

# REGULATING DIGITAL CURRENCIES: BRINGING BITCOIN WITHIN THE REACH OF THE IMF

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PRELIMINARY DRAFT

## *Abstract*

*This Comment examines the potentially destabilizing effects of emerging digital currencies on the international foreign currency exchange. Specifically, it examines “Bitcoin,” a decentralized, partially anonymous, and largely unregulated digital currency that has become particularly popular in the last few years. The paper argues that International Monetary Fund, the institution responsible for coordinating the stability of foreign exchange rates, is ill-equipped to handle the widespread use of Bitcoins into the foreign exchange market. It highlights the inability of the Fund to intervene in the event of a speculative attack on a currency by Bitcoin users. The paper concludes by suggesting an interpretation of the Fund’s incorporating document, the Articles of Agreement, which would allow it to intervene in the event of such an attack.*

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## I. INTRODUCTION

The birth of the Internet heralded in a new era of cheaper, faster, and more efficient commercial transactions. This new type of commerce—also known as “e-commerce”—has brought with it a number of new and complicated social, legal, and economic challenges. In the last twenty years, a wealth of scholarship has been devoted to addressing these concerns.

But one area of research has fallen into neglect: the development of electronic (or Internet-based) currencies. In the 1990s, when the Internet was still fairly new, a sizeable amount of scholarship was devoted to exploring the ways in which the Internet would change how we would choose to use and conceptualize money. Many theorized that the advent of the Internet would cause a new kind of money to be born.<sup>1</sup> Rather than carrying around paper bills or metal coins, people would instead switch to digital currency: Internet-based money stored on a computer and transferred over the World Wide Web. But as the newness of the Internet began to wear off, so did scholars’ interest in its potential to generate new forms of currency. Since then, little has been done to trace the growth of digital currencies in our increasingly computerized and complex digital economy.

Recently, however, particular attention has been given to an emerging digital currency called the “Bitcoin.” Bitcoin is a private digital currency traded online via a peer-to-peer network.<sup>2</sup> Bitcoins are stored as electronic files on a computer’s hard drive, and can be accumulated or transferred just like an e-mail.<sup>3</sup> Software algorithms embedded in the online Bitcoin network protect against fraud and ensure that the files are not counterfeited. Bitcoin was designed to operate without the need for intermediaries or any central issuing authority.<sup>4</sup> Bitcoin does not rely on a central bank to issue it, a commercial bank to store it, or a credit card company to transfer it. Instead, users interact with each other directly and anonymously and without third-party intervention.<sup>5</sup>

Although only four years old, Bitcoin’s ability to serve as regulation-free virtual cash poses a number of difficult legal questions thanks to its transnational and largely decentralized nature.<sup>6</sup> While it has yet to gain the widespread acceptance enjoyed by other major international currencies, if Bitcoin continues to grow in popularity regulatory solutions for the challenges it presents will

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<sup>1</sup> See, for example, Kerry Lynn Macintosh, *How to Encourage Global Electronic Commerce: The Case for Private Currencies on the Internet*, 11 Harv J L & Tech 733 (1998).

<sup>2</sup> Barrett Sheridan, *Bitcoins: Currency of the Geeks*, Bloomberg Businessweek (June 16, 2011), online at [http://www.businessweek.com/magazine/content/11\\_26/b4234041554873.htm](http://www.businessweek.com/magazine/content/11_26/b4234041554873.htm) (visited Mar 11, 2013). Bitcoin is “private” in the sense that it is not issued by a government.

<sup>3</sup> Ogashi Tukafoto, *Bitcoin Mining for Fun and Net Loss*, Slacktory (Aug 4, 2011), online at <http://slacktory.com/2011/08/bitcoin-mining-fun-loss/> (visited Mar 11, 2013).

<sup>4</sup> European Central Bank (hereinafter ECB), *Virtual Currency Schemes* (Oct 2012) \*5, online at <http://www.ecb.int/pub/pdf/other/virtualcurrencyschemes201210en.pdf> (visited Mar 11, 2013).

<sup>5</sup> Id.

<sup>6</sup> Paul Ford, *Bitcoin May be the World’s Last Safe Haven*, Businessweek (Mar 29, 2013), online at <http://www.businessweek.com/articles/2013-03-28/bitcoin-may-be-the-global-economys-last-safe-haven> (visited Mar 29, 2013).

become necessary. Though some scholarship has been devoted to domestic regulation of Bitcoin transactions,<sup>7</sup> virtually no attention has been given to regulating Bitcoin at the international level.

The International Monetary Fund (IMF) is the international institution tasked with coordinating the international foreign currency exchange.<sup>8</sup> It sets minimum standards for what member nations can do to their individual currencies, in order to preserve global economic stability. Like almost every international institution, the IMF's rules apply only to nations that have agreed to adhere to them. Every country—with the exception of North Korea—is a member of the IMF and, therefore, bound by its regulations.<sup>9</sup> By ensuring that (almost) everyone plays by the same rules, the IMF is able to effectively coordinate global economic policy.

Because Bitcoin is not formally backed by a country's government, it is not bound by the IMF's guidelines. As a result, Bitcoin poses a serious threat to the economic stability of the foreign currency exchange if it continues to grow in both value and usage. Any other digital currency that entered widespread use would pose similar problems. Because private digital currencies like Bitcoin fall outside the IMF's legal framework, the IMF is unable to obtain those currencies directly. As a result, the IMF is limited in what it can do to intervene in the event that a private digital currency like Bitcoin is used to attack the value of a conventional currency through what is known as a "speculative attack." A speculative attack occurs when an investor wishes to take advantage of a "weak currency," a currency that has depreciated in value relative to other currencies.<sup>10</sup> If left unchecked, a successful attack can push a weak currency's value even lower, resulting in a destabilization of the international foreign currency exchange.<sup>11</sup> If Bitcoin becomes an important currency in international commerce, its use in speculative attacks could cause serious economic harms unless the IMF develops a way to counter them.

To further complicate things, the longer the IMF takes to bring Bitcoin within its control, the more difficult controlling Bitcoin will become. Bitcoins are generated through computer software which is programmed to halt the production of new Bitcoins by approximately 2025.<sup>12</sup> Once Bitcoins can no longer be generated, their supply becomes finite and their value can be expected to increase. As their value increases, so does the expense that the IMF has to incur in order

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<sup>7</sup> See, for example, Reuben Grinberg, *Bitcoin: An Innovative Alternative Digital Currency*, 4 Hastings Sci & Tech L J 159, 161 (2012).

<sup>8</sup> See Articles of Agreement of the International Monetary Fund (1945), 2 UN Treaty Ser 134 (1947) (hereinafter IMF), Art 1: "The purposes of the International Monetary Fund are: . . . (iii) To promote exchange stability, to maintain orderly exchange arrangements among members, and to avoid competitive exchange depreciation." The term "foreign exchange market" describes the constantly fluctuating relative values of different countries' currencies. See Marc Levinson, *Guide to Financial Markets* 14 (Profile 4th ed 2005).

<sup>9</sup> See International Monetary Fund, *List of Members* (June 13, 2012), online at <http://www.imf.org/external/np/sec/memdir/memdate.htm> (visited Mar 11, 2013).

<sup>10</sup> See Akihiko Matsui, *Strong Currency and Weak Currency*, 12 J of Japanese and Intl Economies 305, 306–07 (1998).  
<sup>11</sup> Id.

<sup>12</sup> Simon Dingle, *Easy Money?*, ITWeb Brainstorm (Sept 1, 2011), online at [http://www.brainstormmag.co.za/index.php?option=com\\_content&view=article&id=4329:easy-money&catid=83:trends&Itemid=124](http://www.brainstormmag.co.za/index.php?option=com_content&view=article&id=4329:easy-money&catid=83:trends&Itemid=124) (visited Mar 11, 2013).

to obtain them. Because having a supply of Bitcoins is necessary to effectively counter a speculative attack, the sooner the IMF can acquire a supply of Bitcoins, the cheaper counteracting such an attack will be.

This Comment examines the potential legal and economic challenges Bitcoin poses to the IMF's regulation of the international foreign currency exchange, and suggests a possible solution. Section II explains Bitcoin, how it works, and what makes it unique. In addition, this section suggests several advantages of digital currencies over traditional paper currencies, and introduces projections about Bitcoin's growth. Section III examines the IMF and its role in the global currency exchange. It provides an overview of why the IMF was created, what its principal goals are, and explains how it works with respect to the foreign currency exchange. Section IV explains the potential destabilizing effects of Bitcoin on the foreign currency exchange. It introduces the concept of a speculative attack, explores potential countermeasures to one, and explains why the IMF is currently ill-equipped to effectively intervene in the event of a speculative attack by Bitcoin users. Section V suggests two ways to use the IMF's founding document, the Articles of Agreement, to guard against a speculative attack by Bitcoin users. First, the understanding of certain provisions of the Articles of Agreement could be expanded to incorporate digital currencies like Bitcoin while leaving much of the underlying framework intact. Alternatively, the Articles of Agreement could be amended to grant Bitcoin quasi-membership status in the IMF itself. This proposal would allow the IMF a more direct means of countering speculative attacks by Bitcoin users while also granting important benefits to Bitcoin users. By adopting either of these solutions, the IMF could effectively coordinate a defense to the threat posed by Bitcoin to the stability of the international foreign currency exchange.

## II. THE EMERGENCE OF BITCOIN AS A DIGITAL CURRENCY

In order to understand Bitcoin's potential impact on the international foreign currency exchange, it is important to understand exactly what Bitcoin is and how it works. This section provides an overview of the technology that supports the Bitcoin platform, discusses the potential benefits of Bitcoin over traditional currencies, and makes predictions about Bitcoin's future.

### A. What is Bitcoin?

Conceptually, Bitcoin is two things at once. First, it is a digital currency, meaning that the unit of account it employs has no physical counterpart with legal tender status.<sup>13</sup> Second, Bitcoin is what Friedrich A. Hayek described as a "private currency": a currency provided by private enterprise aimed at combatting government monopolies on the supply of money.<sup>14</sup> Traditional financial actors,

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<sup>13</sup> ECB, *Virtual Currency Schemes* at \*5 (cited in note 4).

<sup>14</sup> See Friedrich A. Hayek, *Denationalisation of Money* 20 (IEA 1976), online at <http://www.iea.org.uk/sites/default/files/publications/files/upldbook431pdf.pdf> (visited Mar 11, 2013).

such as central banks or government institutions, are not involved with Bitcoin transactions.<sup>15</sup> Consequently, there is little legal regulation or supervision of Bitcoin usage.<sup>16</sup> The interaction between Bitcoin and traditional currencies is not regulated by law, and all aspects of Bitcoin—from its supply to the means by which it is generated—are controlled solely by its users.<sup>17</sup> Hayek argued that traditional government-backed currencies are prone to a number of weaknesses, particularly susceptibility to inflation<sup>18</sup> and political corruption.<sup>19</sup> Private currencies, Hayek argued, are more stable than traditional currencies because they do not share these weaknesses.<sup>20</sup>

In 2009, a pseudonymous hacker (or hackers) calling themselves Satoshi Nakamoto created “Bitcoin,” the world’s first digital, decentralized, and partially anonymous currency.<sup>21</sup> Nakamoto was inspired by an article written back in 1998 by Wei Dai, a graduate from the University of Washington.<sup>22</sup> Dai envisioned a system in which “untraceable pseudonymous entities . . . [could] cooperate with each other more efficiently, by providing them with a medium of exchange and a method of enforcing contracts.”<sup>23</sup> He sought to create a medium of exchange that avoided the need for intermediaries in electronic transactions, and one in which government involvement “[was] not [only] temporarily destroyed but permanently forbidden and permanently unnecessary.”<sup>24</sup>

Drawing on Dai’s vision, Nakamoto created Bitcoin, the world’s first private, decentralized digital currency. Unlike traditional fiat currencies, whose value is determined by law and underwritten by the state,<sup>25</sup> Bitcoin is not backed by a government or legal entity.<sup>26</sup> Bitcoin does not have a central authority in charge of the money supply or a central clearing house.<sup>27</sup> Indeed, no traditional financial institutions are involved in Bitcoin transactions.<sup>28</sup> Instead, users perform all steps of the transactions themselves.<sup>29</sup> Bitcoins are not pegged to any real-world currency.<sup>30</sup> Instead, their

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<sup>15</sup> ECB, *Virtual Currency Schemes* at \*5 (cited in note 4).

<sup>16</sup> Id.

<sup>17</sup> Id.

<sup>18</sup> Macintosh, *How to Encourage Global Electronic Commerce* at 743 (cited in note 1).

<sup>19</sup> Hayek, *Denationalisation of Money* at 89 (cited in note **Error! Bookmark not defined.**).

<sup>20</sup> ECB, *Virtual Currency Schemes* at \*5 (cited in note 4).

<sup>21</sup> Grinberg, 4 *Hastings Sci & Tech L J* at 160–61 (cited in note 7). The true identity of Satoshi Nakamoto remains unknown. See Ford, *Bitcoin May Be the World’s Last Safe Haven* (cited in 6).

<sup>22</sup> Morgen Peck, *Bitcoin: The Cryptoanarchists’ Answer to Cash*, *IEEE Spectrum* (June 2012), online at <http://spectrum.ieee.org/computing/software/bitcoin-the-cryptoanarchists-answer-to-cash> (visited Mar 11, 2013).

<sup>23</sup> See Wei Dai, *B-Money* (1998), online at <http://weidai.com/bmoney.txt> (visited Mar 11, 2013).

<sup>24</sup> Id.

<sup>25</sup> Fiat money is any legal tender designated and issued by a central authority, such as the dollar or Euro. It is similar to commodity-backed money in appearance, but radically different in concept, as it can no longer be redeemed for a commodity like gold. Users are willing to accept it in exchange for goods and services simply because they trust this central authority. Trust is therefore a crucial element of any fiat money system. ECB, *Virtual Currency Schemes* at \*9 (cited in note 4).

<sup>26</sup> J.P., *Virtual Currency: Bits and Bob*, *The Economist* (Jun 13, 2011), online at <http://www.economist.com/blogs/babbage/2011/06/virtual-currency> (visited Mar 11, 2013).

<sup>27</sup> ECB, *Virtual Currency Schemes* at \*6 (cited in note 4).

<sup>28</sup> Id.

<sup>29</sup> Id.

<sup>30</sup> Id at \*21.

value with respect to other currencies is determined by supply and demand.<sup>31</sup> Bitcoin operates using peer-to-peer networking and cryptography to maintain the anonymity of its users and the integrity of transactions.<sup>32</sup> Bitcoin's software is open source, allowing all users to view the underlying computer code and understand how it works.<sup>33</sup>

## B. How Does Bitcoin Work?

### 1. Bitcoin's basics

Bitcoins are computer files, similar to a music or a text file, and can be destroyed or lost just like cash.<sup>34</sup> They are stored either on a personal computer or entrusted to an online service.<sup>35</sup> They can be spent on both virtual and real goods or services.<sup>36</sup> Because Bitcoins are just computer files, "spending" them simply entails sending them from one user to another, like sending an email via the Internet.<sup>37</sup>

Individual Bitcoin transactions are encrypted, logged by a decentralized network running on thousands of computers, and recorded in a public ledger.<sup>38</sup> This public ledger records which Bitcoins have been spent or accepted but does not record the identifying information of the transacting parties, thereby securing users' anonymity.<sup>39</sup> Bitcoins are transferred from one user to another once the transaction has been cleared by another Bitcoin user on the peer-to-peer Bitcoin network.<sup>40</sup> Transactions occur without the presence of a government, bank, payment network, regulator, or other third party entity. In lieu of traditional institutional protections, Bitcoin relies on various technological measures to ensure its transactions are secure.

### 2. Bitcoin's security

Bitcoin operates using a "cryptographic proof" system, which allows users to deal directly with one another without needing a third party to authorize the transaction.<sup>41</sup> Each Bitcoin

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<sup>31</sup> ECB, *Virtual Currency Schemes* at \*6 (cited in note 4).

<sup>32</sup> Dai, *B-Money* (cited in note 23).

<sup>33</sup> See Bitcoin: P2P Digital Currency, online at <http://www.bitcoin.org> (visited Mar 11, 2013).

<sup>34</sup> Tukafoto, *Bitcoin Mining for Fun and Net Loss* (cited in note 3).

<sup>35</sup> Id. Rather than storing their Bitcoin files locally on their own computers, some users chose to deposit their Bitcoin files onto remote computer servers. This service is colloquially referred to as an "online wallet." See id. ECB, *Virtual Currency Schemes* at \*6 (cited in note 4).

<sup>36</sup> See Rick Falkvinge, Why I'm Putting All My Savings Into Bitcoin, *Falkvinge.net* (May 29, 2011), online at <http://falkvinge.net/2011/05/29/why-im-putting-all-my-savings-into-bitcoin/> (visited Mar 11, 2013) (explaining how to transfer Bitcoins).

<sup>37</sup> Sheridan, *Bitcoins: Currency of the Geeks* (cited in note 2).

<sup>38</sup> Id.

<sup>39</sup> Id. A peer-to-peer network is one in which each computer can act as a server for the others, allowing shared access to files and peripherals without the need for a central server. See Oxford Dictionaries Online, online at <http://oxforddictionaries.com/definition/english/peer-to-peer?q=peer+to+peer> (visited Mar 11, 2013).

<sup>40</sup> Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System* (2009), online at <http://www.bitcoin.org/bitcoin.pdf> (visited Mar 11, 2013).

transaction uses public-key encryption to ensure the transacting parties' privacy.<sup>42</sup> Public key encryption generates two mathematically related keys. One key is retained by the payee—somewhat like a private password or pin.<sup>43</sup> The private key is used to access the Bitcoins kept in the payor's account. The other key is made public—like the name of a bank or an account location where the funds reside.<sup>44</sup> The payee uses the public key to locate the payor's account. The payor's account can only be accessed (and funds can only be extracted) by someone with the associated private key.<sup>45</sup> The payor then uses their own private key to authorize the extraction of Bitcoins from their account.<sup>46</sup> All transactions associated with a public key are then broadcast to the entire Bitcoin community.<sup>47</sup> Because public encryption is so complex, faking a Bitcoin transaction would require more processing power than the entire Bitcoin network combined.<sup>48</sup> Public encryption, therefore, effectively ensures that Bitcoin transactions are secure.

Bitcoin also uses a widely-published “peer-to-peer distributed timestamp server” to verify that the digital coins have not been “double spent”—in other words, counterfeited.<sup>49</sup> A timestamp records the exact time that a Bitcoin is created or a transaction from one user to another occurs.<sup>50</sup> These timestamps are aggregated into a master list of transactions involving a particular Bitcoin file—similar to a chain of title—called a “block chain.”<sup>51</sup> The block chains of each Bitcoin are available to all users on a network, and are updated with every subsequent transaction.<sup>52</sup> Because block chains involve an enormous amount of data regarding previous transactions, the timestamp servers make it incredibly difficult to forge a block chain. In that sense, the timestamp server helps guard against Bitcoin fraud.<sup>53</sup>

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<sup>42</sup> J.P., *Virtual Currency* (cited in note 26).

<sup>43</sup> Nikolei M. Kaplanov, *Nerdy Money: Bitcoin, the Private Digital Currency, and the Case Against Its Regulation* \*5 (Temple University Legal Studies Research Paper, Mar 2012), online at <http://ssrn.com/abstract=2115203> (visited Mar 11, 2013).

<sup>44</sup> Id.; see also J.P., *Virtual Currency* (cited in note 26).

<sup>45</sup> J.P., *Virtual Currency* (cited in note 26).

<sup>46</sup> Id.

<sup>47</sup> Nakamoto, *Bitcoin* at \*6 (cited in note 41). This process is similar to systems used on stock exchanges that allow the public to know the time and size of the transaction without disclosing the identity of the parties themselves. Id.

<sup>48</sup> Jacob Aron, *Bitcoin Online Currency Gets New Job in Web Security*, *New Scientist* (Jan 17, 2012), online at <http://www.newscientist.com/article/mg21328476.500-bitcoin-online-currency-gets-new-job-in-web-security.html> (visited Mar 11, 2013).

<sup>49</sup> Nakamoto, *Bitcoin* at \*2–3 (cited in note 41).

<sup>50</sup> J.P., *Virtual Currency* (cited in note 26).

<sup>51</sup> See *Major Glitch in Bitcoin Network Sparks Sell-Off*, *Ars Technica* (Mar 11, 2013), online at <http://arstechnica.com/business/2013/03/major-glitch-in-bitcoin-network-sparks-sell-off-price-temporarily-falls-23/> (visited Apr 7, 2013).

<sup>52</sup> Id.

<sup>53</sup> Id.

### 3. Obtaining Bitcoins

There are three ways for users to obtain Bitcoins. First, users can purchase Bitcoins by exchanging “real money,” such as the dollar or Euro, for Bitcoin files.<sup>54</sup> Like a traditional exchange market, the price of Bitcoins floats against other currencies and is valued by supply and demand.<sup>55</sup> Second, users can obtain Bitcoins in exchange for goods or services, as is true for a traditional currency.<sup>56</sup> Lastly, users can obtain Bitcoins by generating them through a process called “mining.” Mining allows Bitcoin users to generate Bitcoins rather than purchasing them. A user who wishes to “mine” a Bitcoin essentially uses their computer’s processing power to solve a complicated computer algorithm.<sup>57</sup> Every ten minutes, Bitcoins are awarded to whichever miner is able to compute a number below a certain threshold.<sup>58</sup>

There are, however, limits to Bitcoin mining. Mining is an arduous and time-consuming process. The typical office computer would take roughly five to ten years of running nonstop to find any Bitcoins, and the cost of electricity would outweigh the value of the Bitcoins generated.<sup>59</sup> In addition, the number of Bitcoins generated through mining is tightly controlled. Currently, the reward for solving the mining algorithm is fifty Bitcoins.<sup>60</sup> But that number is halved with every 210,000 blocks created (approximately every four years).<sup>61</sup> Bitcoin’s software slows the generation of Bitcoins over time so that there will never be more than 21 million in circulation.<sup>62</sup> In other words, the maximum number of Bitcoins in circulation is finite. Given the rate at which the success of Bitcoin mining slows, Bitcoin generation is estimated to come to halt in 2025.<sup>63</sup> By systematically limiting the growth of Bitcoins, the system ensures that its value cannot be artificially inflated or deflated,<sup>64</sup> “[n]o banker can control it. No evil dictator tyrant can print zillions and destroy the value.”<sup>65</sup>

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<sup>54</sup> *The Tuesday Podcast: Bitcoin*, NPR Planet Money (June 12, 2011), online at <http://www.npr.org/blogs/money/2011/07/13/137795648/the-tuesday-podcast-bitcoin> (visited Mar 11, 2013).

<sup>55</sup> Dan Lyons, *The Web’s Secret Cash*, Newsweek (June 27, 2011), online at <http://www.thedailybeast.com/newsweek/2011/06/19/the-web-s-secret-cash.html> (visited Mar 11, 2013).

<sup>56</sup> ECB, *Virtual Currency Schemes* at \*13 (cited in note 4).

<sup>57</sup> See Allan Harris & Corey Conley, *Will Bitcoin Kill the Dollar?*, Nvate (Nov 23, 2011), online at <http://nvate.com/2177/will-bitcoin-kill-the-dollar/> (visited Mar 11, 2013) (comparing Bitcoin mining to “programs that allow users to volunteer their computer’s idle time to crunch on data for other organizations and people”).

<sup>58</sup> Andy Greenberg, *Crypto Currency*, Forbes (May 9, 2011), online at <http://www.forbes.com/forbes/2011/0509/technology-psilocybin-bitcoins-gavin-andresen-crypto-currency.html> (visited Mar 11, 2013).

<sup>59</sup> *Tuesday Podcast: Bitcoin* (cited in note 54).

<sup>60</sup> See *Rewards Set to Halve for Digital Money Miners*, BBC News: Technology (Nov 21, 2012), online at <http://www.bbc.co.uk/news/technology-20510447> (visited Mar 11, 2013).

<sup>61</sup> Id.

<sup>62</sup> Greenberg, *Crypto Currency* (cited in note 58).

<sup>63</sup> Dingle, *Easy Money?* (cited in note 12).

<sup>64</sup> Id.

<sup>65</sup> Greenberg, *Crypto Currency* (cited in note 58).

### C. The Virtues of Digital Currency

Digital money offers some substantial advantages over traditional, paper-based fiat currencies. First, digital currencies do not require the physical presence of payer and payee for transaction finality.<sup>66</sup> Transactions can be completed anytime, anywhere, without the need to coordinate direct interaction of the participants. This advantage creates several significant economic benefits. The costs associated with the production, transportation, and handling of physical currency can be substantial. The estimated annual costs of handling central bank currency by US retailers and banks are \$60 *billion*, which includes costs of processing and accounting of money, storage, transport, and security.<sup>67</sup> The cost of an electronic payment system would range from one-third to one-half of a paper payment system.<sup>68</sup> Transitioning from a traditional paper-based currency to an electronic one would, therefore, reduce the overall transaction costs associated with transferring value among different types of accounts, banks, and countries.<sup>69</sup> In sum, digital currencies would make currency transactions cheaper and more efficient overall for both individual users and financial institutions.

Transitioning to digital currencies also produces an interesting positive externality in the form of learning spillovers. Digital currencies require the use of software to function. Thus, transitioning to a predominantly digital currency regime would increase users' daily interaction with software systems. This, in turn, could help improve the skills and knowledge of users regarding personal finance software and finance optimization technologies.<sup>70</sup> In a world that is increasingly focused on integrating technology into our lives, accustoming users to software-based finance could create long-lasting and valuable effects.

Finally, some scholars assert that digital currency performs the functions of a currency more efficiently than government-backed, physical money.<sup>71</sup> Currency serves three primary functions. First, it serves as a medium of exchange.<sup>72</sup> Second, it acts as a unit of account and a measure of relative worth.<sup>73</sup> Third, currency acts as a store of value of current earnings for future spending.<sup>74</sup> Digital currencies like Bitcoin have the potential to perform each of these roles more efficiently than traditional fiat currencies.

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<sup>66</sup> Aleksander Berentsten, *Monetary Policy Implications of Digital Money*, 51 *Kyklos* 89, 92 (1998).

<sup>67</sup> David G. Hayes et al, *An Introduction to Electronic Money Issues* \*16 (unpublished report prepared for the US Dept of Treasury, 1996), online at <http://www.occ.gov/topics/bank-operations/bit/intro-to-electronic-money-issues.pdf> (visited Mar 11, 2013).

<sup>68</sup> See id.

<sup>69</sup> Berensten, *Monetary Policy Implications of Digital Money* at 93; see also L.H. White, *The Technology Revolution and Monetary Evolution in The Future of Money in the Information Age*, (Cato 1996), online at <http://www.cato.org/moneyconf/14mc-7.html> (visited Mar 11, 2013).

<sup>70</sup> Berensten, *Monetary Policy Implications of Digital Money* at 93 (cited in note 69).

<sup>71</sup> Macintosh, 11 *Harv J L & Tech* at 756 (cited in note 1).

<sup>72</sup> Brian W. Smith & Ramsey J. Wilson, *How to Best Guide the Evolution of Electronic Currency Law*, 46 *Am U L Rev* 1105, 1106 (1997).

<sup>73</sup> Id.

<sup>74</sup> Id.

1. Superior medium of exchange

As previously discussed, digital currencies impose fewer transaction costs. They allow individuals to transact with one another regardless of where they are or whether they know each other. While the same might be said of other electronic payment systems like PayPal,<sup>75</sup> digital currencies are unique in that they overcome the transaction costs imposed by exchanging one currency for another.<sup>76</sup> Exchanging one form of currency for another imposes a number of costs. From the user's perspective, it entails an extra step that needs to occur before a transaction can be completed. In addition, currency exchange often entails an actual fee.<sup>77</sup> Digital currencies can avoid these costs because they are designed to be used transnationally via the Internet. In this sense, digital currencies are "universal" in that they can operate *outside* a system that uses multiple currencies, thereby avoiding the transaction costs associated with currency exchange.<sup>78</sup>

2. Superior unit of account and measure of relative worth

In order to serve as an efficient unit of account, a currency must provide an almost intuitive measure of relative worth.<sup>79</sup> Without it, users would have to spend time, money, and resources, to determine what the currency is really worth.<sup>80</sup> Gold, for example, derives its value because of its rarity.<sup>81</sup> Recall that generating a Bitcoin involves an incredibly complex and time-consuming process. A Bitcoin, therefore, could be intrinsically and intuitively valuable given how difficult it is to produce. Also, because Bitcoins will not be produced after 2025, they—like gold—might soon be considered "rare."

In addition, an effective currency must also be accepted as legitimate by its users.<sup>82</sup> Traditional currencies in democratic societies, for example, derive legitimacy from the fact that a government issues, manages, and guarantees the currency by operation of law.<sup>83</sup> While legitimacy in the eyes of a currency's users is often obtained by government backing, a government's susceptibility

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<sup>75</sup> Paypal is an online service that allows people to send money without sharing financial information, with the flexibility to pay using their account balances, bank accounts, credit cards or promotional financing via the Internet. See *About PayPal*, online at <https://www.paypal-media.com/about> (visited Mar 11, 2013).

<sup>76</sup> Macintosh, 11 Harv J L & Tech at 756 (cited in note 1). If the value is not intuitive, users must expend valuable time and money to familiarize themselves with the value indicated by the currency. Value associated in an obscure unit of account must be translated into value expressed in a familiar unit of account. See id.

<sup>77</sup> Id.

<sup>78</sup> Daniel Lynch, Chairman of CyberCash, Inc., suggests that the ideal form of money would be "a currency without a country, or of all countries, infinitely exchangeable, without the expense or inconvenience of exchanging among local denominations." Daniel C. Lynch & Leslie Lundquist, *Digital Money: The New Era of Internet Commerce* 122 (Wiley 1996).

<sup>79</sup> Macintosh, 11 Harv J L & Tech at 759 (cited in note 1).

<sup>80</sup> Id.

<sup>81</sup> See Charles R.M. Butt & Robert M. Hough, *Why Gold is Valuable*, 5 Elements 277 (2009).

to interest groups can sometimes harm a currency's stability more than it helps it.<sup>84</sup> This suggests that the ideal currency should be viewed as legitimate while not relying on government backing.

### 3. Superior store of value

Their independence from direct political influence also makes digital currencies superior to traditional currencies as a more stable store of value. When assessing a currency as a store of value, the key question is whether the currency is viewed as reliable and stable enough to operate effectively.<sup>85</sup> After all, storing wealth in any medium that is easily susceptible to collapse or fraud is unwise. As explained above, traditional currencies are often accepted as stores of value because they are backed by governments which, in turn, gives them a sense of legitimacy and stability in the eyes of users. But government backing is a double-edged sword. If, for example, a country is embroiled in conflict, its currency might suffer as a result. If a government decides to inflate its currency as a matter of some greater national economic policy, the wealth held by individuals in the form of currency decreases.

Electronic currencies, on the other hand, would answer to market forces, rather than the policies of national governments and the various special interests they represent.<sup>86</sup> Consequently, issuers of electronic currency would have a strong economic incentive to keep their currencies stable: the more stable the currency, the better a store of value it becomes and the more likely others are to invest in it as a result.<sup>87</sup>

## D. The Vices of Digital Currency

### 1. Uncertainty

Despite the potential advantages of digital currencies like Bitcoin, their wide-spread adoption faces a number of obstacles. First and foremost, economists are worried about the uncertainty surrounding the operation and growth of digital currencies. Because so much of the data on these currencies is either supplied directly by the issuer or scattered across the Internet, it is difficult for scholars to draw any reliable conclusions on whether—and if so, how and when—these currencies might be widely accepted.<sup>88</sup> Others criticize digital currencies like Bitcoin on a more theoretical level

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<sup>84</sup> See Hayek, *Denationalisation of Money* at 89 (cited in note 14). Hayek notes that government-backed currencies are inherently unstable to the extent that the currency, like the government, will always be subject to interest groups. See *id.*

<sup>85</sup> See ECB, *Virtual Currency Schemes* at \*11 (cited in note 4).

<sup>86</sup> Macintosh, 11 Harv J L & Tech at 764 (cited in note 1).

<sup>87</sup> *Id.*

<sup>88</sup> “It is very complicated to obtain a clear overview of the situation regarding virtual currency schemes at this stage. Almost all of the information that can be found is on the Internet, written in blogs or on web pages where personal bias cannot be excluded. With the exception of a few articles from respectable media sources or economics journals, it is almost impossible to find any comprehensive papers on this issue, since no international organizations have published statements. A similar problem exists with regard to the quantitative

because they are neither intrinsically valuable, like gold, nor do they have roots in a commodity expressing a certain purchasing power.<sup>89</sup> Some critics go as far as to describe digital currencies like Bitcoin as nothing more than a Ponzi scheme.<sup>90</sup>

## 2. Lack of regulation

The lack of an underlying legal framework poses additional problems. Because digital currencies like Bitcoin lack regulation or public oversight, they are subject to credit, liquidity, and operational risks, as well as risk of fraud.<sup>91</sup> The lack of oversight coupled with the finality and irrevocability of Bitcoin transactions gives many skeptics cause for concern.<sup>92</sup> Because digital currency transactions necessarily occur over the Internet, cyber-security is a constant concern. Despite the technical measures used to secure individual Bitcoin transactions, user-end storage and usage of Bitcoins are a key security vulnerability. For instance, in June 2011, a hacker compromised a user account containing about 400,000 Bitcoins, totaling approximately \$9 million, causing the value of one Bitcoin to plummet from \$17.50 to \$0.01 in only a few hours.<sup>93</sup>

## 3. Network Externalities

Finally, digital currencies like Bitcoin face the problem of network externalities. The benefit of using a digital currency depends on the number of other users: if few merchants accept digital money, the benefits to households to use digital money products are low; if few consumers use digital money, a merchant has little incentive to accept digital cash.<sup>94</sup> Thus, even if digital currencies are able to overcome the aforementioned barriers, their biggest challenge lies in convincing users to use them and merchants to accept them.

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information and statistics that would be needed in order to assess the speed at which these virtual currency schemes are growing and the point at which they could become a real threat. The quantitative information that is available is not extensive and is usually provided by the respective scheme owner.” ECB, *Virtual Currency Schemes* at \*33 (cited in note 13).

<sup>89</sup> See, for example, Jon Matonis, *Why Are Libertarians Against Bitcoin?*, *The Monetary Future* (Jun 26, 2011), online at <http://themonetaryfuture.blogspot.com/2011/06/why-are-libertarians-against-bitcoin.html> (visited Mar 11, 2013) (arguing that Bitcoin fails to satisfy the Misesian Regression Theorem).

<sup>90</sup> See ECB, *Virtual Currency Schemes* at \*27 (cited in note 4). Users go into the system by buying Bitcoins against real currencies, but can only leave and retrieve their funds if other users want to buy their Bitcoins, i.e. if new participants want to join the system. Id. A Ponzi scheme is an investment fraud that involves the payment of purported returns to existing investors from funds contributed by new investors. See US Securities and Exchange Commission, *Ponzi Schemes: Frequently Asked Questions*, online at <http://www.sec.gov/answers/ponzi.htm> (visited Mar 11, 2013).

<sup>91</sup> See ECB, *Virtual Currency Schemes* at \*17 (cited in note 13).

<sup>92</sup> Id at \*27.

<sup>93</sup> See *Clarification of Mt. Gox Compromised Accounts and Major Bitcoin Sell-Off*, online at [https://mtgox.com/press\\_release\\_20110630.html](https://mtgox.com/press_release_20110630.html) (visited Mar 11, 2013) (press release by Mt. Gox, an online Bitcoin exchange, detailing the cyberattack).

<sup>94</sup> Berensten, *Monetary Policy Implications of Digital Money*, 51 *KYKLOS* at 113 (cited in note 66).

## E. The Current State of Bitcoin and Beyond

Despite all of these potential drawbacks, one thing is clear: Bitcoin's value has skyrocketed. In October 2011, one Bitcoin was worth approximately two US dollars, putting the value of the total number of Bitcoins in circulation at the time at approximately \$20 million.<sup>95</sup> In March 2013, one Bitcoin was valued at more than thirty six US dollars.<sup>96</sup> As of April 2013, one Bitcoin goes for more than \$140 US dollars, placing the current value of Bitcoins in circulation at almost \$1.6 *billion*.<sup>97</sup> To put that into perspective, the value of Bitcoins currently in circulation exceed the value of the entire currency stock of over 30 countries, including Niger, Belize, and Rwanda.<sup>98</sup>

A 2012 study from the European Central Bank suggests that the use of digital currencies like Bitcoin is only expected to grow in the near future.<sup>99</sup> Those predictions are more prescient than they might at first seem. Recent financial crises in both Spain and Cyprus have caused Bitcoin prices to spike as worried citizens exchange their government-backed Euros for Bitcoins.<sup>100</sup> Bitcoin demand in parts of Europe have become so great that some have proposed installing physical Bitcoin ATMs.<sup>101</sup> Hayek's predictions about private currencies seem to be coming true before our very eyes: as the world struggles to recover from the recent global economic crisis, more and more people are losing confidence in traditional currencies and turning to Bitcoin as a private, easy-to-use, digital alternative. The recent explosion in Bitcoin value demonstrates that people are exchanging their own government-backed currencies for Bitcoins despite the theoretical reasons for avoiding it. If Bitcoin continues to grow in importance, policymakers will be faced with a number of difficult questions. What affects will it have on the exchange rates of other currencies? What, if anything, can be done to control those effects? Potential answers to these questions are further complicated by Bitcoin's decentralized infrastructure. The sections that follow examine what might be done to regulate the use of Bitcoin and digital currencies like it in the international foreign currency exchange.

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<sup>95</sup> Grinberg, 4 Hastings Sci & Tech L J at 160–61 (cited in note 7).

<sup>96</sup> Bitcoin Charts, online at <http://bitcoinwatch.com/charts/mtgoxUSD#rg180ztgSzm1g10zm2g25zv> (visited Apr 5, 2013).

<sup>97</sup> Bitcoin Charts, online at <http://bitcoinwatch.com/markets/> (visited Apr 5, 2013). The value of Bitcoins in circulations as of April 2013 was obtained by multiplying Bitcoin exchange rate (1 Bitcoin = 142.60 USD as of April 5, 2013) times the number of Bitcoins in circulation as of April 5, 2013 (10,995,900). See <http://bitcoinwatch.com/bitcoin/> (visited Apr 5, 2013).

<sup>98</sup> Central Intelligence Agency World Factbook, *Country Comparison: Stock of Broad Money*, online at <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2215rank.html#top> (visited Apr 5, 2013).

<sup>99</sup> ECB, *Virtual Currency Schemes* at \*47 (cited in note 4). The report suggests that this expected increase is due in large part to: (1) an increase in online financial transactions; (2) the increased anonymity of digital currencies; (3) their lower transaction costs than traditional payment systems; and (4) their ability to settle transactions more quickly than traditional paper money. See *id.*

<sup>100</sup> Bernhard Warner, *Jittery Spaniards Seek Safety in Bitcoins*, Businessweek (Mar 20, 2013), online at <http://www.businessweek.com/articles/2013-03-20/jittery-spaniards-look-safe-haven-in-bitcoins> (visited Apr 5, 2013).

<sup>101</sup> Ian Steadman, *First Bitcoin ATM Could Go to Cyprus As Price Continues to Rise*, Wired.co.uk (Apr 3, 2013), online at <http://www.wired.co.uk/news/archive/2013-04/3/first-bitcoin-atm> (visited Apr 5, 2013).

### III. THE INTERNATIONAL MONETARY FUND AND THE GLOBAL CURRENCY EXCHANGE

The International Monetary Fund (IMF) plays an important role in regulating the international foreign currency exchange. It was created in 1944 to help coordinate international monetary policy following the turmoil of the Great Depression.<sup>102</sup> The IMF's goal is to regulate international economic transactions—including the foreign currency exchange—in a way that helps promote the growth of world trade.<sup>103</sup> It was created to set basic guidelines that all member nations were expected to follow, particularly with respect to the foreign currency exchange, in order to promote a stable international economy.

As the following overview will demonstrate, the IMF was created to overcome the collective action problem of allowing individual countries to enact self-interested economic policies without jeopardizing the global economy. Since its inception, the IMF's goal has been to protect the world from global economic destabilization. As we shall soon see, this makes the IMF the best institution to address the potentially destabilizing effects of Bitcoin on the international foreign currency exchange.

#### A. The History Behind the IMF

In order to best understand the IMF, it is important to first understand the climate in which it was conceived. Prior to the creation of the IMF, global currencies were fixed in relation to the price of gold.<sup>104</sup> The gold standard allowed nations to value and maintain their currencies at a fixed rate of exchange with other currencies that were tied to gold.<sup>105</sup> The gold standard, however, was abandoned in 1931. Panic caused by World War I led to widespread attempts to “unload” paper currency in exchange for gold. Gold reserves were seriously depleted as a result, and the gold standard collapsed.<sup>106</sup>

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<sup>102</sup> See IMF Art 1 (cited in note 8): “The purposes of the International Monetary Fund are:  
(i) To promote international monetary cooperation through a permanent institution which provides the machinery for consultation and collaboration on international monetary problems.  
(iii) To promote exchange stability, to maintain orderly exchange arrangements among members, and to avoid competitive exchange depreciation.  
(iv) To assist in the establishment of a multilateral system of payments in respect of current transactions between members and in the elimination of foreign exchange restrictions which hamper the growth of world trade.  
(vi) In accordance with the above, to shorten the duration and lessen the degree of disequilibrium in the international balances of payments of members.” [DO YOU NEED ALL OF THIS? CONSIDER REDUCING]

<sup>103</sup> Id.

<sup>104</sup> Shani Shamah, *A Foreign Exchange Primer* 549 (Wiley, 2d ed 2011).

<sup>105</sup> Kenneth Dam, *The Rules of the Game: Reform and Evolution in the International Monetary System*, 54–60 (Chicago 1982).

<sup>106</sup> Id at 37.

In its place, countries began to rely on competitive exchange controls and trade restrictions.<sup>107</sup> In an effort to combat the unemployment caused by the Great Depression, countries sought to stimulate exports by competitively devaluing their currencies.<sup>108</sup> To prevent speculative movement of currencies, some even adopted multiple exchange rates: one favoring trade and another discriminating against capital transactions.<sup>109</sup> In addition, countries often imposed trade restrictions to protect domestic industries.<sup>110</sup> Some argue that the competitive devaluing of currencies and imposition of import restrictions only exacerbated the financial problems created by the Great Depression.<sup>111</sup> In describing the events following the deterioration of the gold standard, one influential diplomat explained:

In many countries controls and restrictions were set up without regard to their effect on other countries. Some countries, in a desperate attempt to grasp a share of the shrinking volume of world trade, aggravated the disorder by resorting to competitive depreciation of currency. Much of our economic ingenuity was expended in the fashioning of devices to hamper and limit the free movement of goods. These devices became economic weapons with which the earliest phase of our present war was fought by the Fascist dictators. There was an ironic inevitability in this process. Economic aggression can have no other offspring than war. It is a dangerous as it is futile.<sup>112</sup>

The IMF was established in 1945 to aid postwar reconstruction, address the problems created in the wake of the gold standard's collapse, and regain control of the international monetary system. The IMF's Articles of Agreement prohibited member nations from devaluing their currency to gain an economic advantage.<sup>113</sup> In order to stabilize the foreign exchange rates, the IMF coordinated a "fixed parity system"—known by many as the Bretton Woods system.<sup>114</sup> Between 1946 and 1971, all currencies were determined by the value of the US dollar, which was, in turn, determined by the price of a set amount of gold.<sup>115</sup> IMF member-nations could not change their exchange rates from the level recognized by the IMF by more than 10% without its permission.<sup>116</sup> However, in 1971, this system collapsed when the US devalued the dollar by more than 10% without the permission of the IMF.<sup>117</sup>

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<sup>107</sup> Shigeo Horie, *The International Monetary Fund: Retrospect and Prospect* at 32–34 (St Martin's 1964).

<sup>108</sup> Dominick Salvatore, *International Economics: Theory and Problems* at 509 (Macmillan 1983).

<sup>109</sup> Id.

<sup>110</sup> Id.

<sup>111</sup> See Jeffrey S. Beckington and Matther R. Amon, *Competitive Currency Depreciation: The Need For A More Effective International Legal Regime*, 10 J Intl Bus & L 209, 212–14 (2011).

<sup>112</sup> US Department of State, 1 *Proceedings and Documents of United Nations Monetary and Financial Conference, Bretton Woods, New Hampshire* 81 (1944), online at [http://fraser.stlouisfed.org/docs/publications/books/1948\\_state\\_bwood\\_v1.pdf](http://fraser.stlouisfed.org/docs/publications/books/1948_state_bwood_v1.pdf) (visited Mar 11, 2013).

<sup>113</sup> “[Each member shall] avoid manipulating exchange rates or the international monetary system in order to prevent effective balance of payments adjustment or to gain an unfair competitive advantage over other member.” IMF Art IV, § 1(iii) (cited in note 8).

<sup>114</sup> Richard N. Gardner, *The Bretton Woods-Gatt System After Sixty-five Years: A Balance Sheet of Success and Failure*, 47 Colum J Transnatl L 31, 40 (2008).

<sup>115</sup> Jonathan Sanford, *Currency Manipulation: The IMF and WTO* \*1, US Congressional Research Service (7-5700 Jan 28, 2011), online at <http://www.fas.org/sgp/crs/misc/RS22658.pdf> (visited Mar 11, 2013).

<sup>116</sup> Id.

<sup>117</sup> Id.

In 1978, the IMF Articles of Agreement were amended to allow countries to use whatever exchange rates they chose so long as they conformed to the guidelines provided in the Articles of Agreement.<sup>118</sup> Today's international foreign currency exchange is regulated under this regime.

## B. How the IMF Works

The IMF's primary purpose is to ensure the stability of the international monetary system by monitoring exchange rates and enabling countries to transact with one another.<sup>119</sup> One way it accomplishes this is by issuing currency loans to member countries. The IMF holds a currency reservoir created by initial subscription.<sup>120</sup> Upon joining the IMF, each member nation is assigned a quota—roughly equivalent to its relative size in the world economy—which determines its maximum contribution to the IMF's pool of financial resources.<sup>121</sup> Up to 25 percent of a nation's quota is payable in widely accepted currencies, such as the dollar, yen, euro, or pound sterling.<sup>122</sup> The rest must be paid in that nation's own currency.<sup>123</sup>

The IMF's pool of currency is available for lending through a drawing system. A member is allowed to purchase any foreign currency it needs in exchange for an equal value of its own currency.<sup>124</sup> All drawings are subject to the IMF's approval.<sup>125</sup> Furthermore, drawings are subject to a number of restrictions and charges that make it increasingly difficult to draw a currency once some has already been drawn.<sup>126</sup> A member must eventually repay all drawings that it makes by repurchasing its own currency in exchange for gold or some other convertible currency.<sup>127</sup> The drawing system provides the fundamental means by which IMF members acquire the resources to counter speculative currency flows and to maintain stable exchange rates between their currencies.<sup>128</sup> Thus, the IMF is able to meet member nations' borrowing needs (via the drawing system) by ensuring that it maintains a diverse and robust currency reservoir (via the quota system).

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<sup>118</sup> See generally IMF Art IV (cited in note 8).

<sup>119</sup> International Monetary Fund, *The IMF at a Glance* (Aug 22, 2012), online at <http://www.imf.org/external/np/exr/facts/glance.htm> (visited Jan 2, 2013).

<sup>120</sup> Thomas Ehrlich & Gerald Meir, Anonymous, *Legal Problems of International Monetary Reform*, 20 Stan L Rev 870, 883 (1968).

<sup>121</sup> International Monetary Fund, *Where the IMF Gets its Money* (Aug 24, 2012), online at <http://www.imf.org/external/np/exr/facts/finfac.htm> (visited Mar 11, 2013); see also IMF Art III, § 1 (cited in note 8).

<sup>122</sup> International Monetary Fund, *Where the IMF Gets its Money* (cited in note 121).

<sup>123</sup> IMF Art III, § 3 (cited in note 8). A member pays in gold the smaller of 25% of its quota or 10% of its net official holdings of gold and United States dollars. See *id.* at Art III, § 3(b).

<sup>124</sup> Ehrlich & Meir, 20 Stan L Rev at 883 (cited in note 120).

<sup>125</sup> *Id.*

<sup>126</sup> See IMF Arts V § 3 (discussing conditions on drawing rights), V § 8 (discussing charges), VI (discussing the limited use for capital transfers).

<sup>127</sup> Ehrlich & Meir, 20 Stan L Rev at 883 (cited in note 120).

<sup>128</sup> See *id.* Speculative currency flows are discussed extensively in Part IV.

#### IV. THE DANGERS OF AN UNREGULATED BITCOIN

As Bitcoin continues to grow in popularity and value, it poses an increasingly serious threat to the stability of the foreign currency exchange and, by extension, international commerce. Recall that the IMF was created to tackle two global economic problems: (1) the artificial devaluation of one's currency to gain an economic advantage;<sup>129</sup> and (2) unstable exchange rates between various currencies.<sup>130</sup> Bitcoin cannot trigger the first concern because the algorithm that supports it prohibits users from artificially manipulating its value.<sup>131</sup> Bitcoin *does*, however, have the potential to create severe and possibly irreversible fluctuations in the foreign currency exchange. Specifically, Bitcoin poses a liability to the IMF and its member nations in the event it is used in what is referred to as a “speculative attack” on another currency.

In order to fully appreciate the potential threat Bitcoin poses, it is important to first understand speculative attacks on currencies. A speculative attack on a currency occurs when an investor wishes to take advantage of a “weak currency,” a currency that has depreciated in value relative to other currencies.<sup>132</sup> The attack begins by taking what is known as a “short position” in the currency. To do this, the attacker borrows a sum of the weak currency and sells it for a stronger (more valuable) currency, with the intention of buying the weak currency back for less than the attacker sold it for.<sup>133</sup> If the currency continues to depreciate in value after the short sale, the attacker makes a profit when they buy it back. By way of illustration, the attacker borrows 100 apples and sells them for 80 oranges. If the value of apples-to-oranges gets weaker, the attacker can then sell their 80 oranges back to the market for 120 apples. The attacker then pays back their loan—100 apples—and is left with a 20 apple profit.

Speculators typically sell the weak currency to commercial banks through long-dated (at least one month) forward contracts.<sup>134</sup> These forward contracts, however, pose a problem to the bank if the currency it purchased from the speculator continues to get weaker. Because forward contracts take some time to mature, the bank is forced to hold on to weak currency as it continues to depreciate in value. When it comes time to buy the currency back, the speculator makes a profit at the expense of the bank. By the time the forward contract matures, the bank is forced to buy the weak currency for more than the currency is worth once the contract matures.<sup>135</sup> This is known as a “maturity mismatch.” This discrepancy gradually depletes the bank's supply of the attacked currency

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<sup>129</sup> IMF Art IV, §1(iii) (cited in note 8).

<sup>130</sup> Ehrlich & Meir, 20 Stan L Rev at 883 (cited in note 120).

<sup>131</sup> Dingle, *Easy Money?* (cited in note 12).

<sup>132</sup> See Akihiko Matsui, *Strong Currency and Weak Currency*, 12 J of Japanese and Intl Economies 305, 306–07 (1998).

<sup>133</sup> See Tijmen R. Daniëls, Henk Jager, and Franc Klaassen, *Defending Against Speculative Attacks* \*4, (Seventh Bundesbank Spring Conference on Economic Risk Discussion Paper No 2009-011, Feb 2009), online at <http://edoc.hu-berlin.de/series/sfb-649-papers/2009-11/PDF/11.pdf> (visited Mar 11, 2013).

<sup>134</sup> International Monetary Fund Research Department, *Capital Flow Sustainability and Speculative Currency Attacks* \*9, (Dec 1997), online at <http://www.imf.org/external/pubs/ft/fandd/1997/12/pdf/imfstaff.pdf> (visited Mar 11, 2013).

<sup>135</sup> Id.

over time. By making a profit at the expense of the bank, the attackers have more money to spend in perpetuating the speculative attack, and the banks have less to use in order to guard against it. If banks are unable to offset the speculative attack, the value of the attacked currency spirals uncontrollably downward, triggering destabilization in the foreign currency exchange.<sup>136</sup>

In order to counteract speculative attacks, banks typically rely on their country's central bank for assistance. Central banks are public institutions which manage a state's currency, money supply, and interest rates.<sup>137</sup> Central banks hold currency reserves which can be loaned out in case of an economic or financial emergency.<sup>138</sup> To counter a speculative attack, central banks have a few options. First, they can raise interest rates to deter speculation.<sup>139</sup> Second, and more importantly, they can intervene directly into the foreign exchange market by offsetting, or "absorbing," the maturity losses felt by commercial banks as a result of their forward contracts with investors. This requires the central bank to buy the commercial bank's excess of the weak currency in exchange for stronger currency at the exchange rate.<sup>140</sup> This ensures that commercial banks are not left with only excess amounts of weak currency thanks to their forward contracts with speculators.

In order for a central bank to absorb the maturity mismatches of a commercial bank, the central bank must have a reserve of currency upon which to draw. In the event of an emergency, where the central bank does not have a currency reserve, the nation served by the central bank can turn to the IMF for assistance, provided that nation is a member. This is where the importance of the IMF's quota system comes into play. As discussed in Section III, the quota system allows the IMF to maintain a diverse stockpile of currencies in case they are needed to help stabilize foreign exchange rates.<sup>141</sup> The amount and variety of the currencies available to member nations is limited to the currencies submitted via the quota system.

Herein lies the threat posed by Bitcoin. In the event that a wealthy Bitcoin investor—or a number of Bitcoin investors—launch a speculative attack on a currency, what can be done to counter it? In theory, individual countries could diversify their reserve portfolio by purchasing Bitcoins from an online exchange. But if a central bank's reserve is unable to absorb the maturity mismatches suffered by its central banks, who can it turn to? The IMF has no supply of Bitcoins; indeed it has almost no way to obtain them directly. The IMF obtains currency via the quota system and the IMF can only collect quotas from its members. Bitcoin is neither a member of the IMF, nor could it become one if it wanted to—IMF membership is only open to nation-states.<sup>142</sup> The IMF

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<sup>136</sup> Aart Kraay, *Do High Interest Rates Defend Against Currencies During Speculative Attacks?*, 59 J Intl Econ 297, 298 (2003)

<sup>137</sup> See Douglas W. Arner, Michael A. Panton, and Paul Lejot, *Central Banks and Central Bank Cooperation in the Global Financial System*, 23 Pac McGeorge Global Bus Development L J 1, 12–15 (2010).

<sup>138</sup> Id.

<sup>139</sup> Daniëls et al, *Defending Against Speculative Attacks* at \*4 (cited in note 133). Raising interest rates raises the forward rate of the forward contract, resulting in a smaller—if not non-existent—profit for the speculator. See id.

<sup>140</sup> Id at \*7.

<sup>141</sup> See Part III.B.

<sup>142</sup> IMF Art II, § 2 (cited in note 8).

could try to purchase its own reserve of Bitcoins, but whose money would it use? Which part of the IMF's general fund would it deplete? In short, Bitcoin's potential to become a major player in the foreign currency exchange raises a number of substantial questions for the IMF. In its current state, the IMF would be unable to supply the currency needed to counter the destabilizing effect of a speculative attack by Bitcoin users on a member nation's currency.

If nations are deprived of the ability to borrow Bitcoins to offset maturity mismatches, their only reasonable alternative is to rely on the ability to raise interest rates. As explained above, raising domestic interest rates is designed to make speculators' financing costs higher than their anticipated capital gains in the event of a devaluation, which might force an eventual closing of short positions.<sup>143</sup> But raising interest rates can have a number of negative side effects. First, the consequences of higher interest rates depend in large part on the status of the affected economy. If the effected economy is in a period of slow growth, raising interest rates—which, in turn, effectively raises prices—could trigger a recession. As the costs of heightened interest rates mount, confidence in the central bank begins to deteriorate: since increasing interest rates during an economically inopportune time only makes sense if the situation dire, those increases fuel speculation that the nation's currency is truly weak and only going to get weaker.<sup>144</sup> This leads to vicious spiral: expectations of devaluation force higher interest rates, which in turn imposes greater costs on the economy.<sup>145</sup> Given the right—or, rather, *wrong*—economic climate, those costs may prove too much, causing the nation to spiral into recession and further exacerbating the speculative attack on its currency.

In short, the ability to increase interest rates and the ability to borrow currency from central banks and the IMF work best in conjunction with one another. Without a reserve holding of Bitcoins, the IMF is severely restricted in what it can do to assist member nations facing a speculative attack by Bitcoin users. In effect, the IMF's inability to contribute leaves nations with only one option: to raise interest rates. And, depending on the state of that nations' economy, that option may prove economically disastrous.

The threat posed by Bitcoin, of course, has yet to materialize.<sup>146</sup> But as Bitcoin usage continues to grow, so does the potential threat it poses to the stability of the foreign exchange market. Although particular attention has been given to Bitcoin in this regard, the same can be true for any digital currency that grows enough in terms of usage and value to be traded for substantial amounts of foreign currency. Without the ability offer digital currency as part of its currency reserves, the IMF would be ill-equipped to ensure global economic stability in a future where digital currency becomes a major player.

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<sup>143</sup> International Monetary Fund Research Department, *Capital Flow Sustainability* at \*9 (cited in note 134).

<sup>144</sup> See Kraay, *Do High Interest Rates Defend Against Currencies During Speculative Attacks?* at 298(cited in note 135) .

<sup>145</sup> Id.

<sup>146</sup> The aggregated value of Bitcoins—roughly \$1.6 billion at the time of writing—is but a small fraction of the wealth traded on the foreign currency exchange. See Bitcoin Watch, online at <http://bitcoinwatch.com/> (visited Jan 15, 2013) (cited in note 96).

## V. HOW TO COUNTER THE BITCOIN THREAT VIA THE IMF

Finding a way to regulate Bitcoin is critical in light of its potential destabilizing effects on the foreign currency exchange. Although there might be a number of ways to mitigate Bitcoin's impact via domestic legislation, those solutions are beyond the scope of this Comment. Instead, I discuss ways in which the IMF can be used to counter the threat posed by Bitcoin.

The IMF is particularly well-situated to solve this problem for two reasons. First, the IMF is an institution specifically designed to help stabilize the global economic system via the foreign currency exchange, as explained in Section III. Second, regulating Bitcoin falls squarely within the IMF's goals, as outlined by Article 1 of the Articles of Agreement.<sup>147</sup> In both of these respects, the IMF is able to coordinate a global response to the threat posed by Bitcoin in a way no other institution can.

There are, however, challenges that must be overcome. The most obvious obstacle to regulating the impact of Bitcoins on the foreign currency exchange via the IMF is one of enforcement. Article VII of the Articles of Agreement allows the IMF to replenish its holding of a member's nation currency.<sup>148</sup> It also allows the IMF to restrict the flow of a currency it deems to be scarce and to apportion its allocation accordingly.<sup>149</sup> Both are vital tools for countering a speculative attack. The first allows the IMF to overcome any currency shortages, ensuring that it has a sufficient amount of currency to lend in an effort to offset a speculative attack. The second gives the IMF the flexibility it needs to respond in the event of an emergency shortage, and allows the member nation whose currency is in short supply to limit the domestic exchange of its scarce currency.

Neither of these tools, however, are available to the IMF in the event of a speculative attack by Bitcoin users. The IMF draws its power from the obligations it imposes via the Articles of Agreement. Those obligations only bind members of the IMF (that is, signatories of the Articles of Agreement). Consequently, Article VII only authorizes the IMF to collect currency from member nations. Membership, however, is only open to nation-states.<sup>150</sup> Furthermore, dealings with the IMF are expressly limited to those done via a member nation's financial institutions.<sup>151</sup> Bitcoin is neither a nation-state, nor does it have any centralized financial institution with which to do business with the

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<sup>147</sup> IMF Art I (cited in note 8102).

<sup>148</sup> Id at Art VII, § 1: "The Fund may, if it deems such action appropriate to replenish its holdings of any member's currency in the General Resources Account needed in connection with its transactions. . . ."

<sup>149</sup> Id at Art VII, § 3(a): If it becomes evident to the Fund that the demand for a member's currency seriously threatens the Fund's ability to supply that currency, the Fund, whether or not it has issued a report under Section 2 of this Article, shall formally declare such currency scarce and shall thenceforth apportion its existing and accruing supply of the scarce currency with due regard to the relative needs of members, the general international economic situation, and any other pertinent considerations. The Fund shall also issue a report concerning its action.

<sup>150</sup> Id at Art II, § 2.

<sup>151</sup> See id: "Each member shall deal with the Fund only through its Treasury, central bank, stabilization fund, or other similar fiscal agency, and the Fund shall deal only with or through the same agencies." Id.

IMF. As they are now, the Articles of Agreement do not permit the IMF to exercise direct control over the use of Bitcoins.

There are, however, two ways to incorporate Bitcoin into the IMF's regime. The first option is to grant the IMF indirect control over Bitcoin by expanding the interpretation of an already-existing provision of the IMF. This approach requires the least amount of change and leaves the overall IMF framework mostly intact. The second option is to grant the IMF more direct control over Bitcoin by granting it and other digital currencies quasi-membership status. This more radical approach would require an amendment of the Articles of Agreement and would fundamentally alter the existing framework's conception of a non-state actor's role in the IMF.

#### A. Indirect Control: Article IV, Section 5 and "Separate Currencies"

The Articles of Agreement contain a set of provisions that would allow the IMF to mitigate the impact of Bitcoins on the foreign exchange market through the pre-existing quota system. Article IV of the Articles of Agreement outlines the obligations of IMF members with respect to exchange agreements. It requires member nations to cooperate with the IMF's guidelines, to adopt domestic policies that facilitate international economic stability, and—most importantly—prohibits activity that would destabilize foreign exchange rates.<sup>152</sup> Section 5 of Article IV holds member nations responsible for both its primary currency as well as any separate currencies it might use.<sup>153</sup> More specifically, any act by the IMF towards a member nation applies to all currencies of a member nation.<sup>154</sup> Any act by an individual member-nation, however, applies to all of its currencies unless it specifies that the action relates to one currency and not the other.<sup>155</sup>

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<sup>152</sup> Id at Art IV, § 1: "[E]ach member undertakes to collaborate with the Fund and other members to assure orderly exchange arrangements and to promote a stable system of exchange rates. In particular, each member shall:

- (i) endeavor to direct its economic and financial policies toward the objective of fostering orderly economic growth with reasonable price stability, with due regard to its circumstances;
- (ii) seek to promote stability by fostering orderly underlying economic and financial conditions and a monetary system that does not tend to produce erratic disruptions;
- (iii) avoid manipulating exchange rates or the international monetary system in order to prevent effective balance of payments adjustment or to gain an unfair competitive advantage over other members; and
- (iv) follow exchange policies compatible with the undertakings under this Section.

<sup>153</sup> Id at Art V, § 5 (emphasis added):

- (a) Action by a member with respect to its currency under this Article shall be deemed to apply to the separate currencies of all territories in respect of which the member has accepted this Agreement under Article XXXI, Section 2 (g) unless the member declares that its action relates either to the metropolitan currency alone, or only to one or more specified separate currencies, or to the metropolitan currency and one or more specified separate currencies.
- (b) Action by the Fund under this Article shall be deemed to relate to all currencies of a member referred to in (a) above unless the Fund declares otherwise."

<sup>154</sup> Id at § 5(b).

<sup>155</sup> Id at § 5(a).

The precise meaning of these provisions—and the intent that motivates how they should operate—is unclear.<sup>156</sup> Article IV, Section 5(a) mentions “separate currencies” by referencing Article XXXI, Section 2, the provision under which signatories accede to the Article of Agreement.<sup>157</sup> Section 2(g) explains that, by signing the Articles of Agreement, member nations accept its provisions on behalf of all of its “colonies, overseas territories, all territories under their protection, suzerainty, or authority, and all territories in respect of which they exercise a mandate.”<sup>158</sup> Presumably, this suggests that the reference to “separate currencies” in Article IV is meant to hold principal nation-states responsible for the currencies of their subsidiaries. Put differently, reading Article IV, Section 5 and Article XXXI, Section 2(g) together was intended to prevent member nations from taking advantage of potential loopholes. If, for example, the United Kingdom was prohibited from devaluing the pound sterling in order to gain a competitive advantage, it was also prohibited from devaluing the rupee in its Indian colonies even though the colony was not—at the time the Articles of Agreement were drafted—formally a signatory to the Articles of Agreement. In essence, Article IV, Section 5’s reference to “separate currencies” is best read as authorizing a means by which the IMF can exercise indirect control over currencies not formally within its reach.

In order to mitigate the potential impact of Bitcoin, the meaning of Article IV, Section 5 could be expanded to include digital currencies. Rather than limiting its scope to currencies used by colonies or overseas territories, the IMF could use Article IV Section 5 to label Bitcoin—or other digital currencies like it—a “separate currency.”<sup>159</sup> As such, the IMF could require member nations to pay part of their subscription quota with Bitcoins.<sup>160</sup> This would require member nations to purchase Bitcoins independently. They would then contribute that amount to the IMF’s general fund as part of their quota, receiving an amount of their own currency or special drawing rights

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<sup>156</sup> Indeed, the IMF’s own legal department takes the position that there is “very little legislative history to illuminate the meaning of [Article IV’s] provisions.” See International Monetary Fund, *Article IV of the Fund’s Articles of Agreement: An Overview of the Legal Framework* \*3 (June 28, 2006), online at <http://www.imf.org/external/np/pp/eng/2006/062806.pdf> (visited Mar 11, 2013).

<sup>157</sup> IMF Art XXXI, § 2 (cited in note 8).

<sup>158</sup> See *id.* at § 2(g): “By their signature of this Agreement, all governments accept it both on their own behalf and in respect of all their colonies, overseas territories, all territories under their protection, suzerainty, or authority, and all territories in respect of which they exercise a mandate.” *Id.*

<sup>159</sup> This approach works best once individual member-nations have enacted domestic regulations on the use of Bitcoins. Once domestic legal oversight is imposed, Bitcoin becomes much more like the currency of a colony or territory in that it is controlled directly by the national government. Efforts to regulate Bitcoins in the US are already underway. See, for example, Brett Wolf, *Senators Seek Crackdown on “Bitcoin” Currency*, Reuters (Jun 8, 2011), online at <http://www.reuters.com/article/2011/06/08/us-financial-bitcoins-idUSTRE7573T320110608> (visited Mar 11, 2013).

<sup>160</sup> The IMF’s Board of Governors conducts general quota reviews at regular intervals (usually every five years). Any changes in quotas must be approved by an 85 percent majority of the total voting power, and a member’s quota cannot be changed without its consent. See International Monetary Fund, *IMF Quotas* (Aug 24, 2012), online at <http://www.imf.org/external/np/exr/facts/quotas.htm> (visited Jan 14, 2013). It would be in the best interest of member nations to adopt such an amendment because it would grant the IMF the ability to shield them from a potential speculative attack by Bitcoin users.

equal to the value of the Bitcoins paid in exchange.<sup>161</sup> In short, expanding the meaning of Article IV, Section 5 would grant the IMF a means of indirectly accumulating Bitcoins through its members.

To accomplish this, the IMF would have to make a minor amendment to the Articles of Agreement. An amendment of this nature would require three-fifths of the IMF's members, having eighty-five percent of the total voting power, to ratify the change.<sup>162</sup> With the necessary votes, the IMF could amend Article XXXI, Section 2(g) to expand the scope of the "separate currencies" referred to by Article IV, Section 5. An amendment would establish Bitcoin, and digital currencies like it, as a "separate currencies" without making any major changes to the obligations outlined in Article IV, Section 5.

Expanding the scope of Article IV Section 5 would accomplish three things. First, it would ensure that the IMF has an adequate supply of Bitcoins from which to draw on in order to counter a speculative attack on a member-nation's currency by Bitcoin users. Second, it would avoid undercapitalizing the IMF's general fund by ensuring that the value of currency going in (Bitcoins) is equal to the value of currency coming out. Finally, incorporating Bitcoins into the IMF's general fund would help reinforce its legitimacy and, in turn, its stability in the eyes of the international financial community.

Applying Article IV, Section 5 to Bitcoins in this way is a novel approach. Nothing in its sparse legislative history supports the proposed application. The most stringent reading of Article IV, Section 5 in light of Article XXXI, Section 2(g) would almost certainly prohibit extending its application to digital currencies like Bitcoin, as the Internet falls quite outside the bounds of "colonies, overseas territories, all territories under their protection, suzerainty, or authority, and all territories in respect of which they exercise a mandate." Indeed, the greatest difficulty in adopting the proposed approach is that the Internet is not a physical place, is not under the exclusive control of any one country, and is thus markedly different from a territory or a colony.

But the absence of feasible statutory alternatives mitigates the thrust of these criticisms. Nothing else in the Articles of Agreement gives the IMF the power to control the impact of digital currencies. The very framework of the IMF is built on a conventional notion of state sovereignty, where nation-states, and *only* nation-states, are the key actors. Digital currencies like Bitcoin, on the other hand, are specifically designed to operate without the need for nation-states. In order to leave

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<sup>161</sup> A special drawing right is an international reserve asset, created by the IMF in 1969 to supplement its member countries' official reserves. Its value is based on a basket of four key international currencies, and SDRs can be exchanged for freely usable currencies. See International Monetary Fund, *Fact Sheet: Special Drawing Rights* (Aug 24, 2012), online at <http://www.imf.org/external/np/exr/facts/sdr.htm> (visited Mar 11, 2013).

<sup>162</sup> IMF Art XXVIII (cited in note 8): "Any proposal to introduce modifications in this Agreement...shall be communicated to the chairman of the Board of Governors who shall bring the proposal before the Board of Governors. If the proposed amendment is approved by the Board of Governors, the Fund shall, by circular letter or telegram, ask all members whether they accept the proposed amendment. When three-fifths of the members, having eighty-five percent of the total voting power, have accepted the proposed amendment, the Fund shall certify the fact by a formal communication addressed to all members."

its underlying framework—with nation-states acting as the principal agents—intact, the IMF needs to find a way to acquire Bitcoins via its members. Expanding its interpretation of Article IV, Section 5 to include indirect control of virtual currencies would allow the IMF to adapt to the ever-changing economic realities of the digital age while retaining its underlying legal framework.

#### B. Direct Control: Granting Digital Currencies Quasi-Membership to the IMF

Alternatively, the IMF could collect Bitcoins directly from Bitcoin users rather than using member-nations as intermediaries. Article II, Section 2 explicitly states that membership to the IMF is only open to other *countries*.<sup>163</sup> Rather than expanding membership to include non-state actors, Article II could be amended to include a new section, Section 3, which provides quasi-membership status for digital currencies. This kind of an amendment would also require three-fifths of the IMF's members, having eighty-five percent of the total voting power, to ratify the change.<sup>164</sup> Instead of granting Bitcoin the full benefits or burdens of membership—for example, the ability to borrow money from the IMF or restrictions on who Bitcoin can do business with<sup>165</sup>—Section 3 would allow the IMF to recognize Bitcoin as an “IMF-official” digital currency once the IMF has obtained a certain amount of Bitcoins from Bitcoin users.<sup>166</sup>

The trade-offs would be mutually beneficial. Bitcoin users would sell Bitcoins to the IMF for an equivalent value of other currencies. In exchange, Bitcoin users would benefit from the increased legitimacy that official IMF recognition would bring. By doing business with an established international institution such as the IMF, Bitcoin users demonstrate that Bitcoin is committed to being a real player in global finance, not just a fringe currency. Direct interaction with the IMF would, in turn, bolster confidence in Bitcoin as a globally accessible digital currency and would increase the potential market for Bitcoins. It is worth noting that participating with the IMF in this manner would not violate Bitcoin's anti-establishment ethos: selling Bitcoins to the IMF would be a simple transaction with none of the IMF's regulatory strings attached.<sup>167</sup> The IMF, on the other hand, would benefit from having the Bitcoin reserves it needs to counter a speculative attack without requiring member-nations to take any domestic action.

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<sup>163</sup> See *id.* at Art II, § 2 (cited in note 8): “Membership shall be open to other countries at such times and in accordance with such terms as may be prescribed by the Board of Governors. These terms, including the terms for subscriptions, shall be based on principles consistent with those applied to other countries that are already members.”

<sup>164</sup> See *id.* at Art XXVIII.

<sup>165</sup> Article XI prohibits IMF members from transacting with non-member countries such as North Korea. See *id.* at Art XI.

<sup>166</sup> An amendment to Article VII might also be required to enable the IMF to purchase currency from non-member entities like Bitcoin users. In its current state, Article VII only authorizes the purchasing of a *member's* currency. See IMF Art VII (cited in note 8).

<sup>167</sup> It is again important to note that the only real restriction the IMF imposes on countries with respect to their exchange rates is requiring that currencies not be devalued in order to create a competitive advantage. Since Bitcoin's software makes it impossible to devalue Bitcoins, the IMF would not be imposing any restrictions on Bitcoins that might detract from its largely decentralized and unregulated status.

This solution is not, however, without its drawbacks. Collecting Bitcoins via a quasi-membership scheme creates a collective action problem. Because Bitcoin operates through a decentralized network of users, aggregating the necessary amount of Bitcoins would be difficult. There is no centralized institution for the IMF to go to, and no easy way for the IMF to contact Bitcoin users directly. The IMF would have to enter online Bitcoin exchanges like any other prospective Bitcoin user. Even if the IMF were able to transact with Bitcoin users directly, the recognition-in-exchange-for-trading scheme creates a tragedy of the commons: all Bitcoin users benefit from the increased legitimacy of IMF recognition, but no one individual user has an incentive to transact with the IMF. In fact, Bitcoin users might very well have incentive *not* to transact with the IMF right away. Recall that Bitcoin's mining software is programmed to cap the generation of Bitcoins by approximately 2025.<sup>168</sup> Once the availability of Bitcoins becomes finite, we can expect the value of Bitcoins to increase. Thus, Bitcoin users have a short-term incentive to hold on to their Bitcoins rather than trade them. Since the proposed system relies on the completely voluntary participation of Bitcoin users, the incentive to hold on to Bitcoins creates a serious problem.

## VI. CONCLUSION

This Comment introduced Bitcoin in conjunction with the history of the International Monetary Fund in order to demonstrate the possibility of future conflict between the two. The peer-to-peer, decentralized, and largely unregulated system that is Bitcoin contains the potential to threaten the global economic stability that the IMF was created to protect. The threat posed by Bitcoin is, for the moment, only theoretical. But as more and more people come to understand the advantages of digital money over paper money, the threat it poses becomes increasingly real. If the future of e-commerce entails a transition to digital currencies, it is critical that our economic, political, and legal institutions are prepared. Recognizing the importance of Bitcoin in the context of digital currencies is the first step in understanding how to best plan for the future.

How, when, and to what extent it will grow remains to be seen. But the potential consequences of widespread adoption of the Bitcoin are already palpable. In order to guard against the global economic destabilization that could occur if and when the world decides to adopt digital currencies, we must consider ways in which our national and international institutions can guide that transition in the here and now. At present, the IMF has at least two options. It can attempt to exercise indirect control over digital currencies vis-à-vis its member-nations by expanding the scope of Article IV, Section 5 of the Articles of Agreement. Alternatively, it can attempt to exercise direct control over digital currencies by offering them a form of quasi-membership status, where increased legitimacy is traded for Bitcoin users' business.

Regardless of which measure is chosen, the potential need for a method to combat speculative attacks using Bitcoin is clear. As the Internet continues to play an increasingly important

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<sup>168</sup> Dingle, *Easy Money?* (cited in note 12).

role in how we conduct commerce, our institutions have to adjust to the new challenges this change creates. The evolution of Bitcoin is no exception. Although still in its nascent stages, Bitcoin and other digital currencies like it are projected to become important players in the future of e-commerce. The time to consider how to prepare for that future is now, before practical problems arise.