The Bitcoin Mirage: An Oasis of Financial Remittance

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ABSTRACT

Since its inception by the anonymous developer Nakamoto (2008) Bitcoin has emerged as a much discussed, but not well-understood finance related technology. Even the definition and practical value of bitcoins (e.g. is it a virtual currency, a commodity, a speculative tool) – and how they should be treated within the existing financial and legal systems is hotly debated. Bitcoin's critics, including well known financial authorities like Mr. Warren Buffett, dismiss bitcoins as a "mirage" and liken them to "checks", which inherently have "have no value" and thus neither should bitcoins. This article counters these claims by first briefly describing how Bitcoin works as a cost-effective remittance system. We then present evidence from both the Federal Reserve and alternative banking systems like check cashing services to illustrate why Bitcoin has the potential to serve as a disruptive financial technology. We conclude by providing an illustration of a successful implementation of a pan-African international remittance system.

Keywords: Bitcoins, Warren Buffett, checks, remittance, Bitpesa

1. INTRODUCTION

Launched through a scholarly article (Nakamoto, 2008), Bitcoin is a decentralized digital currency hailed by its champions like Netscape Co-Founder Marc Andreessen as a "game changer" (Navarro, 2014).The popular press coverage ranges from the use of digital currencies in illicit online commerce (Wallace, 2011) to Congressional hearings in which the advantages of digital currencies are lauded by economic experts like former Federal Reserve Chairman Ben Bernanke (Raskin, 2013).

In the academic literature, how Bitcoin and other digital currencies are created is studied widely in the computer science and cryptographic fields (Androulaki, Karame, Roeschlin, Scherer, & Capkun, 2013; Moore & Christin, 2013; Reid & Harrigan, 2013). Other researchers and organizations including the Federal Reserve (Lo & Wang, 2014; Velde, 2013), The European Central Bank (2012), and The Mercatus Center at George Mason University (Brito & Castillo, 2013) examine these topics from macroeconomic and policy maker perspectives.

Legal scholars have argued the merits of the currency and the need for regulation (Turpin, 2014). Bitcoin has even been used to examine economic phenomena, which are not unique to virtual currencies. Through scrutinizing the publicly available block chain, which displays the break down in ownership of bitcoins, researchers have been able to analyze wealth distribution in the Bitcoin economy in order to support the adage that the rich do get richer (Kondor, Pósfai, Csabai, & Vattay, 2014).

2. WARREN BUFFETT'S MIRAGE

However, other observers of the Bitcoin phenomenon take a decidedly far less charitable approach to Bitcoin. Famed Nobel Prize winning economist and New York Times columnist Paul Krugman characterizes Bitcoin as "evil" (Krugman, 2013) by stating that they are merely a speculative tool, albeit recognizing their potential as a remittance system. Detractors like Warren Buffett are even more dismissive.

In an interview aired on CNBC in March 14, 2014, when asked about bitcoins by Dan Gilbert, founder of Quicken Loans, Warren Buffett warned that they were a "mirage" and should be "stayed away from" (Crippen, 2014). He further likened bitcoins to "checks" and stated "checks inherently have no value". Here is the transcript of the exchange:

"It's a method of transmitting money. It's a very effective way of transmitting money and you can do it anonymously and all that. A check is a way of transmitting money, too. Are checks worth a whole lot of money just because they can transmit money? Are money orders? You can transmit money-by-money orders. People

do it. I hope Bitcoin becomes a better way of doing it, but you can replicate it a bunch of different ways and it will be. The idea that it has some huge intrinsic value is just a joke in my view."

The successive portions of this paper will seek to counter Mr. Buffett's assertions.

3. BITCOIN AS A REMITTANCE SYSTEM

Despite Mr. Buffett's expertise in the world of investing, this interpretation about bitcoins is somewhat limited. This is not surprising considering he made similar statements during the onset of the World Wide Web 25 years ago. One of Mr. Buffett's adages is not to invest in businesses or technologies that he does not fully understand. For a detailed analysis comparing and contrasting the development of the Bitcoin technology and the World Wide Web see Folkinshteyn, Lennon, and Reilly (2015).

For the purposes of this paper, what is relevant to understand is that Bitcoin is indeed a successful method of remittance and that its key value added technology is the "blockchain". It is also critical to understand the unique nature of Bitcoin when compared to other virtual currencies. Per the analysis by the Federal Reserve of Chicago, the Bitcoin approach to digital currency is unique because

"Bitcoin system solves two key challenges of digital money – controlling its creation and avoiding its duplication – at once". (Velde, 2013)

The "blockchain" is the decentralized public ledger that records all bitcoin transactions (Grinberg, 2011; Hayes, 2014). The actual cryptography behind the system is nothing new as it relies on well-established industry standards already in place in existing government and private institutions (Reid & Harrigan, 2013). Bitcoin as currency first came into circulation through the mining of the "genesis block" by its anonymous creator Nakamoto in 2009 (Brito & Castillo, 2013).

These virtual currencies are physically nothing more than a series of digital bits (literally a string one ones and zeros). The process of sending bitcoins from one user to the next is as simple as sending an email, through software applications known as digital wallets (Meiklejohn et al., 2013). The verification of the accuracy of this transaction, however and the validity of the virtual currency is at the heart this software system. It is this part of the system that Mr. Buffett and others are not fully cognizant of.

In a process known as *mining,* the integrity and sequence of bitcoin transactions is verified and recorded in the blockchain. *Miners* are individuals, groups, or companies that run software that is used to independently verify a group of transactions (known as a "block"). Miners compete to solve a computationally difficult task involving computing and re-computing a cryptographic function until it satisfies certain properties. Upon successful completion, the solution is broadcast over the Internet to the entire Bitcoin network for verification. Upon successfully mining a block (aka solving the puzzle) —something that is designed to occur roughly every ten minutes—the winning miner is rewarded with both the associated transaction fees as well as 'fresh' bitcoins (Becker et al., 2013; Brito & Castillo, 2013).

The transaction fees for Bitcoin users are minimal as compared to traditional remittance systems like checks or credit cards (Folkinshteyn et al., 2015). These factors make bitcoins an ideal medium of exchange and a theoretically ideal remittance system, regardless of whether or not bitcoins are a 'true' currency, or simply a commodity. Technologically, Bitcoin requires nothing more sophisticated than one would need to send an email through the Internet, and its average processing time of ten minutes makes the level of trust needed by both parties to be effectively equivalent to an exchange of physical currency.

4. CHECKS HAVE POLITICAL VALUE

The power of the Federal Reserve to act as the Central Bank unfettered is largely based on their independence (Greider, 1989). Created by an Act of Congress in 1913, The Federal Reserve Act directs the Federal Reserve to ensure the efficiency of the payments system of U.S. banks (Bauer & Hancock, 1993).

In competition with private firms, the Fed has acted as an efficient clearing house for checks and electronic transfers through its participation in the ACH (Automated Clearing House) system as FedACH (Bauer & Hancock, 1995; Kamback & Miner, 2009), as well as its FedWire service. As intense users of technology, banks

are well aware of the economic impact of technological changes and are keen to embrace them when efficiencies that result in cost savings and increased profits can be had (Berger, 2003).

The Federal Reserve does not receive taxpayer dollars to operate. Part of its operating budget is subsidized by its FedACH and FedWire activities, though these services are a relatively small source of overall Fed revenue and operate mostly on an at-cost basis (FRBSF, 2012). Thus, much to the chagrin of its opponents in both Houses of the US Congress, unlike the branches of the U.S. Federal government, which are dependent upon appropriations, the Fed is not answerable to the budgets drawn by Congress and the President. Hence, any technology that has the potential for disrupting the Fed's operations is worthy of review (Lo & Wang, 2014). However, as Janet Yellen has herself stated in Congressional hearings, the Fed itself has no authority to supervise or regulate Bitcoin (Rushe, 2014). She added that, "I think it's not so easy to regulate Bitcoin because there's no central issuer or network operator to regulate." (Davidson, 2014).

The Fed maintains a 30 to 40% share of the check processing market (FRBSF, 2012) Though the volume of checks has steadily declined, it is still significant, with check transactions numbering $83 million in 2013, and totaling $155 billion dollars of value (FRB, 2014a). Electronic mechanisms of payment processing, including ACH, Debit, and Credit cards have taken up the slack.

5. MONEY ORDERS, PAYDAY LOANS, PAYMENT SERVICES, AND CHECK CASHING HAVE VALUE

According to an FDIC report issued in 2013, more than a quarter of the American population is either unbanked (lacking a bank account at an insured institution) or underbanked. Underbanked is defined as having a bank account, but having used non-bank, alternative financial services in the past twelve months (Burhouse & Osaki, 2012). This represents a lucrative market in need of financial services, which is evident from the $11.1 billion in revenue in this segment for 2014 (Hoopes, 2015).

While these industries show notable profits, they do so at some social expense: payday loan and check cashing services have been viewed as predatory institutions (Sherblom, 2002), exploiting the working class of low-to-middle income blue- and white-collar employees by charging exorbitant fees for what should be unnecessary or regular financial transactions. Payday loans often have extremely costly APR rates. Check cashers can make two-week payday loans based on personal checks held for deposits at interest rates between 390 and 780 percent. On average it cost $24.5 to cash a $1,002 social Security check in 2006 (Fox & Woodall, 2006).

The associated fees have also seen a steady increase over time, from an average of 1.62% per check in 1987 to an average of 4.11% per check in 2006, an increase of 152.7% over a nineteen year period (Fox and Woodall, 2006) - much higher than the 77.5% rate of inflation over the same interval. These profits have been reflected in the growth of payday loan and check cashing services, which numbered 1,731 in 2001 and 5,384 in 2006, a 211% increase over five years (Fox & Woodall, 2006).

The Federal Reserve also in part processes money orders. In 2013, the Fed processed 101 million postal money orders, with total value of $22 Billion (FRB, 2014b). The average fee for a money order is about $1 per unit (KPMG, 2005).

While this industry is profitable and will likely remain profitable for the foreseeable future (Hoopes, 2015), Bitcoin nevertheless has the potential to seriously disrupt it. When surveyed (Burhouse & Osaki, 2012), respondents reported a variety of reasons for not using traditional banking. These reasons are not decision-making factors in the Bitcoin system.

Table 1: Survey of Why US. Consumers Seek Non Traditional Banking Mechanisms

REASONS	Main reason (% of respondents)	Secondary reason (% of respondents)
Lack of Enthusiasm for Traditional Banks	14.9%	34.2%

ID, credit, or banking history problems	6.8%	16.8.%
Privacy Issues	3.7%	26.4%
Inconvenient hours or location	2.6%	6.8%

Source: Adapted from Burhouse and Osaki (2012)

Barring significant inroads into this industry, it is unlikely that these fees will diminish anytime soon given how regionalized the check cashing and payday loan service industry is. According to a January 2015 IBISWorld Report (Hoopes, 2015), the top four check cashers and payday lenders account for over 16.5% of the market share. The vast majority of these firms operate on a local level, and there is little competition.

While Bitcoin does not offer a perfect solution to each and every one of these issues, it can to some extent mitigate them, especially in the case of check cashing and processing, by offering a convenient, location- and time-independent way of transferring funds between individuals without the need for checks. Payday loan services may be impacted as well, but in the case of proliferation of Bitcoin as a common payment mechanism, they would likely survive with some adjustments to their business model.

Electronic payment systems are becoming an increasingly important conduit for monetary transactions. As of 2006, only about 30% of payments were made by check, with the remainder being made via credit card (~25%), debit card (~30%), and ACH (~15%), from a total of about 90 billion payments. (Quinn & Roberds, 2008). By 2009, checks have further declined to 22%, with the slack taken up by an increase in debit and ACH transactions (35% and 18%, respectively) (Federal-Reserve-System, 2011). Credit card merchant fees are composed of layer upon layer of different fees, and average 2-3% of transaction value (Dwyer, 2015). In 2012, a total of 2.2 trillion dollars of retail transactions were made via credit card, a further $1.8 trillion via debit card, and $0.15 trillion via prepaid card (NilsonReport.com, 2013).

According to the National Association of Convenience Stores, a relatively low-margin industry, total fees paid to credit and debit card processors surpassed the total convenience store industry profits in 2012 (NACS, 2013). The electronic payments industry is also ripe for disruption by Bitcoin or other lower-cost transaction processing systems.

6. BITCOIN AS AN INTERNATIONAL REMITTANCE SYSTEM

Bitcoins allow for the effective, low-cost transfer of funds between parties, independent of their physical location or banking status. These transfers can be done with relatively minimal cost or resource requirements. Essentially, all that is necessary, on top of basic infrastructure (e.g. a computer or mobile phone with access to the internet), is that both parties have a *wallet*, a unique digital identifier that allows users to store, access, and transfer their bitcoins, as well as the transferor having the necessary bitcoins to perform the transfer. While others in addition to the already-discussed Warren Buffett have been critical or questioning of the status of Bitcoin as a currency (Yermack, 2014) this is irrelevant to its value as a medium for monetary exchange.

In the developing world, money sent from overseas workers via international remittance systems can be integral to the economic survival of rural households (Agesa & Kim, 2001; Evans & Ngau, 1991). A cost-effective remittance system can greatly improve the well-being of local inhabitants, as lower fees can preserve more of the earning power of overseas workers (Morawczynski & Pickens, 2009).

One successful mobile payment transmission system used in parts of Africa is the ***M-Pesa*** system (Hughes & Lonie, 2007). Launched by Kenya's largest mobile phone operator Safari in 2007, the M-Pesa has brought banking to rural areas and improved local economic and business conditions (Jack & Suri, 2011). Due to ease of use, lack of confidence in the local currency, and paucity of existing banking institutions, the system has gained wide scale adoption (Mas & Radcliffe, 2010).

M-Pesa differs from Bitcoin, however, in that it is still based on a traditional, electronic central ledger. This centralized ledger is maintained by one agency, namely the mobile phone operator. Due to the success of this M-Pesa system, Bitcoin entrepreneurs have sought to technologically graft (Lennon, 2008) the Bitcoin remittance system onto the M-Pesa system. One such startup, Nairobi-based ***Bitpesa***, recently raised over US $1.1 Million in second round venture capital funding to expand operations into Ghana, Tanzania, and Uganda (Vigna & Casey, 2015). According to the firm's website:

"BitPesa is a digital currency exchange. We accept digital currency, and offer you fiat currencies in return. Currently we only accept Bitcoin and exchange it for Kenyan Shillings. You or your recipient will receive Kenyan Shillings into a Kenyan mobile money wallet (M-Pesa, Orange, Airtel, or Yu)."
Source: https://www.bitpesa.co/faq

The firm charges a relatively low fee via an exchange rate spread:

"There are no transfer fees to use BitPesa. We do take a 3% margin on the BTC to KES exchange rate. The total cost to the client is 3%, which is lower than all other money transfer services to Kenya."
Source: https://www.bitpesa.co/faq

Thus, Bitpesa serves as a conduit for those who hold bitcoins and wish to transmit them to those who already participate in the M-Pesa mobile system. Obviously, overseas bitcoin holders could buy bitcoins and send them directly to their loved ones back home. The receiver's would merely need a bitcoin digital wallet application on their smartphone to receive them. However, by using Bitpesa, and incorporating the functionality of the M-Pesa, customers gain several advantages.

The chief appeal for Bitpesa is the relatively low cost of 3%. By transferring bitcoins directly into the fiat currency of KES (Kenya Schillings), albeit stored in the digital wallets on the mobile phones on the M-Pesa network, users of the Bitpesa system avoid the risk associated with the wide fluctuations in the value of bitcoins. Additionally, Bitpesa users can benefit from the network externalities of the M-Pesa system, as this mobile payment system is well established and accepted in this region of Africa. The level of consumer trust is quite high, far more so than in bitcoins themselves. It should be noted however, that since the M-Pesa system is managed just like any traditional central ledger system, should there be a corruption or failure of the maintenance of this electronic system by the Kenyan mobile phone company, users would suffer losses. In a similar manner, other entrepreneurs in North and South America, Europe and South and East Asia, are imagining ways in which bitcoins could be integrated into existing financial systems. The success or failure of Bitpesa will be instructive to their efforts.

7. CONCLUSION

Our overview of payment and transaction processing industries clarifies the landscape that Bitcoin is trying to enter. It is clear that there are a number of inefficiencies in the system, and a great deal of costs that are ready to be wrung out by a new entrant with a lower cost basis. Though it may seem at first glance that something like the Bitcoin system has no value because it is "only" a mechanism for monetary transmittal, it appears that there is a lot of value to be had by disrupting the existing legacy payment systems.

If Bitpesa or other such systems that seek to integrate bitcoins into existing mobile financial systems are successful, the reduced costs may promote the greater adoption of the Bitcoin system. This disruption can potentially benefit billions of people who can least afford the high costs of the existing remittance systems. Empowering overseas workers to transmit a higher percentage of their earnings through reduced fees associated with remittance promotes economic wellbeing in their homelands. Thus a so-called mirage may truly become an oasis of efficiency in financial remittance.

REFERENCES

Agesa, R. U., & Kim, S. (2001). Rural to urban migration as a household decision: Evidence from Kenya. *Review of Development Economics, 5*(1), 60-75.

Androulaki, E., Karame, G. O., Roeschlin, M., Scherer, T., & Capkun, S. (2013). Evaluating user privacy in

bitcoin *Financial Cryptography and Data Security* (pp. 34-51): Springer.
Bauer, P. W., & Hancock, D. (1993). The efficiency of the Federal Reserve in providing check processing services. *Journal of Banking & Finance, 17*(2), 287-311.
Bauer, P. W., & Hancock, D. (1995). Scale economies and technological change in Federal Reserve ACH payment processing. *Economic Review-Federal Reserve Bank of Cleveland, 31*, 14-29.
Becker, J., Breuker, D., Heide, T., Holler, J., Rauer, H. P., & Böhme, R. (2013). Can we afford integrity by proof-of-work? Scenarios inspired by the Bitcoin currency. *The Economics of Information Security and Privacy,* pp. 135-156.
Berger, A. N. (2003). The economic effects of technological progress: evidence from the banking industry. *Journal of Money, Credit, and Banking, 35*(2), 141-176.
Brito, J., & Castillo, A. (2013). *Bitcoin: A primer for policymakers*: Mercatus Center at George Mason University.
Burhouse, S., & Osaki, Y. (2012). FDIC National survey of unbanked and underbanked households. *Federal Deposit Insurance Corporation*.
Crippen, A. (2014). Buffett blasts bitcoin as 'mirage': 'Stay away!'. March 14, 2014.
Davidson, P. (2014, March 3, 2014). Yellen: Fed can't regulate Bitcoin. *Paul Davidson, USA TODAY*.
Dwyer, B. (2015). Credit Card Processing Fees & Rates.
ECB. (2012). Virtual Currency Schemes.
Evans, H. E., & Ngau, P. (1991). Rural□Urban Relations, Household Income Diversification and Agricultural Productivity. *Development and Change, 22*(3), 519-545.
Federal-Reserve-System. (2011). The 2010 Federal Reserve Payments Study https://www.frbservices.org/files/communications/pdf/press/2010_payments_study.pdf: The Federal Reserve System
Folkinshteyn, D., Lennon, M., & Reilly, T. (2015). A Tale of Twin Tech: Bitcoin and the WWW. *Journal of Strategic and International Studies, Forthcoming*.
Fox, J. A., & Woodall, P. (2006). Cashed Out: Consumers Pay Steep Premium to 'Bank'at Check Cashing Outlets. *Washington, DC: Consumer Federation of America, 3*.
FRB. (2014a). Government Checks Processed by the Federal Reserve--Annual Data.
FRB. (2014b). Postal Money Orders Processed by the Federal Reserve--Annual Data.
FRBSF. (2012). Is the Fed still in the business of processing checks? , 2015
Greider, W. (1989). *Secrets of the temple: How the Federal Reserve runs the country*: Simon and Schuster.
Grinberg, R. (2011). Bitcoin: an innovative alternative digital currency. *Hastings Science & Technology Law Journal Library, 4*, 159.
Hayes, A. (2014). Evidence for Bitcoin/Altcoin Price Efficiency: Miners' Arbitrage in Cryptocurrency Markets.
Hoopes, S. (2015). Check Cashing & Payday Loan Services in the US *IBISWorld Industry Report* (Vol. OD5408): IBISWorld.
Hughes, N., & Lonie, S. (2007). M-PESA: mobile money for the "unbanked" turning cellphones into 24-hour tellers in Kenya. *Innovations, 2*(1-2), 63-81.
Jack, W., & Suri, T. (2011). Mobile money: the economics of M-PESA: National Bureau of Economic Research.
Kamback, E., & Miner, D. (2009). Facilitating money movement globally using international Automated Clearing House payments. *Journal of Payments Strategy & Systems, 3*(3), 253-261.
Kondor, D., Pósfai, M., Csabai, I., & Vattay, G. (2014). Do the rich get richer? An empirical analysis of the BitCoin transaction network. *PloS one, 9*(2), e86197.
KPMG. (2005). 2005 Money Services Business Industry Survey Study. Washington, D.C.: Financial Crimes Enforcement Network (FINCEN)
Krugman, P. (2013). Bitcoin is Evil. *New York Times*. Retrieved from nytimes.com website:
Lennon, M. M. (2008). *Monetizing Mobile: Factors Influencing Devlopment of Mobile Commerce - Korea, China, Japan.* (PhD), University of Rhode Island, Kingstown, RI.
Lo, S., & Wang, J. C. (2014). Bitcoin as money? *Federal Reserve Bank of Boston*.
Mas, I., & Radcliffe, D. (2010). Mobile payments go viral: M-PESA in Kenya.
Meiklejohn, S., Pomarole, M., Jordan, G., Levchenko, K., McCoy, D., Voelker, G. M., & Savage, S. (2013). *A fistful of bitcoins: characterizing payments among men with no names.* Paper presented at the Proceedings of the 2013 conference on Internet measurement conference.
Moore, T., & Christin, N. (2013). Beware the Middleman: Empirical Analysis of Bitcoin-Exchange Risk. In A.-R. Sadeghi (Ed.), *Financial Cryptography and Data Security* (Vol. 7859, pp. 25-33): Springer Berlin Heidelberg.
Morawczynski, O., & Pickens, M. (2009). Poor people using mobile financial services: observations on customer usage and impact from M-PESA.
NACS. (2013). Credit Card Fees a Growing Challenge to Convenience Stores.
Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system.

Navarro, B. J. (Producer). (2014, Tuesday, 27 May 2014). Marc Andreessen in bitcoin for the long run.
NilsonReport.com. (2013).
Quinn, S., & Roberds, W. (2008). The Evolution of the Check as a Means of Payment: A Historical Survey. *Economic Review - Federal Reserve Bank of Atlanta, Volume 93*(4).
Raskin, M. (2013). U.S. Agencies to Say Bitcoins Offer Legitimate Benefits.
Reid, F., & Harrigan, M. (2013). *An analysis of anonymity in the bitcoin system*: Springer.
Rushe, D. (2014, Thursday 27 February 2014). Janet Yellen: Federal Reserve has no authority to regulate Bitcoin. *The Guardian*.
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, 21*(1), 335-368. doi: 10.2979/indjglolegstu.21.1.335
Velde, F. (2013). Bitcoin: A primer. *Chicago Fed Letter*(Dec).
Vigna, P., & Casey, M. J. (2015, Feb 9). BitBeat: Kenya's BitPesa Raises $1.1 Million, Expands Operations *The Wall Street Journal*
Wallace, B. (2011). The rise and fall of Bitcoin. *Wired, 19*(12).
Yermack, D. (2014). Bitcoin Economics: Technology Revolotion 1 MAIN ST, 13 FLR, CAMBRIDGE, MA 02142 USA.

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