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President Biden's Executive Order on Cryptocurrencies and the Future of FinTech

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Introduction

On March 9, 2022, President Biden signed Executive Order 14067, titled "Ensuring Responsible Development of Digital Assets" (Exec. Order No. 14067, 2022). This order comes during a time we are experiencing a proliferation of digital currencies, fraud, bankruptcies, and thefts along with unique microstructures and scalable technological platforms, as well as broad advancements in distributed ledger technologies, which are being explored by major financial institutions and central bankers.[1] As shown in Figure 1, in the last decade, we have seen a large growth in the number of cryptocurrencies, with over 10,000 unique coins presently being traded and exchanged by consumers, investors, and even publicly traded companies.[2]

With an influx of new forms of digital money and coins, also comes the introduction of modern technologies associated with their mining, transacting, and record keeping (Bowden et al., 2021; King et al., 2021). Table 1 shows a taxonomy of the top 120 cryptocurrencies in circulation and ranked according to their market capitalization. This taxonomy identifies the usage cases of each of the cryptocurrencies and identifies the market capitalization size category. For example, bitcoin, which is the oldest cryptocurrency in circulation, presently has a market capitalization of nearly $400 billion (in USD) and is considered to be in the high market capitalization category. Unlike, say, the Ethereum blockchain, which is extensively used for smart contracts, the Bitcoin ecosystem has been largely used for speculative, or, hedging, activities, on the part of market participants, and as a way to store or create value (Koutmos et al., 2021; Mo et al., 2022; Schilling and Uhlig, 2019). Bitcoin cash, on the other hand, which was created after a hard fork with Bitcoin's blockchain on August 1, 2017, is used extensively for payments and digital currency.[3] Albeit these taxonomic classifications are not entirely absolute, in terms of wholly identifying the utilizations of the respective cryptocurrency, especially due to the several uses and applications each of them possesses, it does depict the growing and diverse interests and needs of cryptocurrency users and the aggregate market.

These diverse interests and expectations have translated into an ever-increasing growth in the trade volume of all the cryptocurrencies in circulation. Figure 2 shows the daily (24-hour) trading volume of all digital assets in circulation, including non-fungible tokens (NFTs) and decentralized finance (DeFi) platforms. Presently, there is approximately $100 billion (in USD) of trade volume each day. During the height of the SARS-CoV-2 (COVID-19) pandemic, and in the spring of 2020, daily trade volume exceeded $500 billion (in USD). A probable reason for this excess volume was that lockdowns induced investors, large and small, to engage in more trading in financial markets. Guzmán et al. (2021) examine the impact of the COVID-19 lockdowns on bitcoin trading volume and, using Apple mobility data, show that investors trade bitcoin more actively on days associated with low mobility and lockdown mandates. In a similar vein,

[1] The Board of Governors of the Federal Reserve System are presently exploring the prospects of a central bank digital currency (CBDC) to replace Federal Reserve notes (i.e., physical coins and bills). As early as October 2016, then-Governor Lael Brainard made a presentation at the Institute of International Finance Annual Meeting Panel on Blockchain in Washington, DC, to discuss distributed ledger technology and its implications for payments, clearing, and settlement. During this speech, she also revealed that the Federal Reserve Board has established a working group on this subject. A transcript of this presentation is publicly available here: https://www.federalreserve.gov/newsevents/speech/brainard20161007a.htm.

[2] A partial list of firms that accept certain cryptocurrencies for some transactions can be found here: https://bitpay.com/directory/.

[3] Webb (2018) provides an in-depth discussion of this hard fork that Bitcoin's blockchain experienced, along with a discussion of the implications between blockchain hard forks and income tax law. A background discussion on blockchain forks, and the differences between hard and soft forks, can be found here: https://www.coindesk.com/markets/2017/03/27/a-short-guide-to-bitcoin-forks/.

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Chiah et al. (2022) examine the trading patterns of Australian retail investors during COVID-19 and find investors looked to the stock market as a gambling substitute, especially during periods of lockdowns.

The sheer size of the cryptocurrency market, along with regulatory concerns that investors do not fully understand the inherent risks of crypto-based assets, regularly prompts warnings by government officials around the world. For example, the Office of Investor Education and Advocacy (OIEA) at the Securities and Exchange Commission (SEC) regularly issues statements about fraud, deceptive practices, and other potential scam-related schemes that investors need to be wary of.[4] One such article by the SEC's OIEA, titled "Digital Asset and 'Crypto' Investment Scams - Investor Alert," indicates the following:[5]

> ... Fraudsters continue to exploit the rising popularity of digital assets to lure retail investors into scams, often leading to devastating losses. 'Digital assets' include crypto-currencies, coins, and tokens such as those offered in so called initial coin offerings (ICOs). Investors may be less skeptical of investment opportunities that involve something new or 'cutting-edge,' or may get caught up in the fear of missing out (FOMO). For example, some investors may have FOMO, given the rise in price of some digital assets in recent years, that they will miss an opportunity to become very wealthy ...

In recent years, there has been a rise in cryptocurrency theft and hacks, so there is reason to be skeptical of the plethora of digital assets and platforms that have emerged. Figure 3 shows that from 2016 to 2020, there was a cumulative loss of approximately $2.25 billion (in USD). The year where the highest theft and hacking was reported, given this sample range, is in the year 2018, with $950 million (in USD) reported.

Despite the inherent risks associated with cryptocurrencies, and in terms of market capitalization, bitcoin remains the dominant cryptocurrency in circulation. Figure 4 shows bitcoin's monthly dominance (as a percentage) from April 2013 to June 2022. Bitcoin's dominance is particularly impressive, given that it is estimated as the market capitalization of bitcoin relative to the market capitalization of all digital assets in circulation – including NFTs and DeFi platforms. From this figure, we see that there was a sharp decline in bitcoin dominance shortly after January 2017, where its dominance fell from approximately 85% to 40% within a few months. While a reason for this decline is not established in the research, it is possible that this decline was the result in the rise in popularity of other cryptocurrencies, and in anticipation of the launching of bitcoin futures which happened on December 10, 2017, by the Chicago Board Options Exchange (CBOE), and, subsequently, by the Chicago Mercantile Exchange (CME) on December 18, 2017. As Hale et al. (2018) argue, the rapid decline in bitcoin's price following the introduction of futures is not particularly astonishing, but rather, is an indication that speculative demand is diminishing. This result is because futures effectively provide an investment vehicle by which pessimists can short bitcoin and thereby bet on its price decline.

Despite bitcoin's price volatility, the number of users may be increasing, albeit at a decreasing rate. Figure 5, for example, shows the number of unique wallets on Blockchain.com from November 2011 to June 2022. Presently, there are over 80 million unique wallets. The sharp decline in bitcoin's dominance, which is illustrated in Figure 4, did not necessarily lead to a decrease in the number of users. While it is still too early to tell, it appears however that the growth in the number of users is diminishing.

Given the aforementioned trends in cryptocurrency markets and usage, the White House has recently signaled its intent to scrutinize cryptocurrency markets and for various regulatory bodies, such as the Secretary of the Treasury, to investigate a range of issues pertaining to illicit financial activity. This article serves to discuss some of these issues, along with the motivation for Biden's order, and to discuss its potential impact on cryptocurrencies and fintech at large. The remainder of this article is structured as follows. Section 2 discusses the recent trends in fintech, as well as some of the major players involved. Section 3 outlines Biden's executive order and discusses its language and intended purpose. The study discusses the major areas of the order and links them to what has been reported in the literature. Section 4 analyzes the directions which interdisciplinary research can take in the future, especially considering the executive order. It specifically outlines research questions that are bound to be of interest to academics, government officials and regulators, as well as the general public. Finally, Section 5 concludes this article.

[4] See, for example, here: https://www.sec.gov/investor/alerts.

[5] This article can be found here: https://www.investor.gov/introduction-investing/general-resources/news-alerts/alerts-bulletins/investor-alerts/digital-asset.

Following the Money: Some Recent Trends in FinTech

There are many forces driving fintech today, led by innovators and practitioners across all industries, to academics and regulators seeking to determine and quantify their economic and societal impact. Broadly speaking, and in the words of Mention (2019, p. 59), "... fintech is an umbrella term for innovative technology-enabled financial services and the business models that accompany those services ... fintech can be used to describe any innovation that relates to how businesses seek to improve the process, delivery, and use of financial services ..."

While the advent of cryptocurrencies and blockchain technology represents but a portion of the fintech movement, not everyone believes that cryptocurrencies are the future for our society and economy. For example, when business leaders of multinational companies are interviewed in the popular press and asked about their views pertaining to bitcoin or blockchain, they tend to respond in such a way that suggests they have a lack of faith in any particular cryptocurrency, such as bitcoin, but that the blockchain technology as a whole may have applicability to many key areas of business (Corradi and Höfner, 2018; Garg et al., 2021; Toufaily et al., 2021).

Table 2 shows results of survey data from Deloitte, which posed the following question to senior executives: "Has your organization either brought blockchain to production or plans to do so at some point in the future?" The results of this survey show a considerable number of firms are either currently engaged in blockchain production or have plans for blockchain production within the next year. Of all the countries' senior executives that were interviewed, China (at 49%), Mexico (at 48%), and the United Kingdom (at 40%), showed the highest proportion of positive responses indicating that blockchain production is currently underway to serve some aspect of their business operations.

While we think of blockchain and, more broadly, fintech, as a recent phenomenon, one can argue that fintech can date back to the mid-1850s when the telegraph was invented and its usage began to spread around the world with the building of the first transatlantic cable (Nicoletti, 2017). In our present time, and in an era of Internet of Things (IoT) and Machine-to-Machine (M2M) communications, one is hard-pressed to imagine what an unlinked world would look like or how to conduct day-to-day transactions without the use of technology.

In recent times, however, our discussion of fintech and the intensity of investment in this area has grown substantially. Figure 6 shows the global value of investment in fintech from the first quarter of 2014 to the fourth quarter of 2021 and includes fintech investment arising from venture capital investment, private equity, and merger and acquisition investments. In the third quarter of 2019, this investment value reached a peak of nearly $150 billion. Presently, this value is $40 billion, an amount that is at least double what it was throughout the fiscal year 2014.

While global fintech investment is likely to continue growing in the near future, of interest is to see what aspects, or sectors, of fintech are likely to grow the fastest. Figure 7 perhaps shows a more nuanced view on this subject that has implications for future research. Specifically, the figure shows the value of venture capital-backed funding worldwide from 2016 to 2021 across various market sectors. Following trends in venture capital funding is important since the expectations of venture capitalists, and their resultant investment activities, can play a significant role in shaping our economic landscape and our institutions (Lerner and Nanda, 2020). What we see from Figure 7 is that capital markets, followed by payments, wealth management, and digital lending, in that order, receive more venture capital funding relative to the other sectors. These results may be expected, given that the average consumer often possesses multiple payment methods (e.g., cash, checks, credit cards, debit cards, money orders, etc.) and a considerable number are adopting mobile apps or mobile online accounts (e.g., Android Pay, Apple Pay, Samsung Pay, etc.) (Foster et al., 2019). In 2009, Paul Volcker, who was the 12th chairman of the Federal Reserve from 1979 to 1987, said: "... the most important financial innovation that I have seen the past 20 years is the automatic teller machine (ATM) ... that really helps people and ... is a real convenience ... how many other innovations can you tell me that have been as important to the individual as the ATM, which is in fact more of a mechanical innovation than a financial one?"[6]

Paul Volcker's quip, although has implications for future research and debate into defining what exactly constitutes financial innovation and *how* it impacts our economy and society, also shows that payment efficiency and speed are important driving forces to technological innovation in finance. After all, cryptocurrencies have emerged to

[6] See the December 14, 2009, issue of the Wall Street Journal, titled "Paul Volcker: Think more Boldly," where Paul Volcker discusses financial innovation and the future of banking. Specifically, he asks us to investigate the roles financial innovation played in the real economy and society; URL: https://www.wsj.com/articles/SB10001424052748704825504574586330960597134.

facilitate peer-to-peer (P2P) transactions and lending. As Arner et al. (2015) argue, the year 1987 marked a period of time when regulators began focusing on the systemic risks of cross-border financial interconnections and the role which technology can play. Oliver Stone's film *Wall Street*, which was released in December of that very year, fittingly illustrated the role technology can play and how interconnected our world is becoming; an image of an investment banker holding one of the earliest versions of the mobile telephone—an image that, during those times, may have appeared outlandish but which, today, is all but pervasive among a wide-ranging demographic.

Given the aforementioned, it may finally come to no surprise to see that the largest U.S. fintech companies, shown in Figure 8, consist of firms that specialize in payment processing for e-commerce websites and other such mobile applications. For example, as of 2021, Stripe is valued at $95 billion, while the next largest fintech firm (Klarna) is valued at $46 billion. Extant research, especially following the COVID-19 pandemic, shows that the volume of transactions may continue to increase in the near future as more consumers utilize mobile payment methods and as fintech lending P2P firms continue to establish a market presence in diverse regions of the world. Najaf et al. (2021) examine an expansive sample of U.S. fintech P2P loans and find that the volume of such loans increased significantly during the COVID-19 pandemic. In addition, there was, on average, a 23% increase in unverified loans during the height of the COVID-19 period, when compared to pre-pandemic levels. It is yet to be seen what impact such an increase in (unverified) lending activity can have on our economy, despite the seeming benefits of P2P lending. In the words of Wang and Drabek (2021, p. 1): "... the fast development of disintermediated online lending in the past decade, while providing convenience and efficiency, also generates significant concealed credit risk for the financial system ..."

Overall, finance may disproportionately be a beneficiary of investment into the fintech space. When conducting a mapping study of research in both academia and industry, Fernandez-Vazquez et al. (2019) noted that a majority of the research efforts in blockchain and fintech are focused on the finance and the banking sector. Consistent with this focus, Figure 9 shows the leading digital banks as of 2020, based on the value of the capital raised. Nubank, for example, raised nearly $1.1 billion during this time. These digital banks, despite being dispersed around the world, have a focus on low fee (or fee-free) currency exchange, mobile stock market trading, P2P payments, and cryptocurrency exchange.

The future of fintech firms is yet to be seen, but the sheer valuation sizes of these firms operating in this space suggests that the finance and banking industry will likely be changing in many ways in the near future. An article by the popular digital economy news site, *TechCrunch*, noted the following regarding these technology platforms and their characteristics: "... Uber, the world's largest taxi company, owns no vehicles. Facebook, the world's most popular media owner, creates no content. Alibaba, the most valuable retailer, has no inventory. And Airbnb, the world's largest accommodation provider, owns no real estate. Something interesting is happening ..."[7]

Anatomy of Biden's Executive Order

The White House has not ignored the extraordinary changes taking place in our technology-driven economy. In addition, regulators have responded with proposals for how to sustainably grow fintech investment while monitoring systemic risks in our economy (Claessens et al., 2018).

In response to these trends and the potential risks which they bring to our economy, on March 9, 2022, President Biden signed Executive Order 14067, titled "Ensuring Responsible Development of Digital Assets" (Exec. Order No. 14067, 2022).[8] This order comes during a time we are experiencing a proliferation of digital currencies, with unique microstructures and scalable technological platforms, as well as broad advancements in distributed ledger technologies, which are being explored by major financial institutions and central bankers. In addition, there appears to be a growing number of users (individual users as well as firms and institutions), who either trade cryptocurrencies or use their blockchains in some form (e.g., to create smart contracts). The executive order thus begins by highlighting many of the important trends we discussed earlier in this article:

> … Advances in digital and distributed ledger technology for financial services have led to dramatic growth in markets for digital assets, with profound implications for the protection of consumers,

[7] See here: https://techcrunch.com/2015/03/03/in-the-age-of-disintermediation-the-battle-is-all-for-the-customer-interface/.

[8] See the full executive order here: https://www.federalregister.gov/documents/2022/03/14/2022-05471/ensuring-responsible-development-of-digital-assets. The executive order may also be accessed from the White House's briefing room here: https://www.whitehouse.gov/briefing-room/presidential-actions/2022/03/09/executive-order-on-ensuring-responsible-development-of-digital-assets/.

> 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 ... (Section 1. Policy).

In addition to this introductory statement, the executive order mentions that "… monetary authorities globally are also exploring, and in some cases introducing, central bank digital currencies (CBDCs) …" The debate over whether to institute CBDCs is one that has grown acutely in the wake of the COVID-19 pandemic. In addition, there are several legitimate arguments for, and against, such an initiative, which have yet to be debated publicly despite the rapid advancements some governments are making in piloting such CBDC programs.[9] Some arguments in favor of CBDCs consist of (i) improving payment system efficiency; (ii) reaching out to unbanked citizens in underdeveloped financial systems; (iii) providing more authority to a country's central bank to conduct targeted monetary policy; (iv) preventing the creation and adoption of yet more privately-issued cryptocurrencies (Kiff et al., 2020). Arguments against CBDCs include (i) a possible erosion of personal liberties and privacy, since governments (and even corporations) can track your spending habits, thereby allowing for the possibility for them to alter your credit score, or, alter what public benefits one is able to access; (ii) the ability for central bankers (and their governments) to create inflation and to disincentivize saving, since now negative interest rates can facilely become the norm, thereby posing a hidden tax on firms, savers, and individuals (Assenmacher and Krogstrup, 2021; Baronchelli et al., 2022; Waller, 2016; Wang and Hausken, 2022).

The objectives of the executive order can be found in Section 2 of the order. In this article, we discuss, point-by-point, each of the objectives (a segment of each of the objectives, (a) through (f), is listed verbatim and in italics here):

> *(a) We must protect consumers, investors, and businesses in the United States. The unique and varied features of digital assets can pose significant financial risks to consumers, investors, and businesses if appropriate protections are not in place.*
>
> *(b) We must protect United States and global financial stability and mitigate systemic risk. Some digital asset trading platforms and service providers have grown rapidly in size and complexity and may not be subject to or in compliance with appropriate regulations or supervision.*
>
> *(c) We must mitigate the illicit finance and national security risks posed by misuse of digital assets. Digital assets may pose significant illicit finance risks, including money laundering, cybercrime and ransomware, narcotics and human trafficking, and terrorism and proliferation financing.*
>
> *(d) We must reinforce United States leadership in the global financial system and in technological and economic competitiveness, including through the responsible development of payment innovations and digital assets.*
>
> *(e) We must promote access to safe and affordable financial services. Many Americans are underbanked, and the costs of cross-border money transfers and payments are high.*
>
> *(f) We must support technological advances that promote responsible development and use of digital assets. The technological architecture of different digital assets has substantial implications for privacy, national security, the operational security and resilience of financial systems, climate change, the ability to exercise human rights, and other national goals.*

Literature and motivation for objectives (a) and (b) is alluded to here in this article. In particular, empirical research shows that cryptocurrencies' price volatility is higher relative to what we witness historically in the price volatility of other conventional asset classes, such as currencies, commodities, equities, and bonds, to name but a few (Lo and Wang, 2014). Perhaps this price volatility is one aspect of the discussion, since it translates into unpredictable risks for businesses and consumers that transact with cryptocurrencies, as well as for investors who actively trade such digital assets. Objective (a) goes on further to also reference the cybersecurity risks associated with cryptocurrencies along with those of all the platforms that are connected to them. Whereas objective (a) references the individual elements within the financial system (consumers, investors, and businesses), objective (b) takes a more macro perspective and conveys the importance of protecting U.S. and global financial stability. Within objective (b), it states that digital assets, along with their interconnected ecosystems, should be subject to regulatory and supervisory standards as are traditional market

[9] For a graphical view of countries using CBDCs, or, developing plans to use them, see here: https://cbdctracker.org/.

ecosystems, consistent with the principal "same business, same risks, same rules." This concept is thus far being extended to stablecoin supervision, but objective (b) insinuates that it applies to all facets of digital assets including their surrounding ecosystems.[10]

Whereas objective (c) is rather more specific and expresses the need to address cybercrime and illicit finance activities, such as ransomware, narcotics, terrorism, and human trafficking, objective (d) is broader and expresses the U.S.' interest in ensuring the responsible development of these digital assets and any associated payment innovations. The order goes on to say that the U.S. must stay at the forefront of such technological development and set standards that promote (i) democratic values; (ii) the rule of law; and, among other values and standards, (iii) privacy.

Objective (e) expresses how the U.S. has a strong interest in ensuring "... equitable access to financial services ... particularly for those Americans underserved by the traditional banking system ..." This objective is concerned with equitable access to financial services and identifies how cross-border funds transfers and payments need to be made cheaper, faster, and safer. Objective (f) identifies key points that are also made in some of the other aforementioned objectives. For example, objective (f) expresses how developmental plans of digital payment ecosystems need to take into account issues pertaining to privacy and security in their architectures. Finally, and unlike the aforementioned objectives, objective (f) mentions that there is a need to reduce the negative environmental impacts that may arise from some of the cryptocurrency mining that is happening presently.

As is discussed in Section 4 of this article, much of the executive order references the need for "interagency" cooperation and coordination. For example, in Section 3 of the order, it states how this interagency coordination process will include many of the major branches of government and departments, including the departments of State, Treasury, Defense, the Attorney General, Commerce, Labor, Energy, Homeland Security, and the Environmental Protection Agency, to name but a few. This interagency coordination process also calls on senior officials from the Board of Governors of the Federal Reserve System, the Consumer Financial Protection Bureau, the SEC, and the Commodity Futures Trading Commission, to name but a few. In Section 5 of the order, we see that it colloquially makes reference to "less informed market participants" who may be more exposed to the risks which digital assets bring, as well as the potential for such digital assets to "exacerbate inequities."

Our Future

At first glance, apparently the executive order and its stated objectives are somewhat vague. Executive orders typically direct an administrative agency, or a federal official, to engage in (or to otherwise refrain from) some course of action. While objectives (a) through (f) do not provide some prescriptive policy for digital assets, or the fintech industry at large, the order instead lays a foundation for interagency cooperation in establishing regulations for digital assets. In addition, the order lays the foundation for the possible introduction of CBDCs. While it is not possible to foresee the future of the fintech industry, cryptocurrencies, or, if we will ultimately be using some form of CBDCs, there are some important aspects we can glean from the executive order that are likely to have an impact in our near future. At the very least, these aspects will undoubtedly influence the efforts and resources of future research in academia as well as the regulatory environment.

Before we discuss some of these research avenues, it is important to understand that, while the executive order may be regarded as rather vague in some respects, it does also provide a timeline for a series of reports that are to be submitted to President Biden. A timeline for these reports, as well as the respective interagency cooperation required, is described in Sections 4 through 8 of the executive order, and summarized partially here (the respective relevant section from the executive order is referenced in italics):

- *Sec. 4. Policy and Actions Related to United States Central Bank Digital Currencies.*

  ► Within 180 days of issuance of the executive order, the Secretary of the Treasury, in consultation with, among other key agencies and departments, the Attorney General, Director of National Intelligence, Secretary of State, and the Secretary of Commerce, is to submit a report to President Biden analyzing how CBDCs may impact various facets of our society, such as (a) U.S.

[10] See the October 13, 2020, report by the Financial Stability Report titled, "Regulation, Supervision and Oversight of 'Global Stablecoin' Arrangements. This report can be found here: https://www.fsb.org/2020/10/regulation-supervision-and-oversight-of-global-stablecoin-arrangements/.

national interests and economic stability; (b) financial inclusion; (c) existing currencies and mediums of exchange; (d) global payments.

► Within 180 days of issuance of the executive order, provide an assessment to President Biden, through the Assistant to the President for National Security Affairs (APNSA) and the Assistant to the President for Economic Policy (APEP), on whether legislative changes are necessary to issue CBDCs.

► Within 210 days of issuance of the executive order, to provide President Biden, through APNSA and APEP, legislative proposals concerning CBDCs.

- *Sec. 5. Measures to Protect Consumers, Investors, and Businesses.*

► Within 180 days of issuance of the executive order, the Secretary of the Treasury, in consultation with, among other key agencies, the Secretary of Labor, is to submit a report to President Biden examining the implications of CBDCs on U.S. consumers, investors, business, and for "equitable economic growth."

► Within 180 days of issuance of the executive order, the Director of the Office of Science and Technology Policy and the Chief Technology Officer of the United States, in consultation with, among other key agencies and departments, the Secretary of the Treasury and the Chairman of the Federal Reserve, is to submit a technical evaluation to President Biden of the technological infrastructure and expertise needed to introduce CBDCs.

► Within 180 days of issuance of the executive order, the Attorney General, in consultation with the Secretary of Homeland Security and the Secretary of the Treasury, is to submit a report to President Biden on the role of law enforcement in relation to criminal activity involving digital assets.

► Within 180 days of issuance of the executive order, the Director of the Office of Science and Technology Policy, in consultation with, among others, the Secretary of Energy and the Administrator of the Environmental Protection Agency (EPA), is to submit a report to President Biden on the relation between distributed ledger technology and economic and energy transitions, as well as how this technology can have an impact on the environment.

- *Sec. 6. Actions to Promote Financial Stability, Mitigate Systemic Risk, and Strengthen Market Integrity.*

► Within 210 days of issuance of the executive order, the Secretary of the Treasury is to convene the Financial Stability Oversight Council (FSOC) and produce a report that examines the financial stability risks which digital assets pose, as well as give recommendations to address such risks.

- *Sec. 7. Actions to Limit Illicit Finance and Associated National Security Risks.*

This section of the executive order specifies that within 90 days and 120 days, respectively, of submission to the Congress of the National Strategy for Combating Terrorist and Other Illicit Financing, the Secretary of the Treasury, among other, and in consultation with, other key agencies and departments, is to submit a series of reports. These reports are to be strategic plans regarding the illicit finance risks posed by digital assets and plans that address the roles of the various law enforcement agencies.

- *Sec. 8. Policy and Actions Related to Fostering International Cooperation and United States Competitiveness*

► Within 90 days of issuance of the executive order, the Attorney General, in consultation with the Secretary of Homeland Security, the Secretary of State, and the Secretary of the Treasury, is to submit a report to President Biden on ways to strengthen "… international law enforcement cooperation for … criminal activity related to digital assets …"

► Within 120 days of issuance of the executive order, the Secretary of the Treasury, in consultation with, among other key agencies and departments, the Secretary of Commerce and the Secretary of State, is to develop a framework for interagency and international engagement in order to, for example, "… enhance adoption of global principles and standards for how digital assets are used and transacted …" as well as "… promote development of digital asset and CBDC technologies consistent with our values …"

> Within 1 year of the development of this interagency and international engagement framework, the Secretary of the Treasury, in consultation with, among other key agencies and departments, the Secretary of Commerce and the Secretary of State, is to submit a report to President Biden on priority actions that have been taken under this framework and their efficacy.

► Within 180 days of issuance of the executive order, the Secretary of Commerce, in consultation with, among other key agencies and departments, the Secretary of State and the Secretary of the Treasury, shall devise a framework for "… enhancing United States economic competitiveness in, and leveraging of, digital asset technologies …"

In light of objectives (a) through (f), as well as the timeline specified in the executive order, there is a possibility that government-issued digital money may become some form of our reality in the future. The executive order, and the international and interagency coordination that it calls for, have shown that, at a minimum, authorities around the world believe that digital assets and their ecosystems would best serve societal interests if they were more centrally regulated. As mentioned earlier, the growing investment into fintech firms, blockchain technology, and the proliferation of various different digital coins, have all been motivating factors for this present executive summary.

In light of the aforementioned, this article puts forward several major societal, accounting, economic, and environmental questions that are bound to be of fundamental importance to upcoming regulatory deliberations, political debates, and academic inquiry. Given the complexity of the issues at play, as well as the sheer diversity of stakeholders and governments that can be impacted by this executive order, these questions will certainly call on multiple scientific disciplines and perspectives around the world. They will need to be debated vigorously, candidly, and publicly before informed decisions can possibly be made. These questions, which are in no way exhaustive and in no particular order, are as follows:

- Future Question 1: Is it in society's best interest to institute CBDCs?
- Future Question 2: Are there future applications for blockchain technology other than how it is used for certain cryptocurrencies, such as, and most notably, bitcoin?
- Future Question 3: Can illicit finance continue to thrive if cryptocurrencies are regulated, or, if CBDCs are officially instituted?
- Future Question 4: Is it possible to conceptualize and quantify the environmental impact of present-day cryptocurrency mining?
- Future Question 5: Will monopolies and oligopolies begin to emerge in the fintech sector and, if they do, is there a precedent for what regulatory action can be applied?
- Future Question 6: How will the widespread trading and exchange of cryptocurrencies impact accounting standards and tax reporting?

Each of these questions naturally leads to a multitude of other underlying questions that span fields such as computer science, economics, engineering, finance, law, politics, and sociology, for example. Let us begin with Future Question 1: Is it in society's best interest to institute CBDCs? This question is one we will undoubtedly be facing in the future. Already, and as alluded to earlier, there are a number of nations, including the U.S., which are entertaining the possibility of adopting (their respective version of) CBDCs. Arguments put forward for doing so, as mentioned, include possibly enhanced payment efficiency, financial inclusion, and more authority to the central bank for targeted monetary policy initiatives. Despite such arguments, there is a need for more debate and for more interdisciplinary research as to the

impact such a move can have, for example, on personal liberties and privacy, or the possibility that such a move can effectively disincentivize saving, since negative interest rates may become the norm in the future.

Our next future question is one that is actively being explored across all industry sectors; Future Question 2: Are there future applications for blockchain technology other than how it is used for certain cryptocurrencies, such as, and most notably, bitcoin? As discussed earlier, fintech investment has grown steadily over the years and much of the venture capital-backed funding is in sectors such as capital markets, payments, wealth management, and digital lending. The insurance industry, for example, is examining ways in which blockchain technology can be used to make their operations more efficient, customer-centric, and to reduce the probability that fraudulent claims are approved and processed (Grima et al., 2020).

Our next future question focuses on whether regulation of digital assets is necessary for preventing illicit finance activities: Future Question 3: Can illicit finance continue to thrive if cryptocurrencies are regulated, or, if CBDCs are officially instituted? This question also is linked to objectives (a) and (c) of the executive order, discussed in Section 3 of this article, which are concerned with the protection of consumers, investors, and businesses, and the need to mitigate national security threats posed by the misuse of digital assets. Specifically, objective (c) cites illicit finance activities such as money laundering, cybercrime and ransomware, narcotics, human trafficking, and terrorist activities. As Sanz-Bas et al. (2021) discuss, cryptocurrencies can be used for conducting illegal transactions that often take place on the "dark internet" (Darknet), including purchasing contraband such as stolen bank data, narcotics, malware, or counterfeit banknotes, to name a few examples. These issues are further compounded by the emergence of ICOs as well as initial exchange offerings (IEOs) and will undoubtedly be a question that will require future resources to examine.

Our next question is concerned with the environmental impact which current cryptocurrency mining techniques utilize: Future Question 4: Is it possible to conceptualize and quantify the environmental impact of present-day cryptocurrency mining? This question is of immediate importance, since there are multiple methods for mining cryptocurrencies that have different implications in terms of how energy is used (King et al., 2021). According to some estimates, and as of August 2022, bitcoin alone is estimated to account for approximately 60% to 77% of the total global digital asset electricity usage, while ethereum accounts for approximately 20% to 39%.[11] As shown in Li et al. (2019), more work is needed to fully understand the energy consumption of the multitude of cryptocurrencies that are in circulation today, especially given their unique ecosystems and mining methodologies.

Our fifth question is one for which we do not necessarily have a precedent for and which will likely become an issue in the future: Future Question 5: Will monopolies and oligopolies begin to emerge in the fintech sector and, if they do, is there a precedent for what regulatory action can be applied? While we have a precedent for "big tech" legal cases, or regulatory initiatives for technology firms that have violated anti-monopoly laws (e.g., Birch et al., 2021), we are not necessarily prepared to handle cases whereby, for example, there is a monopoly of firms that serve as intermediaries, or, some sort of clearinghouses, for CBDC transactions and investments? This question, as well as some of the others brought forward, needs to be discussed and debated publicly before any actions are taken. As of now, there is a lack of informed public discussion, despite the growth in fintech investment and strides among policymakers for regulating this industry and introducing CBDCs.

Finally, our last future question is yet another for which there is no precedent: Future Question 6: How will the widespread trading and exchange of cryptocurrencies impact accounting standards and tax reporting? This question is multifaceted since digital assets can be exchanged and traded by individuals, small and midsize enterprises (SMEs), as well as global corporations and even government entities. The Financial Accounting Standards Board (FASB) issued a proposed Accounting Standards Update (ASU) on March 23, 2023, Intangibles—Goodwill and Other—Crypto Assets (Subtopic 350-60): Accounting for and Disclosure of Crypto Assets.[12] This ASU, among other items, sets forth provisions that would apply to cryptocurrency assets that meet the following criteria (see pp. 1–2 of the ASU in footnote 12): (i) The crypto asset meets the definition of an intangible asset as defined in the Codification Master Glossary (U.S. Generally Accepted Accounting Principles); (ii) The holder of the crypto asset does not hold enforceable rights to, or claims on,

[11] See the White House Fact Sheet here: https://www.whitehouse.gov/ostp/news-updates/2022/09/08/fact-sheet-climate-and-energy-implications-of-crypto-assets-in-the-united-states/.
[12] This proposed Accounting Standards Update (ASU) by the Financial Accounting Standards Board (FASB) is available here: https://asc.fasb.org/layoutComponents/getPdf?isSitesBucket=true&fileName=Proposed_ASU_2023-200.pdf.

underlying goods, services, or other assets; (iii) The crypto asset is created, or resides on, a distributed-type ledger that is based on blockchain technology; (iv) The crypto asset is secured using cryptography; (v) The crypto asset is fungible; (vi) The crypto asset is not created or issued by the reporting entity or its related parties.

Taken together, provisions (i) through (vi) seek to elucidate upon, and identify, what constitutes a crypto asset. The ASU then further requires that reporting entities present (i) crypto assets at fair value, and, separately from other intangible assets on the balance sheet; (ii) any changes in the fair value of crypto assets separately from changes in the values of other intangible assets in the income statement, or the statement of changes in net assets for applicable not-for-profit entities. FASB ASC 820 states that fair value is based on the "... price that would be received to sell an asset ... in an orderly transaction between market participants at the measurement date ..." Thus, another issue that arises is whether changes in fair values are included in net income for each reporting period, as is conventionally the case for traditional asset classes.

The SEC utilizes the so-called Howey Test in order to determine whether an asset, digital or otherwise, constitutes an "investment contract" (Henderson and Raskin, 2019). The four criteria of the Howey Test that need to be met are as follows: (i) an investment of money; (ii) in a common enterprise; (iii) with some expectation of profit; (iv) derived from the efforts of others. Recently, the current SEC Chair, Gary Gensler, stated that the SEC regards crypto tokens and coins to be securities under the Howey Test and, therefore, they fall under the purview of the SEC: "... If somebody is raising money selling a token and the buyer is anticipating profits based on the efforts of that group to sponsor the seller, that fits into something that's a security ..." (Reuters, 2022).

While the ASU is specific and provides clear guidance for the accounting treatment and reporting of crypto assets, notice that it appears to apply only to "fungible" crypto assets. Future financial accounting research will indeed need to examine other types and classes of crypto assets, such as NFTs, and what type of accounting and reporting treatment, if any, needs to be applied.

Summary and Concluding Remarks

This article examines Executive Order 14067, titled "Ensuring Responsible Development of Digital Assets" by dissecting the main points of this executive order, as well as discussing the implications that order can have on our economy and society. This executive order comes at a time in our history when we are in what appears the later stages of the COVID-19 pandemic, which has caused severe economic and societal impairment worldwide. In addition, we are experiencing a high degree of market volatility across asset classes, and there are presently discussions taking place among government and central bank officials around the world that we may succumb to a recession in the near-term. In the recent cautionary words of David Malpass, World Bank Group President, "... global growth is slowing sharply, with further slowing likely as more countries fall into recession...my deep concern is that these trends will persist, with long-lasting consequences that are devastating for people in emerging market and developing economies ..."[13] Finally, and as part of the executive order, there is an effort among policymakers to develop CBDCs.

This study discusses, point-by-point, these significant items in the executive order, and provides context for the motivation of this order; specifically, it examines trends in cryptocurrency markets and digital asset usage, trends in fintech and venture capital investment, and senior executives' plans for blockchain production around the world. These trends have undoubtedly spurred the passage of this executive order, yet there is inadequate public discussion taking place as to the implications of what is happening in the fintech sector and what would it mean for everyone if CBDCs were introduced.

This article concludes by posing a series of questions that we will undoubtedly have to come to terms with, and which have implications for researchers across all fields, such as computer science, economics, engineering, finance, law, politics, and sociology, for example. As policymakers continue to mull these issues, let us proceed with caution, transparency, and a willingness to listen to different perspectives. To reiterate a cautionary note from the October 2020 *Report of the Attorney General's Cyber Digital Task Force* (p. vii): "... technological innovation and human flourishing

[13] See full article by the World Bank here: https://www.worldbank.org/en/news/press-release/2022/09/15/risk-of-global-recession-in-2023-rises-amid-simultaneous-rate-hikes.

are complementary concepts, but the former does not guarantee the latter. Good public policy—and the fair and equitable enforcement of such policy—can help bring the two into alignment ..."[14]

[14] The full report is available for download here: https://www.justice.gov/archives/ag/page/file/1326061.

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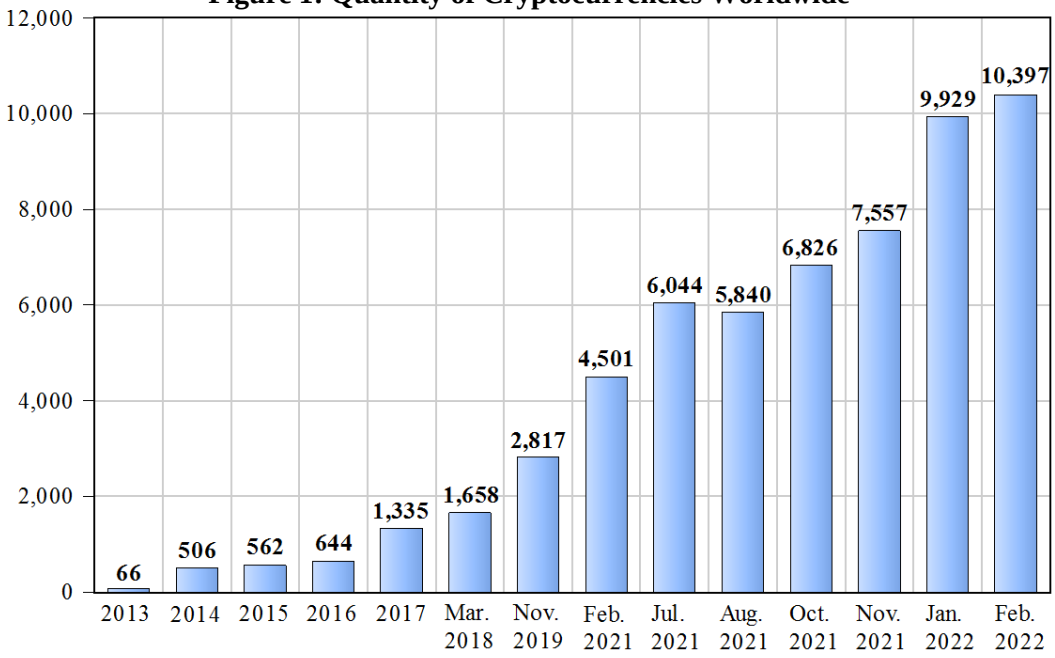
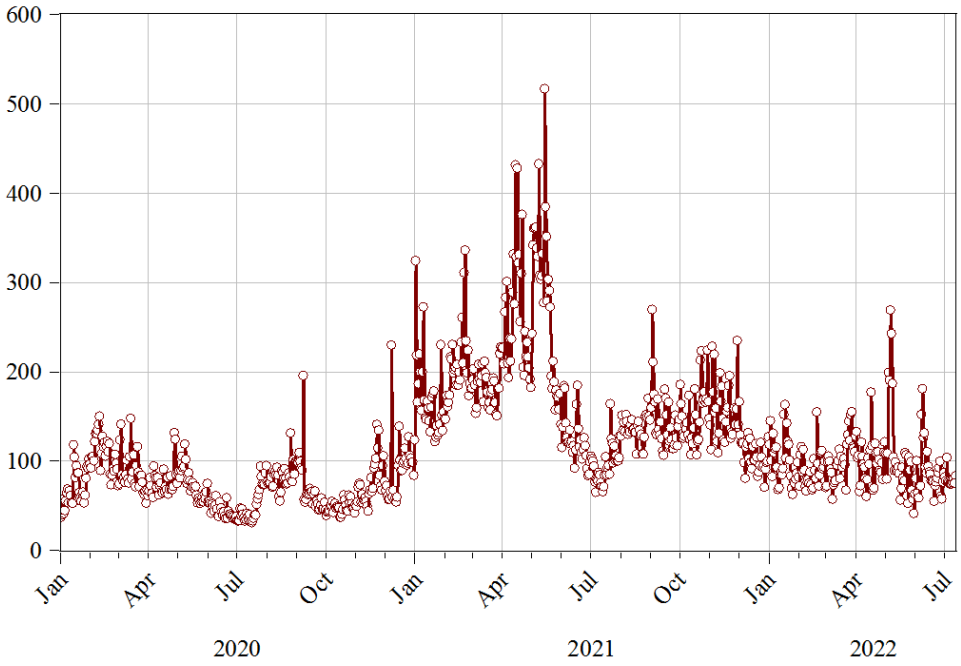
Figure 1: Quantity of Cryptocurrencies Worldwide



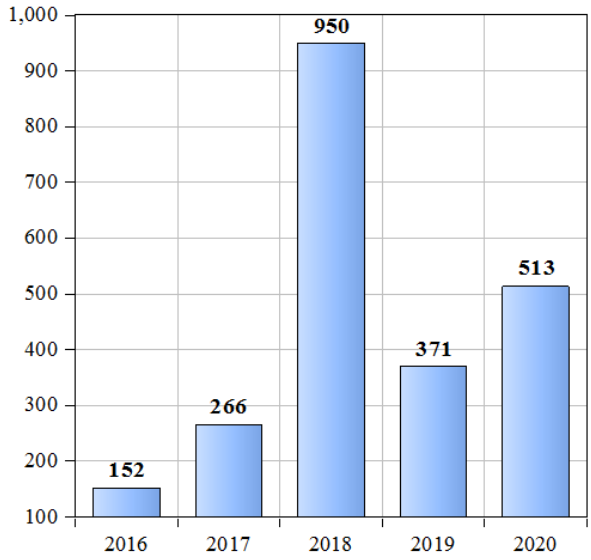
Notes: This figure shows the number of cryptocurrencies worldwide, from 2013 to February 2022. The data for this figure is sourced from Statista, CoinMarketCap.com, and Investing.com.

Figure 2: Daily Trade Volume of All Digital Assets



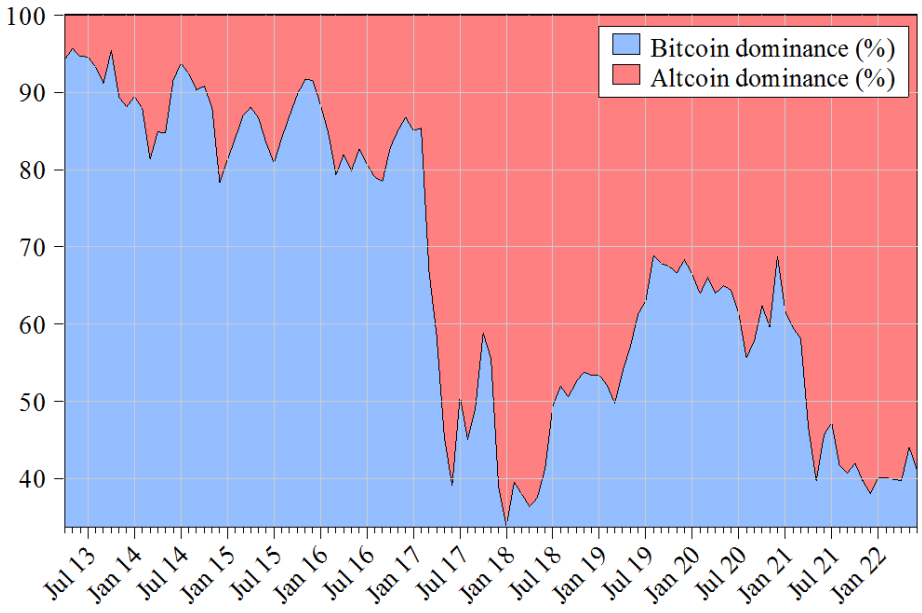
Notes: This figure shows the daily (24-hour) trading volume of all digital assets in circulation (including NFTs and DeFi platforms) from January 1, 2020, to July 13, 2022. The y-axis is expressed in billions of U.S. dollars. The data for this figure is sourced from Statista, CoinMarketCap.com, and CoinGecko.com.

Figure 3: Value of Worldwide Cryptocurrency Theft



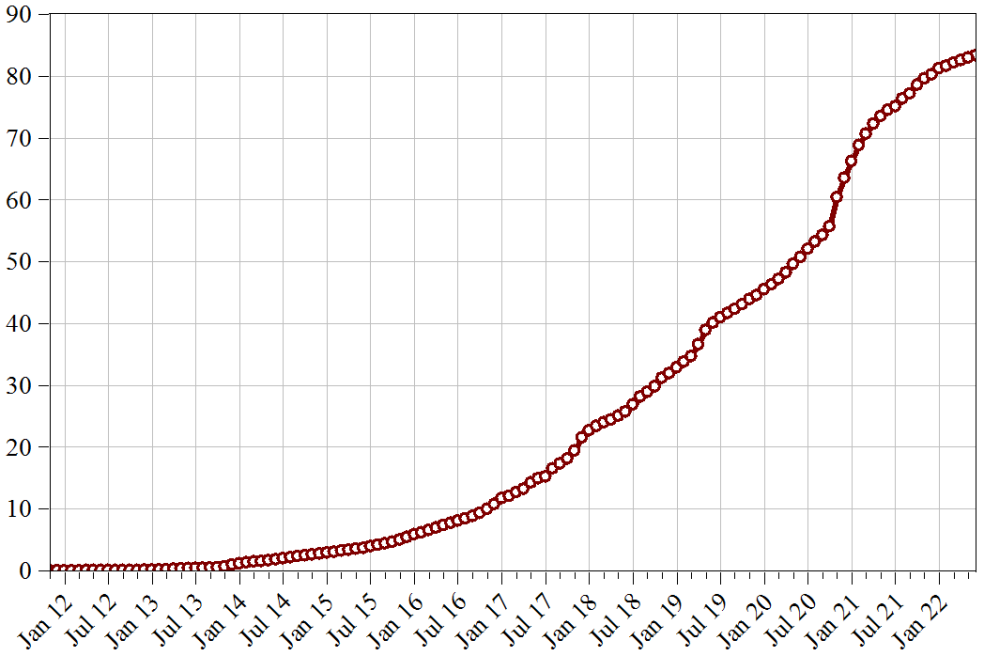
Notes: This figure shows the annual value of cryptocurrency thefts and hacks from 2016 to 2020. The y-axis is expressed in millions of U.S. dollars. The data for this figure is sourced from Statista and CipherTrace.com.

Figure 4: Bitcoin Market Dominance



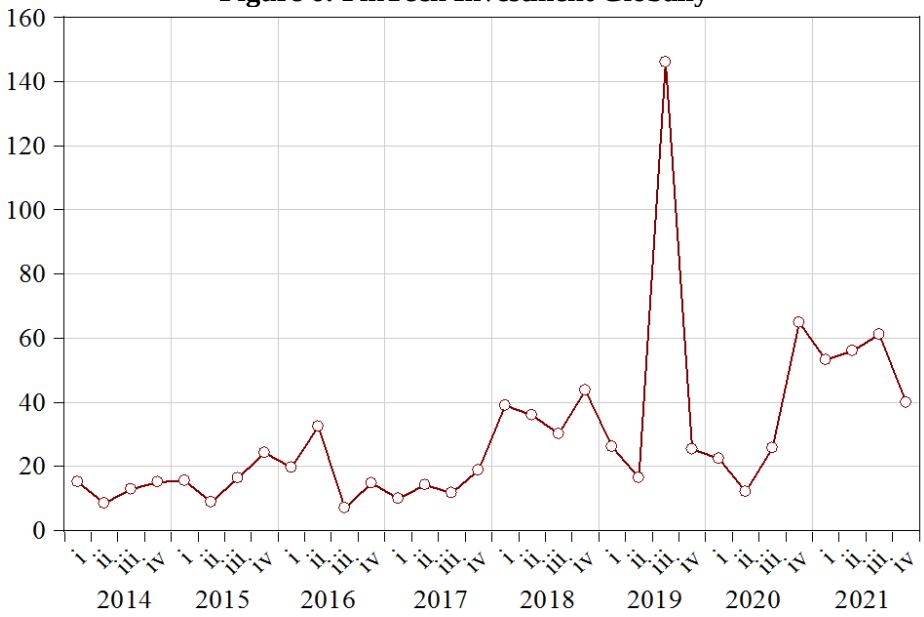
Notes: This figure shows bitcoin's monthly dominance (as a percentage) from April 2013 to June 2022. Bitcoin dominance is often cited and quoted among practitioners and in cryptocurrency research. It refers to bitcoin's market capitalization relative to the market capitalization of all digital assets in circulation (including NFTs and DeFi platforms). The data for this figure is sourced from Statista, CoinMarketCap.com, and CoinGecko.com.

Figure 5: Number of Unique Wallets on Blockchain.com



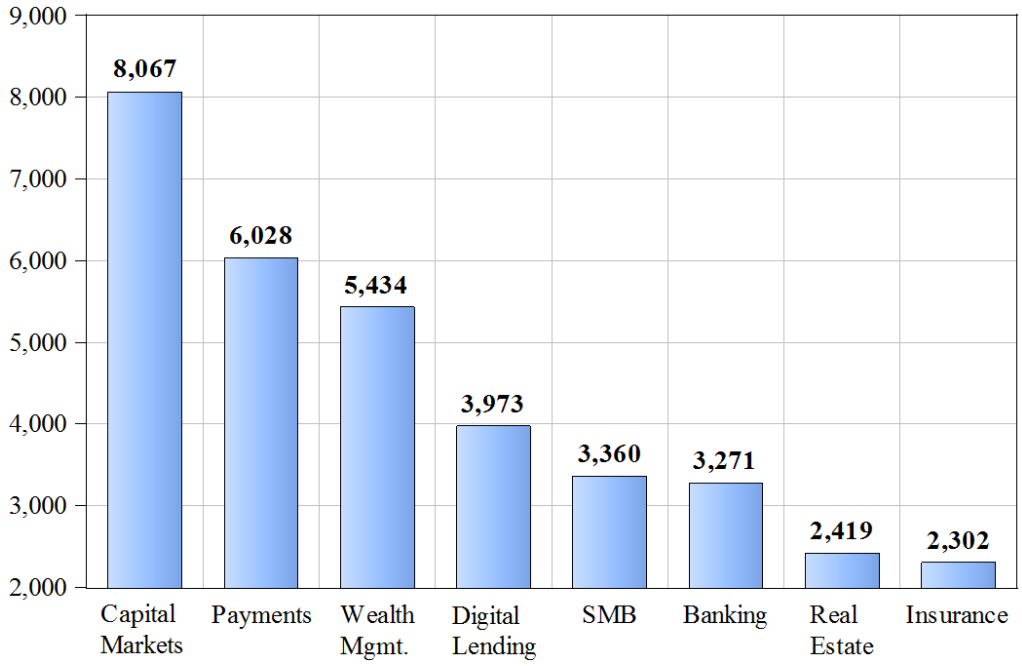
Notes: This figure shows the monthly number of unique cryptocurrency wallets created on Blockchain.com from November 2011 to June 2022. The y-axis is expressed in millions of wallets. The data for this figure is sourced from Statista and Blockchain.com.

Figure 6: FinTech Investment Globally



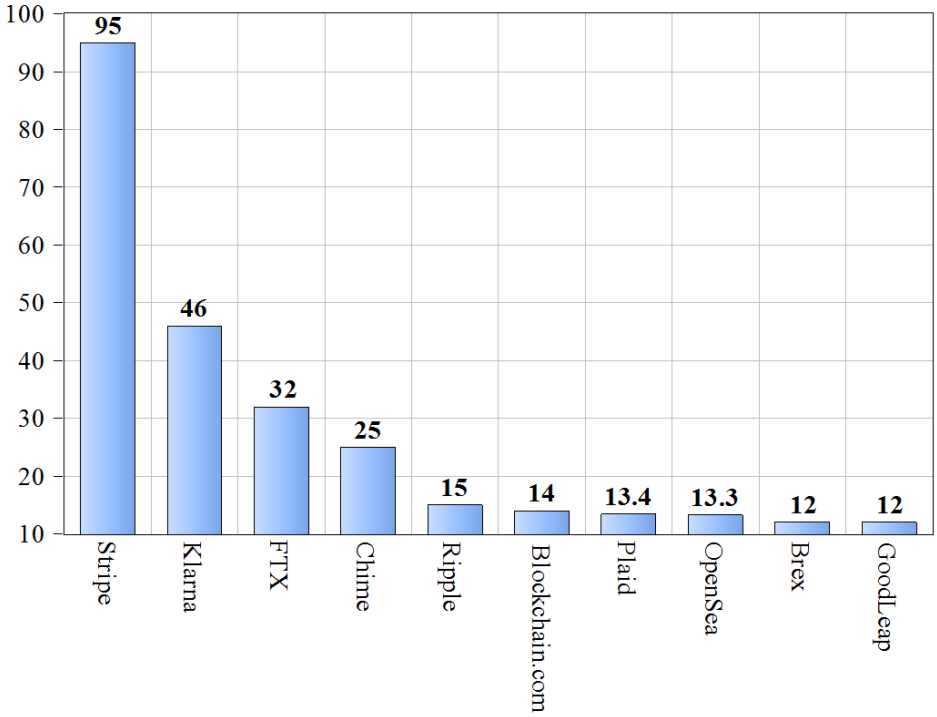
Notes: This figure shows the quarterly value of fintech investment globally from Q1 of 2014 to Q4 of 2021. The y-axis is expressed in billions of U.S. dollars. It includes fintech investment arising from venture capital investment, private equity, and merger and acquisition investments. The data for this figure is sourced from KPMG (see *The Pulse of FinTech H2 2021, page 10*) and Statista.

Figure 7: Value of Venture Capital-Backed Funding Worldwide across Sectors



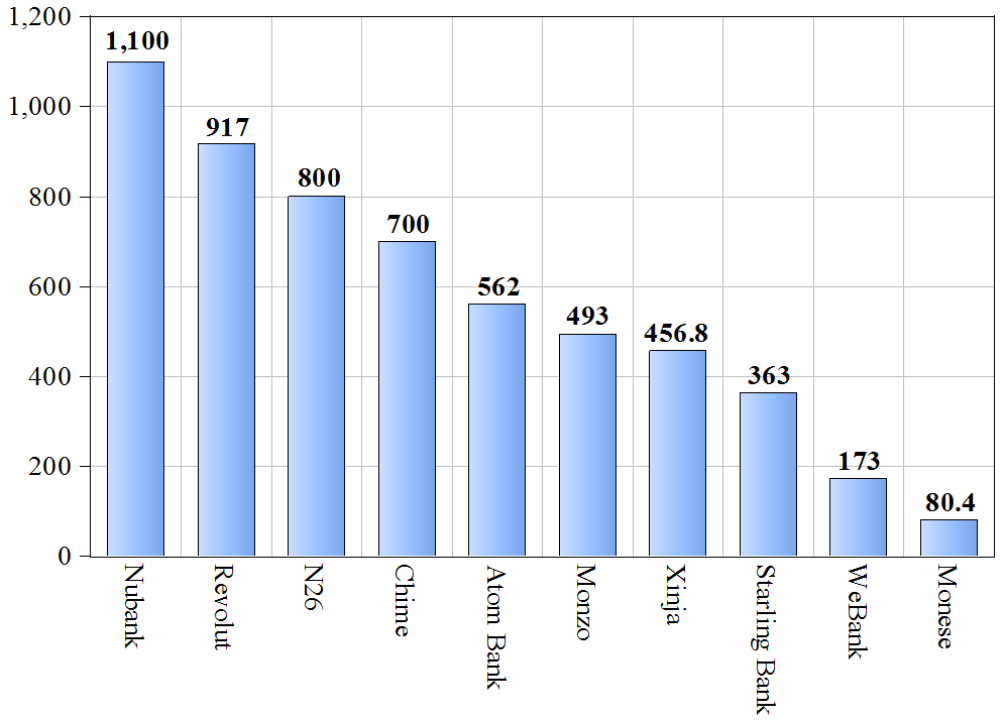
Notes: This figure shows the value of venture capital-backed funding worldwide from 2016 to 2021 across various market sectors. "SMB" refers to small- and medium-sized businesses. The y-axis is expressed in millions of U.S. dollars. The data for this figure is sourced from CB Insights and Statista.

Figure 8: Largest U.S. FinTech Companies



Notes: This figure shows the largest fintech companies in the U.S. in 2021 based on their value. The y-axis is expressed in billions of U.S. dollars. The data for this figure is sourced from Forbes and Statista.

Figure 9: Leading Global Digital Banks by Capital Raised



Notes: This figure shows the leading global digital banks as of 2020, by capital raised. The y-axis is expressed in millions of U.S. dollars. The data for this figure is sourced from FinTech Magazine and Statista.

Table 1: Market Capitalization and Taxonomy of the Top 120 Cryptocurrencies

Cryptocurrency	Taxonomy	Market Cap. (in billions of U.S. dollars)	Market Cap. Size Category
Bitcoin (BTC)	Store of value	392.69	High cap
Ethereum (ETH)	Smart contracts	137.93	High cap
Tether (USDT)	Stablecoin	67.84	High cap
USD Coin (USDC)	Stablecoin	55.93	High cap
Binance Coin (BNB)	Exchange token (centralized)	34.83	High cap
Binance USD (BUSD)	Stablecoin	17.21	High cap
Cardano (ADA)	Smart contracts	16.79	High cap
Ripple (XRP)	Payments/digital currency	15.63	High cap
Solana (SOL)	Smart contracts	12.26	High cap
Dogecoin (DOGE)	Memecoin	7.96	Mid cap
Polkadot (DOT)	Smart contracts	7.73	Mid cap
Dai (DAI)	Stablecoin	6.76	Mid cap
TRON (TRX)	Payments/digital currency	5.66	Mid cap
Wrapped Bitcoin (WBTC)	Exchange token (decentralized)/DeFi	5.51	Mid cap
UNUS SED LEO (LEO)	Exchange token (centralized)	5.15	Mid cap
Avalanche (AVAX)	Exchange token (decentralized)/DeFi	4.86	Mid cap
Shiba Inu (SHIB)	Memecoin	4.50	Mid cap
Litecoin (LTC)	Payments/digital currency	3.74	Mid cap
FTX Token (FTT)	Exchange token (centralized)	3.44	Mid cap
Chainlink (LINK)	Exchange token (decentralized)/DeFi	3.21	Mid cap
Polygon (MATIC)	Payments/digital currency	3.19	Mid cap
Uniswap (UNI)	Exchange token (decentralized)/DeFi	3.08	Mid cap
Stellar (XLM)	Exchange token (decentralized)/DeFi	2.93	Mid cap
Cronos (CRO)	Exchange token (centralized)	2.90	Mid cap
NEAR Protocol (NEAR)	Smart contracts	2.49	Mid cap
Bitcoin Cash (BCH)	Payments/digital currency	2.34	Mid cap
Algorand (ALGO)	Exchange token (centralized)	2.21	Mid cap
Ethereum Classic (ETC)	Smart contracts	2.16	Mid cap
Monero (XMR)	Payments/digital currency	2.08	Mid cap
Cosmos (ATOM)	Interoperability	1.96	Mid cap
VeChain (VET)	Smart contracts	1.68	Mid cap
Decentraland (MANA)	Metaverse/play to earn crypto game	1.54	Mid cap
Hedera (HBAR)	Payments/digital currency	1.49	Mid cap
Flow (FLOW)	Payments/digital currency	1.46	Mid cap
Internet Computer (ICP)	Distributed computing	1.36	Mid cap
Helium (HNT)	Distributed computing	1.35	Mid cap
ApeCoin (APE)	Metaverse/play to earn crypto game	1.34	Mid cap
Theta Network (THETA)	Metaverse/play to earn crypto game	1.29	Mid cap
Tezos (XTZ)	Exchange token (decentralized)/DeFi	1.28	Mid cap
Elrond (EGLD)	Smart contracts	1.24	Mid cap
Filecoin (FIL)	Smart contracts	1.23	Mid cap
TrueUSD (TUSD)	Stablecoin	1.21	Mid cap
Bitcoin SV (BSV)	Store of value	1.20	Mid cap
Axie Infinity (AXS)	Metaverse/play to earn crypto game	1.19	Mid cap
The Sandbox (SAND)	Metaverse/play to earn crypto game	1.09	Mid cap
KuCoin Token (KCS)	Exchange token (centralized)	1.03	Mid cap
Zcash (ZEC)	Smart contracts	0.99	Low cap
EOS (EOS)	Smart contracts	0.96	Low cap
Pax Dollar (USDP)	Stablecoin	0.95	Low cap
Maker (MKR)	Exchange token (decentralized)/DeFi	0.91	Low cap

Aave (AAVE)	Exchange token (decentralized)/DeFi	0.84	Low cap
Huobi Token (HT)	Exchange token (centralized)	0.81	Low cap
Neutrino USD (USDN)	Stablecoin	0.79	Low cap
IOTA (MIOTA)	Smart contracts	0.78	Low cap
BitTorrent-New (BTT)	Smart contracts	0.75	Low cap
The Graph (GRT)	Exchange token (decentralized)/DeFi	0.73	Low cap
eCash (XEC)	Store of value	0.72	Low cap
Klaytn (KLAY)	Exchange token (centralized)	0.71	Low cap
USDD (USDD)	Stablecoin	0.70	Low cap
Quant (QNT)	Interoperability	0.68	Low cap
Fantom (FTM)	Memecoin	0.66	Low cap
Neo (NEO)	Smart contracts	0.65	Low cap
OKB (OKB)	Exchange token (centralized)	0.65	Low cap
THORChain (RUNE)	Exchange token (decentralized)/DeFi	0.62	Low cap
PAX Gold (PAXG)	Smart contracts	0.62	Low cap
Chiliz (CHZ)	Payments/digital currency	0.56	Low cap
Basic Attention Token (BAT)	Exchange token (decentralized)/DeFi	0.55	Low cap
Waves (WAVES)	Smart contracts	0.52	Low cap
Loopring (LRC)	Exchange token (decentralized)/DeFi	0.50	Low cap
Dash (DASH)	Payments/digital currency	0.49	Low cap
Stacks (STX)	Metaverse/play to earn crypto game	0.48	Low cap
STEPN (GMT)	Smart contracts	0.48	Low cap
PancakeSwap (CAKE)	Exchange token (decentralized)/DeFi	0.45	Low cap
Kusama (KSM)	Smart contracts	0.45	Low cap
Zilliqa (ZIL)	Payments/digital currency	0.44	Low cap
Fei USD (FEI)	Stablecoin	0.42	Low cap
Enjin Coin (ENJ)	Metaverse/play to earn crypto game	0.41	Low cap
Gala (GALA)	Exchange token (centralized)	0.39	Low cap
Celo (CELO)	Exchange token (decentralized)/DeFi	0.39	Low cap
XDC Network (XDC)	Exchange token (decentralized)/DeFi	0.39	Low cap
Amp (AMP)	Payments/digital currency	0.39	Low cap
1inch Network (1INCH)	Exchange token (decentralized)/DeFi	0.38	Low cap
Nexo (NEXO)	Exchange token (decentralized)/DeFi	0.38	Low cap
Curve DAO Token (CRV)	Exchange token (decentralized)/DeFi	0.37	Low cap
NEM (XEM)	Payments/digital currency	0.36	Low cap
Holo (HOT)	Exchange token (decentralized)/DeFi	0.36	Low cap
Mina (MINA)	Smart contracts	0.35	Low cap
Kava (KAVA)	Exchange token (decentralized)/DeFi	0.34	Low cap
Harmony (ONE)	Exchange token (centralized)	0.33	Low cap
Decred (DCR)	Store of value	0.33	Low cap
Kadena (KDA)	Smart contracts	0.32	Low cap
Synthetix (SNX)	Exchange token (decentralized)/DeFi	0.32	Low cap
GateToken (GT)	Exchange token (centralized)	0.31	Low cap
Arweave (AR)	Distributed computing	0.31	Low cap
Gnosis (GNO)	Exchange token (decentralized)/DeFi	0.31	Low cap
Bitcoin Gold (BTG)	Payments/digital currency	0.30	Low cap
Qtum (QTUM)	Smart contracts	0.29	Low cap
Symbol (XYM)	Payments/digital currency	0.29	Low cap
Theta Fuel (TFUEL)	Payments/digital currency	0.28	Low cap
BORA (BORA)	Exchange token (decentralized)/DeFi	0.27	Low cap
Convex Finance (CVX)	Exchange token (decentralized)/DeFi	0.26	Low cap
OMG Network (OMG)	Exchange token (decentralized)/DeFi	0.26	Low cap
IOST (IOST)	Smart contracts	0.26	Low cap
IoTeX (IOTX)	Smart contracts	0.25	Low cap
ICON (ICX)	Interoperability	0.25	Low cap

Storj (STORJ)	Stablecoin	0.25	Low cap
Oasis Network (ROSE)	Exchange token (decentralized)/DeFi	0.24	Low cap
Ankr (ANKR)	Exchange token (decentralized)/DeFi	0.24	Low cap
Compound (COMP)	Exchange token (decentralized)/DeFi	0.24	Low cap
Trust Wallet Token (TWT)	Smart contracts	0.24	Low cap
0x (ZRX)	Exchange token (decentralized)/DeFi	0.23	Low cap
Serum (SRM)	Exchange token (decentralized)/DeFi	0.23	Low cap
Kyber Network Crystal v2 (KNC)	Exchange token (decentralized)/DeFi	0.23	Low cap
Ravencoin (RVN)	Exchange token (decentralized)/DeFi	0.22	Low cap
Audius (AUDIO)	Smart contracts	0.22	Low cap
Golem (GLM)	Payments/digital currency	0.22	Low cap
Siacoin (SC)	Distributed computing	0.20	Low cap
JUST (JST)	Exchange token (decentralized)/DeFi	0.20	Low cap
Moonbeam (GLMR)	Payments/digital currency	0.20	Low cap
Celsius (CEL)	Exchange token (decentralized)/DeFi	0.20	Low cap

Notes: This table shows the top 120 cryptocurrencies based on market capitalization (in billions of U.S. dollars). The first column identifies the cryptocurrency as well as its abbreviation. The second column taxonomizes respective cryptocurrencies based on their primary technological, or, economic, utilization. The third and fourth columns, respectively, identify the market capitalization and the size category of this capitalization. The survey period for this table is June 20, 2022, and the data are sourced from Statista and CoinMarketCap.com.

Table 2: Senior Executives' Plans on Blockchain Production

Country	Blockchain currently in production	Plan for blockchain production within the next year	Plan for blockchain production at some other time in the future	Other	None of the above
Canada	36%	48%	12%	1%	2%
China	49%	42%	10%	0%	0%
France	37%	49%	14%	0%	0%
Germany	36%	57%	5%	2%	0%
Mexico	48%	46%	5%	0%	0%
United Kingdom	40%	48%	11%	1%	1%
United States	14%	24%	40%	12%	10%

Notes: This table captures blockchain production sentiment among firms and organizations in each of the listed countries. The data for this table is survey data from Deloitte, which posed the following question to senior executives: "Has your organization either brought blockchain to production or plans to do so at some point in the future?" Details for this survey can be found here using the publicly accessible URL: https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-fsi-2018-global-blockchain-survey-report.pdf. The data for this online survey is as of April 2018.