere between 10% and 80%,[ciii] a discrepancy which must have been extremely confusing to regulators.

Overall, new technologies introduce uncertainty in regulatory decision-making. Attempting to protect investors and acting under uncertainty, enforcement staff may be putting "too much weight on what is immediately available and salient… compared to what is less available…."[civ] When market participants understand these dynamics, this understanding should lower the perceived value (and effectiveness) of regulatory efforts based on pre-innovation laws and would be reflected in price reactions to enforcement.[cv]

The next argument is that enforcement is a one-way street because an increase in enforcement portends a general increase in regulation. The scope of this expansion, however, is unclear *ex ante* since cases and enforcement actions are based on facts and circumstances. Parties not directly affected by an action may only speculate[cvi] how to extrapolate facts from previous cases and quantify relevant risks.

In a relevant seminal study, Brummer and Yadav, examining the history of financial innovation and fintech, propose a regulatory trilemma of concurrently protecting investors and consumers, supporting healthy innovation, and providing clear policy guidelines.[cvii] Our analysis of enforcement falls squarely within this trilemma: while enforcement actions purport to protect investors and market integrity, they address complex innovations *ex post facto* and serve merely as possible tentative guidance to future innovators. This *post hoc*, fact-intensive approach does not comport with the objective of prospective regulatory clarity, which is a valuable economic resource.[cviii]

Recall also that market prices do not exhibit a similarly negative reaction to antifraud enforcement efforts, suggesting that policing crypto by U.S. regulators is not uniformly unwelcome. This distinction is not surprising when we consider the problem of uncertainty. Fraud is bad, and there is no ambiguity when one defrauds

the market and is prosecuted as a bad apple by a strong regulator. It is the other substantive rules and their enforcement where uncertainty may lie.

3. Explaining the CFTC-SEC Differences

3.1. Substantive Law

Is it possible that the SEC may be more susceptible to these problems with either substantive law or enforcement than the CFTC? Let us start with substantive law. Many commentators underscore that the current pre-crypto statutes are not an ideal framework for crypto innovations, and many articles focus on securities law. These critiques span the whole cryptoasset ecosystem: from the need to better define cryptoassets as securities to the outdated rules on primary markets (*i.e.,* distribution of tokens and coins by issuers to investors and consumers) and the need for better secondary market and infrastructure regulation (including regulation of crypto-exchanges).[cix] Self-evidently, if substantive securities laws were more outdated and unsuitable than commodity and derivatives regulation, securities regulation would be associated with inefficiencies and a more negative market reaction. Our results may be interpreted to suggest that a reform of securities law is needed.

Another reason why the SEC and the CFTC are perceived differently may be more foundational and lie in the comparative rigidity of securities law. Namely, innovators may prefer *principles-based* policies pursued by the CFTC to rules-based securities regulation.[cx] Principles-based approaches are naturally more flexible than rules, which may suit well the innovators in fast-paced technology settings. Moreover, implementation of principles calls for a dialogue that may help open productive lines of communication between the regulator and the regulated. This information sharing in turn reduces "radical uncertainty" and information asymmetry between these two stakeholder groups.[cxi]

3.2. The Statutory Mandates and Jurisdiction of the Commissions

Another explanation of the price differences concerns jurisdiction and the problem of uncertainty. As discussed elsewhere in this article,[cxii] the CFTC targets fraud and manipulation in spot and derivatives markets. Both fraud and manipulation are well-understood violations of market discipline, which implies that CFTC actions generate less uncertainty. In addition, since the CFTC's authority in spot markets is limited, market participants have more room to experiment with new assets without a state actor calling the shots and deciding whether to allow a commodity to exist.

The SEC has a comparatively broader jurisdiction. Not only does it bring antifraud actions, but it also regulates primary markets for securities and *de facto*

defines digital assets as securities through enforcement and statements.[cxiii] This approach offers broad, uncertain guidelines to future innovators weighing whether a security is involved in their projects. Uncertainty may explain our results and a negative price reaction following enforcement against issuers of cryptoassets.

Furthermore, in contrast to the CFTC, the SEC may effectively shut down projects in early stages, limiting room for innovation, experimentation, and trading in cryptoassets that it may (possibly) consider securities. A germane example of an abandoned project is the *Telegram* case.[cxiv] Issuers of cryptoassets, as well as investors, understand these heavy risks of SEC enforcement.

3.3. Enforcement Strategies

In addition to these factors, there may be differences in enforcement strategies of the Commissions. For one thing, SEC enforcement is comparatively more aggressive because the SEC launches more enforcement actions and imposes higher penalties.[cxv] These broader efforts transmit a commensurably wider signal not only to the targets of enforcement but also to third-party developers, investors, and intermediaries.

Even mathematically, while pursuing more actions, the SEC could have made more mistakes. A larger enforcement program also suggests that the agency would need to take care to follow a purposive approach in its actions. Generally, in order to convey proper signals to the regulated, an enforcer needs to capture the right types of violations, impose appropriate penalties, and do so an optimal number of times.[cxvi] Yet, it is possible that the SEC has not been consistent and properly strategic in its crypto-related enforcement.[cxvii] (Research on CFTC enforcement has been scarce.)

3.4. Alternative Explanations

Note that we do not claim that SEC enforcement efforts either necessarily produce a welfare-reducing outcome or are net costly compared with CFTC actions. We merely show that actions by the SEC are associated with a more negative price reaction and supply theoretical explanations. Hypothetically, there are alternative justifications.

One is that the SEC, which is larger than the CFTC, is more skillfully addressing information asymmetry and a possible asset bubble in crypto.[cxviii] This indeed could have explained a negative price reaction. However, if that had been the case, the effect of SEC enforcement would have been stronger and more persistent than a few days around the event date. Anecdotally, the 2022 crypto

winter did not occur due to a more competent regulatory intervention by the SEC, just like the summer 2022 bear market in stocks did not result from any SEC efforts.

We believe that the theoretical arguments presented here provide cogent explanations of the differences in market feedback. At the same time, we acknowledge that further comparative studies of the CFTC and the SEC may be warranted. Market reaction also depends on the differences among highly heterogenous cryptoasset classes. For instance, as we demonstrated in previous sections, markets perceive more liquid, better performing, and risky cryptoassets as more vulnerable to U.S. enforcement after controlling for the agency initiating enforcement actions. Cumulatively, however, U.S.-led enforcement is an unfavorable event from the perspective of the global crypto market, and the most negative reactions are associated with SEC actions and actions that have no substantive effect on market integrity (*i.e.*, nonfraudulent cases).

H. CONCLUSION

Regulation of crypto is one of the most important topics on the agenda of U.S. policymakers. But which regulator is well-positioned to regulate crypto markets? In this study, we demonstrate how the global markets react to and distinguish between the SEC and the CFTC, reacting particularly unfavorably to SEC enforcement. Our evidence supports the recent calls for reform from the Congress and the White House and emphasizes the need for a systematic and comparative reassessment of the currently fragmented regulatory approaches to crypto. By reacting to enforcement actions, crypto markets are sending a signal regarding their preferences. To the extent that regulators aim to foster productive innovation and design welfare-maximizing regulations, this market feedback appears highly relevant.[cxix] If a regulatory activity is to be conducted "in the interest of economic productivity," while using the processes of deliberation "oriented to the public good,"[cxx] market reaction becomes a crucial variable. It should be a factor assisting regulators in deliberation and reform and helping them mitigate the asymmetrical expertise between themselves and the markets.[cxxi] We hope that our analysis will provide new information to the Congress, the Commissions, and other stakeholders.

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[i] *See infra* Part B.

[ii] Yesha Yadav, *Looking for the Silver Lining: Regulatory Reform After the "Credit Crunch,"* 15 STAN. J.L. BUS. & FIN. 314, 323–24 (2010).

[iii] John C. Coffee, Jr. & Hillary A. Sale, *Redesigning the SEC: Does the Treasury Have a Better Idea?*, 95 VA. L. REV. 707, 716 (2009).
[iv] For an overview and applications of the theory, see Lynn M. LoPucki, *The Systems Approach to Law*, 82 CORNELL L. REV. 479, 481 (1997).
[v] *See, e.g.*, *Communication from the Commission to the European Parliament, the Council, and the Committee of the Regions, on a Digital Finance Strategy for the EU,* COM (2020) 591 final (Sept. 24, 2020); *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Shaping Europe's Digital Future*, COM (2020) 67 final (Feb. 19, 2020); United Kingdom HM Treasury, *Government sets out plan to make UK a global cryptoasset technology hub*, NEWS STORY, Apr. 4, 2022, https://www.gov.uk/government/news/government-sets-out-plan-to-make-uk-a-global-cryptoasset-technology-hub; UNITED KINGDOM HT TREASURY, KALIFA FINTECH REVIEW, FINAL REPORT (Feb. 26, 2021), https://www.gov.uk/government/publications/the-kalifa-review-of-uk-fintech.
[vi] The White House, *Fact Sheet: President Biden to Sign Executive Order on Ensuring Responsible Development of Digital Assets* (Mar. 9, 2022), https://www.whitehouse.gov/briefing-room/statements-releases/2022/03/09/fact-sheet-president-biden-to-sign-executive-order-on-ensuring-responsible-innovation-in-digital-assets/.
[vii] For an overview of the bill, see, *e.g.*, Joel Seligman, *The Lummis-Gillibrand Responsible Financial Innovation Act*, Columbia Law School Blue Sky Blog, Jun. 27, 2022, https://clsbluesky.law.columbia.edu/2022/06/27/the-lummis-gillibrand-responsible-financial-innovation-act/.
[viii] *See, e.g.*, Elise Hansen, *Senate Bill Would Put Crypto Spot Markets Under CFTC*, Law360, Aug 3, 2022.
[ix] *See infra* Part B.
[x] *See infra* Parts C and E.
[xi] For our event and cross-sectional studies, we use price data for 2,397 major cryptoassets that we collect from CoinGecko. COINGECKO, https://www.coingecko.com/.
[xii] For relevant arguments, see Kristin N. Johnson, *Decentralized Finance: Regulating Cryptocurrency Exchanges,* 62 WM. & MARY L. REV. 1911, 1951, 1980 (2021).
[xiii] CRISTIE FORD, INNOVATION AND THE STATE; FINANCE, REGULATION, AND JUSTICE 144 (Cambridge Univ. Press 2017). On the disruptive impact of fintech on regulations, see, *e.g.*, Saule Omarova, *Technology v. Technocracy: Fintech as a Regulatory Challenge,* 6 J. OF FIN. REG. 75, 77 (2020).
[xiv] Roberta Romano, *Pitfalls of Global Harmonization of Systemic Risk Regulation in a World of Financial Innovation* 20, YALE L. & ECON. RSCH. PAPER (2019).
[xv] Cristie Ford, *A Regulatory Roadmap for Financial Innovation*, *in* THE ROUTLEDGE HANDBOOK OF FINANCIAL TECHNOLOGY AND LAW, 62, 64 (Iris H-Y Chiu & Gudula Deipenbrock, eds., 2021).
[xvi] *See, e.g.*, Katanga Johnson, *U.S. SEC Chair Gensler Calls on Congress to Help Rein in Crypto "Wild West,"* REUTERS (Aug. 3, 2021), https://www.reuters.com/technology/us-sec-chair-gensler-calls-congress-help-rein-crypto-wild-west-2021-08-03/.
[xvii] Howell E. Jackson, *The Nature of the Fintech Firm and Its Implications for Financial Regulation*, *in* FINTECH LAW: THE CASE STUDIES 8, 13 (July 2020).
[xviii] *See, e.g.*, Steven T. Mnuchin & Craig S. Phillips, *A Financial System That Creates Economic Opportunities: Nonbank Financials, Fintech, and Innovation*, U.S. DEP'T TREASURY (July 2018), https://home.treasury.gov/sites/default/files/2018-08/A-Financial-System-that-Creates-Economic-

Opportunities---Nonbank-Financials-Fintech-and-Innovation.pdf; GOFORTH & GUSEVA, *supra* note **Error! Bookmark not defined.**, at 68-88, 133-64, 167-94, 640-56; OFFICE OF THE COMPTROLLER OF THE CURRENCY, JOINT STATEMENT ON CRYPTOASSET POLICY SPRINT INITIATIVE, Nov. 23, 2021, https://www.occ.gov/news-issuances/bulletins/2021/bulletin-2021-56.html. *See also* 31 U.S.C. §310.

[xix] *See, e.g.*, Letter from Robert A. Schwartz, *supra* note 16.

[xx] Jackson, *supra* note xvii, at 11. *See also* Coffee & Sale, *supra* note iii.

[xxi] *See generally* Coffee & Sale, *supra* note iii.

[xxii] *Agency and Mission Information*, U.S. SEC. & EXCH. COMM'N (2014), https://www.sec.gov/about/reports/sec-fy2014-agency-mission-information.pdf.

[xxiii] *Mission Statement*, U.S. COMMODITY FUT. TRADING COMM'N, https://www.cftc.gov/About/AboutTheCommission#:~:text=The%20mission%20of%20the%20Commodity,derivatives%20markets%20through%20sound%20regulation.

[xxiv] *See, e.g.*, Bob Pisani, *SEC Chairman Gary Gensler Embarks on Ambitious Regulatory Agenda. What It Means for Investors*, CNBC (Feb. 4, 2022), https://www.cnbc.com/2022/02/04/sec-chair-gary-gensler-embarks-on-ambitious-regulatory-agenda-what-it-means-for-investors.html; Chairman Rostin Behnam, *Examining Digital Assets: Risks, Regulation, and Innovation*, Testimony Before the U.S. Senate Committee on Agriculture, Nutrition, and Forestry, U.S. Comm. Fut. Trading Comm'n (Feb. 9, 2022), https://www.cftc.gov/PressRoom/SpeechesTestimony/opabehnam20; Nikhilesh De, *CFTC Should Oversee Crypto Spot Markets, Chief Reiterates Before Congress*, COINDESK (Feb. 10, 2022), https://www.coindesk.com/policy/2022/02/09/cftc-should-oversee-crypto-spot-markets-chief-reiterates-before-congress/.

[xxv] *See, e.g.*, Jerry W. Markham, *Merging the SEC and CFTC–A Clash of Cultures*, 78 U. CIN. L. REV. 537, 552–53 (2009); Dan Awrey, *Regulating Financial Innovation: A More Principles-Based Proposal?*, 5 BROOK. J. CORP., FIN. & COM. L. 273, 311 (2011).

[xxvi] *See, e.g.*, U.S. Comm. Fut. Trading Comm'n., *CFTC Statement on Self-Certification of Bitcoin Products by CME, CFE and Cantor Exchange*, Release Number 7654-17 (Dec. 1, 2017), https://www.cftc.gov/PressRoom/PressReleases/7654-17; GOFORTH & GUSEVA, *supra* note **Error! Bookmark not defined.**, at 580-87.

[xxvii] *Infra* Part C.

[xxviii] *See generally* Henry Farrell & Abraham L. Newman, *Choke Points*, HARV. BUS. REV. (2020), https://hbr.org/2020/01/choke-points.

[xxix] *See, e.g.*, Pierre-Hugues Verdier, *The Political Economy of International Financial Regulation*, 88 IND. L. J. 1405 (2013).

[xxx] PIERRE-HUGUES VERDIER, GLOBAL BANKS ON TRIAL: U.S. PROSECUTIONS AND THE REMAKING OF INTERNATIONAL FINANCE 3 (Oxford University Press 2020).

[xxxi] Verdier, *supra* note xxix, at 1419-20.

[xxxii] *See generally* Verdier, *supra* note xxx.

[xxxiii] Rafael La Porta, et al., *What Works in Securities Laws?*, 61 J. FIN. 1, 11-13 (2006); Verdier, *supra* note xxx; Howell E. Jackson & Mark J. Roe, *Public and Private Enforcement of Securities Laws: Resource-Based Evidence*, 93 J. FIN. ECON. 207 (2009); Howell E. Jackson, *Variation in the Intensity of Financial Regulation: Preliminary Evidence and Potential Implications*, 24 YALE J. ON REG. 253 (2007); John C. Coffee, Jr., *Law and the Market: The Impact of Enforcement*, 156 U. PA. L. REV. 229, 242 (2007).

[xxxiv] *See, e.g.*, James J. Park & Howard H. Park, *The Rise of Fintech: Regulation by Selective Enforcement: The SEC and Initial Coin Offerings*, 61 WASH. U. J.L. & POL'Y 99 (2020); Douglas

Eakeley & Yuliya Guseva, with Leo Choi & Katarina Gonzalez, *Crypto-Enforcement Around the World*, 94 SOUTH. CAL. L REV. POSTSCRIPT 99 (2021); Yuliya Guseva, *The SEC, Digital Assets, and Game Theory*, 46 J. CORP. L. 629 (2021) [hereinafter Guseva, *Game Theory*]; Simona Mola, *SEC Cryptocurrency Enforcement*, CORNERSTONE (2021), https://www.cornerstone.com/wp-content/uploads/2022/01/SEC-Cryptocurrency-Enforcement-2021-Update.pdf.

[xxxv] *See* S.E.C. v. Telegram Grp. Inc., 448 F.Supp.3d 352 (SDNY Mar. 24, 2020); Consent Order for Permanent Injunction, Civil Monetary Penalty, and Other Equitable Relief Against Defendants HDR GLbal Trading Limited, 100x Holdings Limited, Shine Effort Inc Limited, and HDR Global Services (Bermuda Limited), CFTC v. HDR Global Trading Limited, No. 1:20-cv-08132 (SDNY Aug. 10, 2021); In the Matter of: Tether Holdings Limited, Tether Operations Limited, Tether Limited, and Tether International Limited, CFTC Docket No. 22-04 (Oct. 15, 2021); In the Matter of: iFinex Inc., BFXNA Inc., and BFXWW Inc., CFTC Docket No. 22-05 (Oct. 15, 2021).

[xxxvi] *See, e.g.*, James Michael Blakemore, *New Things Under the Sun: How the CFTC Is Using Virtual Currencies to Expand Its Jurisdiction*, 73 ARK. L. REV. 205 (2020).

[xxxvii] In the Matter of: Coinflip, Inc., d/b/a Derivabit, and Francisco Riordan, C.F.T.C. No. 15-29 (Sept. 17, 2015).

[xxxviii] 7 U.S.C. § 1a(9).

[xxxix] *Id. See also* 7 U.S.C. § 1a(19)(i); Bd. Of Trade of City of Chicago v. S.E.C., 677 F. 2d 1137, 1142 (7th Cir. 1982), *vacated on other grounds*, 459 U.S. 1026 (1982).

[xl] *In re* BFXNA Inc. d/b/a Bitfinex, C.F.T.C. Docket No. 16–19 (Jun. 2, 2016).

[xli] *Id.* at 5-6.

[xlii] U.S. COMM. FUT. TRADING COMM'N, PRIMER ON VIRTUAL CURRENCIES (2017), https://www.cftc.gov/sites/default/files/idc/groups/public/documents/file/labcftc_primercurrencies100417.pdf.

[xliii] U.S. COMM. FUT. TRADING COMM'N, DIGITAL ASSETS PRIMER (2020), https://www.cftc.gov/PressRoom/PressReleases/8336-20.

[xliv] U.S. Comm. Fut. Trading Comm'n, Retail Commodity Transactions Involving Certain Digital Assets, 85 Fed. Reg. 37734 (Jun. 24, 2020).

[xlv] *See, e.g.*, GARY E. KALBAUGH, DERIVATIVES LAW AND REGULATION (3rd ed. 2021).

[xlvi] C.F.T.C. v. McDonnell, 287 F. Supp. 3d 213, 228 (E.D.N.Y. 2018); Dekrypt Capital, LLC v. Uphold Ltd., 2022 WL 97233, at *3 (Wash.App. Div. 1, 2022).

[xlvii] PRIMER ON VIRTUAL CURRENCIES, *supra* note xlii, at 11.

[xlviii] U.S. SEC. & EXCH. COMM'N, *Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO*, at 2 (July 25, 2017), https://www.sec.gov/litigation/investreport/34-81207.pdf [hereinafter "The DAO Report"].

[xlix] *Id.* at 2.

[l] S.E.C. v. W. J. Howey Co., 328 U.S. 293, 298 (1946).

[li] *Id.*.

[lii] Strategic Hub for Innovation & Fin. Tech., *Framework for "Investment Contract" Analysis of Digital Assets*, SEC. & EXCH. COMM'N 12 n.2 (Apr. 3, 2019), https://www.sec.gov/files/dlt-framework.pdf [hereinafter The Framework].

[liii] *Telegram Grp.*, 448 F.Supp.3d at 367; S.E.C. v. Kik Interactive, 492 F.Supp.3d 169, 183 (SDNY Sept. 30, 2020).

[liv] *See generally* Yuliya Guseva, *When the Means Undermine the Ends: The Leviathan of Securities Law and Enforcement in Digital-Asset Markets*, 5 THE STANFORD JOURNAL OF BLOCKCHAIN LAW AND POLICY 1 (2022).

[lv] 15 U.S.C. § 78c.
[lvi] 15 U.S.C. § 80a–3(a)(1)(C).
[lvii] 15 U.S.C. § 78a et seq.
[lviii] 15 U.S.C. § 80a–1 et seq.
[lix] 15 U.S.C. § 80b–1 et seq.
[lx] 15 U.S.C. § 78e; 15 U.S.C. § 78c(a)(1); 17 C.F.R. § 240.3b-16 (a); 17 C.F.R. § 240.3a1-1 (a)(2).
[lxi] In the Matter of Poloniex, LLC, Exchange Act Rel. No. 92607, at 7 (Aug. 9, 2021), https://www.sec.gov/litigation/admin/2021/34-92607.pdf.
[lxii] *See infra* Part E.
[lxiii] *See* Raphael Auer & Stijn Claessens, *Regulating Cryptocurrencies: Assessing Market Reactions*, 2018 BIS Q. REV. 51; Jeroen Koenraadt & Edith Leung, *Investor Reactions to Crypto Token Regulation*, FIN. ACCT. J. (Feb. 22, 2019), https://ssrn.com/abstract=3339197; Ahmad Chokor & Elise Alfieri, *Long and Short-term Impacts of Regulation in the Cryptocurrency Market*, 81 Q. REV. ECON. & FIN. 157 (2020).
[lxiv] Chokor & Alfieri, *supra* note lxiii.
[lxv] Savva Shanaev, et al., *Taming the Blockchain Beast?, Regulatory Implications for the Cryptocurrency Market*, 51 RES. IN INT'L BUS. & FIN. 1, 2 (2020).
[lxvi] *See, e.g.*, Auer & Claessens, *supra* note lxiii; Raphael Auer & Stijn Claessens, *Cryptocurrency Market Reactions to Regulatory News* (Globalization Inst., Working Paper No. 381, 2020), http://dx.doi.org/10.24149/gwp381 [hereinafter Auer & Claessens, *Regulatory News*].
[lxvii] U.S. Comm. Fut. Trading Comm'n, *LabCFTC Releases Digital Assets Primer*, Rel. No. 8336-20 (Dec. 17, 2020), https://www.cftc.gov/PressRoom/PressReleases/8336-20.
[lxviii] The Framework, *supra* note lii, at 12 n.2.
[lxix] In the Matter of: Coinflip, Inc., d/b/a Derivabit, and Francisco Riordan, C.F.T.C. Docket No. 15-29, at 2, n.2 (Sept. 17, 2015).
[lxx] Policy Statement, *Guidance on Cryptoassets: Feedback and Final Guidance to CP 19/3*, FIN. CONDUCT AUTH. PS 19/22 (2019), https://www.fca.org.uk/publication/policy/ps19-22.pdf.
[lxxi] *Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937*, COM (2020) 593 final (Sept. 24, 2020) https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593.
[lxxii] *Id.* Tit. I, Art. 3, at 34.
[lxxiii] *Id.*
[lxxiv] Chokor & Alfieri, *supra* note lxiii, at 172.
[lxxv] We exclude major stablecoins from our cryptoasset data but not from the enforcement database. The main stablecoins, such as USCD and Tether, have generally maintained their pegs over the years and may be less sensitive to enforcement shocks. At the same time, enforcement actions against stablecoins, particularly antifraud actions, may have broader implications for the crypto market.
[lxxvi] The sample does not include the 2016 action brought by the CFTC against Bitfinex. Only the 2021 order against Bitfinex is included. Starting our analysis in 2017 enables us to compare the two Commissions side by side. Before 2017, it was unclear whether the SEC would consider cryptoassets securities.
[lxxvii] The DAO Report, *supra* note xlviii, at 143.
[lxxviii] *Cyber Enforcement Actions*, U.S. SEC. & EXCH. COMM'N (2021), https://www.sec.gov/spotlight/cyber.
security-enforcement-actions.

[lxxix] CFTC, *Enforcement Actions*, https://www.cftc.gov/LawRegulation/EnforcementActions/index.htm.
[lxxx] The comprehensive list of keywords for the search includes ICO, Initial Coin Offering, Blockchain, Bitcoin, Crypto, Cryptocurrency, SAFT, Agreement for Future Tokens, Smart Contract, STO, Security Token, Token, Digital Asset, Exchange Offering, Coin, Token Offering, and Virtual Currency.
[lxxxi] *See generally* Johnson, *supra* note xii.
[lxxxii] *See, e.g.*, Guseva, *supra* note liv.
[lxxxiii] Philip P. M. Joos & Edith Leung, *Investor Perceptions of Potential IFRS Adoption in the United States*, 88 THE ACCOUNTING REV. 577 (2013).
[lxxxiv] Chokor & Alfieri, *supra* note lxiii.
[lxxxv] Koenraadt & Leung, *supra* note lxiii.
[lxxxvi] Paul Grewal, *The SEC has told us it wants to sue us over Lend. We don't know why,* THE COINBASE BLOG (Sept 7, 2021), https://blog.coinbase.com/the-sec-has-told-us-it-wants-to-sue-us-over-lend-we-have-no-idea-why-a3a1b6507009.
[lxxxvii] Examining fraud as a separate category is important in light of several studies that suggest that cryptoasset offerings (particularly early ICOs) were riddled with misrepresentations and fraud. *See generally* Dirk A. Zetzsche, et al., *supra* note **Error! Bookmark not defined.**, at 278-79, 287-89; Cohney et. al., *supra* note **Error! Bookmark not defined.**.
[lxxxviii] For a theoretical discussion, see *infra* Section G(1).
[lxxxix] Stephen J. Brown & Jerold B. Warner, *Measuring Security Price Performance*, 8 J. OF FIN. ECONOMICS 205 (1980).
[xc] Sergio Correia, *A Feasible Estimator for Linear Models with Multi-way Fixed Effects* (2016), http://scorreia.com/research/hdfe.pdf.
[xci] For the respective statutory frameworks, see *supra* Part C.
[xcii] *Infra* Section F(4).
[xciii] *Bitcoin, ethereum are commodities, says CFTC Chair Rostin Behnam,* CNBC, SQUAWK BOX, May 16, 2022, https://www.cnbc.com/video/2022/05/16/bitcoin-ethereum-are-commodities-says-cftc-chair-rostin-behnam.html?&qsearchterm=cryptocurrency.

[xciv] *See, e.g.*, Cary Coglianese & Christopher Carrigan, *The Jobs and Regulation Debate* in DOES REGULATION KILL JOBS? (Cary Coglianese, Adam M. Finkel and Christopher Carrigan eds., 2013); Michael Sherlock, *BitCoin: The Case Against Strict Regulation*, 36 REV. OF BANKING & FIN L. 975 (2016-17).
[xcv] *See, e.g.*, Stefan Ambec, et al., *The Porter Hypothesis at 20: Can Environmental Regulation Enhance Innovation and Competitiveness?*, Scientific Series 2010s-29, CIRANO (2010), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1682001.
[xcvi] Auer & Claessens, *Regulatory News*, *supra* note lxvi.
[xcvii] On regulation via enforcement, see generally Harvey Pitt & Karen L. Shapiro, *Securities Regulation by Enforcement: A Look Ahead at the Next Decade*, 7 YALE J. ON REGUL. 149, 161-68 (1990) (acknowledging the downsides of enforcement without formal rulemaking, but generally viewing the SEC enforcement program with approval); Donald C. Langevoort, *The SEC as a Bureaucracy: Public Choice, Institutional Rhetoric, and the Process of Policy Formulation*, 47 WASH. & LEE L. REV. 527 (1990) [hereinafter Langevoort, *Bureaucracy*]; Ilya Beylin, *Designing Regulation for Mobile Financial Markets,* 10 U.C. IRVINE L. REV. 497, 501-05, 536 (2020); Donna

M. Nagy, *The Costs of Mandatory Cost-Benefit Analysis in SEC Rulemaking*, 57 ARIZ. L. REV. 129, 154 (2015).

[xcviii] 5 U.S.C. § 551 et seq. For a comprehensive review of scholarship on cost-benefit analysis, see Richard L. Revesz, *Cost-Benefit Analysis and the Structure of the Administrative State: The Case of Financial Services Regulation*, 34 YALE J. ON REG. 545, 546-54, 547 nn.1-4, 552 n. 36, 595-97 (2017).

[xcix] *See, e.g.*, ROBERTA S. KARMEL, REGULATION BY PROSECUTION: THE SECURITIES AND EXCHANGE COMMISSION VS CORPORATE AMERICA 95-96, 317-22, 336 (1982) (observing that "[o]ther regulated persons who will become subject to that regulatory policy do not have the opportunity to object or to comment upon the new interpretation or rule, as they would have in a rulemaking proceeding," *id.* at 96); Nagy, *supra* note **Error! Bookmark not defined.**, at 921, 988-89 (observing that "[a]lthough the SEC staff may in fact engage in policymaking through announcing regulatory interpretations in no-action letters, these policy choices lack the political legitimacy of those that the full Commission makes when acting under its congressionally delegated authority"). *See generally* Roberta S. Karmel, *Government Lawyering, Creating Law at the Securities and Exchange Commission: The Lawyer as Prosecutor*, 61 L. & COMTEMP. PROBS. 33 (1998); Pitt & Shapiro, *supra* note xcvii.

[c] *See, e.g.*, Stephen J. Choi & A.C. Pritchard, *Behavioral Economics and the SEC*, 56 STAN. L. REV. 1 (2003); Stephen J. Choi, *Behavioral Economics and the Regulation of Public Offerings*, 10 LEWIS & CLARK L. REV. 85 (2006).

[ci] *See, e.g.*, Donald C. Langevoort, *The SEC as a Lawmaker: Choices About Investor Protection in the Face of Uncertainty*, 84 WASH. U. L. REV. 1591, 1595, 1625 (2006) [hereinafter Langevoort, *The SEC as a Lawmaker*].

[cii] Choi & Pritchard, *supra* note 53, at 25-26. Robert B. Ahdieh, *Reanalyzing Cost-Benefit Analysis: Toward a Framework of Function(s) and Form(s)*, 88 N.Y.U. L. REV. 1983, 2013-14 (2013).

[ciii] Milind Tiwari, et al., *The Future of Raising Finance - A New Opportunity to Commit Fraud: A Review of Initial Coin Offering (ICOs) Scams*, 73 CRIME, L. & SOC. CHANGE 417, 417-441 (2020); Daniel Liebau & Patrick Schueffel, *Crypto-Currencies and ICOs: Are They Scams? An Empirical Study* (Jan. 2019), https://dx.doi.org/10.2139/ssrn.3320884; Zetzsche, et al., *supra* note **Error! Bookmark not defined.**.

[civ] Langevoort, *The SEC As a Lawmaker*, *supra* note ci, at 1609.

[cv] *See also* Auer & Claessens, *supra* note xcvi.

[cvi] *See, e.g.*, James J. Park, *Karmel's Dissent: The SEC's Use and Occasional Misuse of Section 21(A) Reports of Investigation*, 16 BROOK. J. CORP., FIN. & COM. L. 9, 28-29 (2022).

[cvii] Brummer & Yadav, *supra* note **Error! Bookmark not defined.**.

[cviii] Research suggests that uncertainty is associated with greater volatility and lower investment. *See, e.g.*, Scott Baker, et al., *Measuring Economic Policy Uncertainty*, 131 Q. J. OF ECON. 1593 (2016). Clarity and certainty, by contrast, are one of the objectives of better regulations. *See, e.g.*, Brummer & Yadav, *supra* note **Error! Bookmark not defined.**.

[cix] The literature on these subjects is considerable. *See, e.g.*, Goforth, *Who Is the SEC Protecting?*, *supra* note; Carol R. Goforth, *Cinderella's Slipper: A Better Approach to Regulating Cryptoassets as Securities*, 17 HASTINGS BUS. L.J. 271 (2021); Lewis Rinaudo Cohen, *Ain't Misbehavin': An Examination of Broadway Tickets and Blockchain Tokens*, 65 WAYNE L. REV. 81 (2019); Kevin Werbach, *Trust, but Verify: Why the Blockchain Needs the Law*, 33 BERKELEY TECH. L.J. 487, 519 (2018); Jonathan Rohr & Aaron Wright, *Blockchain-Based Token Sales, Initial Coin Offerings, and*

the Democratization of Public Capital Markets, 70 HASTINGS L.J. 463 (2019); Johnson, *supra* note xii (examining crypto-exchanges).

[cx] *See supra* Part B.

[cxi] Romano, *supra* note xiv.

[cxii] *See supra* Part C.

[cxiii] *Supra* Part C.

[cxiv] *Telegram Grp.*, 448 F.Supp.3d 352. For critiques of *Telegram*, *see, e.g.*, SEC Commissioner Hester Peirce, *Not Braking and Breaking* (Jul. 21, 2020), https://www.sec.gov/news/speech/peirce-not-braking-and-breaking-2020-07-21.

[cxv] Eakeley & Guseva, *supra* note xxxiv.

[cxvi] Gary S. Becker, *Crime and Punishment: An Economic Approach*, 76 J. POL. ECON. 169, 172-73 (1968).

[cxvii] *See, e.g.*, Guseva, *Game Theory*, *supra* note xxxiv.

[cxviii] Indeed, it has been argued that the SEC stemmed the tide of unregulated, unregistered ICOs and possibly pierced the emerging asset bubble. *See, e.g.*, Dell'Erba, *supra* note cix; Daniel Roberts, *SEC Quietly Widens Its Crackdown on Token Sales*, DECRYPT (Oct. 10, 2018), https://decrypt.co/3622/sec-tightens-the-noose-on-ico-funded-startups.

[cxix] This relevance is supported by several theories, including the public interest model and the civic republican theory. Steven P. Croley, *Theories of Regulation, Incorporation the Administrative Process*, 98 COL. L. REV. 1, 77 (1998). *See also id.* at 5 (reviewing theories).

[cxx] CASS R. SUNSTEIN, AFTER THE RIGHTS REVOLUTION: RECONCEIVING THE REGULATORY STATE 12 (1990).

[cxxi] *See, e.g.*, Awrey, *supra* note xxv; Dan Awrey, *Complexity, Innovation, and the Regulation of Modern Financial Markets*, 2 HARV. BUS. L. REV. 235 (2012).