

EXECUTIVE SUMMARY/ THE CHALLENGE

In March of 2022, US President Joseph R. Biden issued an Executive Order on Ensuring Responsible Development of Digital Assets. Citing “profound implications for the protection of consumers, investors, and businesses, including data privacy and security; financial stability and systemic risk; crime; national security; the ability to exercise human rights; financial inclusion and equity; and energy demand and climate change,” the order impels expert insight and direction on policy and research objectives and coordination, with a specific focus on the proper design and adoption of a US central bank digital currency (CBDC), establishing concepts of relative value of digital assets versus sovereign money.

In response, [Fintech at Cornell](#), an initiative of the [Cornell SC Johnson College of Business](#), identified the pressing need for focused, ongoing dialogue amongst **three sectors: academics, regulators, and industry professionals**, and organized the Cornell Convenes forum described in this report. Since March, government entities have agreed with this approach [[FSOC Warns Crypto is Possible Systemic Risk](#)] ([Responsible Advancement of US Competitiveness in Digital Assets](#)) recommending focused discussions like this as valuable tools for the proper understanding and regulatory response to the rapid advent of digital assets activity.

The Cornell Convenes group was the first of its kind to address this specific agenda. Meeting for a half-day on June 6, 2022, in Washington, DC, 26 experts in academia, industry, and regulation gathered in an open discussion observing Chatham House Rule to promote openness of discussion (all in attendance may use information from the discussion but agree not to identify any speaker by name). This focused, open, same-place discussion among academics from three of the nation’s top business schools, three former US regulators, and twenty current and past industry leaders achieved a forceful conferring of informed insights, respectfully working to wrangle clarity from the competing and shared priorities.

This report is authored by the Cornell FinTech Initiative together with help on the Chapters sections from many of the Cornell Convenes participants. It follows the structure of the Cornell Convenes discussion. The Executive Order’s section topics were arranged into four “chapters” addressing variegated issues within digital finance, the group identifying priorities and areas for further study. After each chapter discussion, participants had opportunities to contribute additional commentary via poster boards; these “sticky notes” appear here as well. This report also provides graphics illustrating the various sector perspectives on key ideas discussed within each chapter. After the meeting, many of the assembled divided into three chapter-focused working groups which provided summaries contributing to the deep level perspectives and recommendations. Those summaries are included in the Appendix.

This paper works to capture and share the group’s live discussion, with its free-flowing connections and associations. The goal was to encourage a vigorous discussion rather than to reach broad agreement, but where strong agreement appeared, we note it here. Future discussions are planned.

Note: The contents of this report do not represent the views of Cornell University or the Cornell SC Johnson College of Business, but simply those of the individuals participating in the Cornell Convenes Roundtable so listed.



FROM **ANDREW KAROLYI**
CHARLES FIELD KNIGHT DEAN
CORNELL SC JOHNSON COLLEGE OF BUSINESS

Readers,

I am proud that the Cornell SC Johnson College of Business is participating in this critical dialogue spurred by President Biden's March 9 Executive Order on Ensuring Responsible Development of Digital Assets. This somehow-still-controversial, still mostly-unclearly-regulated, ever-growing field is a potentially tectonic force in finance, and must be understood and managed wisely. These are just some of the reasons why the Fintech at Cornell Initiative is a vigorous priority for the SC Johnson College of Business.

Fintech at Cornell's leadership and fellows are at the very forefront of the advancing capabilities of digital asset finance. Their research and industry work informs their responses to the competing priorities at play in this space.

I believe that this paper will prove constructive to a broader understanding of digital finance, offering responsible insight into the priorities and potential approaches to appropriate regulation.

The Cornell SC Johnson College of Business is dedicated to engagement and collaboration, and we will continue to support groundbreaking conversations like this one.

Sincerely yours,



Andrew Karolyi



Cornell
SC Johnson College of Business

FROM **SUSAN JOSEPH**
EXECUTIVE DIRECTOR, FINTECH AT CORNELL

Hello and thank you for joining the conversation. Tremendous thanks also to Andrew Karolyi, Lin William Cong, and to Fintech at Cornell's sponsors for their unflagging support of this work.

President Biden's March Executive Order was issued for two important reasons: first, because crypto is a world issue, and second, because we do not have clear regulation. Many great minds are thinking about this, but there is no agreement yet on the proper approach to regulations, or even the right agencies to administer them. In order to protect our national interest and the stakeholders engaging in digital finance investment and innovation, this must be a cross-body conversation.

In response to the Executive Order, Fintech at Cornell invited this group of academics, industry representatives, and former regulators to engage in a frank dialogue on the issue. They responded generously, assembling in June to offer their highest-level expertise. Not surprisingly, opinions differed – on whether to act quickly or to wait, on how to regulate (by the nature of the asset, through brand new legislation, or application of existing restrictions), on the degree of the importance of privacy. Our goal was not to achieve agreement on a concrete set of next steps. Our goal was to identify the most salient issues, and to offer ways in which to consider them. I believe we have achieved that. We were happy to take the first step in assembling these groups, and intend to remain engaged in this dialogue, with future sessions planned both in the near and far future.

In a free market, we encourage innovation, but to be a startup in this environment is risky. You might not freely innovate if future enforcement might rise up to stop your work. Existing players also stand to lose in this this type of environment. Meaningful public-private partnership can be fruitful and competitive, if we can stay agile, responsive, and communicative. Clear and thoughtful steps, like perhaps well-crafted light guardrails providing some protection while encouraging exploration, should be taken, and soon.

We were more than encouraged to read that the [US Department of Commerce](#)'s response recommends the formation Advisory Group, a Standing Forum including federal agencies, industry, academics, and civil society, to exchange knowledge and establish ideas -- much like the group we assembled here.

I hope you'll read on, and consider the varied perspectives and priorities expressed. I am eager to hear your thoughts on this conversation, and on the next iterations of our Cornell Convenes discussions about the potential benefits digital assets can offer. This report was written before the FTX bankruptcy; a link to that filing is included in the appendix.

Yours,



Susan Joseph, JD, MBA



FROM **LIN WILLIAM CONG**
FOUNDING FACULTY DIRECTOR
FINTECH AT CORNELL

Readers,

For the past three years, Fintech at Cornell has been galvanized toward assembling the most comprehensive and engaged cohort of expert perspectives from Cornell and the global fintech community. That community continues growing and proving its commitment to lending cogent and discerning perspectives to this unique moment in finance. Our generous sponsors dedicate their knowledge and resources. Executive Director Susan Joseph builds new bridges and strengthens our industry and policy networks. The leadership Cornell SC Johnson College of Business and fellows at the initiative make it all possible.

Everyone involved can see the profound potential for benefit and harm in the FinTech space. Responsible action is necessary, especially concerning digital currencies, as President Biden's Executive Order comprehensively states. Responsible design will be key, along with patient, attentive collaboration.

The Cornell Convenes group who gathered this past June expressed seasoned perspectives from the regulatory, academic, and industry angles, and their conversation and subsequent working sessions suggest possibilities for the balancing of priorities. They highlighted points on various spectrums: between freedoms and protections, regulation and observation, privacy and transparency. Deliberate and focused communications and education channels will underpin every element of this work.

Among the specifics considered are methods and requirements for disclosure; how, when, and what to regulate, which first steps are advisable, and how to preserve American leadership while benefiting from use-case evidence elsewhere (including at the state level).

We hope the report provides an informative anchor for more rigorous studies and lively debates. We are just touching the tip of the iceberg concerning cybercrimes, big data, digital privacy, the interaction of innovation and regulation, etc., and this conversation will certainly continue.

Yours Faithfully,



Lin William Cong

FinTech
at
Cornell



IN THIS REPORT: **TABLE OF CONTENTS**

KEY TERMS FOR DISCUSSION

DISCUSSION SCOPE AND STRUCTURE, ACKNOWLEDGEMENTS

PARTICIPANTS

BEFORE WE BEGIN: DISCUSSION PERSPECTIVES, STRUCTURE

DISCUSSION INTRODUCTION

CHAPTER 1: Protecting Consumers, Investors, and Businesses (EO Section 5)

CHAPTER 2: Limiting Illicit Finance and Associated National Security Risks (EO Section 7)

CHAPTER 3: Promote Financial Stability, Mitigate Systemic Risk, Strengthen Market Integrity (EO Section 6)

CHAPTER 4: Fostering International Cooperation and United States Competitiveness (EO Section 8) and Coordinating Regulators (EO Section 3)

APPENDIX

IN THIS REPORT KEY TERMS FOR DISCUSSION

DeFi: Short for “decentralized finance”

- “Money legos” or open source building blocks to build new financial products for Web 3.0 enabling permissionless access to the ecosystem.
- Open source software developer communities create the DeFi protocols encompassing multiple types of financial services and products on blockchain networks.
- Ethereum currently the most popular network for DeFi Protocols; the [original ethereum whitepaper](#) envisioned derivatives, hedging, savings and subcurrency applications.
- DeFi specifically uses automated protocols known as smart contracts to conduct activities that in the legacy finance world (tradfi) are conducted by brokers, exchanges, banks, and other intermediaries.
- DeFi is evolving; hacks and coding errors are common. Some existing applications include decentralized exchanges (DEXs), stablecoins, lending platforms, wrapped cryptocurrencies, prediction markets, yield farming, liquidity mining

Blockchain: A type of distributed ledger that maintains a continuously growing list of transaction records ordered into blocks (called “append only”) with various protections against tampering and revision, with a cryptographic key.

- Overall the term “blockchain” is used interchangeably with “distributed ledger.”
- There is no true agreed-upon taxonomy yet.
- Economically, blockchains are distributed data infrastructure that offer consensus that can be decentralized on a sliding scale depending on its architecture.

Cryptocurrency: A digital currency that uses cryptographic techniques for governance and security and operates independent of any central bank.

- Cryptocurrencies are a popular use case for the application of Blockchain technology.
- They can be generated by a blockchain platform itself or as an application on layer(s) above it.
- Some cryptocurrencies have been categorized as securities by various regulatory authorities.
- The rules for cryptocurrency treatment differ across jurisdictions.

Stablecoins: Certain types of cryptocurrencies can be created as applications layered on top of public networks as coin offerings that represent digital assets.

- Stablecoin is a cryptocurrency backed by assets.
- Stablecoins act as stable digital currency to tame the extreme volatility of the cryptocurrency markets, and are often offered and used by cryptocurrency exchanges. Stablecoins can be pegged against currencies, commodities or an asset basket which then offers a fixed value relative to the underlying asset enabling a less speculative asset to trade.
- These assets may be considered securities or commodities depending on the jurisdiction and underlying asset composition of the stablecoin.
- Banks are experimenting with stablecoins and testing their issuance.
- Economically, there are three main types of stablecoins:
 1. The ones using collateral and tranching, including fiat-backed or commodity-backed, or backed by assets denominated in certain currencies. USDT and USDC are examples.
 2. The ones using open market operations and relying on the backing of trusted entities. Basis was an example.
 3. Algorithmic. Terra-Luna was an example.

Underbanked: Those who have bank accounts but use alternative financial services as their preferred vehicle.

Unbanked: Those who rely on alternative financial services and do not rely on traditional ones (banking and credit cards) because they lack access to them.

ESG: Environmental, Social and Governance factors. Disclosure of these factors are often used in addition to financial factors when evaluating whether a financial decision is sustainable, mitigates risk, or fits within a responsible finance framework. ESG performance ratings and reports have become increasingly important.

Central Bank Digital Currency (CBDC): Digital form of fiat currency issued and regulated by a nation’s monetary authority.

- Fully trackable, unlike cash. Invokes strong opinions on privacy, security, and inclusion.
- Will require strong identity systems (compliance with know your customer and anti-money laundering regulations needed), likely excluding many emerging markets and non-identified populations (about 1/5th of the world’s population is unidentified).
- The global race is on; China testing their version. CBDCs are a likely reality in the future.

DISCUSSION SCOPE AND STRUCTURE

For the purpose of this discussion, sections of the Executive Order were grouped into the following four chapters of inquiry:

Chapter 1: Protecting Consumers, Investors, and Businesses (from EO Sec. 5) and StableCoins and CBDC (EO Sec. 4)

Chapter 2: Limiting Illicit Finance and Associated National Security Risks (EO Sec. 7)

Chapter 3: Promoting Financial Stability, Mitigating Systemic Risk, and Strengthening Market Integrity (EO Sec. 6)

Chapter 4: Fostering International Cooperation and United States Competitiveness (EO Sec 8) combined with Coordinating Regulators (EO Sec. 3) in the United States.

The Cornell Convenes forum did **not** address the adoption of CBDCs in Section 4 or the climate and energy implications of crypto assets mentioned in Sec. 5 (b)viii (A).

As this report was being drafted, several government responses were issued, but this paper does not address those. Our hope is that these perspectives will be considered in conjunction with the government responses. Links to these are in the [APPENDIX](#).

ACKNOWLEDGEMENTS

On behalf of Fintech at Cornell, the editors wish to thank the participants, and our hosts at Crowell and Moring for providing us with hearty support for this event.

We also wish to thank our sponsors Moody's, FiServ, Broadridge, and Tata Consultancy Services, for their generous and full-throated support.

We also acknowledge with gratitude the Cornell SC Johnson College of Business, which is dedicated to responsible and innovative finance at all levels. It's our hope that this work will prove useful in the development of appropriate understanding and regulation of these dynamic financial events.

**Cornell SC Johnson College of Business
Cornell Convenes 2022 Roundtable Forum on Digital Assets
June 6, 2022 | Washington, D.C.**

Participants

Rajeev Bamra
Marc Boiron
Agostino Capponi
Amy Davine Kim
Dante Disparte
Shawn Douglass
The Hon. J. Christopher Giancarlo
Jason Goggins
Carlton Greene
Keir Gumbs
Kim Hall Ford
Zhiguo He
Bill Hinman
Michele Korver
Sarah Kreps
Rob Krugman
Eric Lewis
Ryan Louvar
Irina Marinescu
Jai Massari
J.P. Mohler
Michael Mosier
Mike Nonaka
Daniel Nunez Cohen
Irina Pisareva
Eswar Prasad
Sunil Sachdev
Lee Schneider
Rodrigo Seira
Heather Smith
German Soto Sanchez
Hadley Stern
Gomathy Subramanian
Rich Widmann
Nancy Wojtas

Fintech at Cornell Executive Director, Susan Joseph

Facilitator: Michelle Jackson

Scribe: Mary Lorson

Fintech at Cornell Student Fellows

- Artem Streltsov
- Qihong Ruan

Cornell Outreach: Peter Krieger, Senior Director, External Relations, Cornell SC Johnson College of Business

Report Authors and Editors: Lin William Cong, Susan Joseph, Mary Lorson, Qihong Ruan, Artem Streltsov

BEFORE WE BEGIN

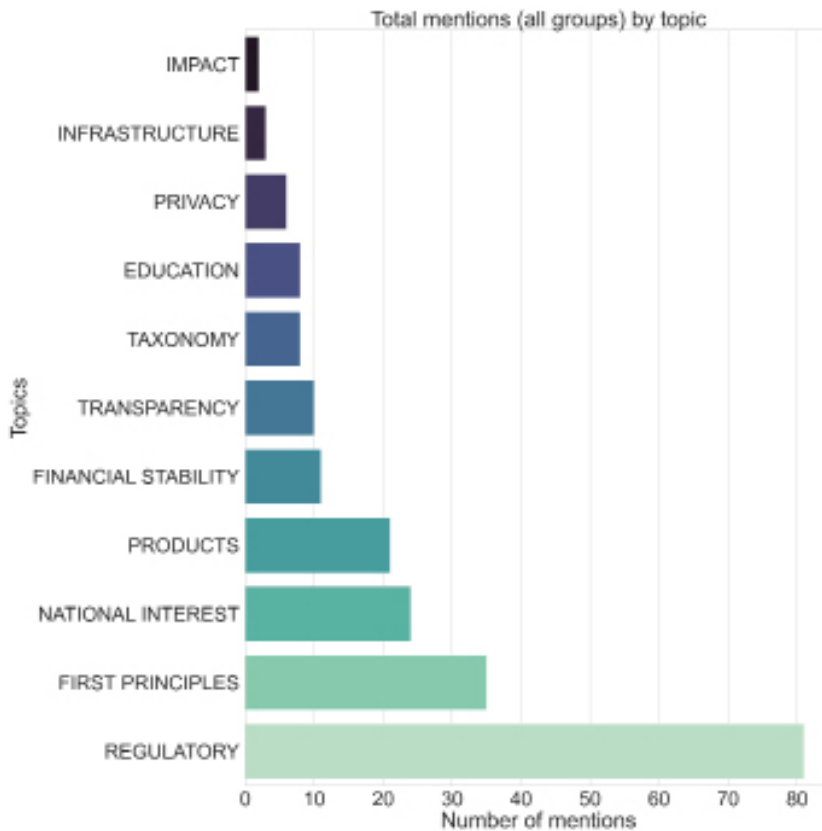
Discussion Perspectives: Breaking down group attitudes by their priorities

The group represented experienced perspectives from the fields of academia, regulation, and industry, enjoying a vivid discussion of the various considerations at play in the establishment of practices, protocols, standards, and policy regarding the development and implementation of digital currency and decentralized financial products. The discussion's specifics are summarized in this paper.

The editors extracted key ideas from each statement and classified them by topic. Using these idea- and topic-level mention counts by sector (academia, regulatory, industry), we are able to identify priorities and the level of agreement among them. We discuss a number of stylized effects in the main body of the paper, leaving the rest to the APPENDIX.

Figure 1 presents the total number of mentions by topic with the top three topics being regulatory, first principles, and national interest. Regulation considerations (when, how regulation applied and to what, with a light enough touch to encourage innovation and a strong enough hand to discourage bad actors) were at the crux of the discussion.

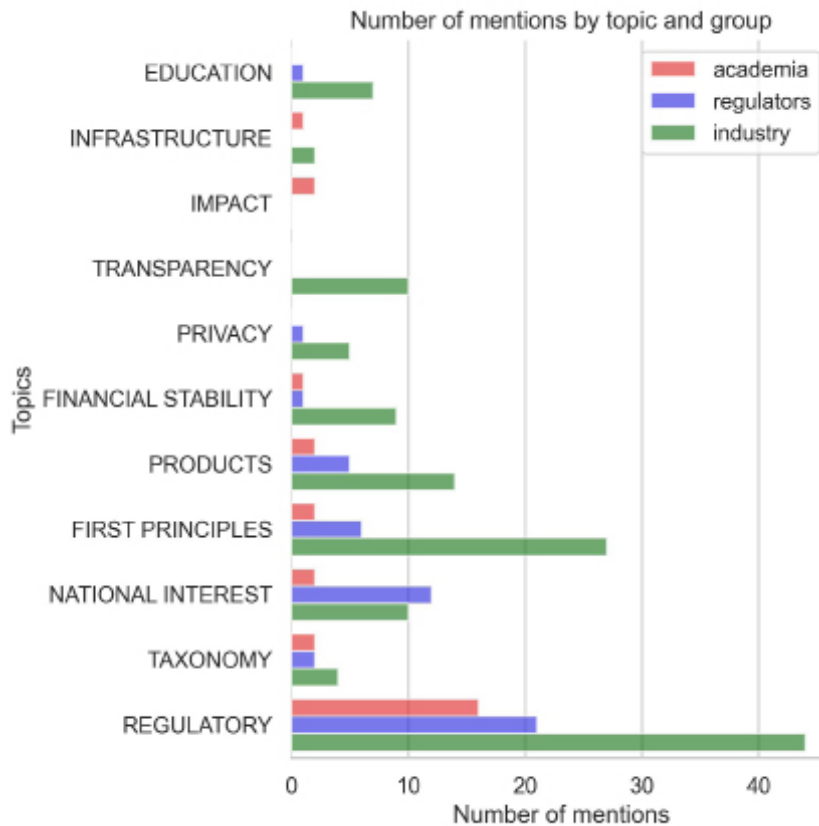
Fig. 1: Percentage of mentions for each group by topic



BEFORE WE BEGIN

Discussion Perspectives: Breaking down group attitudes by their priorities

Fig. 2: Number of mentions (all groups) by topic and group



In Figure 2 we decompose the total topic-level mentions into counts by sector. As follows from this figure, the industry sector led in its thinking about regulatory considerations and first principles, in addition to products, transparency, national interest, and financial stability. The regulatory and academic sectors, on the other hand, showed less interest in transparency but shared as their top two priorities regulatory considerations and national interest. The third priority topic for regulators was national interest, for academia taxonomy placed third. While these indices are interesting, they must only be considered within the context of this particular conversation, and do not indicate an exclusive focus of a given sector. Note that privacy was a top priority for academics as a subset of first principles as a topic.

In the interest of exploration, we compute Pearson and Spearman correlation coefficients between idea-level mention count series for each sector. Pearson correlation measures the degree of co-movement (in terms of number of mentions), while Spearman correlation estimates the ranking agreement (how much rankings of ideas co-move between sectors). Both coefficients range from -100% to 100% with a larger magnitude indicating a stronger effect. We find that the Pearson correlation is 71%, 73% and 62% for academia-regulators, industry-regulators and academia-industry pairs respectively, while Spearman correlation coefficients are respectively 38%, 70% and 20%. Practically speaking, this indicates the highest level of agreement between the regulatory and industry sectors, while academics were closer to regulators, but had a somewhat different priority of ideas from the other two sectors.

BEFORE WE BEGIN

Discussion Perspectives: First Principles

In preparation for the discussion, the conference facilitator and host organization drafted a set of first principles for group consideration. Many, though not all, were discussed.

1. Do no harm, allow innovation to flourish and accept failures within light guardrails.
2. Anticipate transition of the current paper-based system to digital system.
3. Protect privacy as a human right; structure transactions to accomplish it.
4. Create an environment to include and encourage underrepresented parties.
5. Encourage 24/7 economies: education, real-time regulation, interoperability, and standards.
6. Take responsibility and provide dis-incentives to bad actors.
7. Create marketplaces that are resilient to cyber-security and systemic risk.
8. Maintain open source (public goods) systems deeply integrated into the economy.
9. Look at the attributes of the asset in order to define and treat.
10. Preserve permissionless peer-to-peer, to keep the internet open.

THE DISCUSSION INTRODUCTION

The Cornell Convenes roundtable discussion was moderated by a professional **facilitator**, who introduced a widely-published **economist** to begin the day's discussion.

Affiliated with Cornell University and global NGOs, the economist dialed the focus toward the “transformative changes in money and influence” taking place, and emphasized this gathering as an opportunity to provide clarity.

The economist then stated that, in order to create regulatory frameworks, it is necessary to define assets, tokens, and regulatory apparati dealing with new assets and products. One of several former regulators present was instrumental in creating a taxonomy on varieties of tokens, and the economist cited [this](#) work specifically.

The economist went on to frame broader fundamental questions:

- Should the US tweak existing frameworks so that they can encompass new products, or create a new regulatory architecture?
- How can US regulators and industry make sure they can manage regulatory arbitrage?
- How does the US lead responsibly? By setting standards useful to the rest of the world?

He allowed that many sides to this question exist, some advocating for the wait-and-see approach, others arguing that since the opportunities for leadership are waning (“tech doesn’t know borders and other countries are advancing; Japan is already defining its stablecoin, for instance”), waiting too long might allow a status quo to be set in unfavorable ways. “The questions of choosing issuing bodies and parameters frustrate regulators, but also point to possibilities in the technology. There’s a fundamental need for systems at international level. How do we create a framework that allows innovation?”

The economist identified sticky conundra as well, summarized here:

- Crypto already has “quasi-legitimacy,” since crypto holders need to report these to the IRS without the benefit of consumer protection (thus far).
- Decentralization, bitcoin mining, and ownership and decentralized finance can be characterized as “another centralization” which “could lead us to more inequities.”
- Regulation will be important in terms of broader objectives. “We want new tech to lead us to a better world with more access, better-scaled rather than leading to more inequality and defining issues. What sort of regulation is best to serve markets and society?”

The economist then set the tone:

“It’s incumbent on us to think about how we can meet these objectives and create an ecosystem that can support benefits.”

CHAPTER 1 Protecting Consumers, Investors, and Businesses (from EO Section 5)

The Cornell Convenes group delved deeply into questions on disclosure, definition, and regulation, as suggested in EO Section 5 provided below.

Topics strongly identified: taxonomy, definitions, products; existing vs. new regulations (when traditional rules apply and when they don't); regulatory responsibilities balanced with protecting freedom for innovation; disclosure best practices; infrastructure; impact; leadership and competition/national and International expertise and relationships; education

THE EXECUTIVE ORDER STATES:

Sec. 5. Measures to Protect Consumers, Investors, and Businesses. (a) The increased use of digital assets and digital asset exchanges and trading platforms may increase the risks of crimes such as fraud and theft, other statutory and regulatory violations, privacy and data breaches, unfair and abusive acts or practices, and other cyber incidents faced by consumers, investors, and businesses. The rise in use of digital assets, and differences across communities, may also present disparate financial risk to less informed market participants or exacerbate inequities. It is critical to ensure that digital assets do not pose undue risks to consumers, investors, or businesses, and to put in place protections as a part of efforts to expand access to safe and affordable financial services.

Directives and schedules for government reporting are included in the full Executive Order [HERE](#).

CHAPTER 1 DISCUSSION

The industry facilitator began the Chapter 1 Discussion, which addressed the sometimes-aligning, sometimes-competing efforts to protect consumers, investors, and businesses, **with a question:**

“Where to start? With principles, or with asset definitions?”

Industry led the response, stressing **clarity and disclosure** as imperative, central elements of consumer and investor protection.

NOTE: Disclosure was an important topic for many, so much so that at one point the facilitator redirected the group to be more broadly focused on regulation.

An industry leader emphatically expressed the need to build trust with investors and consumers. “Nothing is more core to consumer protection than disclosure.” This person said that disclosure needs to happen when things are changed, pushing information to investors where they prefer it (give access in a variety of ways), that the disclosure should be understandable, and should be frequent and consistent, and should help the reader make decisions. “If done properly, smart disclosure establishes a foundation to help this marketplace.”

A former regulator replied: “When we talk about crypto, we see it as another new investable asset class, so we go to the forms we usually use. In my work on the last decade, crypto is about a new protocol, about establishing the ownership of value; internet of value: broader; I suggest we need to think about it more as an investable asset class.” He argued that this approach would focus the national interest in exploring the full range of this growing field. “We need to think about investor protections in a new way.”

* Disclosure: what info, to whom, by whom, for whom; education; developers; different kinds for different assets and different recipients (tech-savvy and non-tech-savvy); use cases; keeping up with changes; education working with developers on communication; enforcement AI and ML is activity based rather than entity-based but is not transparent to the non-tech-savvy; if a license is required, how is that defi? Difference between consumer protection and investor protection

[TO TABLE OF CONTENTS](#)

An industry representative displayed that industry's particular interest in preserving openness. "This ties into a conversation about what tokens are, but what are the activities? We regulate currency because insiders have information that investors need. When you think about crypto, projects are developing protocols and issuing tokens; platforms offer trading to retail customers. The principles should start where there are information asymmetries, disclosure should be necessary, and then."

A former regulator weighed in that definitions should be the starting point, that once assets are defined, "all the jurisdictions will follow. Hybrid assets will share qualities with some things we recognize, but not completely." This person urged that all involved should "always identify: what does it look like, what kind of regulation might come into play (money laundering) but what about it is so unique that the historic way of treating it won't work?"

This jump-started the next block of discussion.

Editors' note: Definitions and categorizations should consider economic functionality, legal aspects, as well as technical specifications, together with rigorous empirical analyses of existing data. To date, no common taxonomy or classifications exist.

An industry representative shared about disclosure practices – on the abundant accessibility of transaction information and the need for disclosures to be surfaced in an easy-to-find way, but in a way that is sorted and presented to be effective for the user. Implying that traditional ways won't work here, this person suggested **a different form of disclosure relevant to digital assets**, and introduced **the importance of education as a part of disclosure**. "By surfacing it with educational information, the digital asset developer can aggregate the information, and have protocols that surface with the asset."

Another industry representative stated, "Crypto is financialization of the internet; Crypto is radically transparent. I can see every elemental action with crypto, but I can't in traditional finance. This is the future of the internet: the land-grab around ownership." In later parts of the discussion, others presented additional argumentation and evidence that crypto is or can be used for other, non-financial, purposes.

Another industry expert argued that in order to develop fully-appropriate first principles, it would be necessary to "break it down into use cases, because the technology is so broad it won't fit under one framework." Again, activity is identified as a structural feature of digital finance.

TWO SYSTEMS? A lawyer reflected on the assets and the ecosystem's rapid pace of innovation, positing that perhaps two realms will evolve: "a completely separate governmental agency regulating the parallel universe."

Editors' note: When relying on use-cases, definitions and activities must be clearly detailed and defined. Recent use cases for consideration include AirBnB and Uber, which challenged existing industries, leading to competition that brings more choice and better service to consumers. This is not an unknown principle in innovation, two systems evolving at the same time, to allow the market to choose what's best.

An industry representative argued, "We need to make this more accessible for consumers. Last week I spent time with **tech-savvy and non-tech-savvy**. The tech savvy say we don't need regulations; the non-tech savvy group has no idea -- doesn't understand this. There's a strong need for investor protection: the **what**, the **who**, the **how**. Perhaps (we can distinguish) a difference between the asset and the technology. So from that point of view, we can pursue the **who**, which of those players have to be a part of this process." The officer posited that the **how** could be the development of a way to deliver the technology to people. (These are) all disparate questions to take on, but we can't lose the lens of investors. The majority are not tech-savvy."

CHAPTER 1 DISCUSSION, CONTINUED

Editors' interpretation: Investors need to be educated, and disclosure needs to be made accessible to them.

An industry representative wondered whether the lawyer's comment on the fast pace of industry growth brings up an enforcement question. "Maybe the principle from the educational perspective: artificial intelligence and machine learning are useful, can identify anomalies, patterns, etcetera. We can leverage those technologies rather than policing people inside but evaluating markets in real time."

Central question: identity vs. activity

Currently regulation is based on the common approach of using individuals' identity (know your customer, identify bad actors before they can behave badly). Can regulators use the new technology for enforcement, if they base the applications on activities rather than identities/individuals? Can this enable regulators to do their work differently, more efficiently?

An industry representative recommended learning from the existing payment system, identifying what the instruments do and how they're used, and then tailoring regulation to that activity. This person agreed about leveraging technologies for enforcement. "Create crypto frameworks that are forms of payment but divided into the separate mechanisms used," they suggested.

A legal expert enforced the concept that **education is essential** to fully-functioning markets. "Consumers don't know what's under the hood of machine learning mechanisms." She recommended caution with artificial intelligence, arguing that if disclosure is automated, and consumers can't understand what's in the black box of the algorithm, then disclosure still hasn't been achieved.

A former regulator weighed in.

"Regulators in an analogue world asked, 'where are intermediaries, gatekeepers, bottlenecks?' We'll license and regulate them, will give them monopolies. This is also true in financial services; you get licenses in return for giving information to regulators. As we go into a digital world, where intermediaries are being disintermediated, what do regulators do? Traditional regulators don't know what to do. **They need to, rather than resist, accept that the same technology is going to give them tools they haven't had before, to move from an entity-based model to an activity-based model.** Start monitoring activities; that's what Amazon and eBay do – it's being done. Watching data analysis: if regulations become nodes on blockchains, they can do a better job...It will take regulators to move away from the entity-based to an activity-based system."

An IT expert suggested that lessons could be learned for this transition from the transition to e-commerce several years ago.

Editors' note: The Internet quickly became a fast growing technology. Questions regarding taxation, intellectual property, consumer protection, user agreements, privacy, and even management of the Domain Name System (DNS) immediately became topical and were addressed in a joint effort by regulators globally, industry professionals, and international organizations. For instance, in a 1997 white paper, the US Department of Commerce proposed transferring the management of the DNS to a not-for-profit private corporation. The 1999 E-Commerce OECD Guidelines provided a pathway to ensure consumer protection, while the US regulators passed the Anticybersquatting Consumer Protection Act (ACPA) and the Electronic Signature in Global and National Commerce Act protecting the flow of commerce in cyberspace. That same year, the World Intellectual Property Organization (WIPO) produced a set of rules for the Uniform Domain Name Dispute Resolution (UNDR) in an attempt to strengthen intellectual property rights in e-commerce by providing a domain name dispute resolution framework. As for taxation, in 1998 President Clinton's Presidential Decision Directives were issued to provide a favorable space for e-commerce development with a focus on network infrastructure and security. The regulatory perspective was clearly one of light touch to ensure consumer protection without impeding innovation. In a modern world with a much greater number of software and technology experts arriving at a similar resolution in the digital asset space seems feasible.

[TO TABLE OF CONTENTS](#)

CHAPTER 1 DISCUSSION, CONTINUED

An industry expert suggested a lighter touch, to allow for innovation. **“Trying to fit blockchain into the current regulatory framework will limit the power of the blockchain, as innovations continue to be developed, which may be hampered in their growth before their usefulness can be explored.”**

A legal expert agreed with this, adding, “It’s dangerous to compartmentalize tech before you understand what it is. What happens to data licensing? NFT? Other applications we haven’t thought of yet?” This person proposed a “do no harm” approach, “with light guardrails so that we can allow experimentation and permit useful failure along the way.”

Consumer, investor, institution

A policy expert argued for a **principle to be clear about the distinction between consumer protection and investor protection**, because different rules are applied to these parties.

The editors see this as good food for thought. For instance, consumer protection largely revolves around education, bad actor enforcement, and market conduct. So in thinking about how to approach digital assets, consumer education might be at the forefront on the consumer side because the availability of data onchain is not sufficiently understandable by itself to disclose risks. Investor protection from the investment provider side may speak to suitability of the investment, fair dealing, and ethical sales practices. From an institutional perspective, fair dealing comes into play with regard to disclosure of charges and fees. If these disclosures already exist onchain in real time, then what further obligation might be imagined for a financial institution regarding communication of these charges and fees?

Speaking to the regulator, the industry representative noted that “the information changes that we’re seeing, when you think about money laundering and consumer protection (government requires reports over \$10k), now governments can see that online. How can that translate to consumer protection? Can we use tech to reach people where they are, to disclose appropriately who they are?”

An industry leader suggested that the current dynamic is analogous to the early days of the internet and websites. “We did not anticipate people selling regulated things on websites. Sites displace businesses, tokens displace assets; we had regulated activities and then had to adapt regulations to close gaps in partnership with the private sector.” This person argued that “lawyers see blockchain as transparency, but it’s difficult to understand. From a policy perspective, not just disclosure for disclosure’s sake, but (specifying) what kind of disclosure is helpful. (There’s a) false sense of security for investors when some consumers are duped anyway. This is essentially legalized fraud.” This person **sees an essential information asymmetry in the listing of the token, the asymmetry between the request for information and the information that the consumer actually sees. He strongly suggested that this gap be closed.**

Editors’ note: Information asymmetry can lead to some truly formidable consequences. Saber, a defi protocol built on a Solana stablecoin exchange, was purportedly created by eleven developers but found to be two brothers - Dylan and Ian Macalinalao – taking advantage of anonymity and social media. With this, they managed to “build protocols that stack on top of each other, such that a dollar could be counted several times,” significantly inflating the total value locked (TVL) that reached \$7.5 bln. in deposits with Solana’s total deposits at \$10.5 bln. [70% of Solana’s value was created by artificial people, making it the fourth most valuable currency at the time.] These findings question the benefits of developer anonymity and use of TVL as a major metric. They also underscore the fact that a couple of bad actors can distort cryptocurrency markets.

Regulatory and law enforcement consequences for the Macalinalao brothers are pending; however, a somewhat similar example comes to mind from commodity markets. In 1980, by purchasing futures contracts on margin, the Hunt brothers managed to accumulate up to one third of the entire world supply of silver with a view to manipulate its price. The Commodity Exchange (COMEX) responded by adopting “Silver Rule 7” heavily restricting purchase of commodities on margin. This led to a quick unfolding of the bubble with the silver price down over 50% in a span of four days and the Hunt brothers found responsible for conspiracy civil charges. This brings home the point that the regulatory and disclosure practices being considered and developed now for cryptocurrency assets will be crucial for creating stability in this new space and why it is so critical to have broad participation in the discussion.

TO READ MORE: [The Fake Team That Made Solana DeFi Look Huge](#), Coindesk, August 2022.

TO TABLE OF CONTENTS

CHAPTER 1 DISCUSSION, CONTINUED

A former regulator contributed insight on privacy and compartmentalizing. “Crypto is a social technology, a way of interacting more widely; this can be limiting but also what’s unique here.” The enforcement agency took an activities approach. Noting that crypto wallets (places where traders store the secure digital codes needed to interact with a blockchain) act differently, he added, “there’s a permanence here that can be a disaster from the privacy standpoint. If you’re applying old principles, where’s the privacy? Everyone’s exposed once you have the addresses. What’s converging these principles? International Organization for Standardization?”

An industry leader said that with “old school applications, your database was the subserver, but with crypto, the database is the blockchain. The asset is transparent if it’s on the chain without any privacy shields.” This could imply that privacy protections will limit transparency.

EDITOR’S NOTE: This line of inquiry begs the question, “what comes from this?” (WALLET/SIGNALING?). If an address is trading large amounts, the trader is free, but vulnerable because the information is accessible. Privacy implications are abundant here, and echoed throughout the rest of the discussion. One attendee suggested a different form of disclosure, relevant to digital assets, **introducing the importance of education as a part of disclosure.**

“By surfacing it with educational information, the digital asset developer can aggregate the information, and have protocols that surface with the asset.”

A legal expert asserted several key ideas be kept in mind for disclosures of digital assets.

“I not only know **how** but **what** and **by whom**. The risks here are different than in traditional assets. (There is) a long list of information on management thinking carefully about how to tailor what’s important: **Who’s responsible for disclosure?** Does the issuer have the main disclosure obligation, while other parties can have information asymmetries? Active participants are sometimes not the issuer, but they drive the price.”

Implication: The traditional way won’t work here.

An academic wanted to “distinguish between crypto and other off-chain platforms. For assets that are traded on the blockchain, there’s the defi services and other applications, then there’s room for smart disclosure; you can see all the transactions. But providing the info to the right users...**you worry about whether disclosure is being done.**” **Suggestion: transparency does not equal disclosure.**

After this vigorous introduction to the issues of disclosure, the facilitator asked the group to consider other dimensions, inviting broader perspectives.

A legal expert stated that, from his perspective, disclosure was too narrow a lens on which to base a first principle. “Disclosure takes care of itself most of the time,” but also that “if you don’t see any disclosure, then the activity probably isn’t going right.” This person argued that the first principle should be around the main theme: “What is the nature of the asset? The nature of the asset is always important under the law and policy; if we’re not talking about the nature of the asset, we’re not doing law and policy right. But because of this unique world and its flexibility in moving forward, we can be moving toward a whole new world that’s more worth working toward rather than narrowly looking at what the old agencies should be regulating.”

The nature of the asset resonated with the group, and was generally agreed upon as a first principle to this discussion of the proper treatment of digital assets.

**At the end of Chapter 1 discussion, the facilitator summoned the lingering question:
“Do we leverage where we are today, or do we evaluate all this as it evolves?”**

CHAPTER 1: ADDITIONAL INSIGHTS (FROM STICKY NOTES)

Because such vigorous thinking was inspired, participants shared additional ideas in writing after each chapter discussion. Some of these echoed or continued main discussion topics; others brought up ideas not addressed due to time constraints.

We can agree that activities-based regulation makes the most sense, but it requires coordination among regulators at the federal and state levels, and this coordination currently is not occurring. With so many regulators and overlaps in jurisdiction, there is a real risk of inconsistent regulations frustrating innovation.

Transparency does not equal disclosure; you need education and standards

Transparency does not equal safety

Innovation and science at global risk assessment firm: data availability will not help manage risks without an analytical framework to recognize activities and patterns.

Congressional action will be necessary because the SEC will not create a constructive framework for innovation and are regulating by enforcement/stealth

Experiential education curriculum for policymakers;

Hindsight balance between “enforcement” and “regulation”

Develop frameworks in lose (SIC; “loose”?) collaboration with the incumbents and crypto fintechs

Who is auditing the “design flaws” of the financial architecture, not just smart contracts (i.e. tech)

Some great ideas around principles but also need to remember that these ideas have to bridge the partisan gap that exists in DC. So there has to be a little give and take on disclosures, risk management, AML, liability, etc. A bipartisan legislative solution is what we should be striving for that directs the regulators, so Congress must lead that process.

Some aspects to consider from consumer/investor perspective:

- Taxonomy (how to define an asset, attributes)
- Standards (min standards for tech providers)
- Licensing (yes/no? e.g. 24x7, global...)

How do you list and disclose tokens that act as a software license?
On exchanges?

Activities-based regulation makes the most sense, but requires coordination among regulators (currently not occurring)
With jurisdiction overlaps there is risk of inconsistent regulations frustrating innovation

Bipartisan legislative solution is needed

Experiential education curriculum for policymakers

Hindsight balance between “enforcement” and “regulation”

Develop frameworks in lose (sic: “loose”?) collaboration with the incumbents and crypto fintechs

Examine (or expand) regulation vs. Ex-post Regulation blockchain is much better than ex post

Transparency does not equal disclosure: education and standards.

Transparency is not equal to safety.

Data availability in the absence of an analytical framework to recognize activities and patterns will not help manage risks.

Alternatives to stablecoin should be allowed to flourish

CHAPTER 1 TAKEAWAYS

“We will need Congressional action because the agencies (particularly SEC) will not create a constructive framework for innovation and are regulating by enforcement/stealth.”

“Stablecoins are not just a 1:1 dollar or fiat-pegged token. Broader possibilities, such as a tokenized money market fund should be allowed to flourish outside of a bank/depositing institution.”

BIG IDEAS

Regulators stress balance

The regulatory perspective clearly advocated the balancing of a light touch to ensure consumer protection without impeding innovation. In a modern world with a much greater number of software and technology experts, arriving at a similar resolution in the digital asset space seems feasible.

The nature of the asset matters: Products, classification, taxonomy, definitions.

All agreed the assets should be defined by their behavior, and not by identity. In this regard, some assets behave like traditional financial instruments, while others do not, and still others are developing quickly which defy any previous understandings.

Regulators stressed the need for uniform definitions, while academy and industry mentioned classification as “useful,” not essential. An anonymous party did stress the need for agreement on definitions, suggesting a definition rule that defines tokens as those which do and those which don’t act like assets or other products.

Standards, Disclosure, Privacy, and the importance of Transparency

Transparency as an ideal in decentralized finance and crypto currency refers to the availability of market infrastructure to any party, anywhere, who possesses the knowledge of the structure. It was argued by this group that transparency does not equal disclosure (nor does it equal consumer safety, added an industry person), because the skillset inherent in the system is not universally possessed or even understood. It was suggested by one person present that “**disclosure and education should perhaps go hand in hand.**”

Disclosure, education, and licensing; education and standards

Similarly, education and the understanding of clear standards are key to transparency and to the development of industry expertise that can be trusted and shared.

Policy and Regulation, Enforcement and Innovation

Industry representatives stressed the desire to encourage innovation, through flexibility.

General agreement appeared on the need for bipartisan frameworks supporting innovation.

Do we leverage where we are today, or do we evaluate all this as it evolves?

CHAPTER 1 DATA VISUALIZATION

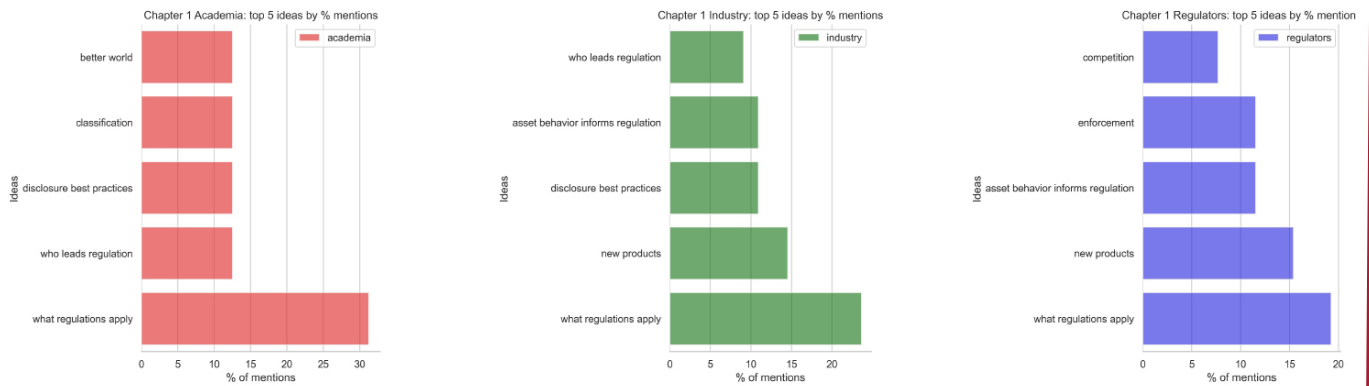


Fig. 3: Top five Chapter 1 ideas by sector

Figure 3 presents the top five Chapter 1 ideas by sector (academia, industry, regulators). The most popular idea, **what regulations apply**, is consistent across the board, while industry and regulators agree on **new products** as being the second most important. Both academia and industry consider disclosure **best practices** as the third most important idea, although that does not make the top five for regulators.

CHAPTER 1 CONCLUSION

Regulators believed strongly in the need to protect national leadership, to remain competitive, and to set policy rather than waiting for enforcement to create the guardrails. Regulators also observed the likelihood of other countries seeking to remain competitive and to be leaders; the industry noted the need for approaches unique to different countries.

Click [HERE](#) to read the Working Group Report for Chapter 1.

CHAPTER 2

Limiting Illicit Finance and Associated National Security Risks Executive Order, Section 7.

Topics strongly identified: privacy, transparency, regulation, risk, unintended consequences, illicit finance

THE EXECUTIVE ORDER STATES:

(a) Digital assets have facilitated sophisticated cybercrime-related financial networks and activity, including through ransomware activity. The growing use of digital assets in financial activity heightens risks of crimes such as money laundering, terrorist and proliferation financing, fraud and theft schemes, and corruption. These illicit activities highlight the need for ongoing scrutiny of the use of digital assets, the extent to which technological innovation may impact such activities, and exploration of opportunities to mitigate these risks through regulation, supervision, public-private engagement, oversight, and law enforcement.

Directives and schedules for government reporting are included in the full Executive Order [HERE](#).

CHAPTER 2 DISCUSSION

The Chapter 2 discussion leader, an academic, began by focusing the discussion on the timing of the regulations, asking if it has so far happened “too soon, or too late?”

This led to a nuanced discussion of unintended consequences, the need for regulators to be opening-minded/co-operative/knowledgeable about how to use the tech to respond to its own endemic issues and vulnerabilities, the need for information sharing and management, and recommendations for enforcement approaches. “They need to know how the tech behaves,” she said.

The discussion leader positioned the “locus of the debate” on two questions:

- a. If you regulate too soon, do they (regulators) understand what they’re regulating? Is that tech so dynamic and moving so quickly that by the time they’ve regulated, it’s already changed?
- b. But if you regulate too late, have the harmful consequences accumulated?

The discussion leader asserted that on this the EO is “pretty vague,” but presented it as a lens for considering implications. “What’s the distribution of risk? What I see is a tendency to regulate tail risk (taking our shoes off every time we fly because one person once had a bomb in their shoe).”

She then posed a series of questions:

- What’s the context in this digital finance realm?
- What’s the risk terrain?
- What should we be thinking about in considering the problem of regulation?
- What’s the risk profile in terms of what’s speculated on in the EO?”

The discussion leader continued: “Despite best intentions, what haven’t we anticipated? Is it a question of regulation overly centralizing something whose virtue is its decentralization? **What’s the tradeoff?** What now can or can’t we do?”

CHAPTER 2 DISCUSSION, CONTINUED

An industry representative picked up on the issue of **unintended consequences**. He dressed down policy makers and political leaders as under pressure and “**not being careful or thoughtful enough**,” and saying that their “firestorm response has created problems.” As examples, this person offered activities-based regulation that has worked well until regulations created issues for the ability of law enforcement to collect information. “One thing can kill a wire fraud case,” he added, referencing an [NFT fraud case](#) brought this year in New York’s Southern District.

Continuing, this person discussed finance and the need to get the **information** into the right hands. “**Regulators need to think about being open minded in allowing the tech to solve certain problems.**” Digital identity can help KYC (know your customer). “Where you don’t have to have central onboarding, we can build tech that will address those problems in a way that it can operate effectively in the ecosystem. But also, with stablecoins and CBDCs: in trying to be more competitive, maybe all will operate together, but (we should be) making sure that the US is a leader here. We need to keep up with China.”

First Principles Focus: Transparency and unintended consequences

Another industry representative asserted: “There’s a need for this transparency. Who’s perceived to be a bad actor? OPSEC SPN has six addresses; however, Chainalysis/TRM (Digital Asset Compliance and Risk Management) labs are doing heuristic scoring. Customers who are trying to move to defi want lists in order to avoid regulation...but they can’t move and agencies keep the list, and only publish six addresses so people are using the government who should provide more.”

An academic added that he has been personally studying intermediaries during the financial crisis, and sees a challenge to the idea of “blockchain providing a nice framework for forensic checking. The code is hard to figure out – and I have been reading this for five years – and for the regulators, too. We need to think about identity, and to protect, but the intermediaries will step in; this is the time that **the intermediary has to provide oversight regulators.**” He acknowledged that this is an identity-based approach.

“When I talk to regulators, they’re lagging behind, but the economists will think about the **unintended consequences**. Regulators don’t have that much time; **it’s the business schools that provide human capital to regulators**, then a positive cycle; but it’s all happening so fast; regulators need more time, and I hope they’re open to hiring more well-trained people.”

One legal expert suggested that, while OPSEC is understood through policy, blockchain has an advantage, because you can see the chain. “You can have factors and data points and **as a former prosecutor, I’d rather have data points than one password. The whole point of the distributed social tech is that people can manage their own risk**, but also you have these different data points and you don’t need to do Know-Your-Customer and can personalize their risk tolerance.”

Another legal expert retorted, “I have trouble squaring the circle: bad actors are bad while privacy is good, but if we try to catch bad actors, we can ruin privacy. (And) if we don’t have bad actors in mind, we’re missing something. We also need to respect due process. Chainalysis, TRM do great work here. I’m not impugning their work, but **that’s different than due process**, and this should be applied.”

Should protocol choose the interaction, or should the individual?

TO LEARN MORE: [An Anatomy of Crypto-Enabled Cybercrimes, Cong, Harvey, Rabetti, and Wu \(2022\)](#)

TO LEARN MORE: [Crypto Wash Trading, Cong, Li, Tang, and Yang \(2020\)](#)

An industry expert added: On protocols, in illicit finance, if we make these permissions (part of the) protocol, this destroys the permissionless protocol. **How can we allow the permissionless nature to exist while protecting compliance?** Sanctions, a protocol intermediating itself, but now that an intermediary is facilitating that transaction...**every single user of the protocol can create a list of those with whom it wants to interact ("block"ing users); use TRM, insert addresses, a permissionless system, where individuals choose who they'll interact with; so that protocols don't get intermediated.**

A former regulator steered the discussion back to the discussion leader's opening about whether **regulations should come earlier or later.** "Europe goes in early, and we come in late. The two approaches show that EU has ability to export regulation. Is this an advantage? Does it cause innovators to adapt to the regulation rather than better problem-solving." This person argued that "our innovation has been better because we come in late. The downside is that crisis-based regulation is done in a rush and isn't best. **The best is for the regulations to be innovative while waiting for Congress to step in.** In 2017 there was no regulation, but bitcoin derivatives were being developed, so we hoped if we held off the innovation would advance. The two sides of this are on view now: on balance, **I agree with the US/North American approach.**"

An industry voice brought the group back to the subject of illicit finance: "It's somewhat controversial: the core attribute of this technology is that it's hard to censor, hard for outsiders to regulate. **Thinking about that, the way that regulators should try to enforce rules is to focus on the on- and off-ramps, and other touch points, rather than trying to intermediate.** It's already starting: this diversion of the institutional decentralized finance (closed) but also the badlands where anonymous permissions (are happening?); keeping this framework in mind."

An industry representative commented on the facilitator's point regarding geopolitics/geo-economics: "I think the Fed turning itself into a retail bank is a good idea and that the US is losing ground and is late." He expressed the view that, for a large stablecoin issuer, "the air gap is a feature, not a bug." If we're in a digital currency space, we run because political leaders provided a destination. The Europeans have a 600-page body of law. We don't have a good answer, but we should be encouraged that the US isn't waning. The dollar is the currency, the underlying rails. (This is) A critical national security objective: we moved over \$6T through our pipeline, but in many countries the CBDCs obfuscate. **Who can innovate an economy?"**

"There are stablecoins and then there's everything else." -- Former SEC regulator

This person went on to devise an approach. "Stablecoins are different from the other digital assets (we always know the issuer and algorithm, can regulate it like a fund, so some regulations are not objectionable) and then there's everything else, trading on digital exchanges. Gensler thinks they're probably trading securities, but once he thinks there's a halfway point" (as an academic had earlier asserted) **"there could be exchanges that give safe harbor. If you have something like that, you can trade there and gather and share information; but what's happening in the unregulated exchanges?"**

CHAPTER 2 DISCUSSION, CONTINUED

A proposition: “Now, you have a place where a consumer can go and buy a digital asset and at least see that the pricing is being overseen; maybe price discovery and integrity is more reliable. **Still, people can trade off-exchange...but if you want the regulated exchange, you can go there. I think this would address the concerns:** exchanges provide 15c2-11 seasoned securities (the recently-amended rule providing for additional disclosure by broker-dealers to potential investors, applying to both equity and fixed-income securities), and the broker/dealer certifies a certain level of information. A similar process could be put together for digital assets.”

An industry representative stressed this: “The national security interest is important, but for institutions to get comfortable, we need safeguards. How risky is this? Do we outsource our understanding of this, or do we need permission? We should be striving for a world where there’s consumer choice. If we can protect the privacy imperative (not assuming they’re harmful or withholding information, but those who want to surrender their privacy in exchange for security). This person suggested that maybe some permissionless protocols can be preserved.” **This person’s firm favors the privacy imperative, “but many proactive regulations kill innovation.”** He went on to show the struggle for balance, as his firm allows innovators to create best circumstances – “the things that private actors think are good for consumers and markets while also helping regulators provide protection.”

Editors’ note: Privacy is seen as instrumental, endangered, and fundamental

An industry representative wondered about the Web3 definition, the internet of control. “Privacy is instrumental,” they put in, saying that the EU law on General Data Protection Regulation (GDPR), “is there because people don’t control their information. **At what point does this data become a digital asset as well?** Then you are able to give permission. From an illicit finance perspective, education is important. Regulators could understand better.”

“**From the banking perspective,**” said one participant, “**it would be a great irony if the invention of blockchain began to realize control over the system.** It’s important to balance privacy and freedom. You can’t bring more than \$10k in cash. There won’t be a perfect regulatory solution but the idea of a government *flowing* every single interaction is dystopian.”

An industry expert claimed that when considering privacy and identity, “the concept of privacy is bigger than crypto. **We need to consider privacy as a fundamental right.** Europe put 600 pages into law, and we haven’t thought about privacy as a right. It’s limiting to see it as a trade-off. You need the overarching right, and then you apply it to different functions. Also, when you think about 24/7 markets, can we regulate in that vein, rather than just raising the hammer?”

RECOMMENDED: Distinct approaches for centralized and decentralized finance.

An academic agreed about avoiding overregulation, arguing for an approach that would **distinguish between regulation for centralized and de-centralized crypto.** “There were a lot of hacks and scams on the issue of whether by regulating defi we increase the risks, but **there should be consistent systems for centralized and decentralized.**”

End of Chapter 2 Discussion

CHAPTER 2: ADDITIONAL INSIGHTS (FROM STICKY NOTES)

Privacy and digital identity – lessons from bank secrecy laws and the rise of reporting.

Decentralized identity and resistance are hard technical problems that warrant time to carefully technically solve (likewise w/privacy regulations).

Innovation should be unencumbered by regulation. This does not mean releasing products without testing and evaluation; it means we should evaluate technologies and regulations – challenge and change; this looks like evaluating the activity AND existing regulation THEN challenging and changing the regulation as appropriate. (Building adjustment periods into introduction schedules?)

How are decentralized identifiers (DIDs) going to impact privacy (support it) and the tradeoff with national security interests?

1. Existing interoperability issues – growing ecosystem making it complex. 2. Cross-chain bridges are susceptible to hacks; 3. KYC (or eKYC) could be similar to what GDPR in EU facilitates (Digital ID is shared to onboard a client, which becomes an encrypted block on the chain after 30-days)

Prescriptive requirements (KYC/CIP, CTR, travel rules) no longer adequately identify risk or customer.

Blockchain forces the issue of modernizing the **Bank Secrecy Act**. The principles remain, but some of the prescriptive requirements (KYC/CIP, CTR, travel rules – either no longer adequately identify risk or identify the customer. We need to keep the principles in mind but acknowledge that the availability of information is now changing.

Privacy can address illicit finance risk vis a vis wallet security, etc.

CHAPTER 2 TAKEAWAYS

General themes:

- Regulate on activity
- Provide education
- Focus on on- and off-ramps
- Be aware of surveillance potential

“Hopefully good tech will move us to activity regulation, but we need more time and education.”

“Regulators should try to enforce rules is to focus on the on- and off-ramps, and other touch points, rather than trying to intermediate.”

“It would be a great irony if the invention of blockchain began to realize control over the system.

CHAPTER 2: DATA VISUALIZATION

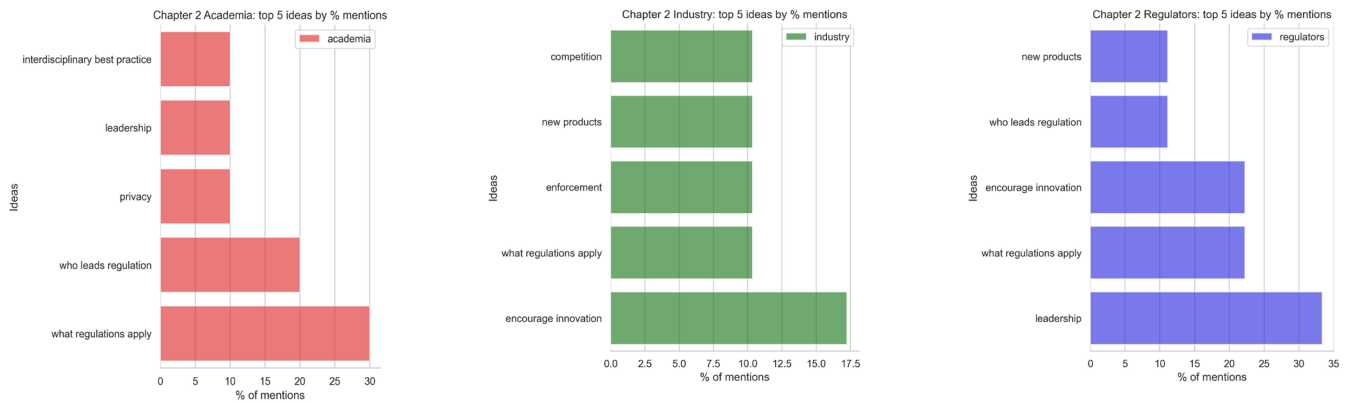


Figure 4. Top 5 Chapter 2 ideas by sector

In these figures, we can clearly see that the groups assessed the questions of illicit finance and national security from different perspectives. Ideas classified as “what regulations apply” seem to have been in focus in each group. Industry was largely interested in encouraging innovation and to a lesser extent interested in enforcement, new products and competition. Finally, central to regulators was US leadership in the field, followed by encouraging innovation.

CHAPTER 2: CONCLUSION

Points for further discussion include a better understanding of and control of enforcement bias. Ruling by enforcement will hamstring innovation. Industry and regulators must engage in new ways.

“When I talk to regulators, they’re lagging behind, but the economists will think about the **unintended consequences**. Regulators don’t have that much time; **it’s the business schools that provide human capital to regulators**, then (it’s a positive cycle; but it’s all happening so fast. Regulators need more time, and I hope they’re open to hiring more well-trained people.” -- Academic

Click [HERE](#) to read the Chapter 2 Working Group Report.

CHAPTER 3

Promote Financial Stability, Mitigate Systemic Risk, Strengthen Market Integrity (from EO Section 6)

Topics strongly identified: crisis, shocks, hacks, risk

THE EXECUTIVE ORDER STATES:

(a) Financial regulators — including the SEC, the CFTC, and the CFPB and Federal banking agencies — play critical roles in establishing and overseeing protections across the financial system that safeguard its integrity and promote its stability. Since 2017, the Secretary of the Treasury has convened the Financial Stability Oversight Council (FSOC) to assess the financial stability risks and regulatory gaps posed by the ongoing adoption of digital assets. The United States must assess and take steps to address risks that digital assets pose to financial stability and financial market integrity.

Directives and schedules for government reporting are included in the full Executive Order [HERE](#).

CHAPTER 3 DISCUSSION

This chapter called for a shorter, more intensely focused discussion period, led by two discussion leaders.

One academic leader began by focusing on system architecture. “System risk is close to heart. I was working on it when the financial crisis happened, reflecting on two sources of systemic risk in crypto markets -- shocks, like Terra and Luna, currency which dropped in value, and then all coins are negatively affected, making transactions impossible. Then from the technological cohort: smart coins, open source -- then some softer; most of the time; the softwares can be hacked.” He briefly discussed the Monox blockchain, in which 31 million dollars in digital coins were stolen. “What about relying on the importance of ensuring continuity of service? We want to transition to software where we can transition quickly.” He invited the group’s thoughts.

See: [The Crypto World Is on Edge After a String of Hacks](#), New York Times, 9/28/22

The other discussion leader, bringing the industry perspective, commented on these well-known crises (hacks and thefts) and argued that regulators failed.

“Today we’ve prepared for big tech or Libra or China tech or gov tech. What blew up first was **Terra**, which got big quick, and failed the most basic of tests: show me the money. If you want to meet that simplest of tests, where in the payment system does it belong?” At his company, he continued, “we follow a model with no leverage. We could give custody to the Federal Reserve. Stablecoin is a lightning rod since 2019, but innovation on the margin creates correlations. (**Tether** should be discussed: an exposure to the real economy) The idea is that a stablecoin could break the buck.”

Regulators are slow, that person argued. “They saw the Terra structure in 2017; didn’t understand it; and where are the regulators then if everything is a security? Not only did the regulators fail, but the basic due diligence failed as well (vaporware). Since September, I talked to Terra four times; got no answers; **these are red flags I’ve got to believe that someone in the government should have seen.**

An industry leader added questions: “On the risk piece, we’re not addressing systemic risk in stablecoin, it’s just an extrapolation of what US is doing with the dollar? Are we just extending the impact into other parts of the economy that are now going to be dependent on stablecoin? How are we **dimensionalizing?**”

Another industry voice advised caution: “We have to be careful in thinking about systemic risk: contagion into traditional financial markets, interconnectivity that causes damage to the real economy, not just about individual losses.”

CHAPTER 3 DISCUSSION, CONTINUED

Industry then parried:

“Stablecoins also have design flaws of financial architecture; we are talking about Terra because it collapsed. But (here’s a) question: commercial paper, not backed by fiat, then: liquidity; how are we doing stablecoins –they are de-centralized in that they use blockchain but they have a centralized issuer; still not transparent enough.”

“We won’t understand Terra; I agree with (bitcoin developer counsel): the collapse of Terra is an example of something not systemically important –not impactful on markets or overall environment. But agree that different stablecoins are constructed differently.”

“On the earlier point about systemic risk and engineering, the risk management we discuss is about regulation and bad actors, but when engineering isn’t done well.” Citing the Ether transaction in which \$34 million became permanently locked up in a smart contract, he recommended, **“We also need to educate engineers and set up risk protocols. That kind of mistake at a systemic level could be huge and is possible.”**

“Terra was comparably the size of Lehman when it fell. I was at Barclays when they bought Lehman; **I saw the rails rewritten** into a hopefully better way. Decentralized text, by design better solves systemic risk problems, intermediaries and off-ramps (can be designed) so people can participate on their own accord and account for their risk.”

“Do these (open-sourced protocols) regulate risk better? If they’re open-sourced, who’s maintaining them? What incentives make sure these protocols are being handled properly?”

“With \$1B US invested, we shouldn’t dismiss algorithmic stablecoins. Terra was a mistake but shouldn’t cause us to dismiss the system. How did that become a systemic risk? **Sandbox dynamic adds controls...**”

CHAPTER 3: ADDITIONAL INSIGHTS (FROM STICKY NOTES)

Promoting financial stability, mitigating systemic risk, strengthening market integrity.

Terra did not present systemic risk in its current form, but its intention was to become systemically important, through the BTC reserves.

Systemic risk vs. systematic risk. Also, is blockchain insurable?

Anonymous, order *book* retail markets should be subject to market regulation—regardless of whether the assets traded are securities, commodities, or [whatever].

Financial Markets are hostile environments – pegs get challenged “Soros Bank of England; every peg gets changed; (Fiat backed, collateralized, algorithm) will be challenged – someone made money on terra collapse.

What makes a project decentralized? What happens when it is?

What does market integrity or market structure look like with permissionless protocols?

Need for international AML and Blockchain standards. Believe that CFTC has initiated a “Technology advisory community, looking for industry experts to participate (I think).

- Insurable blockchain
- Order book retail markets should be subject to market regulation
- Financial markets are hostile
- Definition of decentralized?
- How to identify market integrity and market structure with permissionless protocols?

[TO TABLE OF CONTENTS](#)

CHAPTER 3 DATA VISUALIZATION

Figure 5. Top 5 chapter 3 ideas by sector

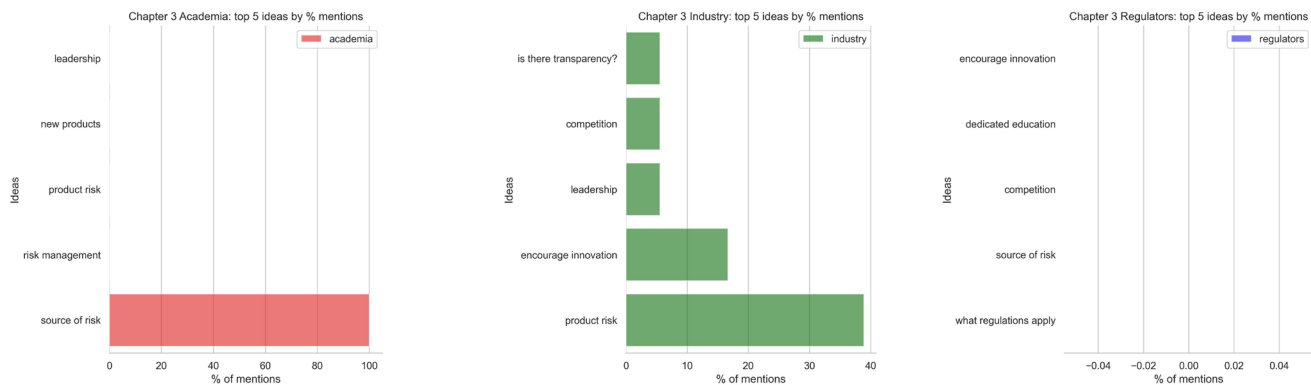


Figure 5. Summary

Figure 5 shows industry representatives focused on the ideas of product risk, innovation encouragement and leadership, while academics provided input on the sources of risk and regulators stayed silent. Industry representation greatly outnumbered academic and regulatory sectors in the discussion.

CHAPTER 3: TAKEAWAYS

“(The) challenge is that digital assets aren’t just a protocol; they are used for payments and investments, which raise additional issues. Innovation by itself is not enough.”

“We also need to educate engineers and set up risk protocols. That kind of mistake at a systemic level could be huge and is possible.”

CHAPTER 3 CONCLUSION

Crypto currency is still segregated, although there is statistical evidence of contagion. The 2018 crypto crash (correlations between assets go up). Before COVID, this regression model showed correlations between stock and crypto prices (was bitcoin acting as an inflation hedge? No inflation in 2018 but an interest rate depression?), and in 2019 the term spread so the yield curve of the bond was inverting (even before COVID we knew that recession was coming).

Click [HERE](#) to read the Chapter 3 Working Group Report.

CHAPTER 4

Fostering International Cooperation and United States Competitiveness (EO Section 8) PLUS Coordinating Regulators (EO Section 3)

Topics strongly identified included education, leadership,

THE EXECUTIVE ORDER STATES:

Sec. 8. Policy and Actions Related to Fostering International Cooperation and United States Competitiveness. (a) The policy of my Administration on fostering international cooperation and United States competitiveness with respect to digital assets and financial innovation is as follows:

(i) Technology-driven financial innovation is frequently cross-border and therefore requires international cooperation among public authorities. This cooperation is critical to maintaining high regulatory standards and a level playing field. Uneven regulation, supervision, and compliance across jurisdictions creates opportunities for arbitrage and raises risks to financial stability and the protection of consumers, investors, businesses, and markets. Inadequate AML/CFT regulation, supervision, and enforcement by other countries challenges the ability of the United States to investigate illicit digital asset transaction flows that frequently jump overseas, as is often the case in ransomware payments and other cybercrime-related money laundering. There must also be cooperation to reduce inefficiencies in international funds transfer and payment systems.

(ii) The United States Government has been active in international fora and through bilateral partnerships on many of these issues and has a robust agenda to continue this work in the coming years. While the United States held the position of President of the FATF, the United States led the group in developing and adopting the first international standards on digital assets. The United States must continue to work with international partners on standards for the development and appropriate interoperability of digital payment architectures and CBDCs to reduce payment inefficiencies and ensure that any new funds transfer and payment systems are consistent with United States values and legal requirements.

(iii) While the United States held the position of President of the 2020 G7, the United States established the G7 Digital Payments Experts Group to discuss CBDCs, stablecoins, and other digital payment issues. The G7 report outlining a set of policy principles for CBDCs is an important contribution to establishing guidelines for jurisdictions for the exploration and potential development of CBDCs. While a CBDC would be issued by a country's central bank, the supporting infrastructure could involve both public and private participants. The G7 report highlighted that any CBDC should be grounded in the G7's long-standing public commitments to transparency, the rule of law, and sound economic governance, as well as the promotion of competition and innovation.

(iv) The United States continues to support the G20 roadmap for addressing challenges and frictions with cross-border funds transfers and payments for which work is underway, including work on improvements to existing systems for cross-border funds transfers and payments, the international dimensions of CBDC designs, and the potential of well-regulated stablecoin arrangements. The international Financial Stability Board (FSB), together with standard-setting bodies, is leading work on issues related to stablecoins, cross-border funds transfers and payments, and other international dimensions of digital assets and payments, while FATF continues its leadership in setting AML/CFT standards for digital assets. Such international work should continue to address the full spectrum of issues and challenges raised by digital assets, including financial stability, consumer, investor, and business risks, and money laundering, terrorist financing, proliferation financing, sanctions evasion, and other illicit activities.

(v) My Administration will elevate the importance of these topics and expand engagement with our critical international partners, including through fora such as the G7, G20, FATF, and FSB. My Administration will support the ongoing international work and, where appropriate, push for additional work to drive development and implementation of holistic standards, cooperation and coordination, and information sharing. With respect to digital assets, my Administration will seek to ensure that our core democratic values are respected; consumers, investors, and businesses are protected; appropriate global financial system connectivity and platform and architecture interoperability are preserved; and the safety and soundness of the global financial system and international monetary system are maintained.

EXECUTIVE ORDER, CONTINUED

Sec. 3. Coordination. The Assistant to the President for National Security Affairs (APNSA) and the Assistant to the President for Economic Policy (APEP) shall coordinate, through the interagency process described in National Security Memorandum 2 of February 4, 2021 (Renewing the National Security Council System), the executive branch actions necessary to implement this order. The interagency process shall include, as appropriate: the Secretary of State, the Secretary of the Treasury, the Secretary of Defense, the Attorney General, the Secretary of Commerce, the Secretary of Labor, the Secretary of Energy, the Secretary of Homeland Security, the Administrator of the Environmental Protection Agency, the Director of the Office of Management and Budget, the Director of National Intelligence, the Director of the Domestic Policy Council, the Chair of the Council of Economic Advisers, the Director of the Office of Science and Technology Policy, the Administrator of the Office of Information and Regulatory Affairs, the Director of the National Science Foundation, and the Administrator of the United States Agency for International Development. Representatives of other executive departments and agencies (agencies) and other senior officials may be invited to attend interagency meetings as appropriate, including, with due respect for their regulatory independence, representatives of the Board of Governors of the Federal Reserve System, the Consumer Financial Protection Bureau (CFPB), the Federal Trade Commission (FTC), the Securities and Exchange Commission (SEC), the Commodity Futures Trading Commission (CFTC), the Federal Deposit Insurance Corporation, the Office of the Comptroller of the Currency, and other Federal regulatory agencies.

Directives and schedules for government reporting are included in the full Executive Order [HERE](#).

CHAPTER 4 DISCUSSION

During this final segment, the assembled discussed the interactions between regulatory entities and practitioners, and the need for coordination among US agencies.

A former regulator opened the discussion with the observation that the world sits at “a thought-provoking moment” on international competitiveness and the development of a global system of regulation. “High-level” conversations are happening, he said, with the SEC inviting people to talk, but these discussions have yet to effect an approach. “Crypto venture capitalists can talk with policymakers in DC but these conversations **won’t help for safe harbor**. He described evidence that some developers are keeping their work offshore in order to avoid US jurisdiction (naming Reddit and Discord). In all, he said, “**Those who are trying to get it right are getting information requests, (but) this makes people feel like they’ll be better off if they avoid the regulators, which is too bad because regulators need insight from people’s experience.**”

An industry representative dismissed the level of discussion between regulators and industry thus far. “I don’t think the regulators and policymakers are walking the walk. We need to push for substantive, lengthy discussion. **These meetings where industry gives a presentation aren’t enough; industry needs to follow on the Executive Order.** Consult with industry, rather than (our) trying to force our way in, asking for substantive helpful conversations, and to shape the conversations. We need to have lengthy conversations; people like us need to be having these conversations, to give solutions to the regulators.”

Another industry representative is optimistic about international cooperation and US competitiveness. “**The obituary of my former project needed to be written in order to take this more seriously. This is not a process in vain: it expands the conversation.** The states will bring some sensibility. California, the fifth largest economy in the world, also has an Executive Order. **It’s a fintech constitutional crisis:** US will win the Web3. Regulatory harmonization (France has licensed Binance; other countries are leaning heavily). **Just because we’re a little late, it’s an advantage. Industry needs to look in the mirror; some aspects of our trade need improvement; industry needs sensible leadership.**”

CHAPTER 4 DISCUSSION, CONTINUED

Former regulator admitted: “It’s disappointing to hear about the challenges of going into our regulatory structure (that’s a step back); CFTC and SEC were open to learning, but in this regard we’ve gone backward. On the international angle, I served at [IOSCO](#) (International Organization of Securities Commissions), and this has been recognized by overseas counterparties. I will say that it’s not always the best approach; the world is looking to the US to lead, and once we have and have set some standards, we can do that. **We need to get our head out of the sand.** Early in the internet, the US leadership was a net-good. Banking would like to stifle this. If we balance traditional-finance with this, it’ll be good for the US. **US should lead first, then sit down. Cooperation later. Further innovation, be open-minded.”**

An industry member agreed with the former regulator. “**Get it right before harmonizing.** If enacted as written, the Solana blockchain goes down, and this would not encourage innovation. We need to think through US leadership, but we also need more detailed conversations. On the Hill, **we need to separate Defi from Cefi,** because custodians might do things differently. Better discussion of crypto asset classes and frameworks for use cases; and then bespoke, targeted changes for DeFi. The **wrong question is: How do we regulate crypto assets?** Our peers are proposing things that don’t work for our models.”

EDITORS’ NOTE: Internationally, it may require the US to lead before harmonizing. But domestically, coordination and communication among regulators and policymakers remain a key issue that the Executive Order aims to explore solutions for. A case in point is that when crypto tax policies and crypto market wash sales rules are not in sync, the efficacy of regulatory actions is severely reduced.

READ MORE: [Tax-Loss Harvesting Using Cryptocurrencies](#)

Cryptography in defense

Another former regulator wanted to re-iterate that decentralized privacy is a “competitiveness and defense issue.” This person said that crypto suffers from being treated as financialization when it’s an infrastructure issue. “The ability to get aid to Venezuelan healthcare workers was because we were able to use cryptography.”

International cooperation and bureaucracy

An academic complained that “International cooperation was a straitjacket, a gesture of the willing-esque, lowering trade barriers and providing an alternative to China’s digital sovereignty firewall. **I associate international cooperation with more bureaucracy,** (but) I think the TPP and digital trade agreement are going to increase the flow, that something in that vein might be productive.”

An industry representative added, “Digital assets are trading around the world. In the US, we participate; FTX (crypto derivatives exchange) has better risk management.”

EDITORS’ NOTE: FTX filed for bankruptcy on November 18, 2022. At the time of this publication, its risk management and other practices are under examination.

A legal expert: Yes, crypto is a comms tech and infrastructure tech, PLUS: it enables convening in so many ways and putting this in a box makes it hard to protect innovation.

DAOs and the Constitution

An industry representative added: Looking at DAOs (Decentralized Autonomous Organizations), in terms of the Constitution: What do you use IFT (interbank fund transfer) for? **This tech crosses borders so fast that how can you control what you need to?** Any ideas on how this gets done?

Another industry member chimed in: On the market infrastructure and 24/7 exchange issue: we’ve helped exchanges to push their infrastructure into the cloud for 24/7 trading. **Tech providers and market can serve as a bridge between traditional exchanges and crypto exchanges.** Until we do that, most institutions will respond the same. Look at the request to change the risk approach and see it competitively. Market participants can help mutualize the cost of moving to 365 trading by a certain date.

[TO TABLE OF CONTENTS](#)

CHAPTER 4 DISCUSSION, CONTINUED

“How does CME participate? Policy makers need to extend, maybe relying on AI and ML on the weekend.”

Former regulator: We live in a democracy. **Industry needs to speak to policymakers (through contributions and conversations).** We should support candidates who support innovation; Congress needs bipartisan (cooperation?) (“party-proof” and well-informed). **This room of experts is struggling to communicate.** We need to give information to Congress; we need to inform Congress in a non-crisis situation to come up with something comprehensive; not be ashamed.

CHAPTER 4 CONCLUSION

In closing the Chapter 4 discussion, the industry facilitator offered insight.

“I’m thinking about the delusion of transparency, how hard this is to understand. As we proceed, in the interest of dispelling the myth of transparency, we should remove the pertinent and **make it understandable for the layperson.** I’m also struck by the conversation on **regulation as a tailwind or activity-based regulation;** it can be built in so many ways.”

Ultimately, she concluded: “How can we envision a system that can pivot as fast as it will need to, envision a flexible, elastic innovation, moving in real-time, tech can go 24/7; how can we create the right regulatory structure?”

CHAPTER 4 TAKEAWAYS

1. Process needed for industry to help regulators;
2. Legislators and agencies both need to have open minds and sync;
3. industry follow-through on the EO is required;
4. DeFi and CeFi need to be clarified legislatively.

“My big takeaway is: how does this industry help regulators?”

“People on the Hill have a more open mind, but the agencies need to start embracing it.”

“These meetings where industry gives a presentation aren’t enough; industry needs to follow on the Executive Order. “

“On the Hill, we need to separate Defi from CeFi, because custodians might do things differently.”

“TradFi needs to learn from crypto in protecting us from risk.”

CHAPTER 4 ADDITIONAL INSIGHTS (FROM STICKY NOTES)

Define technical standards. They matter and should be agreed to.

Think about consumer.

- Crypto is an infrastructure tech.
- It is a communication tech.
- It is a tech that enables a convening.

Where do Decentralized Autonomous Organizations (DAOs) fit in?

- Education needs to inform regulation AND architecture engineering.
- Education and regulation should focus on activities/goals, NOT entities.
- Need plain talk explanations of DeFi, digital asset classes.

Could we look at FX Market for some lessons learned and insights on regulating 24 x 7 market? Getting policy decisions correct (right-sized, activity-based, and differentiating DeFi vs. CeFi) in the US is the prerequisite to international harmonization. But, the US should not let other regions create ill-advised standards. Don't rush and don't let the EU steamroll the US.

Lack of clear standards for ownership and custody of digital assets. Make public the mechanism behind stablecoins.(Need transparency; are they really 1:1 fiat collateralized as promised?)

The key issue with systemic risk is how integrated the asset is. As digital assets are embraced by institutional investors and companies, the risk rises exponentially.

How can the academy bridge any of the communications gaps, through research or other means?

CHAPTER 4: DATA VISUALIZATION

Figure 6. Top 5 Chapter 4 ideas by sector

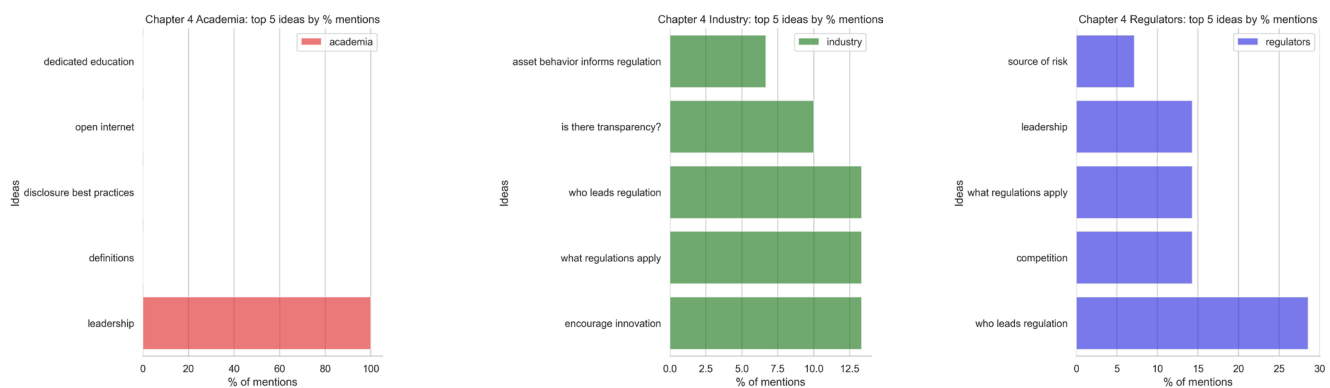


Figure 6. Summary

Industry and regulatory representatives contributed vigorously to the discussion of international cooperation and US competitiveness. The former group's top three ideas are innovation encouragement, what regulations should apply, and who should lead in regulation, while the latter focused more on who should lead in regulation, what regulations should apply, competition and leadership. Regulation-related ideas were important to both the industry and regulatory groups, while both the regulators and the academics paid attention to US leadership in the space.

[TO TABLE OF CONTENTS](#)

EVENT CONCLUSION

The event organizer closed, expressing hope that the ensuing working groups would stay involved.

“The only wrong answer is to stop everything. This tech is broader than financial assets. Other applications for other industries might be helpful: maybe verified communications is an easier application than De-finance; maybe finance is too. This is a technology that can be used for other things. Think outside the politically-antagonizing finance box.”

[TO TABLE OF CONTENTS](#)

APPENDIX

[WORKING GROUP REPORT FOR CHAPTER 1](#)

[WORKING GROUP REPORT FOR CHAPTER 2](#)

[WORKING GROUP REPORT FOR CHAPTER 3](#)

[OTHER GRAPHS - MENTIONS BY SECTOR](#)

[LINKS TO GOVERNMENT REPORTS](#)

[CORNELL CONVENES GROUP PRE-READS](#)

[RETURN TO REPORT TABLE OF CONTENTS](#)

A model for regulatory disclosure of Digital Assets

Working Group Report for Chapter 1

Susan Joseph, Cornell University

With contributions from other Working Group members

The publication of a whitepaper in 2008 by Satoshi Nakamoto introduced the idea of digital assets as a new model for finance that aimed to disrupt and rectify many of the challenges of the existing model through a decentralized approach delivering real time settlement. Fifteen years on, the market for digital assets has grown to billions and has garnered the attention of global regulators, institutional finance, and consumers. In the United States, the President issued an Executive Order regarding Digital Asset policy in March 2022 which moved the discussion forward among agencies, academics, politicians, the financial sector, and technologists. Digital assets are here to stay. The question is how will they be treated? Have we finally hit the tipping point where this new model driven by a technology called blockchain disrupts the legacy model? Depending upon who you ask, the answer may be “yes,” “no,” or somewhere in between. Regardless of your thoughts there is no doubt that this new model will force change to the status quo creating opportunities while disrupting many legacy businesses. Regulatory disclosure is one of the areas that these authors believe will need to evolve to keep pace. This document focuses on potential regulatory disclosures for digital assets and the benefits that the new digital asset disclosure models could bring to the ecosystem, investors, regulators and issuing entities.

Today’s regulatory framework for financial products regulated by the SEC or the CFTC is largely rooted in a depression-era framework based upon the most advanced technology of that day, paper documents. The disclosure process for securities, for example, encompasses many steps, beginning with the mandatory production of documents that provide information about the securities being issued, and the entity that issued the securities, including the business strategy, management team, financial performance, and a host of other information. Once filed with the SEC, these documents are reviewed to ensure that the disclosure document complies with the relevant rules and does not contain any material misstatements.

Leap forward to today and looking ahead, digital assets have introduced a real time world, where money movement and trading happen 24x7, where data is instantly available driving artificial intelligence (“AI”) based decisions, and unfortunately the regulatory framework cannot keep up. A review of the current approach highlights that the model is not aligned with digital assets and ongoing technology advances, creating risk for markets and for investors. This is a serious problem. And we have tools to fix it.

There is a better model and it begins with data and blockchain technology

The vast majority of regulations are built around a similar desire - to protect investors and to facilitate efficient markets. So it makes sense that we would start at the same place with

TO APPENDIX TABLE OF CONTENTS

new technologies. The question is: how do we best protect investors and facilitate efficient markets in a 24/7 digital asset world?

The answer is to leverage the underlying foundation of digital assets to provide them with easy-to-understand information that they need to make timely decisions. As we stated earlier, traditionally this information has been provided in the form of documents; in today's digital asset ecosystem, the information needs to be provided to investors through channels that they can easily consume, starting with digital data ("ddata") that can be delivered through technology, such as apps and digital wallets, as well as in paper formats for investor who prefer to consume information offline. Ddata unlocks the inefficiencies of the current system by separating content from presentation. A ddata driven approach enables information to be consumed in a variety of ways based upon the needs and interest of the consumer. For institutional and professional investors this may be in the form of ddata powered models. For retail investors this can be in the form of disclosure that is personalized to their specific needs by combining the ddata with information about the investor, their goals, their account, and the market in general.

How do we make this happen?

We need to reimagine our approach to regulatory disclosure when dealing with digital assets. In doing so, we need to define what regulatory disclosure must provide in this case, specifically:

1. **What** information should be disclosed by issuers of digital assets and how often?
2. **Where** should the information be disclosed?
3. **How** should stakeholders (including investors) be notified of new disclosure?
4. **What** information should be presented to investors?

Let's look at potential answers to each of these questions

What information should be disclosed by issuers of digital assets and how often?

Going back to the current system, categorizing asset classes evolved to a rather straight forward scheme. We have equities, funds, derivatives, and commodities, each of which logically fall into a regulatory regime overseen by the SEC and the CFTC. The advent of digital assets has thrown a wrench into the traditional categorization schemes and many question how or if digital assets fit within the existing scheme. For instance, are digital assets currencies, securities, or commodities? Are they none of these things or a combination of all of these things? While these are important questions, for purposes of disclosure the more important question is this, how do we create a disclosure regime that is flexible enough to recognize the information being disclosed will vary greatly from asset to asset?

Let us start with a list of questions that disclosure should answer.

1. Strategy & Success - What is the underlying purpose or strategy the digital asset is attempting to solve for and how can success be measured?

[TO APPENDIX TABLE OF CONTENTS](#)

2. Risks - What are the underlying risks associated with the digital asset class and what attributes can we use to measure that risk?
3. Holdings - How widely held is that digital asset class and what is held by insiders?
4. Governance - How are decisions being made? Who is making the decisions?

Strategy & Success

Today in the equity markets, at listing a company files a registration statement with the SEC and is required to provide updates regarding their business, financial performance, and other information on a quarterly basis. We can draw a parallel within the digital asset space, specifically regarding tokens, where the registration statement has been replaced by a whitepaper that describes the purpose of the asset represented by the token, a description of the underlying technology supporting the asset, the tokenization model and information regarding monetization. Unfortunately, these whitepapers vary in structure, information offered, and standards followed, so it is hard to generalize regarding what is being disclosed, and it is certainly hard to compare token offerings where no real standards exist for disclosure.

Moving forward, this information needs to meet agreed upon disclosure standards and be updated on an ongoing basis - taking into account changes to the strategy, modifications related to tokenization/monetization and provide an understanding of the changes that have been proposed and executed on the underlying protocol (technology). Based upon the structure of the issuer, this should be extended to include information related to governance (e.g. details on proposals and voting).

Risks

Risks associated with digital assets will vary greatly dependent upon the type of asset. For instance, in the Stablecoin space, information related to the underlying collateral supporting the asset will be of significant importance. For a Cryptocurrency, information related to changes to the protocol, volume of transactions and so on will be important. These factors should be defined, meet agreed upon standards, and made known. Furthermore, this information should be codified into an extensible ontology that replaces the document with tagged data and information.

For traditional assets like equities, funds and derivatives we already have an ontology of data that issuers are required to file (provide) at various times dependent upon rules. Dependent upon disclosure type, this data is provided in a combination of formats ranging from data (XBRL, XML) to documents. This disparity often results in information being packaged in a document format, which eliminates the ability to specifically tailor the presentation to the needs of the Investor. We can learn from this, and recognize that if the data was codified into an extensible ontology with tagged data and information, the approach would offer better protection for investors and consumers. This better approach that defines the complete ontology of data elements required and is updated on an ongoing basis throughout the year based upon changes and audits to the information

TO APPENDIX TABLE OF CONTENTS

could be set up in a system that pushes understandable and relevant disclosure elements to the investor.

For new asset classes such as Cryptos, NFTs, DAOs and beyond we need to start with the creation of ontologies that are generally accepted as the standard that define what information is needed by regulators, investors, and stakeholders to truly understand how to value the asset. This will vary greatly by asset class and even within the asset class based upon the specific asset.

Where to start? Rather than focus on specifics let's start with a list of categories which not surprisingly look somewhat familiar

Category	Traditional Asset Description	Digital Asset Description
Strategy	Description of Business	Whitepaper
Performance	Financial Statements	Gas Fees, KPI Metrics, <i>Valuation (NFT)</i>
Economic	Number of Shares	Tokenomics (#, Deflation, Inflation, ...) <i>Pegging Strategy (Stable Coins)</i>
Holder	Founders, Insiders, Investors	Founders, Insiders, Investors
Holdings	Assets Held and by Whom	Assets Held and by Whom
Exchanges	Listing Exchange	Listing Exchange(s)
Governance	ESG, Proxy	Governance Rights Model, ESG, DAO
Audit	Financial	Tokenomics and Protocol Changes
Risk	Description of Risks	Description of Risks

The key difference between traditional and digital asset classes will be in the identification and tracking of KPIs. These metrics which will vary from project to project, will provide a list of data elements that can be used to determine success against the strategy of the project. While some of these may be financial in nature, others may not be, providing a deeper understanding of how the project is being managed.

Further, certain information such as token prices are available on-chain 24/7 for everyone to see and act upon. Many argue that this is a transparent characteristic of these types of assets and as such provides more information to consumer (versus traditional assets). These authors believe that this type of transparency is only part of the story and is not enough to fill the asymmetry gap and protect consumers. In concert with the transparency, it is incumbent that other disclosures beyond on chain information are provided in near real time to understand the full picture of the assets.

Key question 1: Where should the information be disclosed?

Today regulatory disclosure information for traditional assets is typically made available through a consolidated system (EDGAR, EMMA, SEDAR, ...), published on a website, or distributed to stakeholders directly. While in some cases this information is in the form of structured data, in too many cases the information is in the form of a document making it difficult to access the underlying data for analysis and/or context.

Re-thinking how disclosure should work for digital assets starts with a better approach. Imagine structurally what disclosure submissions would look like if they were designed around several principles as set out below; Disclosure should:

1. Be in a structured data format (XML, XBRL, JSON, ...)
2. Separate data from presentation (presentation should be handled as part of the push notification process)
3. Be transparent and accessible through API interfaces and published as an event

Given the nature of digital assets, one such solution for disclosure would be to utilize blockchain to create an enumerated trail of auditability for all stakeholders. In this model issuers of digital assets would be required to file disclosure on a public blockchain. This disclosure would include referential information making it easy to understand what issuer and what disclosure is being provided and a list of data attributes in an agreed upon data format. Said differently, the submittal of this data to the blockchain would satisfy digital asset disclosure requirements.

Once items have been filed on the blockchain, transparency of the disclosure would be immediate and such events would trigger notification to holders of the asset.

Key question 2: How should stakeholders (including investors) be notified of new disclosure?

One of the many benefits of open technologies is that they enable the concept of event handling. Essentially, platforms can subscribe to various events and be notified when they occur. In this proposed model, stakeholders would subscribe to event handlers that would notify them of the availability of new digital asset disclosure from the issuer.

While investors would have the ability to subscribe to these events directly, it should be expected that most will expect this to be a service that will be provided by their digital asset broker, bank, custody / wallet provider and others. As such it will be necessary for regulators to define standards for disclosure presentation to ensure that investors receive pertinent information in a timely manner. These presentation rules will then be applied to the data to create something new, a Smart Disclosure.

Key question 3: What information should be presented to investors?

Today regulators have attempted to create disclosure regimes with the intention of educating investors and providing them with the information they need to make decisions. Unfortunately, in too many cases this has not been the case. Disclosure documents have become full of legal jargon and risk avoidance language that make it difficult for investors to understand or to apply the information to themselves. In a data driven model that is applied to digital assets, we have the opportunity to change that and not only ensure investors have access to information but context that highlights what the data means to them.

This Smart Disclosure should be accomplished by combining data elements provided by the issuer with information about the investor, their account, their other holdings, and market conditions to present the recipient with context. Some examples:

- Stablecoin disclosure that provides insight into the underlying assets backing the coin and how inflation / deflation can affect returns and stability
- Crypto project disclosure that provides insight into the effect governance decisions have had on the protocol
- Token content that provides not generic expense and preference information, but specific information based upon the investors position

Holdings

Inherent within the Digital Asset ecosystem is a level of transparency available on chain that provides a real time understanding of who holds every asset at a given moment. Unfortunately for the purposes of regulatory reporting and fortunately for purposes of data privacy, the information on chain only provides the wallet address of the underlying holder. Said differently while we know which wallets hold the underlying assets, we have no idea who the owner of the Wallet is.

Within the traditional asset space (e.g. equities) this has been solved through disclosure events that provide insight into insider and significant investor holdings and transactional activities. While an option for digital assets, given the transparent and real time nature of these assets, a better solution would be to require insiders, stakeholders and partners to make their wallet addresses public. This would enable real time analysis of coin/token issuance and “fee” flow and any anomalies to be immediately identifiable.

Governance

Given that transparency and decentralization is at the core of digital assets the ecosystem has created a model for governance that not only facilitates participation but rewards it. That said not every digital asset facilitates the level of transparency that investors and consumers should demand. With that in mind it becomes important to define standards that answer key questions:

- Structure - what is the structure of the various entities participating in the digital asset?

Today many digital assets are issued through a three-party system that includes the underlying protocol, which is maintained by the community, a foundation which facilitates the growth of the community and the creation of applications on top of the protocol and a lab/corporate entity which was the original creator of the protocol.

While this model has resulted in a tremendous amount of innovation in a very short period of time, it can be difficult to understand the relationships and potential monetization / rewards taking place between the parties. To eliminate questions

TO APPENDIX TABLE OF CONTENTS

and ensure confidence in the assets, at listing issuers should explain these relationships, report how funds move between these entities and report any changes on an ongoing basis.

- Amendments / Changes - how are decisions being made, who gets to participate in the decision making process, and how can we be sure decisions are followed?

As highlighted throughout this document digital assets and blockchain technology provide a level of transparency that has not easily been achieved in the past. This is as true for real time transaction flow as it is for how decisions are made and providing insight into the results of those decisions. Today many digital assets use this model to enable the community to propose changes to the protocol, tokenization models, partnership concepts, and fee structures.

This approach provides access to those holding tokens / coins to forums where they can present ideas, discuss and vote in an on chain manner that is auditable and understandable. Beyond voting, chains are being used to provide status of decisions enabling all stakeholders insight into the development of new features, enhancements to tokenization models and so on.

Unfortunately, some digital assets choose to perform governance off chain providing little insight into how decisions are being made and the impact of those decisions. It is the view of the authors of this document that all governance decisions including conversational components, voting and status reporting be provided on chain in a transparent manner.

One outstanding question is how to ensure that the changes being suggested have been implemented as discussed. While technologies such as game theory and supercomputing can help to ensure compliance initially, a model supported by third party attestation and/or audit may prove to be the simplest approach.

Conclusions

Digital asset classes have created significant excitement among investors, industry participants and regulators. With a defined goal of making it easier for consumers to participate within the financial ecosystem, the interest is understandable. The next step for regulators and industry participants will be to create a regulatory regime that protects consumers/investors while not derailing innovation. The question becomes how?

In the view of the authors of this document it starts with the creation of first principles which can drive both the industry and regulatory rule making process forward.

First Principles of Regulatory Disclosure for Digital Assets:

[TO APPENDIX TABLE OF CONTENTS](#)

1. On Chain and Off Chain data - digital asset disclosure will be made up of both on chain (readily available) and off chain data (provided by the issuer).
2. Filed - Off Chain data should be filed on a defined basis through an appropriate on-chain mechanism
3. Tagged Data - Disclosure should be in the form of tagged data which will then be combined with on chain data to feed presentation templates
4. Disclosure should be engaging and easy to understand - Presentment of data should combine on-chain, off-chain (filed), and information about the holder to provide context as to what the disclosure means to the recipient
5. Pushed Notification - Notification should be pushed to the individual holder through appropriate digital means, delivery audit should be on chain
6. Right to Privacy - Holders of assets have a right to privacy and should not have to share their PII data (name, address, ...) with issuers of assets to facilitate disclosure activity
7. Disclosure should be continuous - Disclosures should be made when there are material developments w/r/t the digital asset.
8. Literacy - Disclosure should reinforce financial literacy by connecting the holder to resources that can define underlying terms

While these principles are likely to be extended over time, we believe beginning with a list that all stakeholders can refer to as rules and processes are developed provides alignment and further protects stakeholders.

Chapter 2: Limiting Illicit Finance and Associated National Security Risks (EO Sec 7)

Sarah Kreps, Cornell University
Michelle Frasher, Moody's
J.P. Mohler, Cooley LLP

Summary: Crypto is an emerging technology that poses national security concerns. In order to map the risks, we need to understand how it works and how it's used. We then can think about the possible national security risks and possible regulatory measures that might mitigate those risks. In other words, the use cases help us understand the misuses, so these uses are the point of departure. We identify three

- Direct payments that allow individuals to make payments for goods and services pseudo-anonymously.
- The use of networks that allows one set of transactions to contaminate another.
- The development of sections of crypto built from the ground up made just for illicit purposes.

These features of crypto offer a starting point in terms of contemplating the range of national security risks ranging from nuclear proliferation to counterterrorism funding to sanctions evasion.

How it Works

1. **Direct payments:** The virtue of crypto means that individuals can make payments in pseudo-anonymous ways. That feature also makes the pseudo-anonymity a potential vice, as exhibited by the large amount of fraud in crypto, which presents both a consumer protection concern but also concerns in terms of individual users seeking to transfer funds for illicit purposes.
2. **Networked transactions.** There are many platforms in which more than one payment can be exploited. Luna is a good example, where \$2 billion was extracted at once and hundreds of millions of that sold. The mechanism that allows exchanges between luna and TerraUSD (UST) could not keep up, investors lost confidence, and the currency crashed, leading to the loss of confidence in many other cryptocurrencies. The case points to economic risk of these networked transactions. The risk may not be systemic because of the comparatively low amount of crypto in the system as a whole, but is not negligible. Stable coins present more of a vulnerability because they are locked to a fiat, making sovereign states more vulnerable.

[TO APPENDIX TABLE OF CONTENTS](#)

3. **Illicit-only crypto.** A small section of crypto is built from the ground up and made for illicit purposes. Tor system built on the internet, for example, but is entirely separate from the protocols used for the internet. In this case, Chainalysis will not be very successful because it cannot tap into this unregistered, completely unknown area. “We are at a deafening pace developing technology that can be wholly reappropriated.”

What are the Potential National Security Risks?

Several national security risks are associated with cryptocurrency technology. In particular, the pseudo-anonymous nature of the exchanges mean that illicit networks can transfer funds to support domestic extremist groups, terrorism, engage in financial fraud, support illegal nuclear weapon development violating nonproliferation protocols.

Another scenario to explore as a future possibility is that as cryptocurrencies become more integrated into the economy, the risk of market manipulation and fraud exposes financial markets to economic volatility.

The crypto platforms and pseudo-anonymous transactions create interactive risk compared to social media transactions that are somewhat track-able. Malicious actors can use decentralized networks to move funds without as easily being identified.

What are the Regulatory Responses?

Momentum post-Luna has shifted away from “light touch regulation” and the SEC appears to be willing to use every tool at its disposal to ensure that at least anyone registered in the US is towing the line. Although illicit actors do have loopholes identified above, some of the same regulations that would address consumer protection will also aid in preventing the illicit activities as well. In particular, Know Your Customer (KYC) enables understanding customers’ activities and legality and the likelihood that they pose risks. These measures are sensible for consumer protection and as guardrails against illicit, national security risks.

Working Group Report for Chapter 3:

Promote financial stability, mitigate systemic risk, strengthen market integrity¹

Caroline [Blanck](#), Stanford University
Irina [Marinescu](#) Supermodular
Qihong [Ruan](#) Cornell University
Lee A. [Schneider](#) Ava Labs
Artem [Streltsov](#), Cornell University
Cristiano [Ventricelli](#), Moody's
Nancy [Wojtas](#), Cooley

Introduction

Covering a topic as broad as financial stability, systemic risk and market integrity more properly requires a book series with chapters by prominent authors looking at digital assets and their markets from different perspectives. Moreover, given the nascent nature of digital assets and their various marketplaces (centralized, decentralized and various stages in-between), any such chapters would of necessity focus on limited data sets. We have been much less bold.²

This chapter takes a discrete look at certain information and data concerning lending markets utilizing digital assets and how they functioned during the recent broad market downturn in asset prices in Q2 of 2022 (the “Downturn”).³ We chose to focus on lending markets because they are by some metrics among the most mature in the digital asset space⁴, and thus might be top of mind for constituents of Treasury and FSOC who are rightly concerned with financial stability, systemic risk, and market

¹ The authors: Caroline [Blanck](#) is a law student at Stanford University Law School. Irina [Marinescu](#) is General Counsel of Supermodular (formerly Gitcoin). Qihong [Ruan](#) is an Economics PhD student and a Fintech@Cornell Student Fellow at Cornell University. Lee A. [Schneider](#) is general counsel at Ava Labs. Artem [Streltsov](#) is a Finance PhD student at the Johnson Graduate School of Management, Cornell University, and a Fintech@Cornell Student Fellow. Cristiano [Ventricelli](#) is a Vice President and analyst at Moodys. Nancy [Wojtas](#) is a partner at Cooley. This chapter represents the individual work of the authors and expresses only their personal views.

² We also note that digital asset venues, smart contracts and other software have been subject to hacks, malfunctions and a variety of other standard software mishaps, none of which this chapter attempts to identify, discuss or explain.

³ There are many types of digital assets, because tokenization can be utilized to create a digital representation of any bundle of rights, asset, item, information or thing. For further discussion of this point, please refer to [A “Sensible” Token Classification System](#), by Lee A. Schneider (available [here](#)). Moreover, there are many ways in which digital assets can be utilized and many different marketplaces for digital assets beyond the lending platforms. This chapter’s aims remain modest and therefore it does not identify, discuss or explain other types of use cases or marketplaces, or analyze individual digital assets or classes of digital assets.

⁴ See Consensus DeFi Market Commentary June 2022 (available [here](#))

integrity. We chose to focus on the Downturn given recency and relative availability of data. We acknowledge this is a limited aperture. In reviewing the lending markets, this chapter focuses on four participants, two of which we characterize as “centralized finance” (“CeFi”) (BlockFi and Celsius) and two of which we characterize as “decentralized finance” (“DeFi”) (Aave and Compound).

We begin with a section on definitions to level-set how we use key terms throughout this chapter. We next provide narrative descriptions of each of the aforementioned four chosen projects and how they performed during the Downturn, including responses each mounted (or not) to volatile market conditions such as the Terra LUNA death spiral⁵. A summary of various quantitative data sets follows to provide an objective lens for the analysis. We conclude with learnings and next steps that might be explored and possibly helpful to Treasury, FSOC and other stakeholders.

We conclude as follows: *First*, the DeFi platforms overall functioned in accordance with their disclosed programming, which sometimes meant programmatically and efficiently calling additional collateral or liquidating positions. This approach resulted in fairly orderly markets that were seemingly reliable and predictable in their functioning and did not result in any bankruptcies or bailouts. *Second*, the CeFi platforms seemingly did not fare as well but are difficult to assess given comparative opacity to DeFi protocols.⁶ *Third*, retail users and traders suffered statistically significant contagion from the 2018 crypto crash but did not apparently do so as a result of the Downturn. Collectively, these findings at first blush support the view that programmatic, transparent platforms like DeFi protocols can effectively promote stability or at least ringfence runaway volatility, reduce risk and strengthen markets (within their perimeters), subject to the caveat that we have analyzed a limited sample set and discrete event timeline.⁷

Our broader conclusion points to the need for more dedicated and robust research and analysis, particularly from a quantitative standpoint. To meet the Executive Order’s designs, we recommend that markets regulators such as banking regulators, commodities regulators and securities regulators, launch research projects with this

⁵ “‘Everything Broke’: Terra Goes From DeFi Darling to Death Spiral”, *Bloomberg*, May 11, 2022 (linked [here](#))

⁶ Our assessment of CeFi platforms is admittedly limited by their comparative lack of transparency.

⁷ As regards systemic risk and impacts on the market from Terra’s implosion specifically, we present several data analyses that point to a lack of systemic risk but nevertheless indicate that it had an impact on players across various sectors. Certain other possible scenarios might have resulted in greater or lesser impacts. None of these predictions can reasonably be called “conclusions” as the analyses were discrete and limited in nature. It is safe to say, we believe, that Terra was not so ingrained in people’s holdings as to have resulted in anything approaching a systemic impact and its inherently limited size and scope due to lack of adoption of both Terra itself and digital assets more broadly helped dampen the impact.

focus. We also encourage the academic community, think tanks, and the private sector to get involved. With the transparency of blockchains and open-source code, as well as the public information that will accumulate in bankruptcy filings, liquidation proceedings, and the transactions associated with the CeFi projects that experienced stress, there should be ample data. Hopefully this small attempt will presage much broader engagement by true experts.

I. Definitions

We provide certain definitions in order to ensure that our usage of certain key terms is explained. This list is not intended to be exhaustive and we encourage all stakeholders to provide clear definitions in their work.

CeFi: centralized finance, or the operation of financial protocols (i.e., rule sets) or primitives to achieve financial or economic ends (e.g., trading, hedging, lending, etc), in each case dependent upon a centralized intermediary for information and coordination. For example, a bank has visibility into all depositor accounts in order to assess individual risk and price loans across the entirety of its portfolio.

Custodial vs. Non-custodial: used in relation to digital asset wallets, the terms refer to whether such assets are intermediated by a custodian or not, respectively; given private keys determine control over digital assets, a custodial wallet conveys that control to a third-party custodian, whereas a user retains sole control over his or her own private keys when storing digital assets in a non-custodial wallet.

Digital assets: we refer to the Executive Order⁸ definition but wish to note that “cryptoassets” might be a more precise terminology due to the encryption required to achieve uniqueness on public (rather than private, centralized) databases.

Decentralized: lacking a single point of failure, single source of truth, or single authority capable of or responsible for making changes to data committed to a database.

DeFi: Take traditional financial services, distill them into their component rule sets (e.g., if loan to value ratio declines below a pre-agreed level, then liquidate), and commit those rule sets via self-executing code to Decentralized networks accessible to anyone with a computer and internet connection.

⁸ Executive Order on Ensuring Responsible Development of Digital Assets, March 9, 2022 (linked [here](#)).

DeFi protocol: A particular DeFi application deployed on a blockchain with open source code that has specific financial functionality such as lending or trading Digital Assets.

Lending platform: a digital venue offering borrowing and lending solutions.

Smart Contract: “a computerized transaction protocol that executes terms of a contract. The general objectives of smart contract design are to satisfy common contractual conditions (such as payment terms, liens, confidentiality, and even enforcement), minimize exceptions both malicious and accidental, and minimize the need for trusted intermediaries. Related economic goals include lowering fraud loss, arbitrations and enforcement costs, and other transaction costs.”⁹

II. Use Cases Examined

A. Aave

Aave styles itself as “a decentralised non-custodial liquidity market protocol where users can participate as depositors or borrowers. Depositors provide liquidity to the market to earn a passive income, while borrowers are able to borrow in an overcollateralised (perpetually) or undercollateralised (one-block liquidity) fashion.”¹⁰ At a basic level, the protocol is a smart contract launched on various ethereum virtual machines, including Ethereum itself and Avalanche. The borrowing and lending features are accomplished through the use of pooling, whereby lending interest in a particular digital asset is pooled together such that borrowers interact with the pool rather than a specific lender.¹¹ From an accounting standpoint, the loans are recorded in tokenized form, which renders bookkeeping transparent and auto-traceable. This transparency in turn also facilitates trading, which improves borrower access to credit.¹²

Liquidations occur based on a so-called “health factor”, which assesses the loan-to-value ratio and other indicators to determine how actual collateralization of a loan measures against minimum collateralization requirements set by the smart contract. A health factor below 1 will trigger the liquidation process, and the severity of the liquidation will depend on how low the health factor has declined. There is also a

⁹ From Nick Szabo, Smart Contracts, 1994, (linked [here](#)).

¹⁰ Aave website, *Introduction to Aave* FAQs no. 1 (linked [here](#)).

¹¹ Aave white paper, p.1 (linked [here](#)).

¹² See for instance “The Effects of Information on Credit Market Competition: Evidence from Credit Cards” (Oct. 2019) (linked [here](#)) . See also “Greater Transparency on Hidden and Distressed Debt Can Reduce Global Financial Risks and Support Recovery”, The World Bank (February 15, 2022) (linked [here](#))

liquidation penalty payable at rates depending on the asset. Liquidation can be avoided by posting additional collateral or repaying some or all of a loan.¹³

Aave has various other features. A quantitative analysis of how Aave functioned during the Downturn is presented in Section III below.

B. BlockFi¹⁴

1. Company and Product Overview

Founded in 2017, BlockFi Lending LLC (together with its affiliates, “BlockFi”) is a financial technology company founded to provide credit services to markets with limited access to simple financial products¹⁵, including specific access to credit for digital assets. Its product offerings include, *inter alia* (a) a bank account-styled custodial wallet, which users can use to exchange, lend and borrow digital assets, (b) crypto-backed loans and (c) a credit card that yields rewards in digital assets.

BlockFi’s main source of revenue is BlockFi Interest Accounts (“BIAs”)¹⁶, whereby customers could lend digital assets to BlockFi in exchange for which BlockFi would pay monthly interest rewards in digital assets. BlockFi achieves this return by rehypothecating said customer digital assets to third parties (such as institutional market participants or corporate borrowers) in order to generate yield. As of December 2021, BlockFi held approximately \$10.4 billion worth of BIA assets across such wallets with almost 600,000 BIA investors.¹⁷ As of February 14, 2022, BlockFi was no longer allowed to transfer supported digital assets to a BIA in the United States.

BlockFi does not offer FDIC insurance or similar protection on BIAs¹⁸.

2. SEC Settlement Order

¹³ Aave website, *Liquidations* FAQs (linked [here](#)).

¹⁴ Notwithstanding the settlement with the SEC discussed herein, BlockFi has yet to file a registration statement or other public company reporting documents, including financial statements. As a result, the information included in this section is based on public statements by BlockFi and its personnel but has not been independently verified.

¹⁵ BlockFi Mission (linked [here](#))

¹⁶ “The BlockFi Business Model - How Does BlockFi Make Money?”, ProductMint (linked [here](#))

¹⁷ “In the Matter of BLOCKFI LENDING LLC”, SEC (February 14, 2022) (linked [here](#))

¹⁸ BlockFi BIA (US) terms (link [here](#)); Terms of service explicitly provide that “Digital currency is not legal tender, is not backed by the government, and crypto accounts held with BlockFi are not subject to FDIC or SIPC protections..”

In February of 2022¹⁹, the SEC charged BlockFi Lending LLC with (a) failing to register BIAs under the Securities Act of 1933 (as amended, supplemented or otherwise modified from time to time, the “**Securities Act**”) as offers and sales of securities and (b) violating the registration provisions of the Investment Company Act of 1940, insofar as BlockFi’s issuance of BIAs amounted to its operating an unregistered investment company.

According to the settlement order, beginning in March of 2019, BlockFi offered and sold BIAs to retail customers as investment opportunities. The SEC found that the BIAs were securities based on two theories: first, that they were “notes” under *Reves v. Ernst & Young*²⁰, 494 U.S. 56, 64-66 (1990), and second, that they were sold as investment contracts under the so-called *Howey Test*.²¹ According to the SEC’s *Howey* analysis, because BlockFi borrowed crypto assets in exchange for a promise to repay with interest,

“[i]nvestors in the BIAs had a reasonable expectation of obtaining a future profit from BlockFi’s efforts in managing the BIAs based on BlockFi’s statements about how it would generate the yield to pay the BIA investors interest...BlockFi offered and sold the BIAs to the general public to obtain crypto assets for the general use of its business, namely to run its lending and investment activities to pay interest to BIA investors, and promoted the BIAs as an investment.”

Because BIAs were securities and BlockFi promoted the BIAs as an investment, the SEC found that BlockFi violated Sections 5(a) and 5(c) of the Securities Act by offering and selling securities without a filed registration statement. Furthermore, the SEC found that, because BlockFi acted as an issuer of securities engaged in the business of investing, reinvesting, owning, holding, or trading in securities and owning investment securities, BlockFi had operated as an unregistered investment company. In addition to offering unregistered securities, the SEC found that BlockFi had committed securities fraud in violation of Sections 17(a)(2) and 17(a)(3) of the Securities Act by making materially false and misleading statements on its website concerning the risks associated with BIAs and its lending activity.

¹⁹ “BlockFi Agrees to Pay \$100 Million in Penalties and Pursue Registration of its Crypto Lending Product”, SEC (February 14, 2022) (linked [here](#))

²⁰ “In the Matter of BLOCKFI LENDING LLC”, SEC (February 14, 2022) (linked [here](#))

²¹ *S.E.C. v. W.J. Howey Co.*, 328 U.S. 293, 66 S. Ct. 1100, 90 L. Ed. 1244 (1946). An “investment contract” is a type of security under the definitional provisions of the Securities Act. It was definitively defined by the Supreme Court in 1946. For one view on the proper reading of the Supreme Court case, see “Oranges Are Not Securities. And Neither Is SOL” by Lee A. Schneider, available [here](#).

As a result of the aforementioned order, BlockFi agreed to pay a \$50 million penalty to the SEC, \$50 million in fines to 32 state regulators to settle similar charges, cease its unregistered offers and sales of BIAs, bring its business within the provisions of the Investment Company Act within 60 days, and register offers and sales of BIAs under the Securities Act.

BlockFi has since begun complying by carrying out a Section 3(a)(9) securities intercompany exchange, as disclosed in its April 2022 Form T-3²², as a result of which (a) existing BIAs enjoy an exemption under the Trust Indenture Act, though BIAs offered to US retail customers will cease yielding variable interest, and (b) no new BIAs will be offered to US retail customers.

3. What happened to BlockFi during the Downturn

BlockFi discharged approximately 20% of its 850 employees²³ and increased interest rates on its loans²⁴, citing a “dramatic shift in macroeconomic conditions”²⁵ and a need to “achieve profitability.” However, BlockFi did not freeze customer funds or prohibit customers from making withdrawals²⁶, like some of its crypto lending competitors, including Celsius (discussed below).

BlockFi had high exposure to the Grayscale Bitcoin Trust (“GBTC”)²⁷, previously holding about 5.6%²⁸ of its outstanding float, which lost well over 50% of its value since the beginning of 2022. BlockFi liquidated its entire position and currently does not directly hold any GBTC²⁹. This liquidation resulted in a significant loss.

Despite apparent financial stress as evidenced by the aforementioned circumstances, BlockFi did not file for bankruptcy or enter any type of liquidation proceeding. Instead, it entered into a deal with FTX providing (a) BlockFi with a line of credit of

²² BlockFi Form T-3 Application, SEC (linked [here](#))

²³ “BlockFi, the Peter Thiel-backed crypto lending start-up, cuts 20% of its staff as bitcoin plunges”, CNBC (June 13, 2022) (linked [here](#))

²⁴ “Update to BlockFi Interest Account (BIA) Rates” BlockFi (June 24, 2022) (linked [here](#))

²⁵ Zac Prince, BlockFi CEO on Twitter (linked [here](#))

²⁶ “BlockFi Winds Down Loans Backed by GBTC Stock, CEO Says”, Blockworks (July 13, 2022) (linked [here](#))

²⁷ “BlockFi Winds Down Loans Backed by GBTC Stock, CEO Says”, Blockworks (July 13, 2022) (linked [here](#))

²⁸ “BlockFi Boosted Grayscale Bitcoin Trust Holdings by 11.9M Shares, Now Holds \$1.7B GBTC”, CoinDesk (September 14, 2022) (linked [here](#))

²⁹ Zac Prince, BlockFi CEO on Twitter (linked [here](#))

up to \$400 million and (b) FTX with an option to buy BlockFi at a maximum price of \$240 million^{30,31}.

4. What we learned about BlockFi’s operations during the Downturn

In Q2 2022³², over half a billion dollars of BlockFi loans were uncollateralized. The SEC actually identified this problem as part of the settlement order, noting that BlockFi frequently misstated that its institutional loans were “typically” overcollateralized, when in fact, most were not. BlockFi intended BIAs to be overcollateralized, but large institutional investors were often unwilling to post large amounts of collateral. In 2019, only 24% of institutional crypto asset loans were overcollateralized, 16% in 2020 and 17% in 2021.³³

One of BlockFi’s prominent borrower counterparties was Three Arrows Capital (“3AC”), which went into forced liquidation in July 2022. BlockFi lost approximately \$80 million³⁴ as a result, and has since closed all positions with 3AC. Zac Prince, BlockFi CEO, recently noted that no customer funds were impacted by the 3AC liquidation³⁵ though it has been reported elsewhere that BlockFi experienced increased withdrawals following the 3AC liquidation and after Celsius (discussed below) froze withdrawals.³⁶

³⁰ “FTX US Gains ‘Option to Acquire’ BlockFi for up to \$240M”, *CoinDesk* (July 1, 2022) (linked [here](#))

³¹ The deal featured no minimum price, and the final purchase price shall be based on certain performance metrics, though the cap represents a significantly lower valuation than what BlockFi received in its last funding round.

³² “BlockFi Had \$600 Million in Crypto Loans Not Covered by Collateral in Q2”, *Decrypt* (July 22, 2022) (linked [here](#))

³³ “In the Matter of BLOCKFI LENDING LLC”, *SEC* (February 14, 2022) (linked [here](#))

³⁴ “Crypto mega hedge fund Three Arrows Capital reportedly files for bankruptcy in New York”, *Techcrunch* (July 1, 2022) (linked [here](#))

³⁵ Zac Prince, BlockFi CEO on Twitter (linked [here](#))

³⁶ Factbox: The crypto crash hit these companies the hardest, *Reuters* (July 28, 2022) (linked [here](#))

It is difficult to make further assessments about how the Downturn impacted BlockFi given it is a private company. Some of this might change were it to become a public filer and otherwise adhere to investment company requirements pursuant to the aforementioned SEC settlement, but the actual disclosures BlockFi makes as a result of the settlement remain to be seen.

C. Celsius

1. Company and Product Overview

Celsius is a digital asset-focused financial technology company providing financial services to institutional, corporate, and retail clients across more than 100 countries.³⁷ It was created in 2017 by founders Alex Mashinsky, S. Daniel Leon, and Nuke Goldstein. Celsius' primary operations consisted of: (a) financial services through which retail and institutional users can (i) earn rewards on cryptocurrency such users transferred to Celsius, (ii) securely store and access cryptocurrency, (iii) borrow fiat using cryptocurrency as collateral, (iv) send and receive cryptocurrency using Celsius' CelPay services; and (b) Bitcoin mining through its mining subsidiary.³⁸

To attract users, Celsius promised high interest rates on deposits. Celsius' platform was launched in 2018 and by the end of 2018, over \$50 million of crypto had been transferred onto its platform by users. By May of 2019 that number grew to \$200 million.³⁹ By March of 2021, that number had grown to more than \$10 billion.⁴⁰ By July 2022, Celsius had approximately 1.7 million registered users and approximately 300,000 active users with account balances of more than \$100, and approximately \$6.0 billion in assets.⁴¹ In March 2022, on average, Celsius paid approximately 5 percent APY in rewards on digital assets to users.⁴²

In March 2018, the CEL token, which underpins the Celsius network's earning and reward systems, was sold publicly by Celsius, raising \$50 million in proceeds. The total number of CEL was fixed at 650 million, of which 50% were sold in a presale (40%) and a public sale (10%). The founders, team and advisors had reserved approximately 23% of CEL for themselves with the remainder reserved for awards and airdrops (approximately 27%).⁴³ CEL continues to trade on a number of crypto exchanges

³⁷“About Us”, Celsius (September 23, 2022) (linked [here](#))

³⁸See paragraph 42 of Declaration of Alex Mashinsky, CEO of Celsius Network LLC, in support of Chapter 11 petitions and First Day Motions (the “*Declaration*”) (linked [here](#)).

³⁹ See paragraphs 37 and 38 of Declaration.

⁴⁰ See paragraph 7 of Declaration.

⁴¹ See paragraph 9 of the Declaration.

⁴² See paragraph 43 of the Declaration.

⁴³ “Supply Schedule - What is Celsius Network?”, Messari (linked [here](#))

although Celsius has filed for bankruptcy protection⁴⁴. Prior to the automatic stay that was triggered as a result of this bankruptcy petition, users could elect to receive interest or rewards in the form of CEL in exchange for a higher reward rate. Active users on the Celsius platform could earn a variety of rewards and incentives, including lower borrower fees and higher rewards and receive priority access to future products.⁴⁵ On July 12, 2022, the CEL price was approximately \$0.71 USD with a market cap of approximately \$170.3 million USD.⁴⁶ On August 29, 2022, the CEL price was \$1.33 with a market cap of approximately \$318.7 million USD.

The terms of use⁴⁷ forming the basis of the contract between Celsius and its users provide that in exchange for the opportunity to earn rewards on digital assets deposited with Celsius, users transfer “all right and title” of their digital assets to Celsius, including “ownership rights” and the right to “pledge, re-pledge, hypothecate, rehypothecate, sell, lend, or otherwise transfer or use” any amount of such digital assets, whether “separately or together with other property”, “for any period of time,” and “without retaining in Celsius’ possession and/or control a like amount of [digital assets] or any other monies or assets, and to use or invest such [digital assets] in Celsius’ full discretion.”⁴⁸ Since 2019, Celsius disclosed in its terms of use that it might “experience cyber-attacks, extreme market conditions, or other operational or technical difficulties which could result in immediate halt of transactions either temporarily or permanently.”⁴⁹

In December 2021, Celsius announced the first closing of its Series B equity funding with a capital raise of approximately \$600 million from various investors at an implied enterprise value of approximately \$3 billion. By May 2022, the Company had raised approximately \$690 million from its Series B financing, with all but \$6 million of that amount funded.⁵⁰ That round was announced at a \$3.25 billion valuation.⁵¹

2. What happened to Celsius during the Downturn

The implosion of Terra Luna⁵² and the TerraUSD (UST) and the general decline of the crypto markets precipitated Celsius users to withdraw digital assets from Celsius’

⁴⁴ “Bankrupt Crypto Lender Celsius Considers Financing Proposals”, Bloomberg (August 16, 2022) (linked [here](#))

⁴⁵ See paragraph 51 of the Declaration.

⁴⁶ See paragraph 52 of the Declaration.

⁴⁷ Celsius Network Terms of Use (linked [here](#))

⁴⁸ See paragraph 13 of Celsius’ “Terms of Use,” as of April 14, 2022.

⁴⁹ See paragraph 11 of Celsius’ “Terms of Use,” as of April 14, 2022.

⁵⁰ See paragraph 8 of the Declaration.

⁵¹ “Celsius Series B Expands to \$750 million”, Yahoo Finance (Nov. 25, 2021) (linked [here](#)).

⁵² “‘Everything Broke’: Terra Goes From DeFi Darling to Death Spiral”, Bloomberg, May 11, 2022 (linked [here](#))

platform in large amounts and at a rapid pace.⁵³ Although Celsius suffered only a relatively minor loss of \$15.8 million on all activity related to Luna or UST,⁵⁴ a maturity mismatch across proprietary investments Celsius made with customer funds rendered it unable to recover on illiquid assets and thus unable to timely meet user withdrawals and provide additional collateral to support its obligations.⁵⁵

As a result, on June 12, 2022, Celsius paused all withdrawals, swaps, and transfers on its platform.⁵⁶ On or about June 19, 2022, Celsius retained Centerview Partners LLC, as a financial advisor and investment banker, and Alvarez & Marsal North America, LLC, as a restructuring advisor to advise on potential transactions. On or about June 28, 2022, Celsius retained Kirkland & Ellis LLP as restructuring counsel, while still continuing to raise additional funds to provide new liquidity.⁵⁷

By mid-June, the amount of Celsius' liquid assets and the dollar value of all remaining assets had decreased so significantly that Celsius lost the ability to continue borrowing stablecoins, and thus lost the ability to maintain the magnitude of crypto assets necessary to match its crypto liabilities.⁵⁸ Such a dramatic reduction in the dollar value of its crypto income created a further spread that hindered Celsius' recovery plan.⁵⁹

One month after the pause on withdrawals, swaps, and transfers on the Celsius platform, on July 13, 2022, the Celsius Network, Inc. and 7 of its direct and indirect subsidiaries, filed voluntary petitions for relief under Chapter 11, 11 U.S.C. §§ 101-1532, with the United States Bankruptcy Court for the Southern District of New York. Celsius' bankruptcy filing showed a balance gap of \$1.2 billion, with most liabilities owed to Celsius users.⁶⁰

D. Compound

Compound is an Ethereum-based decentralized protocol that allows user-borrowers to post digital assets as collateral in order to borrow USDC (the US dollar stablecoin sponsored by Circle), and allows user-lenders to supply USDC and earn interest.⁶¹ The protocol allows users to borrow and lend Ether at variable interest rates. The platform pays user-lenders interest in the same token that they lent. Interest rates on

⁵³ See paragraph 12 of the Declaration.

⁵⁴ See paragraph 109 of the Declaration.

⁵⁵ See paragraph 13 of the Declaration.

⁵⁶ See paragraph 14 of the Declaration.

⁵⁷ See paragraph 15 of the Declaration.

⁵⁸ See paragraph 124 of the Declaration.

⁵⁹ See paragraph 124 of the Declaration.

⁶⁰ See paragraph 16 of the Declaration.

⁶¹ Compound III Introduction (linked [here](#))

Compound are determined by the liquidity in the market for the specific digital asset. Compound determines its collateral factor, or how much a user can borrow, based on the quality of the asset being borrowed. Each asset has a different collateral factor. When users borrow from Compound they must post digital assets that are worth more than they are borrowing, resulting in all loans being over-collateralized at the outset. As prices for the collateral fluctuate and the value of the digital asset a user has posted as collateral approaches the value of what the user has borrowed, the Compound smart contract automatically closes the position. As such, a margin call occurs and users lose what they posted as collateral and keep their borrowed amount.⁶²

Compound gives users tokens in exchange for their activity in the protocol to represent their collateral.⁶³ COMP is the native token on Compound and is a governance token. As of September 23, COMP had fallen by approximately 70% this year.⁶⁴ A quantitative analysis on how Compound functioned during the Downturn is presented in Section III below.

III. Quantitative Data: DeFi Appears to Have Weathered the Downturn Without Major Incident

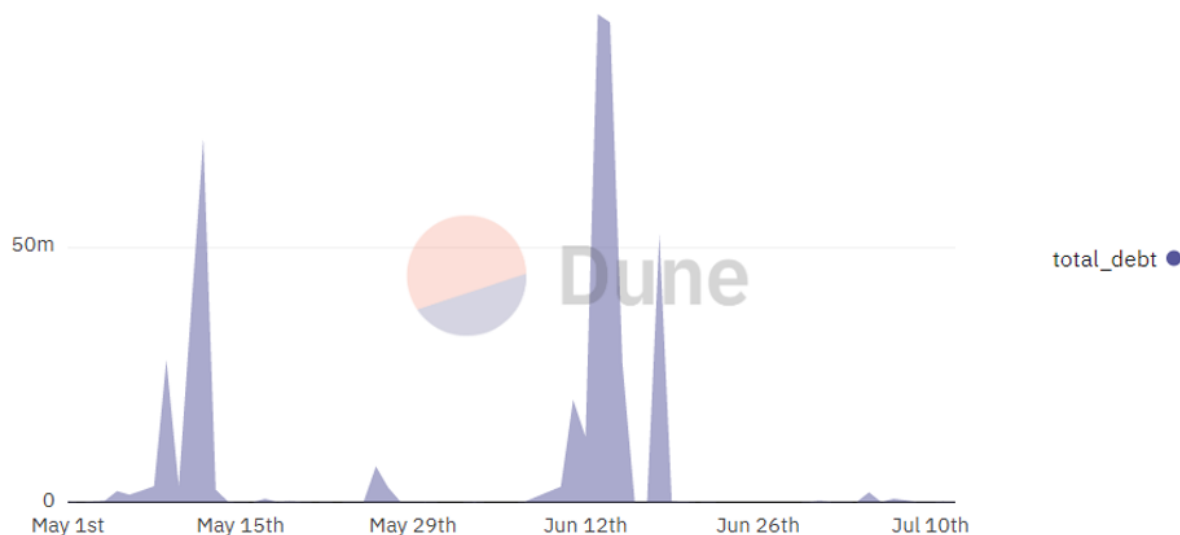
To assess DeFi's performance, we analyzed the extent to which users interacting with DeFi protocols suffered unanticipated losses. We did so by first narrowing in on discrete market dislocation dates - namely May 12, June 14 and June 18, each of which was an evident high-water mark in terms of DeFi liquidations.⁶⁵

⁶² "What is Compound and How does it Work?", Gemini (linked [here](#))

⁶³ "What is Compound and How does it Work?", Gemini (linked [here](#))

⁶⁴ Compound, CoinDesk (linked [here](#))

⁶⁵ See Dune Analytics, Liquidations Chart (linked [here](#))



To further segment our data, we looked at the three largest lending protocols by total value locked: namely Aave, MakerDAO and Compound.⁶⁶

We then looked at liquidation levels across each on the relevant dates, drilling down into data about collateral tokens (i.e., which tokens are most often used as collateral for loans) and debt tokens (i.e., which tokens are most often borrowed), which have been pulled from Dune⁶⁷ whereas [DefiLlama](#) has been employed to fetch the total borrowing amount and the utilization rate in each protocol.

Before we look at the data, it might be helpful to level-set on DeFi protocol mechanics more generally.

Ethereum-based DeFi protocols hold approximately 5% of all digital assets, worth more than \$60 billion, that are locked in DeFi lending protocols.

These protocols typically issue a native (governance) token that endows holders with decisioning power over such matters as protocol risk factors, collateral ratios and fee levels.

Furthermore, for some protocols these native tokens can also be used to repay insolvent debts in case a very severe default scenario occurs. For instance, extra protocol tokens may be created and sold on the open market to raise money to make up for any outflows or shortages in collateral if the value of the collateral throughout the entire system drops quickly. Owners of governance tokens in these protocols accept the possibility that their holdings may be reduced in order to ensure the

⁶⁶ Aave and Compound are described briefly above. Information about MakerDAO can be found at makerdao.com (linked [here](#)).

⁶⁷ See this dashboard for more detail: <https://dune.com/stocastico/liquidations-in-defi>

stability of the platform. The potential for token supply dilution incentivizes token holders to maintain good system governance.

Similar to a margin loan against a stock portfolio, borrowers frequently take out DeFi loans against a collateral digital asset they want to maintain exposure to and subsequently use the loan proceeds to pursue other investment strategies or other on-chain activities. Compared to sovereign currency-denominated deposits (such as typical U.S. dollar-denominated savings accounts), DeFi lenders may be able to earn interest rates higher than those provided by bank accounts. Despite these DeFi loans' overcollateralization, lending policies are nonetheless vulnerable to changes in the value of the underlying collateral asset, particularly during extreme market events like the Downturn.

DeFi lending platforms often let users borrow up to a maximum amount depending on collateral type, which is ordinarily much less than 100% of the collateral value. This is similar to more conventional (non-DeFi) securities lending procedures.⁶⁸

The main money market protocols in DeFi are MakerDAO, Aave and Compound, whose total value locked amounts to \$8.72 billion, \$3.4 billion and \$2.18 billion respectively as of September 23, 2022. While MakerDAO only allows users to borrow its native stablecoin DAI, Aave and Compound have two-sided markets that afford users access to many of the most liquid digital assets in the market.

Against this background, the data reviewed suggest that during the Downturn, DeFi lending protocols withstood severe stress resulting from borrowers being liquidated due to declining collateral prices. More collateral was posted and positions were liquidated in accordance with each protocol's programming but all in an orderly fashion that continued as markets moved lower, sometimes quite quickly.

We now take a look at how DeFi lending protocols dealt with such liquidations during the Downturn, one of the most severe "black swan" events ever recorded in the DeFi space, and how their users fared.

This analysis focuses on three main aspects:

1. Liquidations: the share of bad debts has been marginal

The amount of liquidated debt has ranged between \$52 million and \$94 million, with Aave and Compound jointly accounting for 78-91% of the total liquidations. The percentage of liquidated debt over the total outstanding debt amount has ranged between 0.57% and 0.95%.

Although the historical quantification of insolvent debts is quite complex to perform, we can check how much insolvent "bad" debt each protocol currently holds by looking at <https://bad-debt.riskdao.org/>

⁶⁸ See, e.g., Regulation T and Regulation U of the Board of Governors of the Federal Reserve.

Lending Markets Bad Debt						
Name	Blockchain	TVL ↓	Bad Debt ↓	Bad Debt Ratio ↓	Last Update ↓	Details
 Maker		\$8.72B	\$1.3M	0.01%	2 hours ago	169 insolvent accounts
 Aave		\$3.4B	\$0.38M	0.01%	an hour ago	4617 insolvent accounts
 Compound		\$2.18B	\$63.64K	0.00%	an hour ago	1046 insolvent accounts

As we can see, the bad debt ratio is negligible. This implies that risk management policies and frameworks put in place and implemented programmatically by DeFi lending protocols have ensured liquidations were executed in a timely and orderly manner with minimal adverse consequences to digital asset lenders. This is consistent with our analyses on each of the three high water mark dates:

May 12, 2022			
	Liquidated debt (\$)	Total debt (\$)	Liquidated / Total debt
Aave	29,637,149	4,752,815,871	0.62%
MakerDAO	14,411,096	6,011,049,659	0.24%
Compound	27,452,210	1,689,104,999	1.63%
Total	71,500,455	12,452,970,528	0.57%

June 14, 2022			
	Liquidated debt (\$)	Total debt (\$)	Liquidated / Total debt
Aave	46,228,613	2,421,694,172	1.91%
MakerDAO	2,463,401	6,470,209,297	0.04%
Compound	45,480,016	1,054,893,873	4.31%
Total	94,172,030	9,946,797,342	0.95%

⁶⁹ Risk DAO (September 23, 2022) (linked [here](#))

June 18, 2022			
	Liquidated debt (\$)	Total debt (\$)	Liquidated / Total debt
Aave	15,931,173	1,947,126,898	0.82%
MakerDAO	5,440,942	6,284,430,635	0.09%
Compound	31,254,708	952,470,519	3.28%
Total	52,626,823	9,184,028,053	0.57%

2. Collateral token liquidity: no bank runs occurred for collateral tokens

The collateral token distribution is quite concentrated around ETH and BTC, which jointly account for 85% - 99% of the liquidated collateral tokens. However, the most important metric to analyze is the utilization rate, namely what percentage of the tokens supplied by lenders has been borrowed.

The higher the utilization rate, the lower the percentage of lenders being able to withdraw their funds. The utilization rate for ETH ranges between 12% and 22% whereas that of BTC is actually lower, ranging from 1% to 3%, on the relevant dates.

May 12, 2022			
	Collateral value (\$)	Share of total collateral	Utilization rate
WETH	50,289,648	70%	22%
WBTC	14,406,478	20%	2%
Others	6,867,434	10%	
Total	71,563,560	100%	

June 14, 2022			
	Collateral value (\$)	Share of total collateral	Utilization rate
WETH	86,621,817	92%	19%
WBTC	6,200,254	7%	3%
Others	1,318,158	1%	
Total	94,140,229	100%	

June 18, 2022			
	Collateral value (\$)	Share of total collateral	Utilization rate
WETH	26,609,184	51%	12%
WBTC	17,999,217	34%	1%
Others	7,993,273	15%	
Total	52,601,674	100%	

[TO APPENDIX TABLE OF CONTENTS](#)

3. Borrowed token liquidity: stablecoin debt has been orderly liquidated

Stablecoins represented the lion's share among borrowed tokens, with the top 3 stablecoins by market cap (USDC, USDT and DAI) accounting for 89%-99% of the total debt.

The fact that almost all debt was taken in the form of stable assets instead of volatile ones means that short-selling as a result of borrowing in DeFi lending protocols has had a limited effect on the broad market selloff. Short-selling occurs with volatile assets.

The utilization rate has ranged from 33% to 63%, allowing more than one third (in dollar value) of lenders to potentially withdraw their funds at their convenience.

The higher utilization rate on USDT likely was caused by short-term arbitrage opportunities due to a temporary deviation from the peg.

May 12, 2022			
	Debt value (\$)	Share of total debt	Utilization rate
USDC	21,606,796	30%	45%
DAI	26,429,354	37%	59%
USDT	20,787,319	29%	63%
Others	2,647,190	4%	
Total	71,470,659	100%	

June 14, 2022			
	Debt value (\$)	Share of total debt	Utilization rate
USDC	38,173,200	41%	44%
DAI	6,092,906	7%	51%
USDT	49,108,229	52%	48%
Others	848,293	1%	
Total	94,222,628	100%	

June 18, 2022			
	Debt value (\$)	Share of total debt	Utilization rate
USDC	21,884,781	42%	33%
DAI	19,597,156	37%	48%
USDT	5,381,719	10%	53%
Others	5,786,841	11%	
Total	52,650,497	100%	

[TO APPENDIX TABLE OF CONTENTS](#)

The analysis above appears to show that DeFi lending held up well during the downturn. But the analysis is limited in its nature because it focuses on the events on discrete days. Because DeFi lending protocols typically rely on digital assets as the collateral for loans, when the price of digital assets drops, the collateral position can be liquidated. If those liquidations had led to further price drops of digital assets and the default of loans, creditors would have suffered significant losses, leading to cascading financial failures.

For example, in the event of an extreme price drop of ETH, the collateral for stablecoin DAI would be liquidated, leading to more selling pressure on ETH, and possibly reinforcing that cycle, which might in turn make the 1DAI=1USD peg unsupportable and any ecosystem using DAI as the unit of price would also be at risk. From daistats.com, the value of DAI collateralization is more than 10 billion dollars as of September 2022. In the event that these 10-billion-dollar collateral positions are liquidated, the digital asset market would face huge selling pressure. The -2% depth of ETH at Binance is 20 million dollars, only 0.2% of the collateral value. The crypto market would drop by a lot in the event of collateral liquidation. Moreover, the DAI could be unpegged from USD, and the ecosystem built on 7 billion DAI would be at risk. Such contagion might then spread beyond DAI.

While, as shown above, none of this occurred during the Downturn, the possibility existed. These figures have illustrated the importance for regulators to monitor the collateral liquidation risk in the DeFi lending network.

IV. Systemic Risk and Traditional Finance⁷⁰

Having examined select CeFi and DeFi use cases as well as overall DeFi market data as it relates to end-user impact, we now try to analyze how and to what extent shocks emanating from the digital asset markets affect traditional finance.

We first consider the case of the Terra meltdown during the Downturn and show that, by at least one metric, there is not enough evidence to conclude that digital asset-exposed traditional finance (centralized) firms were affected by it to a larger extent than traditional finance firms without such exposure. By way of contrast, we have uncovered some evidence of contagion from the digital asset markets during the “Great crypto crash” of 2018.⁷¹

⁷⁰ Contributed by Artem Streltsov, PhD student in Finance at the Johnson Graduate School of Management, Cornell University

⁷¹ “The Great Crypto Crash of 2018: Cryptocurrency’s 80% plunge is now worse than the dot-com crash”, Financial Post, September 12, 2018 (linked [here](#))

To run this analysis on Terra’s possible impact, our prime outcome of interest is the 4-factor Fama-French cumulative abnormal return (Fama and French, 1993; Carhart 1997) of each stock for the period of May 4th through May 8th of 2022. These represent exposure to the market, firm size, book-to-market and momentum risk factors explaining stock returns as compensation to investors for bearing risk. We use CRSP stock price data, Compustat quarterly firm fundamentals (both from WRDS), and Kenneth French factor data as data sources (from the Kenneth French Data Library). In addition, we refer to news announcements and reports to flag crypto-exposed firms (38 in total) such as MSCI Cryptocurrency Risk, Goldman Sachs and Bank of America classifications as well as articles published on barrons.com and marketwatch.com.

From the analysis, we see that on average digital asset-exposed stocks had an economically significant more negative abnormal return of (-2.7) percentage points versus (-0.56) percentage points from what all non-digital asset-exposed stocks experienced during the period. The difference, however, is not statistically significant (p-value of 0.36). A direct measurement of the treatment effect (how much of this decrease can be attributed to digital asset exposure) is likely to be confounded by company fundamentals, therefore a finer identification strategy is needed.

Attribute	Treatment Mean	Control Mean	T-test p-value
Tobin's Q	3.20	2.32	0.14
Cash Flow	0.02	0.02	0.97
Size	9.95	9.69	0.67
Cash	0.15	0.13	0.54

Table 1. Comparison of crypto exposed (treated) and non-crypto exposed (control) firms’ characteristics.

As a better alternative, Abadie-Imbens bias-adjusted matching estimator (Abadie and Imbens, 2011) is used to compute the Average Treatment effect for the Treated (ATT). For each digital asset-exposed firm (treated firm) we find a non-exposed firm (control firm) in the same industry (categorized by SIC 2 codes) and of similar credit rating that is as close as possible in terms of cash flow, Tobin's Q (a proxy for and a public assessment of firm investment opportunities), firm size, and cash holdings. Control firms are then used to estimate the counterfactual outcome for the digital asset-exposed firms to produce the final ATT estimate. Table 1 presents a comparison of treated and control firms' characteristics. As we see, the two groups are similar, and therefore we cannot reject the hypothesis that the means are identical at any reasonable significance level.

The treatment effect (ATT) is next considered. The calculated ATT is negative - digital asset-exposed firms had a more negative abnormal return by 6.3 percentage points than control firms. But the result is not statistically significant (p-value 0.35). We, therefore, have insufficient evidence to conclude that digital asset-exposed traditional firms were affected to a statistically significant extent by the Terra meltdown.

We further look for evidence of a contagion analyzing cross-market correlations. We follow Forbes and Rigobon (2002) and turn our attention to cross-market correlations as estimated by a Vector Autoregressive Model (VAR) adding 1-month Treasury bill rate (the risk-free return) as an exogenous variable. Vector Autoregression (VAR) is a multivariate stochastic process model with a separate equation modeling each endogenous time series. It is a generalization of a univariate autoregressive model (AR) and models each series as a function of lagged values of itself and of other endogenous series. For example, one equation for VAR(1) would model the market return at time t as a function of market return at time $t-1$ and the BTC return at time $t-1$. We split the series into two subperiods - stable and turmoil - based on the Bitcoin return volatility using the top 5% quintile as the cut-off (see Figure 1). The two periods above the cut-off correspond to the "Great Crypto Crash" of 2018 and the COVID-19 panic of 2020. We focus on the former since in the latter period COVID-19 affected all sectors of the economy in parallel, while the former originated in the digital asset market space.

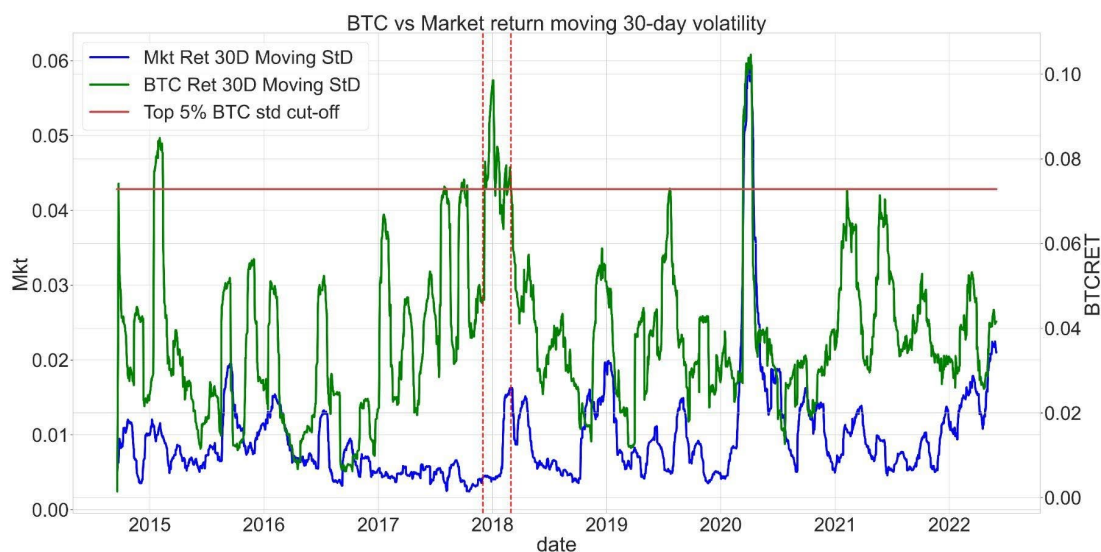


Figure 1. Bitcoin return volatility (blue) and the 95% percentile cut-off (red).

For each of the subperiods using the VAR model we estimate cross-market correlations and volatility, adjust for bias in estimating correlations as in Forbes and Rigobon (2002), and test the null hypothesis that correlation between the two markets during the full period is greater than that during the turmoil subperiod (that is, no contagion).

Our results indicate that the standard deviation of Bitcoin returns spiked up to 0.076 against 0.0392 during the stable period. Cross-market correlation increased from 12% to 70% before bias adjustment and from 9% to 58% after bias adjustment corresponding to a t-statistic of 42.78 and 36.15 respectively. Given such large statistics we have sufficient evidence to reject the null hypothesis (of no contagion) and suggest that there was a contagion from the digital asset markets to the US stock market during the Great Crypto Crash.

In Figure 2 we further provide a 120-day rolling window estimate of cross-market correlations. We can see a significant spike in the correlation between the Bitcoin return and the US Market return during the Great Crypto Crash as well as during the COVID crisis, of which only the former likely can be attributed to the digital asset markets.

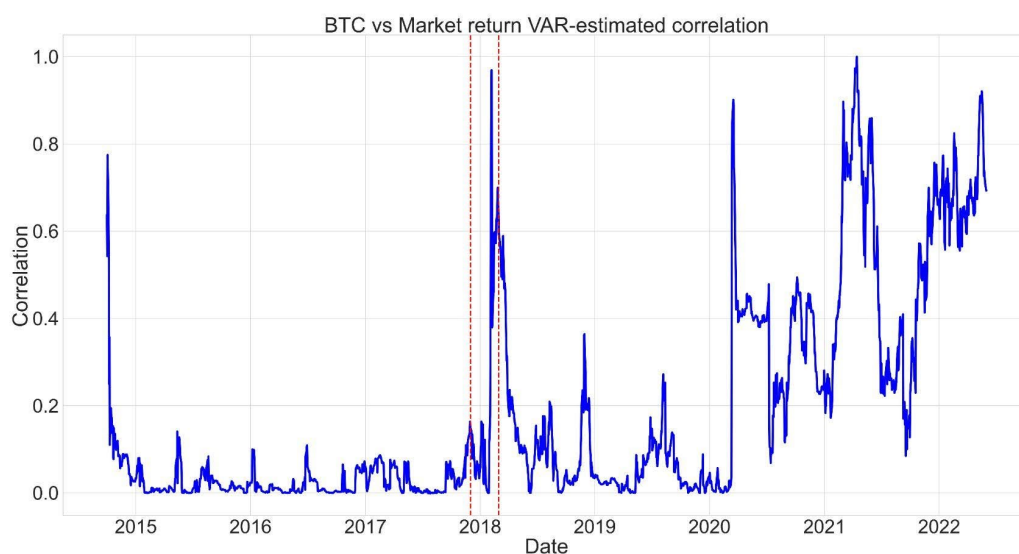


Figure 2. 120-day moving window VAR estimated cross-market correlations.

In sum, it appears that retail stockholders suffered statistically significant contagion from the 2018 crypto crash but did not as a result of the Terra meltdown.

V. Systemic Risk in the Digital Asset Companies Network⁷²

We now turn our focus to a different mode of analysis designed to look at possible contagion from another vantage point. Financial institutions often feature crossholdings and dis-continuous losses in values when failures happen. These features can allow financial contagion to spread and lead to multiple hierarchies of financial cascades. As a result, a relatively small shock to the financial network can exaggerate losses of market value. These premises lead to our next research question: How large is the size of financial cascades that the Terra meltdown would have caused given certain cross-ownership conditions?

Employing the framework of Elliott et al (2014), which studies how financial cascading failures depend on the network structure such as integration and diversification, we assume that 100 actors (3ac, Celsius, etc.) hold the top 100 digital assets and also cross-hold ownership in each other, thereby facilitating possible financial contagion through a cascade of failures. If one actor fails, other actors holding its shares would suffer losses and might fail if their asset values are under a particular failure

⁷² Contributed by Qihong Ruan, PhD student in Economics at Cornell Economics department

threshold, which further might lead to a cascade of actors failing. We obtained data of the top 100 digital assets from Coincodex using a market cap snapshot on May 1, 2022, several days before the Terra meltdown.

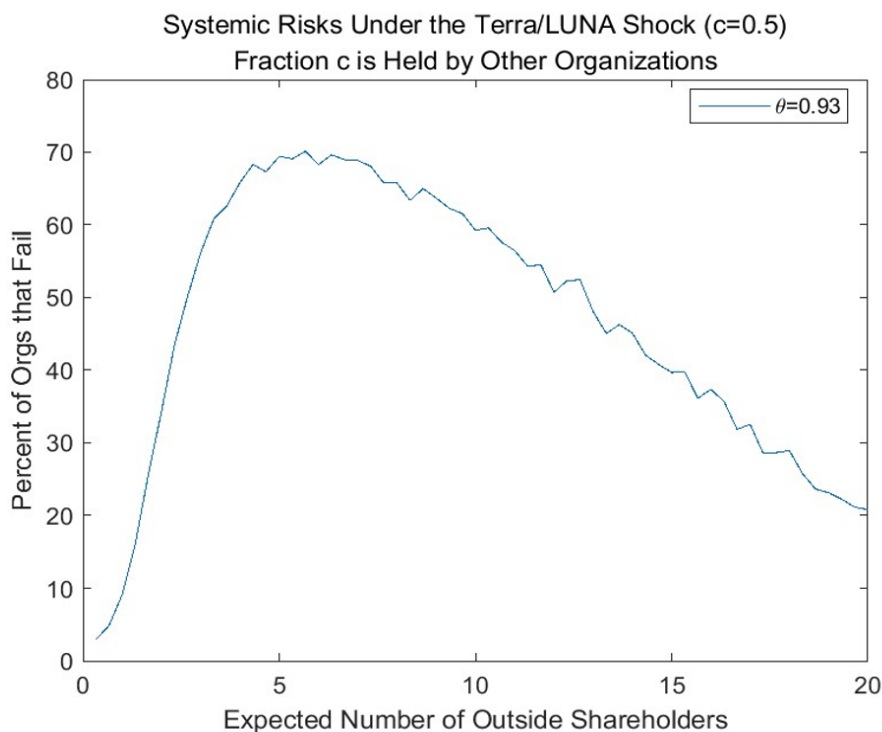


Figure 3. How Diversification Level d Affects Systemic Risks From Terra Meltdown

Under the chosen conditions, we find that the size of financial cascades depends on several features of the cross-holding structure, including the integration level (the fraction of ownership by other actors), the diversification level (the number of other actors holding the shares), and the failure threshold of actors, which means that if the asset value of actors is under the threshold, the actor will go bankrupt and lose all the value of its assets.

Figure 3 shows the inverted-U relationship between the percent of organizations that fail and the expected number of outside shareholders. From this chart, we can observe several interesting results. First, if an actor is 50% owned by other actors, and there are 5 outside owners of that actor, then 70% actors in the crypto system are likely to fail as a result of the Terra meltdown, if the failure threshold is 0.93, meaning that failure happens when the asset value of an actor is less than 93% of its original level. Second, if the number of outside owners is very small, then financial contagion due to one actor’s failure is less likely to trigger other failures, which is consistent with the intuition of what should be the case. Third, a similar result obtains if the number of outside owners is large; one agent’s failure is much less

likely to cause financial contagion. This lessened likelihood of cascades stems from the fact that the other actors have well-diversified portfolios. Thus, it is a medium level of diversification of ownership that potentially leads to the most financial contagion.

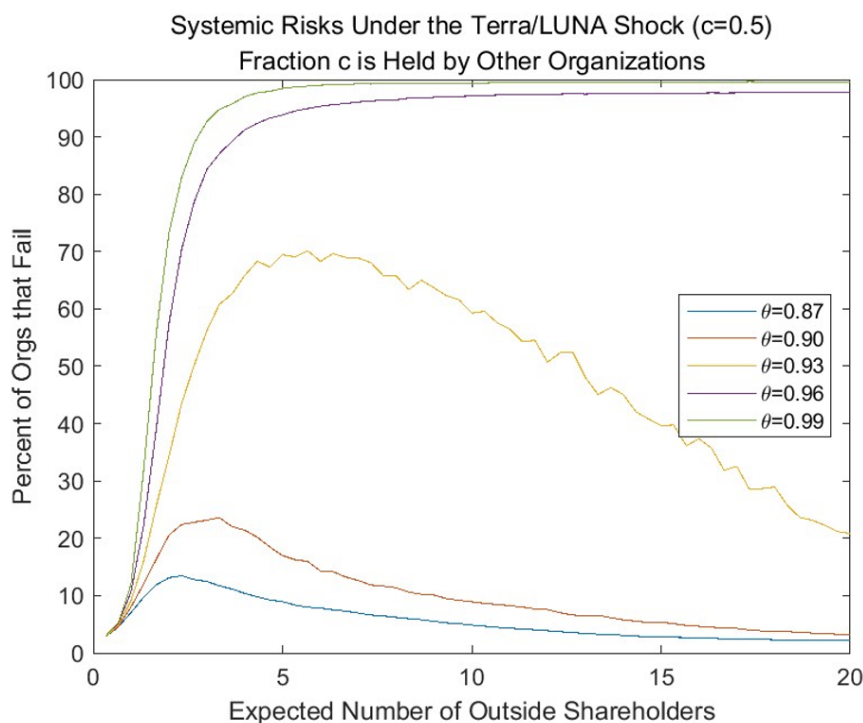


Figure 4. How Failure Threshold θ Affects Systemic Risks Under the Terra Meltdown

Figure 4 shows that as the failure threshold becomes higher, the number of cascading failures also is likely to increase. Furthermore, Figure 5 shows that the size of financial cascades increases with the fraction of an actor owned by outside holders (that is, the greater the level of Integration between actors, the more likely and severe the cascade of failures). However, higher levels of integration may help reduce the probability of first failures, as Figure 6 shows, such that the higher the fraction owned by outsiders, the less likely the first failure in the financial network will happen.

This analysis suggests the importance of transparency of the cross-holding structure amongst actors in the digital asset ecosystem. Information about cross-holdings should allow for better analysis of the potential impacts of stress conditions both on an individual actor as well as on the cascade that might follow based on outside ownership of that actor. Such analysis should allow regulators and other market

participants to better evaluate and prevent systemic risks from the digital asset markets. When the systemic risks are known, there are more opportunities to control them such that even if the market suffers a temporary setback, it will recover steadily.

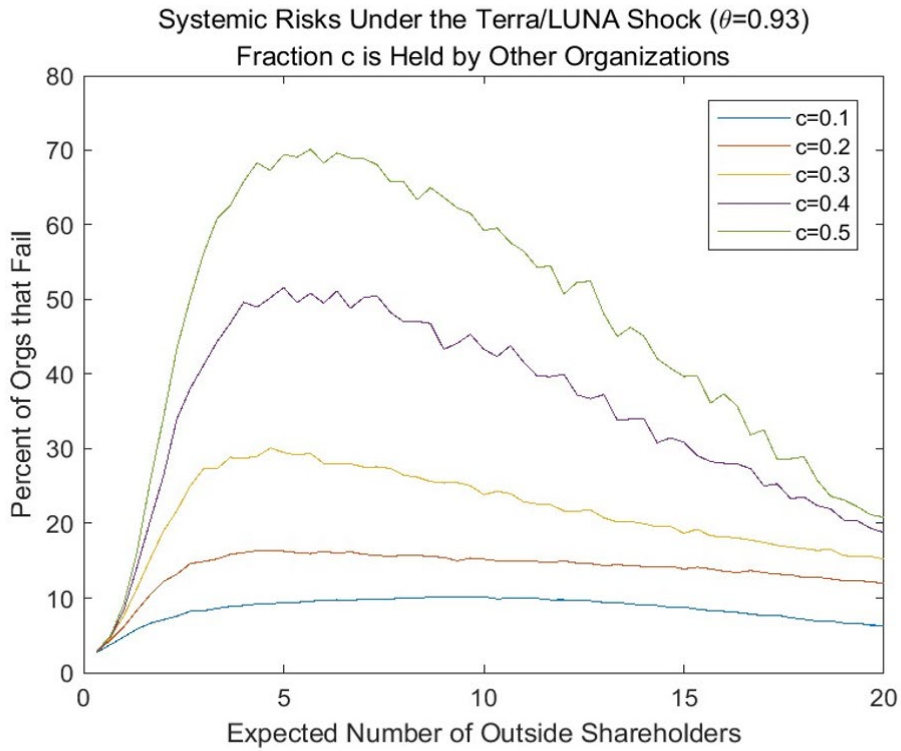


Figure 5. How Integration Level c Affects Systemic Risks Under the Terra Meltdown

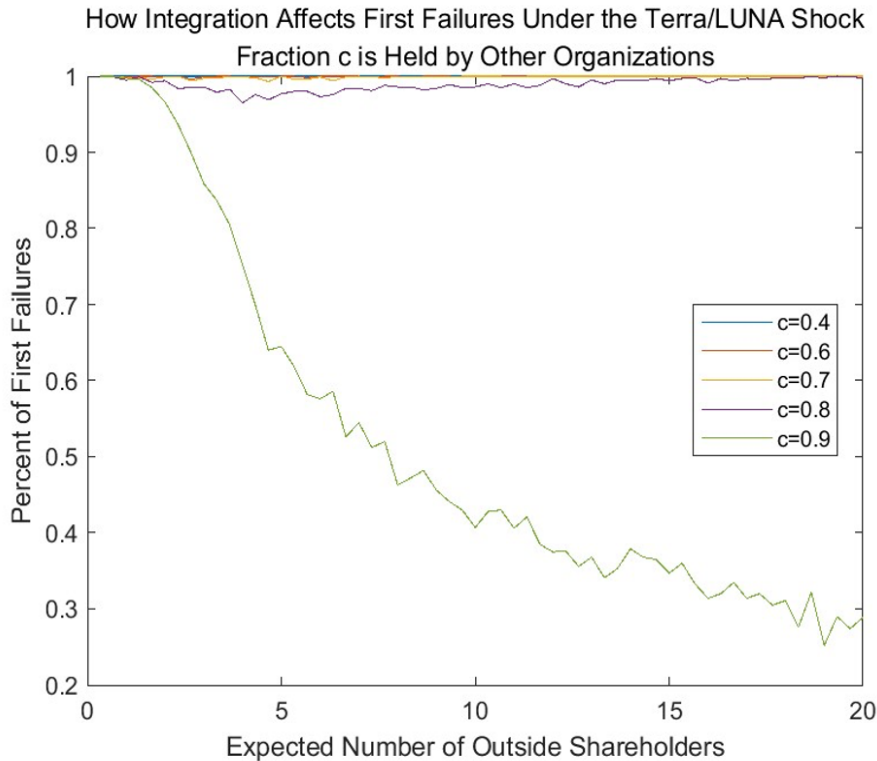


Figure 6. How Integration Level c Affects First Failures Under the Terra Meltdown

CONCLUSION

This note is like the first swipe of windshield wipers during a rainstorm: we caught a glimpse of our surroundings but the wipers need to continue to work hard.

The glimpse has considered various systemic risks that could be caused by the digital asset sector: financial contagion spreading to the traditional financial market, cascading failures of digital asset companies, and the liquidation of collateral positions in the DeFi lending ecosystem.

Based on the glimpse, we have several observations if not quite conclusions. First, as a result of the Downturn the centralized lending platforms Celsius and BlockFi either entered bankruptcy or required a huge infusion of capital at a considerably discounted valuation. While the data available do not empirically support particular conclusions as to why each result obtained, we can reasonably speculate that initial under-collateralization and failure to speedily liquidate positions that became greatly under-collateralized as a result of the Downturn caused these situations.

[TO APPENDIX TABLE OF CONTENTS](#)

Second, DeFi protocols Aave and Compound started with over-collateralization and had set parameters for when collateral calls were made and deadlines for posting the called collateral that, if not met, triggered liquidations. Neither protocol suffered from an inability to maintain outstanding loans, execute on collateral calls, or effectively liquidate positions that violated collateral requirements, nor did either require an infusion of capital or bankruptcy protection. The data we reviewed also offered no evidence of impacts on users more severe than the programmatic consequences of the Downturn, which programming was transparent to all users.⁷³

These two observations lead to a third observation: automated collateral calls and liquidations at first glimpse appear to keep lending platforms financially healthy without undue harm to their users.

Finally, the data also support a preliminary observation that the Downturn did not lead to systemic contagion similar to what occurred during the 2008 financial crisis. Yes, the digital asset markets suffered stress from the Downturn and some participants suffered greatly, but not in ways that implicated markets more broadly and even within digital asset markets, the contagion from, e.g., BlockFi and Celsius, did not spread to, e.g., Aave and Compound.

The strongest conclusion we reach is that the wipers need to continue to work hard. Monitoring and researching these markets and the various risks they potentially pose can help develop a sustainable financial system. We encourage all manner of researchers to dive into the data in much greater detail than our extremely modest attempt so that real conclusions might be reached.

Selected Resources

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⁷³ We have not considered the implications on the rest of the market from these automated collateral calls and liquidations.

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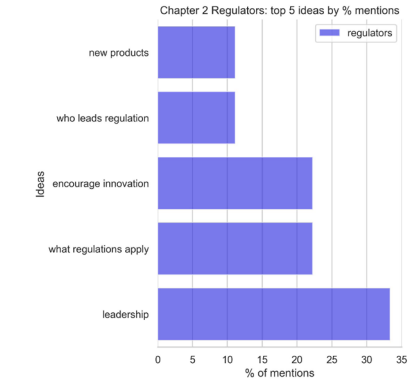
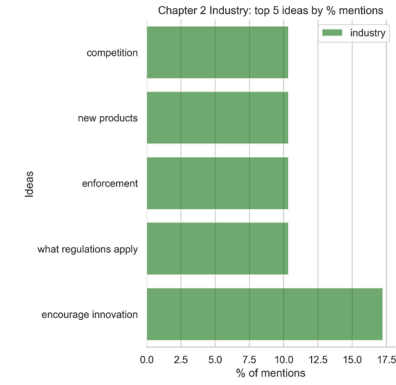
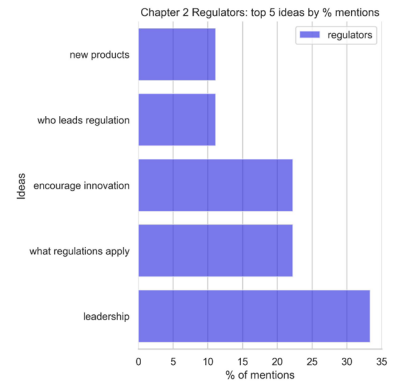
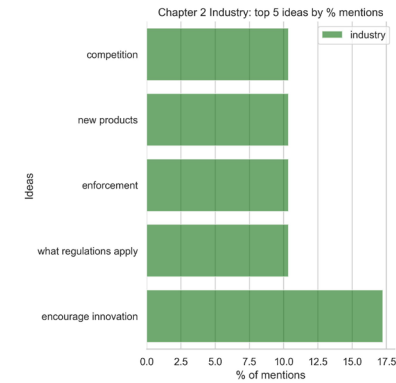
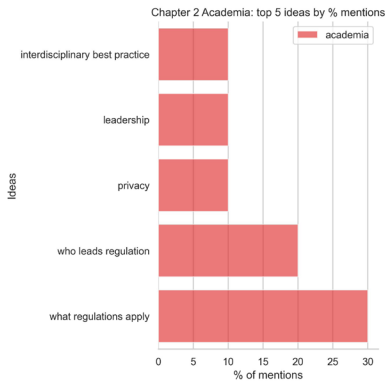
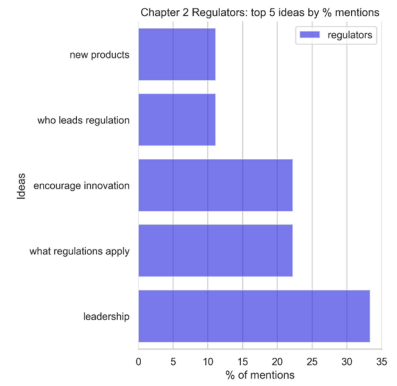
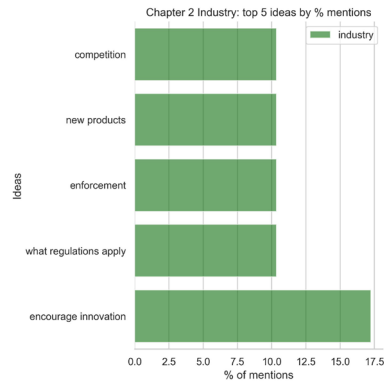
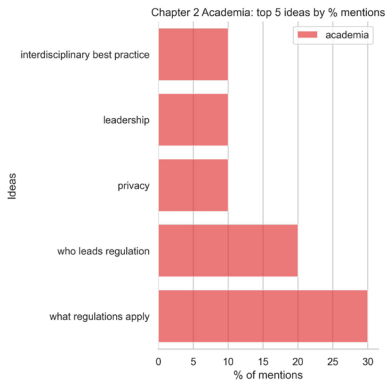
https://econ.hkbu.edu.hk/eng/Doc/20220616_LEHAR.pdf [Note: We believe this draft article gives good insight into overall market behavior through its presentation of liquidation and trading data. The data seems to support the view that once a liquidation price is reached, lots of selling occurs putting more downward pressure on the price and resulting in significant price drops. This reflects a well-understood circumstance associated with the transparency of DeFi protocols: to some extent the liquidation price becomes a self-fulfilling prophecy when the markets are headed down. Their data also seem to show that price recoveries occur, at least in part, due to arbitrageurs using flash loans to buy in response to the selling. However, we note several shortcomings: On the conclusions that the data also supports a conclusion of market fragility and that there is a price “echo chamber,” we are skeptical and do not see how this data supports either conclusion, unless they mean that these phenomena occur in all markets (they seem to acknowledge this point). Their critique seems to be that too much transparency (of liquidation price, of oracles, of sell pressure) is a bad thing, but we do not see that supported in the data, particularly without data from other markets showing different results, which they do not have.

We do not know whether greater volatility due to quick market action because of transparency results in “more real” prices or not, and their data do not show an answer one way or the other. We can see both sides of that argument.

The added element of transparency in DeFi markets arguably creates better markets, especially because you have quantity transparency. The SEC always proposes rules that ignore quantity as a factor in getting proper prices. The argument seems to be that episodic large quantity orders will cause fluctuations that are not reflective of the “real” price. But that assumes that real price is based on some longer term steady state, an assumption that is not supported with any data that we are aware of. Why are minute to minute prices less real? They actually reflect supply and demand at the time of the large order, which arguably is more real.]

[TO APPENDIX TABLE OF CONTENTS](#)

OTHER GRAPHS



[TO APPENDIX TABLE OF CONTENTS](#)

GOVERNMENT RESPONSES TO THE EXECUTIVE ORDER

To the extent that the reports issued in response to the Executive Order are available, they can be accessed below.

FSOC Systemic Risk:

<https://home.treasury.gov/system/files/261/Fact-Sheet-Report-on-Digital-Asset-Financial-Stability-Risks-and-Regulation.pdf>

OSTP Climate: <https://www.whitehouse.gov/wp-content/uploads/2022/09/09-2022-Crypto-Assets-and-Climate-Report.pdf>

CBDC: <https://www.whitehouse.gov/wp-content/uploads/2022/09/09-2022-Technical-Evaluation-US-CBDC-System.pdf>

DOJ Enforcement: <https://www.justice.gov/ag/page/file/1535236/download>

Treasury: Future of Money and Payments (Section 4): <https://home.treasury.gov/system/files/136/Future-of-Money-and-Payments.pdf>

Treasury: CryptoAssets. https://home.treasury.gov/system/files/136/CryptoAsset_EO5.pdf

Treasury: Illicit Finance Action Plan (Section 7): <https://home.treasury.gov/system/files/136/Digital-Asset-Action-Plan.pdf>

Commerce: U.S. Competitiveness (Section 8) . <https://www.commerce.gov/sites/default/files/2022-09/Digital-Asset-Competitiveness-Report.pdf>

DOJ: International Law and Digital Assets (also Section 8). <https://www.justice.gov/ag/page/file/1510931/download>

Treasury: Framework for International Engagement on Digital Asset; <https://home.treasury.gov/news/press-releases/jy0854> (fact sheet only)

Link to FTX bankruptcy filing: <https://cases.ra.kroll.com/FTX/Home-Index>

TO APPENDIX TABLE OF CONTENTS

**FinTech at Cornell presents Cornell Convenes:
Digital Asset Roundtable Pre-Reads**

June 6, 2022, Washington, D.C.

General Background and Executive Order: <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/>

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[Market Making in Crypto — A Secured Lending Lawyer’s Learnings | by Irina Marinescu | Medium](#)

[Biden executive order begins whole-of-government review of digital asset policy and regulation | Davis Polk](#)

[Foundational principles for US crypto asset regulation | International Financial Law Review \(iflr.com\)](#)

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[CNBC prediction that bitcoin may not last much longer](#)

MIT Tech Review: <https://www.technologyreview.com/2022/04/12/1049307/money-is-about-to-enter-a-new-era-of-competition/>

<https://www.project-syndicate.org/commentary/biden-digital-asset-crypto-executive-order-by-dante-alighieri-disparte-2022-03> - on the EO / now echoed in California

[US order seeking digital asset transparency and oversight would limit risks, promote financial stability](#)

<https://www.banking.senate.gov/imo/media/doc/Disparte%20Testimony%2012-14-21.pdf>

[Michele Korver FinCEN Chief Digital Currency Advisor - Bitcoin Magazine: Bitcoin News, Articles, Charts, and Guides](#)

[Women to Play Key Role in Future Crypto Governance; Carole House Quoted \(executivegov.com\)](#)

[Bakkt Stock Price Extends Rally to 451% on Mastercard, Fiserv Crypto Deal \(businessinsider.com\)](#)

[Fiserv Research Shows Digital Wallet Use Surging, Fintechs Key to Consumer Financial Experience \(yahoo.com\)](#)

["Amy Davine Kim on Blockchain Policy for 2020" \(Two Think Minimum\) - Publications - The Technology Policy Institute \(techpolicyinstitute.org\)](#)

TO APPENDIX TABLE OF CONTENTS

[Book: J. Christopher Giancarlo: “CryptoDad – The Fight for the Future of Money” \(Wiley 2021\)](#)

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[Value Premium, Network Adoption, and Factor Pricing of Cryptocurrencies](#)

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TO APPENDIX TABLE OF CONTENTS

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TO APPENDIX TABLE OF CONTENTS

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TO APPENDIX TABLE OF CONTENTS