Cryptocurrency Public Policy Analysis

Joseph B. Walton

Virginia Commonwealth University

Author Note

This public policy analysis is work product for PADM 625 Fall 2014 Barrack to partially fulfill the Master of Public Administration degree at the L. Douglas Wilder School of Government & Public Affairs at VCU.

Correspondence concerning this paper should be directed to waltonjb@vcu.edu.

Abstract

Cryptocurrency – including a particular initial denomination known as Bitcoins – has received since 2009 wide and growing publicity in technology, finance, U.S. and international law enforcement, as well as general public journalism and popular press. This recent popular press coverage of cryptocurrency (how and from where do Bitcoins originate?, how much is one worth today or tomorrow?, will it last with all the stumbling implementation and technical intricacies?, purchasing illegal drugs and guns with Bitcoins!) overshadows cryptocurrency's applicability to financial and currency system theories which have been developed and predicted for decades or more: the fundamental theory of currency; currency denationalization; a return to an international standard monetary unit (before nationalized fiat); the inefficiency of costly 3rd-party-trust currency models; and global concerns about currency hegemonies as well as political influence of monetary policy, and currency hedge/speculation.

As the moral panic of Bitcoin and similar initial implementations of cryptocurrency fade and cryptocurrency systems gain traction underground or aboveground anywhere in the world, U.S. and international public policymakers and regulators will need to surveil, understand, and evolve public policy to accommodate any aspect of cryptocurrency which develops from technical novelty to realization of predicted grand monetary theories. Some of those areas of evolution include: national central bank monetary control; public sector dependence (oversight, taxing, fees) on private sector financial models and structures; and viability of traditional national and international law enforcement techniques.

U.S. federal and major subnational public sector policymakers and regulators must remain vigilant for and educated about cryptocurrency usage whether in nationalized or denationalized use cases or they risk missing early opportunities to shape the rapidly changing landscape of digital financial systems in the U.S and abroad. This vigilance and awareness could be in the form of continued congressional hearings and regulatory surveillance. But a more proactive approach including federal grants for research and study of cryptocurrency, promotion of national and international symposia regarding currency technology and implications should be pursued. The nature of cryptocurrency's raison d'être and early-adopter motivation foretells a disruptive network-effect adoption despite entrenched interests' efforts at preclusion similar to numerous recent technical innovations in the private sector like music or other intellectual property downloads, retail shopping, taxis services, hotel lodging, traditional print journalism, and traditional communication systems.

(word count 370)

Keywords: cryptocurrency, currency, monetary, policy, regulation, fiat, denationalization, SDR (Special Drawing Rights), bitcoin, bitcoins

Cryptocurrency Public Policy Analysis

Introduction

The inexorable march of technology and its historical leveling of ancient to modern aspects of society and humanity (fire, the wheel, sliced bread, the internet, cellphones; see also *The World is Flat* by Thomas Freidman) will claim soon the ultimate trophy: international monetary and fiscal barriers and the national/political pride they protect in the form of sovereign[1] currencies and putative 'coins of the realm'. For millennia, sovereign states and their people have relied upon smelted precious metals and paper currency (as well as a variety of other materials from cowrie sea shells to beaver pelts) or bank notes representing those materials for everything from buying daily personal needs to waging war (Crank the presses! (DR, 2011)) and keeping peace (Norris, 2009). Increasingly these tokens of value are being reduced to 1s and 0s with no other nexus to the physical world (Kaplanov, 2012) in most modern societies. Direct deposit of salaries and wages, debit cards, and online shopping have combined to cause handling of actual cash currency to be increasingly rare. Indeed, even the germ theory vector of cash is hastening the transition to digital transactions!

In a global society skeptical of large economic powers' monetary policy and global currency hegemony(ies) (Kennedy, Lietaer, & Rogers, 2012), "recurring periods of mass unemployment" (Hayek, 1990), private sector financial systems' cost, complexity, opaqueness, speculation and vulnerability (Lietaer & Dunne, 2013) national fiat currencies have a poor track

[1] For the purposes of this policy analysis, sovereign state means individual nation and its currency as well as shared currencies among sovereign states. Indeed the reluctance of sovereign nations to give up their currency for an 'economic community' currency is a challenge (Euro, anyone?) (Lo & Wang, 2014)).

record. "The global financial crisis that began in 2007 is not the first" according to the International Monetary Fund (IMF), to wit:

> Between 1970 and 2007 there were 124 systemic banking crises, 208 currency crises, 63 episodes of sovereign debt defaults; and,
> Between 1670 and 1970 there were 48 major crashes [monetary and/or currency related] (Kennedy, Lietaer, & Rogers, 2012)

Global financial security and the other realms of security which it promotes need a better way than nationalized currencies and political monetary policy for stability.

From an economic perspective the notion of currency denationalization has been seriously debated for decades in the hallowed halls of London and Chicago economic schools. Writing in 1976[2], Friedrich Hayek posited:

> "As soon as one succeeds in freeing oneself of the universally but tacitly accepted creed that a country must be supplied by its government with its own distinctive and exclusive currency, all sorts of interesting questions arise which have never been examined" (Hayek, 1990)

This was speculation for him at the time (his epic treatise in 1976 on currency denationalization was jotted off while pausing other work lest he forget his fancy theories about the topic) and novel in the realm of monetary policy but it was the first serious academic discussion of the merits (or lack thereof) of nationalized currency among all nations. Now in 2014, innovation, entrepreneurialism, and so-called disruption is 'all the rage' in the private sector and has a burgeoning following in the public sector. Why not with regard to national currencies?

> "I have now no doubt whatever that private enterprise, if it had not been prevented by government, could and would long ago have provided the public with a choice of

[2] Hayek's referential material for this analysis is the 1990 3rd edition of his 1976 1st edition. By the 3rd edition he had made helpful revisions.

> currencies, and those that prevailed in the competition would have been essentially stable in value and would have prevented both excessive stimulation of investment and the consequent periods of contraction" (Hayek, 1976).

Has Hayek's time come?

"Milton Friedman, the famous economist and Nobel Laureate, opposed the existence of the Federal Reserve and argued that a better system would entail a money supply steadily increasing at a predetermined rate" (Turpin, 2014) which is exactly what cryptocurrency is theorized to represent and indeed can do. Furthermore in an infamous 1999 interview on the topic of the then novel internet, Friedman predicted "the one thing that's missing, but that will soon be developed, is a reliable e-cash, a method whereby on the Internet you can transfer funds from A to B, without A knowing B or B knowing A" (Cawrey, 2014). Friedman's interview also offers predictions of the need for similar anonymity to cash, two people blindly exchanging $20, and that such a system would necessarily be viable for crime. As early implementations of cryptocurrency have demonstrated, Milton Freidman was quite prescient. Should his wider vision for e-cash be discounted?

And finally from a postpositivist public administrative perspective, "the public doesn't trust [a] technocratic approach anymore!" (Buchstein [reviewing Fischer's postpositivism], 1996). The nationalized fiat currencies of the U.S and other major economic powers have been spectacularly unstable with regular frequency (see above) for centuries. The opaque political influence of at least U.S. monetary policy has been a major driving force behind so-called Tea Party political protests since the Great Recession and which bear roots in anti-federal/central bank sentiment likely since Nixon declared 'we were all Keynesians'. While Frank Fischer's initial conceptions of postpositivist public administrative theory did not approach monetary

policy, there is little doubt the U.S. has entered a postpositivist period with regard to central bank regulation – at least for many folks outside the central bank itself[3]. The essence of national currency is both a highly technocratic and pure "social choice" (to use Fischer's ultimate theoretical classification) and one which modern technology and globalization (the rise of non-U.S. economies) cannot long keep from democratization and de-coupling from any particular political power.

Literature Review

"A saturnalia of fraud, a carnival for rogues"

– Rep. R. Conkling – N.Y. from the floor of the U.S. House of Representatives, 1861, describing fiat currency while speaking in opposition to its use for paying Civil War expenses

About Money and Currency

It is relevant to fundamentally describe money and currency to fully consider and appreciate the process of seeking a digital alternative. The 'Adam Smith' of money and currency is William Stanley Jevons who authored *Money and the Mechanisms of Exchange* in 1875. In it he deconstructs and explicates the entire financial system as it had been known then and which bears striking resemblance to present times. This is a fact which is particularly salient for a discussion about cryptocurrency because of cryptocurrency's potential to actually fundamentally change the global financial system(s) – not much has changed since 1875 – unlike anything else

[3] Lo & Wang's referential material for this analysis is a case in point. Their FRB Boston essay is a reasonably fair review of Bitcoins but with regard to cryptocurrency (which they conflate with Bitcoins) they cite Bitcoins' pitfalls, quite convincing monetary policy research (an uncited statement), and the crash of the Euro in 2010/2011 to utter, "Hence, it is not advisable to adopt a single currency across many countries."

since Jevons' treatise was published. Part of Jevons' (1875) vast treatise includes these four Functions of Money:

1. A medium of exchange – this is the primary distinction according to Jevons in what eliminates the inconveniences of barter which is limited by the coincidence of two parties having and wanting opposite things at the time of transaction, in other words money or currency "lubricates the action of exchange"
2. A common measure of value – once a medium (currency) is used in circulation, a common measure of value will be attached such that "people learn the value of other articles in terms of" the currency
3. A standard of value – Jevons refers here to the ability of the currency to maintain is value relatively stable over time such that borrowing and lending can occur for commodities or services with a reasonable assurance from the creditor that its initial charge, when paid, will effectively be worth the debt. Importantly Jevons states, "no substance permanently bears exactly the same value" but that it would be "desirable to select as a standard of value that which appears likely to continue to exchange for many other commodities in nearly unchanged ratios"
4. A store of value – this final function of money provides its portability or "convenient form for conveyance to distant places". He goes on to write – in 1875, 140 years ago! (emphasis added):

> But at times a person needs to **condense his property into the smallest compass**, so that he may **hoard it away for a time, or carry it with him on a long journey, or transmit it to a friend in a distant country**. Something which is **very valuable, although of little bulk and weight, and which will be recognised [sic] as very valuable in every part of the world**, is necessary for this purpose. The current money of a country is perhaps more likely to fulfil [sic] these conditions than anything else, although diamonds and other precious stones, and **articles of exceptional beauty and rarity, might occasionally be employed**

Finalizing the discussion on money and currency fundamentals, Jevons describes the separation of functions as being is possible but that it would be very convenient to find a medium of exchange which embodies all the functions. Indeed, in his time, silver and gold and wheat were the most common currencies to fulfill the four functions for person-to-person, person-to-merchant or sovereign issues. Jevons concludes by saying "it must be our endeavor, if possible, to discover some substance which will in the highest decree combine the characters requisite for

all the different functions of money" and that he'll hopefully decide "the exact nature of the commodity which is best adapter to meet our needs in the present day" (Jevons, 1875).

Jevons later describes characteristics of the 'material of money' in a manner which requires less detail for this policy analysis. The seven traits are: utility and value; portability; indestructability; homogeneity; divisibility; stability of value; cognizability [sic] (Jevons, 1875). Jevons explicates each of these in great detail but for the purposes of consideration of cryptocurrency vis-à-vis physical currency, these material properties are quite easy to understand and need little further description here. Indeed, in 2014, all societies are quite familiar with the material nature of 'cash' as attested to by the decline of its usage in favor of electronic representations of sovereign currency (direct deposit of salaries and credit/debit cards to name two common ones). Thus, from the perspective of cryptocurrency, most of society's currency usage is approaching the realm of cryptocurrency albeit with[4] sovereign currency.

Standard-base Currency, Fiat Currency, and Manipulation

To finalize the discussion generally about modern money, the concepts of sovereign currency, fiat currency and so-called standards (currency backing) must be addressed as well. Jevons writing in 1875 fully details the history of currency backing (e.g., the gold standard) and this is something which readers today understand from high school civics class. For hundreds of years the currency of the United States and most developed nations was either made of gold or silver or backed by gold or silver, making the national units of money and fractions thereof

[4] If most law abiding 1st world citizens are so heavily dependent on electronic aspects of currency already, there is only the unit of money which remains for cryptocurrency to displace – only human nature or Fischer's Postpositivist Social Choice then prevents cryptocurrency adoption? Would machines/robots/computers be so reluctant to standardize on a single global fungible digital asset?

actual precious metals or *mere* bank note representations of precious metals on deposit in the central bank of the sovereign nations. While the money supplies could be regulated to some extent in-country or internationally, the fixed standard made – in accordance with the material properties above – significant manipulation[5] difficult because the monetary policy had to be backed by gold (Hayek, 1990).

In the early 1970s, the United States left the gold standard to explicitly enter a technocratic monetary policy realm and its coin of the realm became a free-floating currency (the U.S. dollar) based on the fundamental concepts of currency above and regulated by supply of currency and interest rates on interbank exchanges thereof. Concurrent to and shortly thereafter, most other nations followed suit for similar reasons to the U.S. For the purposes of the discussion of cryptocurrency it is important to note: worldwide, these sovereign monetary units then and now have *no* backing or fixed value but are based on trust and 'faith and credit' and generally the GDP of their sovereigns – they are fiat. These fiat currencies adhere to Jevons principles above and are dictated by monetary policies (money supply, institutional interest rates, bonds, etc.) set by sovereign quasi-public bodies pursuing public and private interests and political ends (e.g., in the U.S., the Federal Reserve's Federal Open Market Committee, 170 countries have central banks, too, and the International Monetary Fund) (Lietaer, Arnsperger, Goerner, & Goerner, 2012).

Of interest just beyond these potentially pernicious notions of currency policy, regulation and manipulation, are theories about massive speculation (98% of the financial systems world-wide (Lietaer, et al., 2012), sovereign tax, and sovereign debts which further bind the citizens of a nation to its sovereign currency. Indeed, by requiring the public to pay taxes in the national

[5] In the U.S. an early indication of decoupling standard-base currency occurred to pay for the Civil War. This was hotly contested (in the Congress, Rep. Roscoe Conkling of New York said de-standardizing would "proclaim throughout the country a saturnalia of fraud, a carnival for rogues" (Norris, 2009)) it but ultimately passed.

currency, a currency valuation (particularly for fiat) is partially created. This so-called Fiat Currency Paradigm (Lietaer, et al., 2012) is at least an interesting thought experiment and one which, while not implausible, might just be important for societies to ***sever*** to be on the safe side of citizenship. In other words, if there is merit to the Fiat Currency Paradigm then it should be severed to eliminate the confusion of fiscal policy and a mere medium of financial exchange (Lietaer, et al., 2012). Denationalized currency can do that.

About a single fungible digital asset – cryptocurrency

With the understanding provided above about the theoretical fundamentals of money and currency and global financial systems, we can add to this discussion the theoretical concept of a single global fungible asset in a digital form – cryptocurrency. It is important at this point in the policy analysis to consider just cryptocurrency only with regard to the fundamentals of currency above and explicitly disregard any notion of a *particular* cryptocurrency. While Bitcoin is the predominant cryptocurrency in popular press and the cryptocurrency world (Lo & Wang, 2014), its parent theory is more elegant than the present day implementation. The tactical issues with the present day implementations of cryptocurrency theory (there are many (Turpin, 2014) (Kaplanov, 2012) (Lo & Wang, 2014)), however, should not dilute the *theory* of cryptocurrency as a strategic, social technologic development[6]. From a purely theoretical perspective then to the *individual user*, cryptocurrency can have all the benefits of physical currency – indeed even standard-based currency – with none of the detriments. This is the important point and the

[6] I am trying to avoid the difficult notion of defending Bitcoins per se. It is outside the scope of this policy analysis to demonstrate that the previous few years' worth of issues for a new global digital currency (namely Bitcoins) pale in comparison to millennia worth of problems for traditional sovereign 'standard-based' currency or worse, fiat. Hayek's treatise scorches this ground well…and that doesn't include aggregating historical pickpocket thefts through major heists. Physical currency is not pitfall-free and digital cash can actually help.

network-effect adoption synergy: the value to an individual user is nearly negligible but in aggregate, within a sovereign currency or among them all (globally). The impact is seismic: tens of billions in annual credit and debit transaction fees (Turpin, 2014) and sundry other financial system issues (Quantitative Easing? (Turpin, 2014)).

Cryptocurrency Background

Cryptocurrency (most publicly recognized as Bitcoins) has significant origins[7] only as recent as 2009 (Nakamoto, 2009) with the idea[8] posited as far back as 1998 (Kaplanov, 2012) (and reinforced by Milton Friedman in 1999). It represents a novel and avant-garde digital currency and financial system which is intended by its creator(s) and worldwide users (largely Western nationals but not insignificantly non-Westerns nationals (China, Russia, and former Soviet bloc) to replace or supplant national sovereign fiat currencies and many (all?) aspects of modern financial systems with one single digital fungible asset traded globally based on global exchange-backed valuation[9] (Turpin, 2014). While the concepts of fiat and denationalized currency are nothing new (see Hayek), the accessibility to a global fungible digital asset with all of the features of modern currency(ies) by individual actors around the world is wholly unprecedented – but not unpredicted (see Milton Friedman). Since the theory's release and recent few years of implementation, Nakamoto's system has gained wide acceptance for

[7] Part of the lore of cryptocurrency is the unverified person(s) behind the name Satoshi Nakamoto, there is rampant speculation about 'who' the name represents and whether the person or persons are still involved in the effort. This is spurious to the nature of cryptocurrency.

[8] And as far as the mid-1980s for concepts of electronic cash (Moore, 2013)

[9] Cryptocurrencies are traded and valued based on dedicated exchanges run within the cryptocurrency community. Nominally the value of a given cryptocurrency monetary unit is based on the scarcity of the unit combined with the globally available products' offering price in that monetary unity – a perfect currency system. This is roughly approximated by foreign currency exchanges for traditional sovereign currencies.

impregnability (Davis, 2011) and alignment with Jevon's theories of currency (Lo & Wang, 2014).

The basics of Nakamoto's theory extend well-established public/private key cryptography to a transparent, resilient transaction history ledger for accounting purposes, create a finite and increasingly difficult algorithm for key creation (which creates key value), and eliminate the 'trusted 3rd party' (at a minimum three!) typically required for currency exchange. These three features are the essence of a currency system which Jevons, Hayek, Freidman augured from their various perspectives for over a century. From Jevons' point of view, such a theorized digital currency is universally valued, stored and carried; Hayek's idea about denationalization are initially met for a sovereign-neutral currency system; and Milton Friedman's prescience of the value of the internet to currency finally has an algorithm.

The most significant aspect of cryptocurrency theory and implementation is related to the security of the creation, storage, and transaction of the monetary units and bears further discussion for validity here. The security is based on modern cryptographic technologies (Lo & Wang, 2014) (Bradbury, 2013) which are directly related to the encryption and security used across the internet and modern computer systems. This is so-called public/private key encryption (or one-way hashing) and is widely regarded as impregnable with current computing technology and can become more unbreakable as computing technology advances (Davis, 2011).

The one-way hash is a mathematical computation which has two parts, or keys, one designated as private and one as public. This 'perfect' key-based encryption was discovered in the 1990s and finalized for general use after rigorous public review and scrutiny. It is what makes security on the internet possible in a variety of common and familiar forms most notably through web browsers. It is this one-way encryption which is employed in cryptocurrency

models and provides the basis for the entire cryptocurrency theory. The beauty of this model is that the mathematic equation cannot be broken with current computing power and can be increased over time as computing power increases to keep it strong and safe. The inherent security of the cryptocurrency technologies are rigorous and not subject to weakness (Davis, 2011).

The deeper technical specifics of any given cryptocurrency are beyond the scope of this analysis but there is widely accessible background and detailed information instantly available on the internet. Indeed, cryptocurrency theory and implementations are 'open source' which is fundamental to its existence and potential. The underlying fundamental technologies used by cryptocurrencies are an innovative integration of several common, modern computer, communications, and global technical access capabilities (Kaplanov, 2012) which have revolutionized such things as file-sharing (notably music and other intellectual property), social networking, retail and commercial sales, as well as news and information dissemination.

The application of these technologies to financial systems and currency use specifically should be regarded only as a difference in application of well-established and well-understood globalized digital technologies. Therefore it should be considered that cryptocurrencies and their potential to revolutionize traditional financial systems are technological possible even if they are not popularly or publicly accepted in the near-term. The attractiveness of this new technology should over time be considered to have as much appeal to individuals working collectively for their own good as music downloads, social networking, retail sales, and information dissemination all via the internet did over the last fifteen years.

Thus, this analysis is written based on the presumption that an open source, digital technology exists or will exist which at least approximates a single national fiat currency and

further could be used on an international basis to effectively denationalize individual currencies to a single denationalized currency. For such an approximation, consider the serial number on U.S. paper currency. If that digital identification were used by a payer to represent the note, a simple digital currency system would be created. Much like a credit or debit card transaction, a user could 'pay' for a good or service by providing the serial number of a sufficient amount of currency. A modern merchant system could 'look up' the serial number for validity and non-duplication (in a theoretical central bank master record of all currency) and then accept it. Should a return of currency be needed (whole return or fractional), the merchant could offer serial numbers back to the payer which correspond to a given monetary unit. The user then carries those serial numbers – they are subject to loss and theft as usual – until a future transaction is desired. The major component of this theoretical system is an merchant-accessible (presumable digital) ledger of currency serial numbers – is currently maintained by the Federal Reserve Bank in a proprietary system to which access is protected from merchant systems. However, it is that private ledger which modern public/private key cryptography can displace and which the cryptocurrency system does displace.

Since 2009, Nakamoto's theory has created a basic denomination of cryptocurrency known as Bitcoins and various denominations of other cryptocurrencies which are based on the same fundamental theory. Indeed this existence of multiple implementations of the cryptocurrency theory make possible widespread adoption of any type of innovative implementation[10] and foretell the possibility of idiosyncratic currency systems in the future, potentially offering a method for greater adoption of regional or community currency (see Margrit Kennedy, et al. People Money: The promise of regional currencies). Additionally a

[10] The technical nuances of different denominations are beyond the scope of this analysis but these nuances create differing cryptocurrency generation rates and have separate exchanges on which they are traded.

global ecosystem of technophiles[11], advocates, private enterprise with significant fiat currency investments in hardware, software and infrastructure to support cryptocurrency has materialized to aggressively implement and experiment with cryptocurrency. This infrastructure includes:

1. internet-based exchanges for trading cryptocurrency
2. a massive online marketplace for drugs, guns, human-trafficking (Silk Road, serious enough use to warrant international law enforcement, shut down in 2013)
3. thefts, exchange crashes, valuation swings, user error, computer error
4. burgeoning number of retailers and other end users accepting Bitcoins
5. U.S. and International intrigue and political attention

Discussion

In summary then, the problem with cryptocurrency should not be considered in the theory itself. Cryptocurrency can be theorized to be a perfect currency replacement given modern developed society's dependence on and comfort with prevalent global fiat currencies and nearly ubiquitous electronic storage and transaction thereof[12]. Indeed, the very widely in the last 24 months publicized issues with cryptocurrency have been blunders, speculation, and thefts (Moore, 2013) which are not unlike that which occur with traditional currencies regularly or certainly which should be expected from such a novel technology.

The actual problem for policymakers and regulators is with the implications for national and international monetary policy which arise from a single global fungible digital asset. This theorized asset would be controlled by no government(s) and have its value derived from the global exchange of the currency itself and therefore not subject to political monetary policy.

[11] The author 'mines' Bitcoins and other cryptocurrencies

[12] Developed and developing nations have largely shifted to electronic means of storage, use, and movement of their currencies. Cash is on the decline as even are checks in favor of direct deposits of salary/wages and credit/debit cards or even smartphones. Cards and phones are merely security credentials (like the public/private key pair of cryptocurrency) and not actual proxies for currency. National currencies and financial systems are well established as purely digital but proprietary (and obviously sovereign, a unique type of proprietary).

Furthermore, the security and encryption of theorized cryptocurrencies which yield extreme to total anonymity of usage could moot or require alteration of current regulatory, law enforcement, and tax policy. A significant part of this realignment of currency and its underlying financial system would impact the current private sector entities which provide currency storage and transaction services (banks (central or private), credit card payment system, etc.). Thus it is reasonable to expect resistance and obfuscation of cryptocurrency's value and viability from those incumbents.

As history has shown, holding on to (often times appearing as tradition but in this case monopolistic control) an antiquated technology for reasons which have no nexus to the democratic or collective 'real need' is unsustainable. In the 21st century this is tritely acknowledged historically as resistance to the railroads because of the horse and buggy monopoly or resisted innovation in communications technology because of incumbent interests (long distance provider got into the cellular business for it to take off). So in the spirit of Hayek and Freidman, for U.S. (or any (inter)nation(al)[13]) legislative or regulatory bodies to resist cryptocurrency because of:

1. political monetary policy power or control with or without international peers
2. law enforcement's comfort with leveraging traditional currency and financial systems to do its job
3. perceived ideas about how complicated non-national currency and monetary policy might be (Lo & Wang, 2014)

misunderstands the point of any currency, ab initio. Currency doesn't exist to provide those three things above, it exists as Jevons outlined in 1875 – to provide a means for all the needs a buyer and seller might have and none of which are predicated on sovereign control.

[13] In the US, politicians have voiced significant concerns about cryptocurrency but adopted initial accommodating tax policy; China and various more tightly controlled countries have acted prohibitively towards cryptocurrencies.

Indeed it could be argued sovereign control was merely facilitative until a better system could be found (Hayek, 1990) – namely cryptocurrency!

For example, community dollars – notably non-sovereign currency – are a well-known and accepted practice albeit not too prevalent or wholly viable given the limits/scope of a community to have the variety of economic inputs and outputs needed for modern society (Kaplanov, 2012). Would the cellphone service provider accept an Ithaca dollar[14]? But what if the community were the world and there was a community dollar for the world? Would not there be enough variety and economic inputs and outputs? So, to the extent community dollars are viable (Kennedy, et al., 2012), a 'global community' monetary unit should be even more viable. In this regard the idea of Special Drawing Rights (Wyplosz, 2010) at the UN/IMF make sense and merely need a financial system mechanism – which is precisely what cryptocurrency can provide (Lo & Wang, 2014).

In a larger sense, U.S. monetary policymakers and regulators should prepare for the inevitable decline of the U.S. dollar as the world's currency just as previous sovereign currencies declined over time for their successors (Wyplosz, 2010) (Hayek, 1990) (Kaplanov, 2012). While the value of the dollar may continue to be strong and reasonably accepted worldwide, it is naïve to consider the dollar will remain the world's currency and indeed invites ever increasing 'control mechanisms' and political monetary perturbations to attempt to achieve otherwise. In this light then, the United States should preclude another nation's currency ascension by advocating for a long-term goal of establishing a global currency. This is a keen innovative posture as well as a positive national security (perceived or otherwise) stance. By embracing the trends of pure technology and democratization of social constructs (globalization) with regard to

[14] See (Kaplanov, 2012)

currency, the U.S. can skip ahead of losing economic hegemony by short circuiting the next currency's ascension.

Incumbent private sector financial service providers may have a bias against cryptocurrency for self-serving reasons (cryptocurrency obviates many of the built private sector systems) or for fear of the stability of cryptocurrencies. However, while they may be skeptical, the fierce competition among them and collectively to protect their business models could likely be bent towards acceptance and adoption of cryptocurrency models lest they be left behind by the next innovator.

It appears, like other modern technologic advances under the network effect, the most significant reason for this lag in appreciation and adoption is that very few groups of individuals have much (if any) obvious vested (Kaplanov, 2012) interest in cryptocurrency's success while at the same time at least two main international constituencies have immense vested interests in cryptocurrency *not* succeeding: central bankers and private sector financial institutions (Kaplanov, 2012). Interestingly, a September 2014 report from the Federal Reserve Bank of Boston confirms the value of cryptocurrency generally (Lo & Wang, 2014) but unfortunately conflates the tactical issues of Bitcoin with the theory of cryptocurrency itself.

Despite the fact there are erudite naysayers, the few early adopter groups for which cryptocurrency has viability and keen interest are generally of the criminal bent (drug-related or non-drug criminal) (Turpin, 2014) (Kaplanov, 2012) thus putting them outside of the mainstream as well as the law but ironically well within the predicted users and validity Milton Friedman predicted in 1999. That there is viability within the Bitcoin network and from cryptocurrency such that the US and international law enforcement shut down 'the eBay of drugs' – The Silk Road – would tend to indicate there is *not insignificant* value and viability to cryptocurrency

generally. The chairman of the U.S. Senate Finance Committee Charles Schumer's pronouncement of 'the money-laundry that is cryptocurrency' testifies to the potential of the system! It works!

Furthermore, the massive interests opposed to, skeptical of, or biased against cryptocurrency are almost all major sovereign states and, by extension, the traditional financial systems (public and private) on which those sovereign states rely (Turpin, 2014) (Kaplanov, 2012) (Hayek, 1990). International sovereign state's fiscal policy, governmental revenue, as well as private interests' exploitation of inefficiencies (middle-man transactional costs: credit and debit cards alone are ~US $48B (Turpin, 2014)) were built upon state-controlled (with attendant indirect international control) currencies and the inability for individuals to safely and securely transfer readily stored value. Indeed in pure speculation alone there are trillions of dollars of 'inefficient allocation of resources' made possible by the speculation among and within fiat currencies (Norris, 2009).

Cryptocurrency has a complicated but technologically sound underpinning. It is merely four years old but is well aligned to the basic principles of currency as proscribed by Jevons (1875) and fits well with modern societies comfort with digitized money. The most significant issue for cryptocurrency is how it can assume is its ready application as a single global denationalized currency – this is something which early adopters are struggling but it is the beauty of globalization. Given its open source nature and rapid adoption among technophiles, it could evolve rapidly and eventually handsomely as a perfect currency for the world. With significant potential for adoption and use despite public sector control, it should not be ignored. U.S. policymakers and regulators should not seek to delegitimize or prohibit cryptocurrency innovation with onerous policy and regulation (or political diatribes) and instead should seek

common cause with the cryptocurrency theories as a matter of national policy to remain in the vanguard of currency evolution and economic hegemony and economic security.

Cryptocurrency bears an important and accessible possible future for the mass of humanity: the ability to transfer value from one person to another but do so without the knowledge of or requirement of elaborate national and international financial systems currently required by the public and private financial ecosystem(s) (Hayek, 1990). It should be noted, in case there is doubt, this same uncoordinated but powerful group of folks – individuals in society as a whole – have driven the last decade's most significant advances in applied technology in a similar fashion and are individually but collectively responsibly for the adoption of all new technologies. This nameless, faceless mass of humanity working individually and uncoordinated have recently democratized decades-, centuries-, or millennia-old social structures as diverse as:

1. Journalism – through a variety of self-/micro-publishing mechanisms available on the internet
2. Retail shopping (as far back as bazaars and agoras) – so-called click-and-order as opposed to brick-and-mortar
3. Communication – email, SMS messaging, Twitter and Facebook replace word-of-mouth and carrier pigeons; cell phones have replaced the postal service and even wired communication
4. Personal sales – Craigslist and eBay have replaced newspaper classifieds (a never before considered 'inefficiency' as demonstrated by the massive losses of revenue and profits newspapers have suffered)
5. File and music sharing – the recording industry and other intellectual property concerns fought a losing battle before capitulation and embracing new technology
6. Taxis services – Uber and Lyft – through democratized technology *alone* – have roiled the taxi and livery sector *and* the public sector regulation thereof – in just a couple short years
7. Hotel lodging - Airbnb – through democratized technology *alone* – has roiled the hotel and lodging sector *and* the public sector regulation thereof – in just a couple short years
8. 3D Printing – this is as avant-garde as cryptocurrency and holds the potential to radically alter human conceptions of much of the built environment. To 'print' the physical goods used on a daily basis alters transportation and communication

> technologies as well as governmental and regulatory processes. The celebrated printing of a firearm, for instance, has unknown long-term social impacts

The nature of the success of these recent examples, as with any applied technology, is always the same: network effect adoption, disruptive velocity (speed, direction, and inflection(s)), vast granular and macro increases in efficiency, and the ability to go – nearly sight-unseen – from obscurity to ubiquity in just a few years. But perhaps the biggest commonality these have is no centrally coordinated creation or distribution and – oftentimes – actually coordinated opposition to central control. Indeed, with most of these examples, an attempt to describe their disruptive effects even just a few years before they emerged would have received skeptical or derisive disagreement. But most importantly, these technologic changes were energized by the latent inefficiency they displaced, much like cryptocurrency will.

Conclusions and Public Policy Recommendations

Cryptocurrency is like gold (the perfect currency except for its weight (Tseng, 2010)) but weightless. That presents public policy and private profit challenges. For cryptocurrency, this means national and international public policy and legal entities should surveil, collaborate, protectorate and react to the potential loss of control implicit in a global, universal, single fungible digital asset (Lo & Wang, 2014). In the case of cryptocurrency, like many technologic paradigm shifts in the past, the public sector challenges are complicated by incumbent systems and institutions which will resist innovation and through which public sector organizations must further metamorphose. Notably this includes tax and fee regulatory structure on which governments depend.

Based on the above review and analysis, the present public policy recommendations for U.S. legislators and regulators are as follows:

1. Exhort the safe and effective interaction with cryptocurrency by the general public
    a. use could include altogether avoidance, mere education, or fully transacting depending on the risk tolerance of the user
    b. given the ‘open source,’ ‘underground’ and ‘democratic’ nature of cryptocurrency, not unlike private sector technical disruptions, public sector monopoly control of currency and monetary policy could be undermined by cryptocurrency regardless of the incumbents’ efforts to remain in control
    c. cryptocurrencies could gain traction anywhere in the world as a denationalized currency or digital sovereign currency – its nature precludes arbitrary control
    d. the United State should be a leader in technology innovation even for technologies which impinge on areas traditionally controlled by public entities (currencies and monetary policy)
2. Surveil and collaborate internationally on worldwide usage of cryptocurrencies generally and specifically for law enforcement needs
    a. whether cryptocurrency systems are merely relied upon for illegal activity or are targeted for compromise with criminal intent there is no reason they should enable or facilitate criminal activity any greater than traditional currencies
3. Consider the benefits of precluding hegemony of *any* sovereign fiat currency from predominating (the) global economy(ies) by theorizing for a future global cryptocurrency
    a. a globalized future without a stable democratic, capitalism-biased currency hegemony (the dollar or euro are secondary to the yuan, ruble, rupee, or other) could have greater global economic instabilities than the perceived instabilities represented by a single global cryptocurrency
4. Continue hearings at the federal and major subnational level
    a. Three congressional hearings have been held about cryptocurrency (one specifically focused on the topic)
5. Promote grants to the NSF, NIST, Federal Reserve or Higher Educational orgs to study, research and surveil cryptocurrency systems and their implementation
6. Request of the Federal Reserve a study on converting the dollar to a fully digital currency
7. Request of the Federal Reserve a study on the impact of other national currencies converting to digital currencies
8. Request of the Internal Revenue Service further guidance with regard to the currency or asset status of cryptocurrencies

References

Bartlett, B. (2013, 05 14). Keynes and Keynesianism. *The New York Times*.

Bradbury, D. (2013, 11). The problem with Bitcoin. *Computer Fraud & Security*, pp. 5-8.

Buchstein, H. (1996). Book Review: Frank Fischer, Evaluating Public Policy. Chicago: Nelson-Hall, 1995, 296 pp. *Policy Sciences*, 72-75.

Cawrey, D. (2014, 03 05). *How Economist Milton Friedman Predicted Bitcoin.* Retrieved 11 28, 2014, from CoinDesk: http://www.coindesk.com/economist-milton-friedman-predicted-bitcoin/

CFS Editors. (2014, 03). Alternative currencies fall prey to hackers and malware. *Computer Fraud & Security*, pp. 1, 3.

CFS Editors. (2014, 04). Further fallout from the Target breach as banks and retailers consider responses. *Computer Fraud & Security*, pp. 1, 3.

Davis, J. (2011, 10 10). THE CRYPTO-CURRENCY. *New Yorker*, pp. 62-70.

DR. (2011, 06 03). The Future of Money (Hint: It's Virtual). *U.S. News and World Report*.

Hayek, F. A. (1990). *Denationalisation of Money - The Argument Refined, 3rd Ed.* London: The Institute of Economic Affairs.

Hill, K. (2014, 01 20). China Bites Into Bitcoin. *Forbes*, pp. 23-23.

Jevons, W. S. (1875). *Money and the Mechanism of Exchange.* New York: D. Appleton and Co.

Kaplanov, N. M. (2012). Nerdy Money: Bitcoin, the Private Digital Currency, and the Case Against Its Regulation. *Temple Law Review*, http://ssrn.com/abstract=2115203.

Kennedy, M., Lietaer, B., & Rogers, J. (2012). *People Money: The promise of regional currencies.* Devon: Triarchy Press.

Krugman, P. (2013, 12 22). Op-Ed: Bits and Barbarism. *The New York Times*.

Lietaer, B. A., Arnsperger, C., Goerner, B., & Goerner, S. (2012). *Money and Sustainability: The Missing Link.* eBook: Triarchy Press.

Lietaer, B., & Dunne, J. (2013). *Rethinking Money: How New Currencies Turn Scarcity into Prosperity.* San Francisco: Berrett-Koehler Publishers.

Lo, S., & Wang, J. (2014). *Bitcoin as Money?* Boston: Federal Reserve Bank of Boston.

Moore, T. (2013). The promise and perils of digital currencies. *International Journal of Critical Infrastructure Protection*, 147-149.

Nakamoto, S. (2009, 01 03). *Bitcoin: A Peer-to-Peer Electronic Cash System.* Retrieved from Bitcoin Foundation: https://bitcoin.org/bitcoin.pdf

Norris, F. (2009, 09 03). Bernanke: Greenback's New Father. *The New York Times*.

NS Editors. (2011, 06 04). The future of money. *New Scientist*.

NS Editors. (2013, 11 06). Silk Road online drug market taken down. *Network Security*, pp. 1-2.

Tseng, N.-H. (2010, 07 21). The dollar alternatives. *Fortune*.

Turpin, J. B. (2014). Bitcoin: The Economic Case for a Global, Virtual Currency Operating in an Unexplored Legal Framework. *Indiana Journal of Global Legal Studies*, 335-368.

Wyplosz, C. (2010). Is the era of the dollar over? *Journal of Globalization and Development*.