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ONE HUNDRED FOURTEENTH CONGRESS

Congress of the United States

House of Representatives

COMMITTEE ON ENERGY AND COMMERCE
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MEMORANDUM

March 14, 2016

To: **Subcommittee on Commerce, Manufacturing, and Trade Democratic Members and Staff**

Fr: **Committee on Energy and Commerce Democratic Staff**

Re: **Hearing on "Disrupter Series: Digital Currency and Block Chain Technology"**

On **Wednesday, March 16, 2016, at 11:00 a.m. in room 2123 of the Rayburn House Office Building**, the Subcommittee on Commerce, Manufacturing, and Trade will hold a hearing titled "Disrupter Series: Digital Currency and Block Chain Technology."

I. BACKGROUND

Digital currencies include both virtual currencies and cryptocurrencies, neither of which is legal tender.[1] The term "virtual currency" commonly refers to payment systems used in virtual domains such as online gaming.[2] Cryptocurrencies use encryption algorithms in a new way to secure transactions and control the creation of new units.[3] The focus of this hearing is cryptocurrencies.

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[1] *Digital vs. Virtual Currencies*, Bitcoin Magazine (Aug. 22, 2014) (online at bitcoinmagazine.com/articles/digital-vs-virtual-currencies-1408735507).

[2] European Central Bank, *Virtual Currency Schemes* (Oct. 2012) (online at www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf).

[3] *Crypto Currency*, Forbes (Apr. 20, 2011) (online at www.forbes.com/forbes/2011/0509/technology-psilocybin-bitcoins-gavin-andresen-crypto-currency.html).

The technology behind most cryptocurrencies, known as "blockchain," is a digital public ledger that anyone can inspect, but no individual controls.[4] The ledger software keeps track of all transactions and can only be updated by consensus of a majority of participants in the system.[5]

II. CRYPTOCURRENCIES

Cryptocurrencies are not backed by any central authority and derive value in part because of their scarcity.[6] They allow peer-to-peer transactions to take place without going through a financial intermediary, such as a bank.[7] In addition, they are not government-backed or insured; each currency's value instead depends on factors such as how many merchants accept it, how many might accept it in the future, and whether or not governments ban it.[8]

A. Examples of Cryptocurrencies

Bitcoin is the most well-known and widely used cryptocurrency.[9] It relies on the principles of cryptography to produce coins and process transactions. Bitcoin's controlling computer code is completely public, or "open source."[10] Transactions are processed by users of the system, who verify by consensus that the parties to the transaction have sufficient funds to complete the transaction.[11] All transactions are recorded in the blockchain.[12]

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[4] *The Trust Machine*, Economist (Oct. 31, 2015) (online at www.economist.com/news/leaders/21677198-technology-behind-bitcoin-could-transform-how-economy-works-trust-machine).

[5] *The Next Big Thing, Or Is It?*, Economist (Mar. 9, 2015) (online at www.economist.com/news/special-report/21650295-or-it-next-big-thing); *Forget Bitcoin—What Is the Blockchain and Why Should You Care?*, Recode (July 5, 2015) (online at recode.net/2015/07/05/forget-bitcoin-what-is-the-blockchain-and-why-should-you-care/).

[6] *Bitcoin's Legality Around the World*, Forbes (Jan. 31, 2014) (online at www.forbes.com/sites/kashmirhill/2014/01/31/bitcoins-legality-around-the-world/#41a01c979b2b).

[7] *We Must Regulate Bitcoin. Problem Is, We Don't Understand It*, Wired (Mar. 1, 2016) (online at www.wired.com/2016/03/must-understand-bitcoin-regulate).

[8] *The Crypto-Currency*, New Yorker (Oct. 10, 2011) (online at www.newyorker.com/magazine/2011/10/10/the-crypto-currency).

[9] *Id.*

[10] Rainer Böhme et al., *Bitcoin: Economics, Technology, and Governance*, Journal of Economic Perspectives (Spring 2015).

[11] *Id.*

[12] David S. Evans, *Economic Aspects of Bitcoin and Other Decentralized Public-Ledger Currency Platforms*, Coase-Sandor Institute for Law & Economics, University of Chicago Law School (Apr. 2014).

There are several hundred other types of cryptocurrency, but only about 20 sell for more than $1 per unit.[13] Although they share the basic characteristics, these Bitcoin alternatives each have their own individual features.[14]

B. Benefits and Challenges of Cryptocurrencies

Cryptocurrencies can offer advantages to underbanked and unbanked populations, especially in regions where state-backed currency is consistently unstable and traditional financial services are less accessible.[15] Also, they may offer users increased privacy and anonymity as well as lower transaction costs in comparison to traditional payment methods.[16]

Despite some of the potential benefits of cryptocurrencies, a number of barriers have impeded the widespread adoption of cryptocurrencies. Current public perception and receptivity of cryptocurrencies is low, as shown in a 2014 study that found that 80 percent of Americans were not willing to consider using Bitcoin.[17] Because they are not considered legal tender, many existing consumer protections with respect to consumer financial transactions do not apply to cryptocurrencies.[18] For example, they are not protected by deposit insurance.[19] Without the backing and management of a central authority, they are vulnerable to extreme price fluctuations and deflation.[20]

The perceived criminal element associated with cryptocurrencies provides another disincentive for average consumers. Cryptocurrencies have been used to facilitate money laundering, arms trafficking, ransom demands, data theft, and terrorism.[21]

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[13] *12 Cryptocurrency Alternatives to Bitcoin*, Bankrate (Feb. 2014) (online at www.bankrate.com/finance/investing/cryptocurrency-alternatives-to-bitcoin-1.aspx).

[14] *Bitcoin: How Its Core Technology Will Change the World*, New Scientist (Feb. 5, 2014) (online at www.newscientist.com/article/mg22129553-700-bitcoin-how-its-core-technology-will-change-the-world).

[15] *Can Bitcoin Help The World's Unbanked?*, CNBC (Jul. 5, 2015) (online at www.cnbc.com/2015/07/05/can-bitcoin-help-the-worlds-unbanked.html)

[16] Congressional Research Service, *Bitcoin: Questions, Answers, and Analysis of Legal Issues* (Dec. 2, 2015) (R43339).

[17] *Most People Still Don't Know What Bitcoin Is, and Don't Care to Know*, Wall Street Journal (Feb. 5, 2014) (online at blogs.wsj.com/moneybeat/2014/02/05/most-people-still-dont-know-what-bitcoin-is-and-dont-care-to-know).

[18] U.S. Government Accountability Office, *Virtual Currencies: Emerging Regulatory, Law Enforcement, and Consumer Protection Challenges* (May 2014) (GAO-14-496).

[19] *Id.*

[20] *Bitcoin's Deflationary Weirdness*, New Economic Perspectives (Apr. 24, 2013) (online at neweconomicperspectives.org/2013/04/talking-bitcoin.html).

[21] *EU to Step Up Checks On Bitcoin, Prepaid Cards to Fight Terrorism*, Reuters (Feb. 2, 2016) (online at www.reuters.com/article/us-eu-terrorism-financing-idUSKCN0VB1N7);

Furthermore, the mechanisms employed by cryptocurrencies give rise to unique consumer protection questions. Cryptocurrency transactions are irrevocable, which impedes the ability of businesses to process simple consumer transactions such as chargebacks or returning purchases.[22] Without a central backing authority to guarantee value and assume the burden of risk, the security of the network is the currency's only safeguard. High-profile hacks of popular Bitcoin exchanges and wallets have resulted in the theft of hundreds of thousands of Bitcoins.[23]

C. Current Legal Status and Regulatory Actions Regarding Cryptocurrencies

Various federal agencies have issued guidance on cryptocurrencies, including the United States Commodity Futures Trading Commission and the Department of the Treasury's Financial Crimes Enforcement Network.[24] The Federal Trade Commission and the Securities and Exchange Commission have successfully brought cases against people committing fraud related to Bitcoin.[25] The Internal Revenue Service also issued guidance.[26]

New York is the only state to establish rules for licensing cryptocurrency businesses.[27] Other states have considered regulation, and the Conference of State Bank Supervisors released a draft model regulatory framework on cryptocurrencies in September 2015.[28] Current federal and state money transmitter laws apply to businesses providing a person-to-person payment system involving legal tender (such as an exchange that converts dollars to cryptocurrency).[29]

Bitcoin, Currency of Vice, The Guardian (Mar. 4, 2013) (online at www.theguardian.com/business/2013/mar/04/bitcoin-currency-of-vice); *Hollywood Hospital Pays $17,000 in Bitcoin to Hackers; FBI Investigating*, Los Angeles Times (Feb. 18, 2014) (online at www.latimes.com/business/technology/la-me-ln-hollywood-hospital-bitcoin-20160217-story.html).

[22] *See* note 18.

[23] *A History of Bitcoin Hacks*, The Guardian (Mar. 18, 2014) (online at www.theguardian.com/technology/2014/mar/18/history-of-bitcoin-hacks-alternative-currency).

[24] *Bitcoin vs. the SEC*, Politico (Apr. 23, 2015) (online at www.politico.com/agenda/story/2015/04/bitcoin-money-stock-market-000026).

[25] *Id.*; *Bitcoin Startup Butterfly Labs Settles with FTC for $38.6M, But it Can't Pay*, Ars Technica (Feb. 18, 2016) (online at arstechnica.com/tech-policy/2016/02/bitcoin-startup-butterfly-labs-settles-with-ftc-for-38-6m-but-it-cant-pay).

[26] *See* note 16.

[27] *NY Financial Regulator Lawsky Releases Final BitLicense Rules for Bitcoin Firms*, Wall Street Journal (Jun. 3, 2015) (online at www.wsj.com/articles/ny-financial-regulator-lawsky-releases-final-bitlicense-rules-for-bitcoin-firms-1433345396).

[28] Conference of State Bank Supervisors, *Model Regulatory Framework on State Virtual Currency Regulation* (online at www.csbs.org/regulatory/ep/pages/framework.aspx).

[29] *Dark Money: Only 35 Bitcoin Dealers Are Compliant with US Law*, Verge (Dec. 12, 2013) (online at www.theverge.com/2013/12/12/5201636/without-legal-clarity-many-bitcoin-companies-go-unregistered).

III. BLOCKCHAIN

Industry interest in alternative applications of blockchain, the technology underlying cryptocurrencies, has risen in the past year, stemming mainly from its ability to keep track of transactions (i.e., who owns what at a given time) securely and permanently.[30] The blockchain allows all users in the network to view the transaction history it records.[31]

Unlike Bitcoin's open-source public blockchain, much of the industry interest in blockchain technology has focused on private or semi-private "permissioned" blockchains.[32] Instead of allowing anyone to add and process groups of transactions, known as "blocks", permissioned blockchain networks require an invitation to join.[33]

A. Potential Uses of Blockchain Technology

Financial services companies are leading investment in blockchain technology.[34] The use of a trusted private ledger for recordkeeping of financial transactions could reduce the need for third parties that charge fees for their services, such as clearinghouses, custodian banks, accountants, and auditors.[35] Additional savings could result from increased speed and efficiency enabled by the blockchain and from limiting human error by automating certain functions.[36] Estimates of banks' cost savings from the use of permissioned blockchains range from $20 to $50 billion per year.[37]

Blockchain has a myriad of other potential applications. The decentralized nature of blockchain may help ensure accuracy in pool-based services as diverse as insurance and fantasy sports.[38] In the future, blockchain-based programs could enable individuals to selectively and

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[30] *See* note 4; *The Technology Behind Bitcoin Could Solve a Big Problem Banks Had in the 2008 Crisis*, Business Insider (Feb. 5, 2016) (online at www.businessinsider.com/itbit-ceo-blockchain-2008-financial-crash-risk-settlement-2016-2?r=UK&IR=T).

[31] *Id.*

[32] David Yermack, *Corporate Governance and Blockchains*, National Bureau of Economic Research Working Paper (Dec. 2015) (online at www.nber.org/papers/w21802.pdf).

[33] *Id.*; Joshua A.T. Fairfield, Bitproperty, Southern California Law Review (2015).

[34] *See* note 4.

[35] *Id.*

[36] *Blockchain Promises Back-Office Ledger Revolution*, Financial Times (Oct. 13, 2015) (online at www.ft.com/intl/cms/s/0/7aad0826-638c-11e5-9846-de406ccb37f2.html#axzz42ZHoRAen).

[37] *See* notes 4 and 33.

[38] *Good News —Fintech Could Disrupt Finance*, Financial Times (Mar. 8, 2016) (online at www.ft.com/intl/cms/s/0/425cb3ca-e480-11e5-a09b-1f8b0d268c39.html#axzz42YPbHljv); *Intel*

securely share their personal health information with medical entities of their choosing.[39] A startup in New York allows consumers to sell energy generated by solar panels on their houses on the free market.[40] Blockchain has spurred several initiatives supporting new platforms for secure online voting.[41]

Blockchain also enables so-called algorithmic or "smart" contracts, which encode self-executing terms into the blockchain.[42] Auto and property titles, rare and valuable artifacts, and digital music and media downloads could have permissions and ownership recorded in a blockchain.[43]

B. Future Regulatory and Consumer Protection Challenges for Blockchain

The use of blockchain may pose new legal and regulatory challenges, particularly in the areas of financial oversight, property, and securities investments.[44] Some experts have pointed out that permissioned blockchains may use anticompetitive tactics or price fixing that would violate antitrust regulations.[45] Although blockchain may enable cost savings for business, there is no guarantee that those savings will be passed on to consumers.[46] Like any disruptive technology, blockchain could eventually lead to job loss in the industries that it displaces.[47]

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is Testing a Blockchain it Built With a Fantasy Sports Game, CoinDesk (Feb. 26, 2016) (online at www.coindesk.com/intel-testing-blockchain-built-fantasy-sports-game).

[39] Guy Zyskind et al., *Enigma: Decentralized Computation Platform with Guaranteed Privacy*, MIT Media Lab (2015) (online at enigma.mit.edu/enigma_full.pdf); *Estonia Is Using the Technology behind Bitcoin to Secure 1 Million Health Records*, Business Insider (Mar. 3, 2016) (online at www.businessinsider.com/guardtime-estonian-health-records-industrial-blockchain-bitcoin-2016-3).

[40] *Blockchain-Based Microgrid Gives Power to Consumers in New York*, New Scientist (Mar. 2, 2016) (online at www.newscientist.com/article/2079334-blockchain-based-microgrid-gives-power-to-consumers-in-new-york).

[41] *Bitcoin Could Change Voting the Way it's Changed Money*, Motherboard (Jun. 6, 2014) (online at motherboard.vice.com/read/bitcoin-could-change-voting-the-way-its-changed-money).

[42] Ahmed E. Kosba et al., *Hawk: The Blockchain Model of Cryptography and Privacy-Preserving Smart Contracts*, IEEE Symposium on Security & Privacy (2016) (online at eprint.iacr.org/2015/675.pdf).

[43] *IBM Adapts Bitcoin Technology for Smart Contracts*, Wall Street Journal (Sep. 16, 2015) (online at www.wsj.com/articles/ibm-adapts-bitcoin-technology-for-smart-contracts-1442423444).

[44] *See* note 16.

[45] *See* note 33.

[46] *See* note 11.

[47] *Blockchain in the Corporate Environment Has Big Potential, But Faces Implementation Challenges*, Wall Street Journal (July 27, 2015) (online at blogs.wsj.com/cio/2015/07/27/

C. WITNESSES

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