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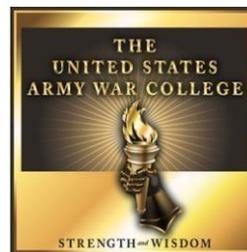
Selected for publication in *The Army War College Review*

# The Banker's Dilemma: Cryptocurrency and United States' Financial Power

by

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Class of 2018

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REPORT DOCUMENTATION PAGE			Form Approved--OMB No. 0704-0188		
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1. REPORT DATE (DD-MM-YYYY) 01-04-2018		2. REPORT TYPE STRATEGY RESEARCH PROJECT		3. DATES COVERED (From - To)	
4. TITLE AND SUBTITLE The Banker's Dilemma: Cryptocurrency and United States' Financial Power			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S) Lieutenant Colonel C. Ryan Gunst United States Army Reserve			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Colonel Douglas W. Winton			8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army War College, 122 Forbes Avenue, Carlisle, PA 17013			10. SPONSOR/MONITOR'S ACRONYM(S)		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION / AVAILABILITY STATEMENT Distribution A: Approved for Public Release. Distribution is Unlimited.					
13. SUPPLEMENTARY NOTES Word Count: 5,998					
14. ABSTRACT This paper describes the dollar's role as the foundation for U.S. financial power and the instruments that descend from its central position in the international financial system. The emergence of Bitcoin and decentralized cryptocurrencies is introduced and how they work briefly described. The dilemma these decentralized currencies represent for central banks is explained, how cryptocurrencies will affect U.S. instruments of financial power, and how they may eventually impact the central role of the dollar. The essay concludes by assessing the possible third order effects on U.S. strategy while presenting possible approaches U.S. policymakers may consider for capitalizing on cryptocurrency's evolution in the international financial system.					
15. SUBJECT TERMS Innovation, Fintech, Blockchain, Bitcoin, Sanctions, Banking, Encryption, Dollar					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES 35	19a. NAME OF RESPONSIBLE PERSON
a. REPORT UU	b. ABSTRACT UU	c. THIS PAGE UU			19b. TELEPHONE NUMBER (w/ area code)

## The Banker's Dilemma: Cryptocurrency and United States' Financial Power

(5,998 words)

### Abstract

This paper describes the dollar's role as the foundation for U.S. financial power and the instruments that descend from its central position in the international financial system. The emergence of Bitcoin and decentralized cryptocurrencies is introduced and how they work briefly described. The dilemma these decentralized currencies represent for central banks is explained, how cryptocurrencies will affect U.S. instruments of financial power, and how they may eventually impact the central role of the dollar. The essay concludes by assessing the possible third order effects on U.S. strategy while presenting possible approaches U.S. policymakers may consider for capitalizing on cryptocurrency's evolution in the international financial system.

## **The Banker's Dilemma: Cryptocurrency and United States' Financial Power**

Since World War II, the central role of the dollar in the international monetary system has provided the United States with a unique structural position of advantage and instruments of financial power. This system is now undergoing profound technological change. Blockchain threatens to become the most disruptive technology innovation since the splitting of the atom. Its application in the form of cryptocurrency represents a complex adaptive system that is eroding the traditional U.S. instruments of financial power and presents the potential to one day subsume the dollar's role as the proprietary protocol the global financial system uses to communicate. The second order effects of cryptocurrency on U.S. financial power are significant. The third order effects could impose constraints on the United States' means for projecting military power and, by extension, create disruptions in the international order.

This paper describes the dollar's role as the foundation for U.S. financial power and the instruments that descend from its central position in the international financial system. It introduces the emergence of Bitcoin and decentralized cryptocurrencies and briefly describes how they work. It explains the innovator's dilemma these decentralized currencies represent for central banks, how cryptocurrencies will affect U.S. instruments of financial power and may eventually impact the central role of the dollar. It concludes by assessing the possible third order effects on U.S. strategy and presents possible approaches U.S. policymakers may consider to capitalize on cryptocurrency's evolution in the international financial system.

### **The Dollar's Dominance**

The U.S. dollar's role as an international reserve currency has been the foundation of U.S. financial power since World War II. The 1944 Bretton Woods

agreement established a gold-backed U.S. dollar as the international reserve currency.<sup>1</sup> This agreement established the dollar as the universally accepted unit of accounting, medium of exchange, and store of value around the world.<sup>2</sup> When the United States moved the dollar off the gold standard in 1971, it transitioned from a designated “de jure” international reserve currency to a market driven “de facto” currency sustained by the depth and liquidity of U.S. financial markets.<sup>3</sup> In 1974, the United States reinforced the dollar’s international market standing by extending security guarantees to Saudi Arabia in exchange for the pricing of oil sales in U.S. dollars.<sup>4</sup> In return, Saudi Arabia reinvested these oil proceeds in U.S. securities, further strengthening the prominence of the dollar in the international financial system.<sup>5</sup>

The international market’s preference for dollars creates a currency bloc between the United States, the countries who use it in their reserves, and the institutions that use it for exchange and unit of accounting.<sup>6</sup> In 2017, the dollar was the primary currency held in reserve by foreign central banks across 149 countries.<sup>7</sup> It currently makes up 64 percent of the more than \$9.2 trillion in official foreign exchange reserves.<sup>8</sup> It also serves as the primary denomination for international transactions, constituting 88 percent of foreign exchange market turnover.<sup>9</sup> The network effect from this monetary dependence aligns the interests of dollar-holders with U.S. financial interests.<sup>10</sup> Countries that hold dollars in their reserves are, quite literally, invested in its value and stability. Over time, these countries and institutions naturally align their interests with the interests of the United States, reinforcing the dollar, and further contributing to its role as the dominant reserve currency.<sup>11</sup>

As the issuer of the internationally preferred currency, the United States derives unique profit, or seigniorage, from U.S. dollars held overseas.<sup>12</sup> Seigniorage is the difference between the cost of producing new currency and its monetary value.<sup>13</sup> While it costs the U.S. government relatively nothing to print a hundred-dollar bill, it can use that bill to purchase a hundred dollars' worth of goods and services from other countries.<sup>14</sup> In 2016, foreign countries held approximately 60 percent, of all U.S. dollars in print, generating an estimated \$900 billion in U.S. seigniorage.<sup>15</sup>

Even more valuable than seigniorage, the foreign demand for dollars allows the United States to finance a greater current account deficit without the market discipline that would be imposed on other nations in the form of higher debt yields.<sup>16</sup> This ability to rely on continued foreign investment at low cost helps sustain economic growth, which in turn, provides the financial means required for the United States to resource a global security strategy that heavily relies on the projection of military power.<sup>17</sup> In 2016, the United States made up 36 percent of global military spending at \$611 billion.<sup>18</sup> This spending provides the means for U.S. power projection and serves as the basis for the advancement of the U.S. interests abroad.<sup>19</sup>

The strategic position of advantage the United States receives from the dollar's role in the international financial system has not gone unnoticed by its competitors. In the aftershocks of the 2008 financial crisis, the Governor of the People's Bank of China published an essay aimed at the U.S. dollar's dominance.<sup>20</sup> It argued for the creation of "an international reserve currency that is disconnected from individual nations and able to remain stable in the long run."<sup>21</sup> Russia has expressed similar complaints about the dominance of the dollar. In a talk before Russian elites in 2014, Valdimir Putin stated,

“We already see that more and more countries are looking for ways to become less dependent on the dollar and are setting up alternative financial and payments systems and reserve currencies.”<sup>22</sup> These comments only represent the most recent criticisms, which extend as far back as Bretton Woods, of the “exorbitant privilege” the United States receives from the dollar’s “hegemony” and the ability to run a trade deficit “without tears.”<sup>23</sup>

The United States derives unilateral structural power from the administration of the dollar as the primary protocol the international monetary system uses to communicate.<sup>24</sup> Businesses make almost 90 percent of their international transactions in U.S. dollars.<sup>25</sup> They conduct these transactions through correspondent banking with U.S. banks that exchange foreign currency for dollars.<sup>26</sup> This dependence on access to the dollar and, by extension, U.S. banks makes adherence to U.S. policies a prerequisite for conducting business in the international financial system. If the international monetary system was the Internet, the United States would be Microsoft and the USD would be a proprietary version of the Transmission Control Protocol/Internet Protocol (TCP/IP) computer systems use to communicate.

#### U.S. Instruments of Financial Power

Since 1970, the United States has maintained Anti-Money Laundering and Combating the Financing of Terrorism (AML/CFT) legal regimes that require banks and other “Money Services Businesses” (MSBs) to maintain recordkeeping and provide reporting on the source, volume, and movement of monetary instruments into and out of U.S. financial institutions.<sup>27</sup> These laws require businesses to apply AML/CFT requirements to all of their transactions. As a result, international institutions conducting

correspondent banking in dollars must adhere to U.S. AML/CFT laws to maintain access to the currency they need for conducting international transactions.

International dependence on the dollar provides the United States with derived instruments of financial power in the form of sanctions and financial intelligence. These instruments provide coercive tools for disrupting an entity's financial operations to achieve foreign policy and national security objectives.<sup>28</sup> These instruments may be comprehensive, targeted against an entire state, or selective, tailored to a subset of groups, institutions, and individuals the United States desires to influence. As instruments of U.S. financial power, sanctions take the form of blacklisting, asset freezes, and asset forfeiture.

Blacklisting consists of banning financial transactions with a target entity.<sup>29</sup> The U.S. conducts blacklisting to deny targets from accessing sources of banking, financial transfers, and credit.<sup>30</sup> To support the application of these sanctions, the Department of the Treasury's Office of Foreign Assets Control (OFAC) maintains a list of "Specially Designated Nationals and Blocked Persons" (SDN).<sup>31</sup> The SDN list currently contains almost 6000 groups, individuals, and companies "owned, controlled, or acting on behalf of targeted entities."<sup>32</sup> These blacklists also extend to any entity or property in which any member maintains more than 50 percent ownership.<sup>33</sup> To maintain compliance, institutions use software to screen customers against the SDN list before concluding transactions.<sup>34</sup> The OFAC makes updates to the SDN list available in machine-readable formats that institutions use to keep their SDN filters current.<sup>35</sup> This process ensures international enforcement of U.S. sanctions as foreign banks conducting correspondent banking in dollars must apply these criteria to do business with U.S. institutions.<sup>36</sup>

Freezing assets consists of suspending transactions on a target entity's existing accounts. When a financial institution has an account holder added to the SDN list, the target accounts are "blocked" or "frozen."<sup>37</sup> The blocked funds remain held with the financial institution and the property of the targeted account holder.<sup>38</sup> The account will continue to accrue interest and is subject to normal service charges, but the financial institutions cannot conduct transfers or withdrawals on the account without approval from OFAC.<sup>39</sup>

Asset forfeiture is government seizure of a target entity's property. When blocked assets are associated with activity subject to U.S. asset forfeiture laws, law enforcement agencies may use civil and criminal proceedings to seize a target's assets.<sup>40</sup> After conducting due process, agencies deposit forfeited funds into accounts maintained by the Department of Justice and the Department of the Treasury.<sup>41</sup> The departments repurpose these funds to resource law enforcement training programs, best practice development, new initiatives, and investigative technologies.<sup>42</sup>

Financial intelligence (FININT) consists of the products derived from the collection and analysis of information concerning financial entities, assets, transactions, and their relationships.<sup>43</sup> The Office of Terrorism and Financial Intelligence (TFI) is The Department of the Treasury's office responsible for the development and dissemination of FININT.<sup>44</sup> Analysts from TFI's Office of Intelligence and Analysis (OIA) and Financial Crimes Enforcement Network (FinCEN) collect information from a wide variety of sources ranging from the "pocket litter" of captured personnel to digital financial data collected through AML/CFT laws, to produce FININT products for U.S. federal, state, local, and international law enforcement.<sup>45</sup> AML/CFT reporting provided by financial

institutions conducting correspondent banking is a key source of information for the development of FININT. AML/CFT regimes provide TFI with audit records and file reporting involving suspicious currency transactions and customer relationships.<sup>46</sup> This information allows FININT analysts to identify money laundering and prevent entities from evading financial sanctions.<sup>47</sup>

To coordinate FININT information with international Financial Intelligence Units (FIUs), FinCEN participates in a body called the Egmont Group.<sup>48</sup> The Egmont Group is a forum for sharing FININT information, expertise, and technology among more than 150 participating international FIUs.<sup>49</sup> The Egmont Group provides the Department of the Treasury a forum for extending U.S. FININT instruments into the international system.

### Blockchain, Bitcoin, and Cryptocurrency

In 2008, the financial community received the digital equivalent of the Einstein-Szlard Letter which described the possibility of the atomic bomb to President Roosevelt.<sup>50</sup> A person or group operating under the pseudonym “Satoshi Nakamoto” published a sophisticated technical paper titled, “Bitcoin: A Peer-to-Peer Electronic Cash System,” to a cryptography email list proposing a new protocol for the creation of a decentralized virtual currency called “Bitcoin.”<sup>51</sup> Instead of a trusted intermediary, such as a bank or credit agency, “Nakamoto” proposed a self-validating peer-to-peer network that would rely on cryptography to conduct trusted transactions between parties. Bitcoin users would be able to transfer value directly without trusting each other or another third party. The decentralized peer-to-peer Bitcoin network would provide banking services between individuals who could now serve as their own banks and digitally store value in Bitcoin.

The following year, Nakamoto conducted a financial technology “Trinity Test” that demonstrated the concepts outlined in the Bitcoin paper. Nakamoto released an open-source implementation of the Bitcoin software and users began hosting Bitcoin nodes on their networks.<sup>52</sup> The Bitcoin peer-to-peer network synchronizes a permanent immutable public “distributed ledger” across decentralized network nodes. The network records all bitcoin transactions on the ledger and shares it publicly with network participants.<sup>53</sup> Network nodes validate transactions by timestamping and cryptographically signing the ledger to record bitcoin transfers in chronological order.<sup>54</sup> The nodes then synchronize the transactions with the rest of the network for validation and provide updates to their copy of the distributed ledger.

The emergence of Bitcoin has evolved a new set of technical terminology to describe its unique features. The Bitcoin network processes transactions in “blocks” and appends them to the distributed ledger in a chronological “chain.” Because of this, the underlying peer-to-peer protocol has evolved the descriptive title “distributed ledger technology” or “blockchain.” Due to the central role of cryptography in the Bitcoin “Electronic Cash System” and its spinoffs, digital currencies have developed the nomenclature “cryptocurrencies.”<sup>55</sup>

Users conduct transactions on the Bitcoin network with virtual tokens, or “bitcoins” that serves as a unit of accounting, store of value, and medium of exchange in the Bitcoin network. Users obtain bitcoins by purchasing them with traditional currency through a virtual currency exchange, exchanging goods and services for them directly with bitcoin holders, or “mining” them by hosting a node on the Bitcoin network.<sup>56</sup> To put bitcoins into circulation and incentivize support for hosting network nodes, the protocol

distributes bitcoins to node owners that are the first to successfully collect transactions into a new block for addition to the chain and complete a computational “proof of work” problem.<sup>57</sup> “Miners” are network users who contribute their electrical and computing power to solving this proof of work problem.<sup>58</sup> The process of recovering bitcoins through this process is “mining.”<sup>59</sup> Miners receive Bitcoin seigniorage in the form of bitcoins as a reward for maintaining the Bitcoin blockchain.<sup>60</sup>

Nakamoto coded Bitcoin’s monetary policy into the software’s source code. Bitcoin increases the number of bitcoins in circulation gradually over time to a maximum number of 21 million.<sup>61</sup> It is currently estimated the Bitcoin network will issue all available currency in 2140.<sup>62</sup> To provide network liquidity, each bitcoin is divisible to eight decimal places, making the actual number of transactable units more than 2 quadrillion or 2,000 trillion.<sup>63</sup> As the number of bitcoins in circulation increases, the proof of work computations become harder, requiring increasing amounts of computing power to successfully mine bitcoins.<sup>64</sup> This proof-of-work mining structure also protects the networks consensus mechanisms from spoofing by connecting the distributed network nodes used for transaction validation to physical resources that are harder to virtually replicate and scale, like power and processing time.

Users transact with Bitcoin and other virtual currency in accounts contained in virtual “wallets.” Wallets are applications that provide a user with addresses that act as accounts for receiving bitcoins and private cryptographic keys for spending Bitcoins by sending them to other addresses.<sup>65</sup> Virtual currency exchanges, like Coinbase, may provide a wallet online as part of an exchange service or they may be an application run on the user’s hardware.<sup>66</sup> “Hot storage” is an online wallet connected to the Internet,

such as a wallet provided by an online currency exchange or an application on a networked computer.<sup>67</sup> “Cold storage” is a wallet disconnected from a network. A cold storage wallet might be a wallet stored on a stand-alone computer, on removable media, such as a USB stick, or a printout of the private keys.

Because Nakamoto released Bitcoin as open-source software, developers can develop their own improvements on the blockchain protocol. This has spawned the proliferation of an entire ecosystem of cryptocurrency and blockchain-token projects commonly referred to as “alternative coins” or “ALT-coins.” These ALT-coin projects innovate on the blockchain protocol to create new applications, such as decentralized payment systems, self-executing smart contracts, and “privacy coin” networks.<sup>68</sup> Currently, there are more than 1,400 cryptocurrency and blockchain-token projects with a combined market capitalization of more than \$600 billion dollars.<sup>69</sup> In a business environment reminiscent of the dot-com boom, many of these 1,400 ventures will not survive to create successful cryptocurrency markets; however, some of these projects may provide the entrepreneurial seeds for the future blockchain “killer apps” that will produce the decentralized equivalents of today’s Google, Facebook, and Amazon.

#### Cryptocurrency as Disruptive Financial Innovation

Bitcoin and other cryptocurrencies built on blockchain technology represent disruptive innovation in an international financial system organized around the U.S. dollar. In *The Innovator’s Dilemma*, Clayton Cristensen describes the characteristics of emerging disruptive technologies.<sup>70</sup> Although they provide new unique capabilities, disruptive technologies in their infancy are typically lower performing than established technologies in their markets.<sup>71</sup> The new technology is sustained by a smaller market of fringe customers who appreciate its unique capabilities.<sup>72</sup> The limited demand and

smaller market size dissuades market leaders from adopting the emerging technology.<sup>73</sup> Further, the existing standards and processes organizations established around the old technology make transition difficult.<sup>74</sup> Over time, market preferences change from functionality, to reliability, to convenience, and then to price.<sup>75</sup> At this point the new technology can compete with the sustaining technology to overtake the market and smaller, more agile organizations capitalize on first mover advantage to overcome incumbents who cannot quickly transition to the disruptive technology.<sup>76</sup>

The same disruptive innovation trends are emerging with decentralized cryptocurrencies in the international financial system. Despite the initial lack of adoption and investment from central banks and other incumbents in the traditional financial markets, cryptocurrency's innovative technology, decentralized nature, and anonymity have created a fringe market appeal. Entrepreneurs, libertarians, and black marketers have been Bitcoin's community of early adopters. For technology entrepreneurs, blockchain represents the foundation for building a digitally native financial system to fund the next generation of internet services.<sup>77</sup> For libertarians, Bitcoin offers a decentralized financial system outside of central bank control and government intervention. For black market users, Bitcoin offers a way to bypass U.S. instruments of financial power and conduct transactions without detection by law enforcement.

In parallel, the financial system's largest incumbents, central banks, have rejected cryptocurrency's unique value and smaller markets. During a press conference in December 2017, the Chairman of the United States Federal Reserve, stated, "Bitcoin at this time plays a very small role in the payment system. It is not a stable source of value and it does not constitute legal tender. It is a highly speculative asset."<sup>78</sup> These

large bureaucratic organizations are also constrained by their existing processes and regulations that value centralized management, low volatility, and transparency. In a September 2017 speech before the Bank of England, the International Monetary Fund's Managing Director stated, "For now, virtual currencies, such as Bitcoin, pose little or no challenge to the existing order of fiat currencies and central banks. Why? Because they are too volatile, too risky, too energy intensive, and because the underlying technologies are not yet scalable. Many are too opaque for regulators; and some have been hacked."<sup>79</sup> Despite these assessments from the financial system's incumbents, more than \$600 billion has flowed out of the traditional financial system and into cryptocurrency markets.

#### Erosion of U.S. Instruments of Financial Power

For black markets attempting to move illicit finances, cryptocurrencies provide some degree of user anonymity from sanctions targeting and FININT collection, but they are not panaceas. Contrary to its public perception, Bitcoin and similar cryptocurrency networks are not completely anonymous "dark" networks, but pseudonymous "grey" networks.<sup>80</sup> Although Bitcoin transactions are designed to be "trustless" and do not require identification, Bitcoin's publicly exposed distributed ledger records the originating address, amount, and receiving address.<sup>81</sup> Any information that creates a link between the user's identity and their Bitcoin address also creates a link between their identity and their entire transaction history from that address.<sup>82</sup> This also provides traceability and links to any address they transact with.<sup>83</sup> These connections provide analysts a publicly available audit trail of every transaction in the history of the Bitcoin network. Any transaction a user makes with an exchange or a business that reveals

their identity, provides FININT analysts with complete traceability of their transaction history within the network.

While cryptocurrency users can legally mine and conduct transactions in cryptocurrency anonymously, transferring that value into the traditional financial system by converting it to dollars through a U.S. currency exchange requires them to reveal their identity. To prevent cryptocurrencies from becoming an outlet for money laundering, FinCEN issued guidance in 2013 designating operators of virtual currency exchanges as MSBs, subject to AML/CFT regulations.<sup>84</sup> FinCEN requires U.S. virtual currency exchanges to establish and validate the identity of customers exchanging cryptocurrencies like Bitcoin, for traditional fiat currency. This policy makes U.S. virtual currency exchanges a gateway for appending real world identity to virtual currency as it interfaces with the traditional financial system. Wherever cryptocurrency users intersect with the traditional financial system through U.S. currency exchanges they create a connection between their user identity and their cryptocurrency wallet addresses.

Although the designation of U.S. virtual currency exchanges as MSBs disconnects anonymous cryptocurrency systems from the larger international financial system in the United States, this designation may not extend to international virtual currency exchanges the same way it does to international banks conducting correspondent banking in dollars. Virtual currency exchanges are not dependent on access to U.S. correspondent banking to trade in Bitcoin and other cryptocurrencies. These international exchanges provide potential outlets for bypassing AML/CFT regulations to transfer illicit finances from cryptocurrency networks into the traditional financial system. In January 2018, the Secretary of the Treasury acknowledged

concerns about the use of international virtual currency exchanges to avoid U.S. anti-money laundering regimes. He stated, “Under our laws if you have a wallet to own bitcoins, that company has the same obligation as a bank to know your customer...The rest of the world doesn’t have that. So, one of the things we will be working very closely with the G-20 on is making sure that this doesn’t become the Swiss numbered bank accounts...”<sup>85</sup> The G-20 meeting the following March acknowledged the potential use of cryptocurrencies for money laundering but deferred to the Financial Action Task Force (FATF) to establish global standards for cryptocurrency.<sup>86</sup>

The FATF is an international body established by the G-7 nations to set legal and regulatory standards for protecting the integrity of the international financial system from money laundering and illicit activity.<sup>87</sup> International financial institutions that fail to integrate FATF recommendations into their AML/CFT practices can receive a FATF risk designation that discourages other international institutions from conducting business with them.<sup>88</sup> The Department of the Treasury will increasingly need to coordinate AML/CFT cryptocurrency regulations with international bodies like the FATF and the Egmont Group to prevent international currency exchanges from becoming outlets for money laundering and illicit financing.

Cryptocurrency technology is evolving faster than international regulators can coordinate policies to protect established AML/CFT regulations and mechanisms for FININT collection. New privacy ALT-coin cryptocurrency networks like Monero are emerging to increase the anonymity of blockchain protocols.<sup>89</sup> These “dark” cryptocurrency networks use a mix of cryptography, “anonymizers,” and “mixers” to obscure the source, amount, and destination of cryptocurrency transactions.<sup>90</sup>

Anonymizers use tools such as The Onion Router network to conceal a user's identity by encrypting transactions and tunneling them through multiple computer proxies.<sup>91</sup>

Mixers further comingle these transactions with other blockchain transactions to obscure links between sender and receiver addresses. These techniques make privacy coin transactions opaque to regulators and FININT analysts. To bring these dark cryptocurrency transactions into the light, FinCEN and other FININT units will need to cultivate new sources of financial data and analytical techniques to develop signatures for cryptocurrency networks.

The decentralized digital nature of cryptocurrency creates new challenges for law enforcement agencies seeking to seize forfeited cryptocurrency assets held outside the custody of virtual currency exchanges and other MSBs. Cryptocurrency networks provide entities the means to digitally store and transfer large assets without relying on intermediaries compelled to adhere to U.S. AML/CFT regulations. Cryptocurrency users can keep unlimited amounts of cryptocurrency assets in local hot and cold storage wallets under their direct control without relying on a bank or other third party. The blockchain's distributed ledger maintains an accounting of these assets, but their transfer remains under the control of the holder of the private keys. To seize these assets law enforcement officials must gain access to the user's private keys and transfer the cryptocurrency to government-controlled wallets. If the assets are in hot storage, law enforcement officials can do this by gaining virtual access via cyber operations. To seize cryptocurrency assets stored in cold storage wallets, such as on a disconnected computer, USB thumb drive, or in print, law enforcement will need to physically seize the private keys.

Asset seizure of cryptocurrency is further complicated by its digital nature. Users can encrypt wallets to prevent unauthorized access to their private keys. If an entity becomes aware of attempts to access their wallet, they may move assets to more secure physical or virtual locations. Because cryptocurrency keys can exist in multiple forms and formats, law enforcement officials will need to clandestinely seize and transfer assets before a target can move them on the blockchain. Sophisticated targets could blend these techniques with automated algorithms to create condition-based “dead man’s switches” that automatically encrypt private keys or transfers assets upon some condition, such as a failure to login within a specific period or other condition.

Entities may combine these techniques into a “spread spectrum” approach that uses algorithms to keep assets in constant motion across wallet addresses. Malware bot-networks have used domain generation algorithms to hide and protect command and control communications across a constantly rotating schedule of domains.<sup>92</sup> Money launderers could use similar techniques to transfer cryptocurrency assets between types of cryptocurrency, wallets, and physical jurisdictions, to keep the currency in constant motion and ahead of law enforcement targeting and seizures.

In March of 2018, the Department of the Treasury announced it may add cryptocurrency addresses to the SDN list “to alert the public of specific digital currency identifiers associated with a blocked person.”<sup>93</sup> The decentralized and irrevocable nature of cryptocurrency transactions prevents systematic freezing and blacklisting of user addresses. Except for wallets held in the custody of virtual currency exchanges and other MSBs, governments cannot systematically block, freeze, or blacklist decentralized cryptocurrency transactions. Blocking or blacklisting an entity’s

cryptocurrency address to affect a freeze would require a change to the cryptocurrency's underlying protocol. There is no single interface to apply the SDN against to prevent transactions on the blockchain. Users can anonymously download a wallet and establish a cryptocurrency address for sending and receiving funds to and from the currency's distributed ledger.<sup>94</sup> These types of software updates, or "forks," require a network consensus of more than 50 percent of the network nodes to adopt the change and transition the service into a new version with the updated software.

### The Dollar's Continued Dominance

Due to their immaturity, relatively small market size, and corresponding volatility, cryptocurrencies do not currently represent a threat to the dollar. As the original, most stable, and most widely used cryptocurrency, Bitcoin, makes up approximately 38 percent of the cryptocurrency market with a capitalization equivalent to more than \$166 billion.<sup>95</sup> This market is inconsequential compared to the U.S. dollar, which makes up approximately 14 percent of the global currency market with a capitalization of more than \$14 trillion.<sup>96</sup> The small size of the cryptocurrency market results in high volatility that further diminishes its role as a unit of accounting, store of value, and medium of exchange. The current 60-day volatility estimate for Bitcoin is approximately 7.3 percent, while gold averages approximately 1.2 percent volatility and the dollar and other major currencies average between 0.5 and 1.0 percent volatility.<sup>97</sup>

Despite their volatility, there are indications that cryptocurrencies are gaining traction in the dollar dominated financial system. As a store of value, cryptocurrencies have performed well during their short history compared to gold or even the best traditional fiat currencies. Since its inception in 2009, Bitcoin has grown in value to

approximately 47 percent when compared to gold.<sup>98</sup> In the same period, the dollar has lost approximately 13 percent of its value when compared to gold.<sup>99</sup>

The number of businesses that price and accept payment in cryptocurrency is growing, demonstrating an increasing effectiveness as a unit of account and medium of exchange. As a system of payment, cryptocurrency transactions remove intermediaries, like banks and payment processors, reducing the cost of conducting financial transactions.<sup>100</sup> Currently, there are more than 12,000 businesses globally that accept Bitcoin payments.<sup>101</sup> Increasingly, recognized brands like Overstock.com, Expedia, Microsoft, Dish Network, and other merchants are accepting bitcoin in exchange for goods and services.<sup>102</sup> More recently, U.S. state governments have also begun to accept cryptocurrency as a medium of exchange. In 2018, the state legislatures of Georgia and Arizona introduced bills allowing the use of cryptocurrency for tax payments.<sup>103</sup>

Banks have begun to take note of cryptocurrency's growing role in the financial system. In its 2017 annual filing with the Security and Exchange Commission (SEC), J.P. Morgan Chase & Co. wrote, "...both financial institutions and their non-banking competitors face the risk that payment processing and other services could be disrupted by technologies, such as cryptocurrencies, that require no intermediation."<sup>104</sup> Bank of America echoed these concerns in its SEC filing, stating, "Further, clients may choose to conduct business with other market participants who engage in business or offer products in areas we deem speculative or risky, such as cryptocurrencies."<sup>105</sup> For these large financial institutions, decentralized cryptocurrency networks represent growing

competition for the near monopoly provided to traditional financial institutions designated as trusted intermediaries by the government.

The near-term possibility of cryptocurrency achieving parity with the dollar is low. The dollar's ubiquity meets the needs of most markets and creates a network effect that reinforces its acceptance as the international standard.<sup>106</sup> Although additional blockchain innovations and the possibility of future financial downturns increase the opportunities for cryptocurrency to gain market share over time, central bank technology adoption and government regulation provide a countervailing effect to this threat.

The potential impact on U.S. financial power of a decentralized cryptocurrency displacing the dollar is less ambiguous. The decentralized nature and anonymity features of cryptocurrency are already eroding the effectiveness of instruments of U.S. financial power. If decentralized cryptocurrency were to replace the role of the dollar in the international markets, it would further diminish these instruments. More significantly, the United States would be subject to greater market discipline in the form of higher debt yields that could place economic and political constraints on U.S. defense spending.<sup>107</sup> This could require the United States to significantly reduce its force structure and capabilities, resulting in a less expeditionary military posture around the world. As demonstrated by the recent force structure trade-offs made in response to the Budget Control Act and subsequent retrograde of U.S. forces from Europe and Iraq, a U.S. military retrenchment created by constrained spending would likely leave regional power vacuums that would precipitate disruptive military conflicts.<sup>108</sup> The results of these conflicts could reshape the international order in ways that are impossible to anticipate.

## Managing the Banker's Dilemma

There are three strategic initiatives U.S. policy makers should consider to manage the effects of cryptocurrency on the international monetary system and U.S. financial power. First, the Department of the Treasury and other agencies should consider developing increased authorities and capabilities for using cyber operations to deliver financial effects. Second, federal regulatory institutions with authority over cryptocurrency should consider developing an “embrace and extend” strategy for regulating decentralized cryptocurrencies that achieve the critical mass required to compete in international financial markets. Lastly, the President should consider appointing a commission to coordinate and guide the development of U.S. policy for the development of blockchain technology and decentralized cryptocurrencies.

To develop FININT and deliver sanctions in a future environment where targets store illicit assets digitally and move them anonymously over decentralized cryptocurrency networks, the Department of the Treasury and other enforcement agencies will increasingly need access to the same level of cyber authorities and capabilities currently reserved for organizations like the National Security Agency's (NSA) Office of Tailored Access Operations.<sup>109</sup> Development of decision quality FININT will require the integration of financial and information technology expertise with sophisticated cyber reconnaissance capabilities.<sup>110</sup> Treasury and other agencies will increasingly need to adopt techniques that more closely resemble the approaches used by hackers and malware developers, than those used by financial regulators.<sup>111</sup> To freeze cryptocurrency assets, agencies may need to develop self-propagating “sanctionware” that targets selectors for specific sanctioned entities and encrypts their private keys until they meet designated conditions.<sup>112</sup> Asset seizures may evolve to

include remote compromise and exploitation of a sanctioned entity's computer to transfer cryptocurrency assets to government wallet addresses. Increasingly, Treasury and other agencies will need to apply cyber methods to sustain the effects currently delivered through U.S. instruments of financial power.

Federal regulatory institutions with authority over cryptocurrency should develop an “embrace and extend” strategy for regulating decentralized cryptocurrencies that achieve the critical mass required to compete in international financial markets.

“Embrace and extend” is the strategy used by Microsoft and other information technology vendors to protect proprietary standards from competing open standards.<sup>113</sup> It consists of embracing emerging open standards (e.g. Bitcoin) and integrating them into proprietary platforms (e.g. the U.S. dollar) and then extending the protocol to include unique beneficial features.<sup>114</sup>

At different levels within the government, this is already occurring in an uncoordinated fashion. State governments seeking to develop new markets have begun to embrace the use of blockchain and are accepting cryptocurrency for taxes and other fees<sup>115</sup> At the federal level, the Department of the Treasury's designation of the virtual currency exchanges as MSBs and the inclusion of cryptocurrency addresses on the SDN list are extending AML/CFT features of the dollar into cryptocurrency networks. To be effective, the government will need to integrate and synchronize these approaches. The addition of a cryptocurrency taxonomy into the SDN creates the opportunity for cryptocurrency developers to integrate SDN checking into their protocols. To create incentives for developers to include this functionality, the federal government will need

to take measures to embrace cryptocurrency and more broadly integrate it into the existing financial system.

When faced with the Einstein-Szilard Letter and a race for atomic weapons in 1939, President Roosevelt established the Advisory Committee on Uranium that eventually led to the development of the Manhattan Project.<sup>116</sup> To facilitate an integrated U.S. strategy for cryptocurrency, the President and Congress should appoint an independent commission to coordinate and guide U.S. policy on the development of blockchain technology.<sup>117</sup> The unique open source, organically digital, trustless, anonymous, decentralized nature of cryptocurrency will create new, unique, markets that function fundamentally differently than those that have dominated the dollar-based financial system. By establishing a small independent organization outside the existing bureaucratic structure, U.S. policymakers can develop strategic approaches to capitalize on cryptocurrency's unique features without the constraints of the existing financial system.

### Conclusion

Since World War II, the central role of the dollar in the international monetary system has provided the United States with a unique position of advantage and instruments of financial power. Now, information technology is converging with the field of finance to create disruptive innovation in how society accounts for, stores, and transfers value. Bitcoin and other decentralized cryptocurrencies have emerged to erode the United States' ability to develop FININT and deliver sanctions. To replace these capabilities, the Department of the Treasury and other U.S. agencies will increasingly need to provide the capability to conduct cyber operations for conducting financial coercion.

Decentralized cryptocurrencies present an innovator's dilemma for the traditional financial system. While they do not currently disrupt the dominance of the dollar and other fiat currencies, these technologies are still in their infancy and continue to gain market acceptance. At some point in the future, they may develop the critical mass required to compete with the role of traditional currencies.

Policymakers have a unique window of opportunity to influence development of cryptocurrencies. Rather than attempting to suppress their adoption, they should identify opportunities to integrate decentralized cryptocurrencies in ways that complement the United States' preeminent role in the international financial system. This may mean developing tradeoffs between the historical benefits received from the current dollar-dominated, centralized, international financial system and the opportunities presented by a future cryptocurrency-based, decentralized, digital financial system.

To evaluate these opportunities objectively, policymakers will need to approach cryptocurrency unencumbered by the status quo and look at the financial system through a new lens. This will require insight from outside the existing bureaucracy and processes that have sustained and applied U.S. financial power over the last 70 years. By doing so, the United States can position itself to maintain its position of advantage into the future.

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