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BITCOIN AND THE BLOCKCHAIN AS POSSIBLE CORPORATE GOVERNANCE TOOLS: STRENGTHS AND WEAKNESSES

*Fiammetta S. Piazza**

Bitcoin and similar virtual currencies are rapidly evolving and gaining traction in today's economy. However, legislators in the United States and abroad are still assessing the legal status of cryptocurrencies and often pursuing quite different approaches in their regulation. On the other hand, the blockchain, the technology underlying Bitcoin transactions, offers itself as a great tool that should be implemented in the corporate governance field because of its recording certainty features. The blockchain, through the distributed ledger, allows users within a network to perform peer-to-peer digital transactions while accessing and monitoring changes in the ledger as they occur. The ledger also offers an opportunity to maintain information securely, by encrypting and allowing access only to holders of cryptographic "keys".

Because of its lack of a centralized issuer and absence of securities deriving from a national apparatus and definite legislation, Bitcoin presents a series of uncertainties that prevent implementation as a corporate governance tool. Instead, the blockchain's capacity to maintain confidential information securely, such as corporate strategies to be voted on by a board of directors or shareholders, within a network of allowed users and to record transactions or events with certainty should be explored and implemented in the corporate field. This article analyzes the current legal status of Bitcoin and blockchain technology; the relationship between the two; and advantages and disadvantages of implementing either or both technologies for transparency of ownership, corporate voting, accounting, and self-executing, "smart", contracts purposes. This article suggests that while neither should be implemented for accounting and ownership reporting purposes, blockchain could prove a useful tool for corporate voting.

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I. INTRODUCTION

With the rapid evolution of the Internet and the transition to the Web of a diverse array of infrastructure and systems, virtual currencies have quickly developed. Today, virtual currencies play a key role in the transformational change affecting the world economy, reflecting the expanded venues available to consumers to access goods and services.¹ Indeed, unlike traditional currencies, virtual currencies offer a peer-to-peer exchange mechanism eliminating the need for intermediaries and central clearinghouses.²

While virtual currencies are not afforded legal tender, they may still have equivalent traditional currency value.³ Within this category, Bitcoin has developed and attained primary market status among virtual currencies that can be exchanged for traditional currencies.⁴ Bitcoin's main feature is the so-called blockchain: a ledger where the parties to each transaction report their exchange. Accordingly, while the features and characteristics of each Bitcoin exchange may vary tremendously, it is possible, within the exchange and with the necessary access authorization, if any, to monitor transactions. However, this does not translate in complete transparency because some exchanges permit users to create anonymous accounts. While this is no longer possible in the United States following the recent Financial Crimes Enforcement Network ("FinCEN") guideline making it clear the Banking Secrecy Act applies to Bitcoin even though it has not been recognized as currency, anonymous foreign exchanges may still impact American corporate governance because of the global nature of today's economy and the ease of access to those foreign exchanges.⁵

¹ International Monetary Fund, *Virtual Currencies and Beyond Virtual Currencies and Beyond: Initial Considerations*, 5, available at <https://www.imf.org/external/pubs/ft/sdn/2016/sdn1603.pdf>.

² *Id.*

³ Sarah J. Hughes & Stephen T. Middlebrook, Feature, *Advancing a Framework for Regulating Cryptocurrency Payments Intermediaries*, 32 YALE J. REG. 495, 504 (2015).

⁴ *Id.*

⁵ Dep't of the Treasury Fin. Crimes Enforcement Network, Guidance Paper FIN-2013-G001, Application of FinCEN's Regulations to Persons

Section II of this paper discusses, in subsection A, the general realm of virtual currencies and Bitcoin's supremacy. Subsection B distinguishes between Bitcoin, blockchain technology, and distributed ledgers. Subsection C analyzes the mechanics of Bitcoin's transactions on the blockchain. Lastly, subsection D, surveys the current regulatory framework regarding Bitcoin in the United States.

Section III examines the consequences of implementing Bitcoin or the blockchain in the governance of companies. Specifically it examines the potential benefits and disadvantages of both as tools to enhance transparency, conduct corporate voting and accounting, and enter "smart contracts." Ultimately, this paper suggests implementation of blockchain, but not of Bitcoin, may be viable in some of those areas.

II. VIRTUAL CURRENCIES, BITCOIN, AND THE BLOCKCHAIN

A. Virtual Currencies and Bitcoin: Evolution and Problems

Satoshi Nakamoto – an alias⁶ – has long been thought to be the creator of Bitcoin when a technical paper was posted on the

Administering, Exchanging, or Using Virtual Currencies (2013) available at https://www.fincen.gov/statutes_regs/guidance/pdf/FIN-2013-G001.pdf.

⁶ While Bitcoin has developed since Nakamoto first published its protocol, the true identity of its designer (or designers) is still unknown. After posting the protocol, Nakamoto, other than for a few messages, has disappeared and, in his words, "[has] moved on to other things." *Who is Satoshi Nakamoto?*, THE ECONOMIST (Nov. 2, 2015 23:27) <http://www.economist.com/blogs/economist-explains/2015/11/economist-explains-1> (discussing how, among other things, Nakamoto's own funds have remained untouched). Several individuals and agencies, spanning from John Nash to the NSA, have been thought to be the "face" behind the Nakamoto mask, but no ultimate finding has been made. See, e.g. Justin OConnell, *10 People who have been Called the Inventor of Bitcoin, Satoshi Nakamoto*, CRIPTOCOINSNEWS (Aug. 21, 2015), <https://www.cryptocoinsnews.com/called-the-inventor-of-bitcoin-satoshi-nakamoto/> (discussing the ten people who have been thought to be the inventor).

Internet describing the protocol in 2008.⁷ However, recent developments around the identity of Bitcoin's creator identify in Craig Wright the true "father" of Bitcoin.⁸ Regardless of the identity behind Bitcoin, the protocol was first implemented in 2009 and, since then, several versions of the cryptocurrency have been created and are easily available for download.⁹

Before explaining the functioning of Bitcoin and its role in today's economy, it is helpful to remember that traditional currencies are defined as a system of money used and generally accepted in a country (or union of countries as in the European Union's eurozone) as a form of payment.¹⁰ Traditional currencies are also known as fiat currencies from the Latin term *fiat* meaning "let it be done" or "so it shall be" in the sense of a governmental decree or order. This is so because, different from commodity-based money like gold, silver or copper-backed coins, fiat currencies do not have an intrinsic value. Instead, the national government, as issuer, declares its value as legal tender and, in the words of Milton Friedman, "[t]he pieces of green paper have value because everybody thinks they have value. Everybody thinks they have value because in his experience they have had value."¹¹ Indeed, fiat currencies are part of multi-layer national infrastructure inclusive of a national bank or system of banks (e.g. the United States Federal Reserve) and an agency or department

⁷ P. CARL MULLAN, *THE DIGITAL CURRENCY CHALLENGE – SHAPING ONLINE PAYMENT SYSTEMS THROUGH U.S. FINANCIAL REGULATIONS* 85 (Palgrave MacMillan eds., 1st ed. 2014).

⁸ Following years of speculation, Australian Craig Wright has come forward claiming to be the original creator of Bitcoin. As proof, he "digitally signed messages using cryptographic keys created during the early days of Bitcoin's development. They keys are inextricably linked to blocks of bitcoins known to have been created or 'mined' by Satoshi Nakamoto." *Australian Craig Wright Claims to be Bitcoin Creator*, BBC.COM (May 2, 2016), <http://www.bbc.com/news/technology-36168863>.

⁹ MULLAN, *supra* note 7, at 86.

¹⁰ Article, Ralph E. McKinney Jr. et al., *The Evolution of Financial Instruments and the Legal Protection against Counterfeiting: A Look at Coin, Paper, and Virtual Currencies*, 2015 U. Ill. J. L. TECH. & POL'Y 273, 274.

¹¹ MILTON FRIEDMAN & ROSE FRIEDMAN, *FREE TO CHOOSE: A PERSONAL STATEMENT* 249 (1980).

entrusted with the production of currency (e.g., the United States Department of the Treasury Bureau of Engraving and Printing.)¹²

A virtual currency is a “medium of exchange existing entirely in intangible form that is not legal tender but which can substitute for legal tender.”¹³ Within the broader category of virtual currencies often used for online games and social media are cryptocurrencies, Bitcoin being the most popular example.¹⁴ Cryptocurrencies are distinguishable from other virtual currencies in that they are “internet-based virtual currenc[ies] in which the ownership of a particular unit of value is validated using cryptography.”¹⁵ Accordingly, Bitcoin is a virtual currency with equivalent value in real currency but no legal tender status, at least in most jurisdictions.¹⁶

The American Constitution reserves to the Federal Government the power to coin money and regulate its value.¹⁷ However, laws prohibiting the circulation and use of unauthorized instruments meant as currency or generally means of payment, have not been interpreted to prohibit new types of money.¹⁸ Instead, these laws have been applied for prosecuting counterfeited US dollar bills and coins.¹⁹ Nonetheless, many countries have taken a direct stance and have explicitly ruled that Bitcoin cannot be used as legal tender within their borders.²⁰ Even so, private parties can agree, in contract, to use Bitcoin as method of payment for their transactions. Thus, the

¹² *Id.* at 277.

¹³ Hughes & Middlebrook, *supra* note 3, at 504.

¹⁴ *Id.*

¹⁵ *Id.*

¹⁶ *In Re Coinflip, Inc. et al.*, CFTC Docket No. 15-29 (CFTC Filed Sept. 17, 2015), <https://www.irs.gov/pub/irs-drop/n-14-21.pdf>.

¹⁷ U.S. Const. art. I, §8(5).

¹⁸ U.S.C. §336.

¹⁹ Julie Andersen Hill, *Virtual Currencies & Federal Law*, J. CONSUMER & COMM. L., 49 (2015).

²⁰ European Central Bank, *Virtual Currency Schemes – A Further Analysis*, 24 (2015), available at <https://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemesen.pdf>.

biggest hurdles Bitcoin faces are volatility and absence of a supporting institutional infrastructure.²¹

Between March and April 2013, “Bitcoin’s dollar exchange rose from about \$50 to \$350 and then fell back to near \$70. Bitcoin’s price rose even more sharply during the fall of 2013, rising from near \$50 in September to more than \$110 by early December. During 2014, Bitcoin’s price showed large day-to-day variations but generally trended down. By mid-January 2015, a Bitcoin was priced near \$200²² then, as of July 2015, Bitcoin was trading at an exchange rate of \$279.32 per Bitcoin.²³ However, it should be noted that Bitcoin’s volatility has been declining steadily and Bitcoin has maintained lower levels of volatility compared to unstable reserve currencies like the Russian Ruble and the Brazilian Real.²⁴ Specifically, Bitcoin’s volatility between March and May 2016 has been about 1.23% and around 1.45% between April and May 2016.²⁵ For comparison, and to better grasp Bitcoin’s level of risk, volatility of gold averages at around 1.2%, while major currencies average between 0.5% and 1.0%.²⁶ Furthermore, “while gold has decreased by around 11% amid the [F]ederal [R]eserve’s announcement of new interest rates implementation, the price of [B]itcoin has increased to around US\$430.”²⁷ In 2017, in the midst of uncertainties surrounding what

²¹ Since most countries have abandoned the gold standard – the guarantee that anyone could trade a country’s currency in return for equivalent amount of gold – the value of national currencies derives from social acceptance, trust, and confidence in that country’s economy. *The Global Monetary System – Not Floating, but Flailing*, THE ECONOMIST (July 5, 2015), <http://www.economist.com/news/finance-and-economics/21606322-after-150-years-monetary-experimentation-world-remains-unsure-how>.

²² Craig K. Elwell, M. Maureen Murphy & Michael V. Seitzinger, *Bitcoin: Questions, Answers and Analysis of Legal Issues*, CONGRESSIONAL RESEARCH SERVICE REPORT, 7 (Jan. 28, 2015) (available at <http://www.fas.org/sgp/crs/misc/R43339.pdf>).

²³ *Id.*

²⁴ Joseph Young, *Volatility of Bitcoin Price Consistently Declined since 2010*, BITCOIN NEWS SERVICE (Jan. 3, 2016, 4:00 PM), <http://www.newsbtc.com/2016/01/03/volatility-of-bitcoin-price-consistently-declined-since-2010/>.

²⁵ *The Bitcoin Volatility Index*, BITCOIN VOLATILITY, <https://btcvol.info/>.

²⁶ *Id.*

²⁷ Young, *supra* note 24.

policies will be implemented regarding Bitcoin by the new administration, “the cryptocurrency rose 3.1% to \$1,164.10 . . . topping the all-time closing high of \$1,137 set in November 2013.”²⁸ February 2017, as a response to the newly inaugurated presidential administration, has indeed marked the longest Bitcoin has traded at over \$1,000.²⁹ This is because commentators expect “the Trump administration to be at least more accepting of the cryptocurrencies, even if they will not necessarily embrace them.”³⁰ This stems, at least in part, from the fact that Trump’s transition team includes “Bitcoin supporters” like Peter Thiel, co-founder of PayPal and investor in several Bitcoin companies, and Mick Mulvaney, an outspoken supporter of Bitcoin and founder of the bipartisan Blockchain caucus.³¹ Mulvaney, Director of the Office of Management and Budget, has created the bipartisan caucus aimed at educating Congress about Bitcoin and blockchain technology.³² This is a significant step, regardless of political views, to foster regulation and thus certainty around cryptocurrencies and blockchain technology. Mulvaney has also stated that “[b]lock chain technology has the potential to revolutionize the financial services industry, the United States economy and the delivery of government services, and I am proud to be involved with this initiative.”³³

Hypothetically, and national debates aside, if Bitcoin’s acceptance becomes more widespread, its volatility may decrease and this, in turn, may result in increased global acceptance of Bitcoin as a

²⁸ Olga Kharif, *Bitcoin Price Sets Record on Trump Policy Uncertainties*, BLOOMBERG (Feb. 23, 2017 10:35 AM), <https://www.bloomberg.com/news/articles/2017-02-23/bitcoin-price-sets-intraday-record-on-trump-policy-uncertainties>.

²⁹ Charles Bovaird, *Bitcoin Price Tops \$1,000 for Longest Stretch in History*, COINDESK (Feb. 21, 2017 20:32), <http://www.coindesk.com/bitcoin-price-tops-1000-longest-stretch-history/>.

³⁰ Neha Thakur, *Will Trump and Bitcoin be Good Partners*, NEWSBTC (Jan. 23, 2017 9:35 AM), <http://www.newsbtc.com/2017/01/23/will-trump-and-bitcoin-be-good-partners/>.

³¹ *Id.*

³² *Id.*

³³ Shivdeep Dhaliwal, *Donald Trump Inauguration Special: Make Bitcoin Great Again!*, THE COINTELEGRAPH (Jan. 20, 2017), <https://cointelegraph.com/news/donald-trump-inauguration-special-make-bitcoin-great-again>.

means of exchange.³⁴ However, without a national infrastructure backing the virtual currency, Bitcoin's success can merely be temporary as in the case of mortgage-backed securities and other financial instruments in the past.³⁵ Indeed, it has been argued that Bitcoin may become the subject of a financial bubble as it "seems to fit the basic definition of speculative bubble – that is, a special kind of fad, a mania for holding an asset in expectation of its appreciation."³⁶ News regarding price increases both publicize and amplify bubbles' effects.³⁷ They often justify the current bubble phenomenon by attributing it to an inspiring "new era" story aimed at attracting more attention as the prices rise.³⁸ In Bitcoin's case, the narrative was that "a computer whiz invented a new kind of money in the form of electronic currency units, as part of decentralized computer-driven system for a world economy that extends beyond the reach of any single government."³⁹ Indeed, commentators have speculated Bitcoin has already been the subject of a bubble in China in 2013.⁴⁰ There, the Government has issued laws both banning the use of Bitcoin and prohibiting transfers out of the country of currency in amounts higher than \$50,000.⁴¹ Interestingly, on November 3, the price of Bitcoin rose to its 2015 peak of US\$377.36, amounting to a 75% increase since August of that same year.⁴² Supporting the speculation that Bitcoin was the subject of a Chinese bubble, while the price rose globally, Chinese Bitcoin exchanges were

³⁴ Kevin V. Tu & Michael W. Meredith, *Rethinking Virtual Currency Regulation in the Bitcoin Age*, (Aug. 22, 2014) (available at SSRN 2485550).

³⁵ David Min, *Understanding the Failure of Market Discipline*, 43 (Mar. 3, 2014), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2403988.

³⁶ Robert J. Shiller, *In Search of a Stable Electronic Currency*, N.Y. TIMES (Mar. 1, 2014), <http://www.nytimes.com/2014/03/02/business/in-search-of-a-stable-electronic-currency.html>.

³⁷ *Id.*

³⁸ *Id.*

³⁹ *Id.*

⁴⁰ Anthony Cuthbertson, *Bitcoin Price Hits 2015 Peak Amid Speculation of 'Second Bitcoin Bubble'*, INT'L BUS. TIMES (Nov. 2, 2015), <http://www.ibtimes.co.uk/bitcoin-price-hits-2015-peak-amid-speculation-second-bitcoin-bubble-1526956>.

⁴¹ *Id.*

⁴² *Id.*

trading the virtual currency at leading prices, “sometimes trading at \$10/bitcoin higher” than other exchanges world wide.⁴³

Historically, national central banks have been entrusted with the mandate of protecting their national currency by “seeking to match the supply of money to the needs of the economy and thus maintain[ing] price stability.”⁴⁴ This result is usually achieved by attempting to make inflation rates as close as possible to set benchmarks. Those benchmarks are usually low, as in the 2% target of the United States, to avoid the uncertainty about the future and the corrosive effects on currency value that would be caused by high inflation.⁴⁵ In fact, trust that a national currency is a reliable store of value derives from the confidence that the currency will be honored at a value reflecting public expectations.⁴⁶ Accordingly, be it directly by setting interest rates,⁴⁷ or indirectly by issuing public communications “prepared for the purpose of shaping economic and monetary conditions prospectively, as instruments of persuasion,” central banks play a pivotal role in managing currency stability.⁴⁸ Bitcoin’s independence from countries’ currency systems has been claimed to be its strength, however, while this may be somewhat true for highly unstable economies, it is not an automatic conclusion for more stable and confidence-inspiring ones. Indeed, regardless of the actual level of a country’s economic stability, it does provide consumers with an interface to relate to and that is neutral from private interests. Distinguishably, Bitcoin’s anonymous creation and the private ownership of all Bitcoin exchanges create a reality where

⁴³ *Id.*

⁴⁴ Board of Governors of the Federal Reserve System, *Why Does the Federal Reserve Aim for 2 Percent Inflation Over Time?*, available at http://www.federalreserve.gov/faqs/economy_14400.htm. Similarly, in Europe, the ECB has a targeted inflation rate below, but close to 2%. See ECB, *Monetary Policy*, available at <https://www.ecb.europa.eu/mopo/html/index.en.html>.

⁴⁵ Sarwat Jahan, *Inflation Targeting: Holding the Line*, IMF, <http://www.imf.org/external/pubs/ft/fandd/basics/target.htm>.

⁴⁶ Hilary J. Allen, *\$ = € = Bitcoin?*, (Aug. 13, 2015), Suffolk Law School Research Paper No. 15-33, 15, <http://ssrn.com/abstract=2645001>.

⁴⁷ Morgan Ricks, *Regulating Money Creation After the Crisis*, 1 HARV. BUS. L. REV. 75, 77 (2011).

⁴⁸ Douglas R. Holmes, *Communicative Imperatives in Central Banks*, 47 CORNELL INT’L L.J. 15, 17 (2014).

Bitcoin stability depends on the interrelation of conflicting private interests.

Interestingly, according to its own website, Bitcoin's value derives from the fact that it is "useful as a form of money."⁴⁹ This circular reason strengthens the fear that while the public is currently interested in purchasing Bitcoin because of trust in its development, if this belief disappears no central bank or government can provide support to users. A sudden end to the acceptance of Bitcoin as a payment method would translate into chaotic erosion of its value and, ultimately, Bitcoin would lose its status as currency.

The lack of a neutral institution devoted to price stability can explain, at least in part, Bitcoin's volatility and riskiness. In contrast to public sovereigns, Bitcoin exchanges have a private corporate nature and relatively easy access to bankruptcy procedures that could leave subscribers, as creditors, unprotected to a higher degree than they would be if a bank were to be insolvent. However, as mentioned above, Bitcoin is an interesting alternative in unstable economies where the national currency is completely distrusted. For example, Argentina is increasingly gaining interest in Bitcoin.⁵⁰ Nonetheless, Bitcoin may not be the best option even in those economies. An example of a more structured and more reliable alternative currency is the Unified System for Regional Compensation ("SUCRE").⁵¹ SUCRE started as a virtual currency for transaction between Ecuador and Venezuela. It was intended as a medium to replace the US dollar as means of exchange in order to limit and decrease the US influence

⁴⁹ Bitcoin, *Why Do People Trust Bitcoin?*, <https://bitcoin.org/en/faq#why-dopeople-trust-bitcoin>.

⁵⁰ See J.M.P. Montevideo, *Bitcoin in Argentina: If it can't Make it there*, THE ECONOMIST (June 12, 2014, 13:36), <http://www.economist.com/blogs/schumpeter/2014/06/bitcoin-argentina>; Nathaniel Popper, *Can Bitcoin Conquer Argentina?*, THE NEW YORK TIMES (Apr. 29, 2015), http://www.nytimes.com/2015/05/03/magazine/how-bitcoin-is-disrupting-argentinass-economy.html?_r=0.

⁵¹ Mercedes Alvaro & Jeffrey T. Lewis, *Who Needs Bitcoin? Venezuela has its "Sucre"*, (Jan. 2, 2014 6:51 pm), <http://www.wsj.com/articles/SB10001424052702304202204579256062854362716>

and control over Latin American trade and, at the same time, increase stability of those markets.⁵²

While theoretically appealing, Bitcoin lacks the full faith and credit that has allowed national currencies to successfully function and resist crises.⁵³ “No private issuer enjoys the same extent for its markets, the same capacity to coerce demand for its liabilities, or the same psychological association with confidence in society.”⁵⁴ This is not to say that currencies alternative to national fiat currencies cannot successfully exist. However, it is of extreme importance that virtual currencies, by nature, tend to be unstable and extremely sensitive to new events requiring past commitments to be readjusted.⁵⁵

Consider the fate of bank-issued money in the United States prior to the establishment of the US dollar as the common currency. Many state banks issued their own IOUs with nothing but their own assets to back them. Predictably, they failed whenever too many claimants sought to make good on their claims at the same time. This follows from the hierarchy of finance and the fact that non-state entities, by definition, have limited resources. Critically, their ability to mobilize fresh resources may falter precisely when it is most needed, namely in times of crisis.⁵⁶

Accordingly, Bitcoin and other similar virtual currencies’ are too unstable to implement an overreaching corporate governance system like that applicable to companies. Doing so could potentially expose shareholders to greater risks than traditional transaction-recording methods do without a countervailing benefit.

⁵² *Id.* See also generally, Caroline R. Hurtado, Note, *Fiscal Policies as Decisive Solutions for Troubled Economies: Differing Legislative Enactments in Argentina and Ecuador*, 24 LOY. L.A. INT’L & COMP. L. REV. 391 (discussing the dollarization process undergone Latin American countries to obviate to economic instability).

⁵³ FELIX MARTIN, MONEY: THE UNAUTHORIZED BIOGRAPHY, 75 (2014).

⁵⁴ *Id.* at 114.

⁵⁵ Katharina Pistor, *A Legal Theory of Finance*, 41 J. COMP. ECO. 315, 322 (2013).

⁵⁶ *Id.*

B. Distinguishing Distributed Ledgers, Blockchain, and Bitcoin.

Blockchain and Bitcoin are too often incorrectly used interchangeably because of the strong association between the two. However, the blockchain is merely the technology through which Bitcoin functions and making the distinction between the two is fundamental to understanding the potential independent use in corporate governance of the blockchain, but not of Bitcoin, proposed by this paper.

The blockchain is a particular type of distributed ledger and represents the technological evolution of a tool as old as commerce.⁵⁷ Indeed, in ancient times transactions were recorded on papyrus and paper, today, the same recording occurs in computerized form.⁵⁸ What distinguishes distributed ledgers from the traditional form of recording is that, through algorithms, the ledgers can be collaboratively created by all of those sharing it in a network consisting of multiple sites, geographies, and institutions.⁵⁹ Distributed ledgers allow all users within the network to access and visualize changes to the ledger as they occur while maintain the information safe from unauthorized access via cryptographic “keys” and signatures, controlling users’ relative powers.⁶⁰ Indeed, underlying the distributed ledger technology lays the blockchain, which accomplishes peer-to-peer digital cash transaction in Bitcoin, or otherwise.⁶¹ This is further analyzed in the next subsection.

Distributed ledgers, as contrasted to Bitcoin, offer an interesting tool to implement in corporate governance because of their potential positive effect in at least some field of governance which is discussed in Section III of this paper. Compared to current data management methods, distributed ledgers offer a more secure alternative given their resistibility to hacks. Unlike centralized

⁵⁷ UNITED KINGDOM GOVERNMENT CHIEF SCIENTIFIC ADVISOR, *Distributed Ledger Technology: Beyond Block Chain*, 5, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/492972/gs-16-1-distributed-ledger-technology.pdf.

⁵⁸ *Id.*

⁵⁹ *Id.*

⁶⁰ *Id.*

⁶¹ *See infra* Subsection Section II-c.

systems, a successful cyber-attack on a distributed ledger would have to contextually target all shared copies.⁶² While not completely immune from hacks, this technology is also resistant to unauthorized changes or malicious tampering because users can immediately spot those changes.⁶³ The technology represents an opportunity for evolution in various fields given its adaptability to various uses: distributed ledgers are capable of applicability to most transactions given their ability of “guaranteeing and tracking assets as they move from one ledger to another.”⁶⁴ Interestingly, various governments globally, are already moving towards the implementation of distributed ledger technologies paralleling the private corporate world.⁶⁵

C. Mechanics of Bitcoin Transactions on the Blockchain

Given Bitcoin’s nature, mathematical formulas and cryptography respectively control its issuance and use.⁶⁶ While users’ software store a public record of all transactions – the blockchain – the actual identity of the transacting parties remains anonymous, as no personal information is required to create an account on the platform or exchange Bitcoins.⁶⁷ Elimination of a third party intermediary, such as a bank, ensures anonymity within Bitcoin transactions.⁶⁸ Anonymity is furthered by the absence of reporting

⁶² UNITED KINGDOM GOVERNMENT CHIEF SCIENTIFIC ADVISOR, *supra* note 57, at 6.

⁶³ *Id.*

⁶⁴ *Money with no Middleman*, THE ECONOMIST, <http://www.economistinsights.com/technology-innovation/analysis/money-no-middleman/tab/1>, (last visited May 10, 2016).

⁶⁵ UNITED KINGDOM GOVERNMENT CHIEF SCIENTIFIC ADVISOR, *supra* note 57. Five countries (United Kingdom, Estonia, Israel, New Zealand, and South Korea, have also created a network of digitally advanced government with the goal of strengthening the digital economy. *See* UNITED KINGDOM CABINET OFFICE AND GOVERNMENTAL DIGITAL SERVICE, *D5 London: About D5 Member Countries*, (Dec. 9, 2014), <https://www.gov.uk/government/news/d5-london-about-d5-member-countries>.

⁶⁶ MULLAN, *supra* note 7, at 86-87.

⁶⁷ *Id.* (noting that Bitcoin’s issuance is capped at 21M units).

⁶⁸ Federal Reserve Board, *Bitcoin: Technical Background and Data Analysis*, 5 available at <http://www.federalreserve.gov/econresdata/feds/2014/files/2014104pap.pdf>.

requirements and regulatory agencies, such as central banks and taxing authorities.

In the absence of a third party clearinghouse, participants are free, but not bound, to voluntarily record each transaction on the blockchain.⁶⁹ However, the effectiveness of this recording method is disputable: users who record their transactions are rewarded with newly minted Bitcoins.⁷⁰ Conversely, no penalty follows from failure to record.⁷¹ This incentive-based policy explains, at least in part, the steady growth of Bitcoin systems.⁷²

The blockchain is comprised of a series of transactions each consisting in a “block”.⁷³ Each block indicates the asset and consideration exchanged, the time of the transfer, and the identity (or at least the pseudonym) of the transacting parties.⁷⁴ Each block is “chained” to the preceding and the subsequent one through headers that report information (using codes) regarding the content of the previous transaction block.⁷⁵ Thus, through the codes reported in each block’s header one can retrieve the preceding transaction block and so on until the original transaction is reached.⁷⁶ However, while it is possible to trace Bitcoin transactions back to the original acquisition of assets, depending on the type of exchange used, it is potentially impossible to trace the transaction back to individuals.⁷⁷ Furthermore, depending on the visibility options set by the exchange, blockchain records may be publicly visible or restricted to authorized users and subscribers only.⁷⁸ In the alternative, an intermediate solution has developed whereby a company uses a private blockchain accessible to authorized users only to record its daily transactions but then periodically updates and reports an aggregate version of those

⁶⁹ *Id.*

⁷⁰ *Id.* (explaining that minting refers to the creation of new Bitcoins).

⁷¹ *Id.*

⁷² *Id.*

⁷³ PAOLO TASCA, *Digital Currencies: Principles, Trends, Opportunities and Risks*, Deutsche Bundesbank research report (2015), http://papers.ssrn.com/sol3/Papers.cfm?abstract_id=2657598.

⁷⁴ *Id.*

⁷⁵ *Id.*

⁷⁶ *Id.*

⁷⁷ *Id.*

⁷⁸ *Id.*

transactions on a publicly accessible blockchain.⁷⁹ This intermediate solution is called, given its mechanics, a side chain.⁸⁰

Regardless of the accessibility options, to execute a transaction, both a private and a public key are necessary.⁸¹ Each party to the transaction has a private encryption key that provides access to their personal account and that, when paired with the public key, allows transactions to go through.⁸² Specifically, a transaction requires a “pair of interlocking encryption keys” acting as peer-to-peer signatures.⁸³ The use of digitally encrypted signatures to authenticate transactions is threefold in that it ensures the authentication, non-repudiation, and integrity of payment messages.⁸⁴

Moreover, Bitcoin transactions are final and irreversible: voluntary refunds are the only way to revert the effect of the transfer.⁸⁵ Because there is no administrator, no transaction can be blocked or penalized.⁸⁶ Furthermore, Bitcoin users have the option to either keep a Bitcoin wallet (also called dark wallet when kept on dark web⁸⁷ exchanges), on their own or through third parties, or convert the currency back to their local currency.⁸⁸ The latter option may, depending on the method used, entail a potential for identity

⁷⁹ *Id.*

⁸⁰ *Id.*

⁸¹ MULLAN *supra* note 7, at 86.

⁸² *Id.*

⁸³ *Id.*

⁸⁴ Federal Reserve Board, *supra* note 68, at 8.

⁸⁵ MULLAN *supra* note 7, at 87.

⁸⁶ *Id.*

⁸⁷ The dark web is a layer of the web accessible only through specific software and where users can maintain nearly absolute anonymity. Stuart Dredge, *What is Tor? A Beginner's Guide to the Privacy Tool*, THE GUARDIAN, (Nov. 5, 2013 07:47 AM), <http://www.theguardian.com/technology/2013/nov/05/tor-beginners-guide-nsa-browser> (last visited Nov. 24, 2015).

⁸⁸ Steve Kovach, *What It's Like Using an ATM that Automatically Turns Your Cash into Real Bitcoins*, BUSINESSINSIDER (Mar. 10, 2014 5:00 PM), <http://www.businessinsider.com/bitcoin-atm-2014-3> (on how to buy and cash Bitcoin).

discovery.⁸⁹ Indeed, it should not come as a surprise that a commonly heard phrase in the Bitcoin industry is “buyer beware.”⁹⁰

As mentioned, Bitcoin further differs from traditional currencies in that no central bank controls the amount of currency available and no jurisdiction guarantees it.⁹¹ Instead, a mathematical protocol with no central administrating or monitoring authority generates the Bitcoin.⁹² Given its math-based issuance and incentive-based transaction recording, while Bitcoin’s current cap of \$21M should not be reached earlier than 2140, each Bitcoin unit can be divided into fractional units thus enhancing the currency’s presence and spread.⁹³ The cap of Bitcoin availability tends to suggest a commodity-like nature, which will be discussed more in depth in the following section about Bitcoin regulation alternatives. However, unlike traditional natural commodities, Bitcoin’s cap is only mathematically enforced and thus easily transformable, which adds a further layer of unique complexity.

Furthermore, software and services like TOR (necessary to access the dark web), the “dark wallet” (Bitcoin wallets stored on the dark web), and Bitcoin-laundering services which are intentionally designed to obscure the source of a Bitcoin transaction, enhance Bitcoin’s already anonymous character and further complicate traceability.⁹⁴ Indeed, in the case of laundering services, the chain of transactions on the blockchain is obscured by “linking all transactions in the same [B]itcoin address and sending them together in a way that makes them look as if they were sent from another address.”⁹⁵ Other services pursuing the same goal instead “comingle” different series of

⁸⁹ This paper does not go into detail as to Bitcoin use in the dark web but suffices it to say that there Bitcoin’s anonymous features are extremely enhanced by additional layers of encryption. *Id.*

⁹⁰ MULLAN *supra* note 7, at 87.

⁹¹ FATF Report, *Virtual Currencies Key Definitions and Potential AML/CFT Risks* (June 2014), <http://www.fatf-gafi.org/media/fatf/documents/reports/Virtual-currency-key-definitions-and-potential-aml-cft-risks.pdf>.

⁹² *Id.*

⁹³ *Id.*

⁹⁴ As mentioned above, use of Bitcoin in the dark web offers further opportunities to avoid and evade regulation. *Id.*

⁹⁵ *Id.*

transactions, rendering the identification of the user to whom the sender intended to direct the funds impossible.⁹⁶

To further understand Bitcoin's instability, it should be noted that Bitcoin acceptance peaked in 2013 with over 64,000 businesses around the globe accepting it as form of payment.⁹⁷ However even lucrative businesses suffer from this instability, for example Mt. Gox, the largest Bitcoin exchange, filed for bankruptcy in 2014, after Bitcoin valued at around US\$500 million mysteriously disappeared.⁹⁸ This example, considering the anonymous features of the currency, illustrates the great volatility and risks associated with the trading of Bitcoins.

Enforcement agencies picked up on Bitcoin early, and, relatively soon after its creation, the FinCEN intervened issuing an interpretative guidance which is discussed in the next subsection.

D. Current Regulatory Framework for Bitcoin in the United States

Similarly to other virtual currencies, no Bitcoin-specific regulation has been enacted, nor does this paper suggest that it is necessary. However, a definitive categorization of Bitcoin as a specific financial instrument is necessary for market confidence in terms of legal certainty and clarity regarding applicable statutes and regulations. Indeed, while this article focuses on the dichotomy of Bitcoin and blockchain technology as potential corporate governance tools, it is important to understand that depending on the definition of Bitcoin as a certain financial instrument or another, its regulation may change considerably. Specifically, depending on the path followed, Bitcoin may function as a reliable governance tool. While legislatures are globally moving towards regulating Bitcoin use and exchange, regulation is not uniform as countries are following different approaches.

This article suggests that, notwithstanding what the applicable regulation is, Bitcoin is not a suitable corporate governance tool

⁹⁶ *Id.*

⁹⁷ Federal Reserve Board, *supra* note 68, at 5.

⁹⁸ *Id.* at 2.

because of externalities that render the virtual currency unstable and unreliable. However, to overview the current regulatory framework in the United States is helpful in understanding how unripe the legal system is to accept Bitcoin as corporate governance tool. Instead, this article suggests that, for at least certain aspects of corporate governance, distributed blockchain ledgers may represent a feasible and practical tool as discussed below in Section III.

Given the lack of a universal definition of Bitcoin, its status and consequent regulation greatly differs depending on whether it is categorized as a form of money, a security, or a commodity.⁹⁹

1. *Current Applicable Law*

FinCEN has clarified in its 2013 guideline that, because of their anonymous features, Bitcoin users and exchangers are subject to the Bank Secrecy Act (“BSA”).¹⁰⁰ Specifically, the guideline clearly states the BSA applies “to persons creating, obtaining, distributing, exchanging, accepting, or transmitting virtual currencies”, but does not go as far as classifying Bitcoin’s status.¹⁰¹ Pursuant to the BSA, a “money transmission service” is a two-step service of “acceptance of currency, funds, or other value that substitutes for currency from one person *and* the transmission of currency, funds, or other value that substitutes currency to another location or person by any means.”¹⁰²

Following the FinCEN 2013 guideline, Bitcoin administrators and exchangers, in their capacity as Money Services Businesses (“MSB”), must comply with the appropriate Treasury Department registration process.¹⁰³ Conversely, Bitcoin users do not fall within the guideline MSB definition and are outside the Treasury

⁹⁹ For further and deeper analysis of Bitcoin’s regulation *see*, Fiammetta S. Piazza, *Bitcoin in the the Dark Web: A Shadow over Banking Secrecy and a Call for Global Response*,

¹⁰⁰ Guidance Paper FIN-2013-G001, *supra* note 5.

¹⁰¹ *Id.*

¹⁰² *Id.*

¹⁰³ *Id.* (emphasis in original); *Money Services Business (MSB) Registration*, FINCEN, https://www.fincen.gov/financial_institutions/msb/msb.registration.html, (last accessed Feb. 5, 2016).

Department scope of authority, at least for registration purposes.¹⁰⁴ The guideline also defines and clarifies that Money Transmitting Services (“MTS”) are within the scope of the USA Patriot Act of 2001, which, among other addressed issues, imposes fines for, for example, failure to register and obtain a Money Transmitter license.¹⁰⁵

FinCEN’s conclusion that the BSA applies to Bitcoin represents a major turn towards a thorough regulation of Bitcoin and, by extension, of other similar cryptocurrencies.

2. *Status as a Form of Money*

“[Bitcoin] can be used to purchase goods or services, and [. . .], to pay for individual living expenses.”¹⁰⁶ Based on this reasoning, a Texas District Court ruled on a matter of first instance and held that “[i]t is clear that Bitcoin can be used as money.”¹⁰⁷ While relatively limited in terms of market acceptance, Bitcoin “can also be exchanged for conventional currencies, such as the US dollar, Euro, Yen, and Yuan.”¹⁰⁸ Accordingly, the Texas court found that “Bitcoin is a currency or form of money.”¹⁰⁹ The ruling is dated July 2013, only four months after FinCEN’s guideline publication.

While avant-garde and based on a sound reasoning, the Texas court ruling should be carefully approached. Indeed, even though Bitcoin is exchanged and used as money, unlike national currencies, it lacks the support of a central authority like the United States Treasury for the US dollar and it does not have intrinsic value, as do

¹⁰⁴ *Id.*

¹⁰⁵ Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism (USA Patriot ACT) Act of 2001, Pub. L. No. 107-56.

¹⁰⁶ *Id.*

¹⁰⁷ SEC v. Shavers, 2013 U.S. Dist. LEXIS 110018 (E.D. Tex. Aug. 6, 2013). (Addressing the issue of whether jurisdiction under the Securities Acts of 1933 and 1934 applied to the facts of the case involving a Bitcoin Ponzi scheme).

¹⁰⁸ *Id.*

¹⁰⁹ *Id.* (The court’s ultimate finding was that investors wishing to invest in BTCST provided an investment of money).

commodities.¹¹⁰ Because of the differences between traditional national currencies and Bitcoin, it has been argued that Bitcoin lacks at least one of two required characteristics to be considered a true currency.¹¹¹ Specifically, although Bitcoin may be a means of exchange it is not a store of value.¹¹²

Furthermore, in evaluating whether Bitcoin can be brought within the definition of currency, it is of remarkable importance to remember Bitcoin's lack of national infrastructure, as opposed to fiat currencies. Indeed, other than in exceptional cases, a national currency can always be exchanged for and accepted as form of payment. Instead, Bitcoin could vanish both because of the combination of Bitcoin being the result of an Internet mathematical protocol, the absence of a physical "paper-trail" backing up the blockchain, and the Internet and computers being subject to viruses.¹¹³

3. *Status as a Security*

The issue of "whether the Bitcoin itself could be a security" has yet to be addressed by a court."¹¹⁴ Indeed, while *Shavers* acknowledges it as an option, the court there did not delve into an analysis of whether Bitcoin can be considered a security instrument. The issue is even more intricate considering that, while there is agreement regarding the fact that a security is, in economic terms, a

¹¹⁰ Paul Krugman, *Op-Ed, Bitcoin Is Evil*, NEW YORK TIMES (Dec. 28, 2013), http://krugman.blogs.nytimes.com/2013/12/28/bitcoin-is-evil/?_r=0.

¹¹¹ John Authers, *Time to Take the Bitcoin Bubble Seriously*, FIN. TIMES (Dec. 11, 2013), <http://www.ft.com/cms/s/0/4ad1bba0-61fa-11e3-aa02-00144feabdc0.html#axzz3sNu5guRP>.

¹¹² *Id.*

¹¹³ An example of a more structured and more reliable alternative currency is the Unified System for Regional Compensation (SUCRE). SUCRE started as a virtual currency for transaction between Ecuador and Venezuela and was intended as a medium to replace the US dollar as means of exchange to limit and decrease the US influence and control over Latin American trade and, at the same time, increase stability of those markets. Alvaro & Lewis, *supra* note 51. *See also* generally, Hurtado, *supra* note 52. (discussing the dollarization process undergone Latin American countries to obviate to economic instability).

¹¹⁴ Daniela Sonderegger, Note, *A Regulatory and Economic Perplexity: Bitcoin Needs Just a Bit of Regulation*, 47 WASH. U. J.L. & POL'Y 175, 195.

form of investment, there is not a uniform definition. Instead, different countries' legal definitions vary, sometimes significantly, covering a broad spectrum of alternatives. In the United States, the Securities Act of 1933 comprehensively defines the term and provides, in relevant part, that "security means any note, stock, treasury, stock, security future, security-based swap, bond . . . , investment contract . . . or, in general, any interest or instrument commonly known as a 'security'"¹¹⁵

Over the years, American courts have developed and used the Howey test to determine whether an interest is a security pursuant to the Securities Act of 1933.¹¹⁶ In *Howey*, the court, beginning with a textual analysis of the law, reasoned that the preliminary issue to solve to understand what is a "security" is determining what is intended by "investment contract."¹¹⁷ Specifically, the Howey test analyzes whether, at the time the interest is issued, the "investment contract," and consequently the security, is "a contract, transaction or scheme whereby a person invests his money in a common enterprise and is led to expect profits solely from the efforts of the promoter or a third party."¹¹⁸ For purposes of applying the Howey test, whether the shares in the enterprise are evidenced by formal certificates, or by nominal interests in the physical assets employed in the enterprise, is irrelevant.¹¹⁹ However, Bitcoin's analysis in light of the Howey test is ineffective, at least in part because Bitcoin's features do not suit themselves.¹²⁰ Specifically, while Bitcoin users may invest Bitcoin, the cryptocurrency itself does not generally represent a share of a common enterprise the investor believes will prove fruitful through the efforts of a third party. Thus, although Bitcoin may be used as a

¹¹⁵ 15 USCS § 77b.

¹¹⁶ SEC v. Howey Co., 293 U.S. 293.

¹¹⁷ Section 2 (1) of the Act defines the term "security" to include the commonly known documents traded for speculation or investment. This definition also includes "securities" of a more variable character, designated by such descriptive terms as "certificate of interest or participation in any profit-sharing agreement," "investment contract" and "in general, any interest or instrument commonly known as a 'security.'" *Id.* at 297.

¹¹⁸ *Id.* at 298-299.

¹¹⁹ *Id.*

¹²⁰ Sonderegger, *supra* note 114, at 195.

security if the mentioned conditions are met, it remains unclear whether it does, unequivocally, qualify as such.¹²¹

4. *Status as a Commodity*

Classical political economy defines a commodity as product or service produced by human labor and available for sale on the market.¹²² Regardless of school of thought, it is generally agreed that a commodity is a good, easily interchangeable with other commodities of the same type also used in commerce.¹²³ Indeed, an essential characteristic of commodities is that their quality is essentially uniform across producers and are uniquely fungible.¹²⁴ Specifically, to be commodities, goods must be: (1) standardized; (2) usable upon delivery; (3) and their price must vary enough to justify creating a market for the item.¹²⁵ As an illustration, agricultural goods like wheat, corn, oil, and coffee, energy-related goods like coal, oil, and gas as well as precious metals like copper, silver, and gold are typical commodities.¹²⁶

Unlike the unexplored status as a security, the US Commodity and Futures Trading Commission (“CFTC”) issuance of its first action against an unregistered Bitcoin option-trading platform in 2015, confirms that Bitcoin, and similar digital currencies, fall within the definition of commodities and are thus subject to the Commodity Exchange Act (“CEA”).¹²⁷ While the CFTC’s action appears to show a clear intent to regulate Bitcoin as a commodity, it might be an effort to at least pose some restrictions and promote its regulation.

¹²¹ *Id.* at 196.

¹²² KARL MARX, CAPITAL: VOLUME I 38 (Int’l Publishers, 1967).

¹²³ *Commodity*, INVESTOPEDIA, <http://www.investopedia.com/terms/c/commodity.asp> (last visited Feb. 6, 2016).

¹²⁴ *Id.*

¹²⁵ *Commodity*, INVESTING ANSWERS, <http://www.investinganswers.com/financial-dictionary/commodities-precious-metals/commodity-1035> (last visited Feb. 6, 2016).

¹²⁶ *Commodity*, BUSINESS DICTIONARY, <http://www.businessdictionary.com/definition/commodity.html> (last visited Feb. 6, 2016).

¹²⁷ *In Re Coinflip, Inc. et al.*, *supra* note 16.

It is important to note that, significantly differently from traditional commodities, Bitcoin's availability is potentially limitless. However, taking into account Bitcoin's potential status as a form of money and its lack of an infrastructure typical of national currencies, Bitcoin's availability is limited. This is because of the long-standing belief that currencies, typically currencies of countries possessing significant quantities of commodities or other natural resources, have been endorsed as commodities.¹²⁸ Additionally, Bitcoin is notably different from traditional commodities, as it is extremely volatile.¹²⁹ For these reasons as well as Bitcoin's virtual nature, leading to its unknown supply because of its algorithmically coded scarcity and future demand, some argue Bitcoin is more dissimilar to traditional commodities than it is similar.¹³⁰

In light of the general uncertainty surrounding Bitcoin, the CFTC has clarified "commodity" as a term to be broadly construed to include "all services, rights, and interests in which contracts for future delivery are presently or in the future dealt in."¹³¹ Regardless, scholars are perplexed about the CFTC's finding and suggest its implications may shake *Shaver's* holding that Bitcoin can be a security.¹³² In the words of New York Law School Professor Houman Shadab, "[t]he [CFTC order] puts to rest any notion that virtual currencies qualify as securities. Otherwise, the Securities and Exchange Commission would be bringing this action, not the CFTC."¹³³ Unfortunately, no light is shed in the general gray fog surrounding Bitcoin even in this context because neither the SEC nor

¹²⁸ Brian Perry, *Forex Currencies: Commodity Pairs (USD/CAD, USD/AUD, USD/NZD)*, INVESTOPEDIA, <http://www.investopedia.com/university/forex-currencies/currencies8.asp> (last visited Feb. 6, 2016).

¹²⁹ Bitcoin's volatility is further discussed in Section II-A of this article. *See supra* p. 268. *See, also, e.g.*, Young, *supra* note 24.

¹³⁰ Danny Bradbury, *Why Bitcoin's Volatility is Unique among Commodities*, COINDESK (Apr. 29, 2014, 11:11 A.M.), <http://www.coindesk.com/bitcoins-volatility-no-other/>.

¹³¹ 7 U.S.C. 1(a)(9). *See, e.g.*, Board of Trade of City of Chicago v. SEC, 677 F. 2d 1137, 1142 (7th Cir. 1982).

¹³² Pete Rizzo, *CFTC Ruling Defines Bitcoin and Digital Currencies as Commodities*, COINDESK (Sept. 17, 2015 22:06), <http://www.coindesk.com/cftc-ruling-defines-bitcoin-and-digital-currencies-as-commodities/>.

¹³³ *Id.*

the CFTC have issued any disclosures following issuance of the CFTC order. Consequently, while it is undisputed that Bitcoin falls within the scope of the definition of commodity, no final determination can be made regarding its status as security.

5. *The Federal Reserve, the Internal Revenue Service, and Other State and Federal Regulators*

The Federal Reserve Chairwoman Janet Yellen expressly stated during testimony before the Senate Banking Committee that the agency “doesn’t have authority to supervise or regulate Bitcoin in any way.”¹³⁴ This conclusion was heavily motivated by the absence of a “central issuer or network operator,” which makes it “not easy to regulate Bitcoin.”¹³⁵ The Chairwoman has not offered policy guidance but has made clear that “[t]his is a payment innovation that is taking place entirely outside the banking industry.”¹³⁶

Taking a diametrically opposed approach, the Internal Revenue Service (“IRS”) has affirmed its authority over Bitcoin. Specifically, the IRS has clarified that it treats Bitcoin like property subject to property tax and that “sale or exchange of convertible virtual currency, or the use of convertible virtual currency to pay for goods or services in a real-world economy transaction, has tax consequences that may result in a tax liability.”¹³⁷ As a means of comparison, the United Kingdom has moved towards a comprehensive regulation of Bitcoin.¹³⁸ The HM Revenue and

¹³⁴ Ryan Tracy, *Yellen: Bitcoin ‘Doesn’t Touch’ Banks the Fed Oversees*, THE WALL STREET J. (Feb. 27, 2014 12:32 P.M.), <https://www.wsj.com/amp/articles/no-headline-available-1393521584>.

¹³⁵ Charles Cooper, *Fed Chief Yellen: No Power to Regulate Bitcoin*, CNET (Feb. 27, 2014 10:37 A.M.), <https://www.cnet.com/news/fed-chief-yellen-no-power-to-regulate-bitcoin/>.

¹³⁶ Shelly Palmer, *Bitcoin: Money, Currency or Something Else?*, THE HUFFINGTONPOST (March 3, 2014 10:10 AM), http://www.huffingtonpost.com/shelly-palmer/bitcoin-money-currency-or_b_4889845.html.

¹³⁷ IRS Notice 2014-21: Virtual Currency Notice at 1, March 25, 2014, available at <https://www.irs.gov/pub/irs-drop/n-14-21.pdf>.

¹³⁸ Sarah Saunders, *Cryptic Currency*, TAXATION (March 11, 2015), <https://www.taxation.co.uk/Articles/2015/03/10/332784/cryptic-currency>.

Customs (“HMRC”) has issued a policy brief on the treatment of income received from, and charges made in connection with, activities involving Bitcoin and other similar cryptocurrencies, for: Value Added Tax (“VAT”); corporation and income tax; and capital gains purposes.¹³⁹ While the country’s recent vote towards leaving the European Union will have consequences over this issue, currently, the tax treatment in the United Kingdom is as follows: acquisitions by mining are considered outside the scope of VAT; Bitcoin is considered a foreign currency for corporation and income tax purposes; and gains or losses on Bitcoin are chargeable or allowable for capital gains tax if they accrue to an individual and are not covered by trading profit rules.¹⁴⁰

Domestically, states have moved in the direction of regulating Bitcoin and cryptocurrencies through license systems. For example, New York has proposed a “BitLicense” regulation plan aimed at “help[ing] protect consumers and root[ing] out illicit activity.”¹⁴¹ So far, five more states – California, Colorado, New Hampshire, New Mexico, and Texas – have also moved toward a similar and favorable regulation of the Bitcoin.¹⁴² Implementation of these systems of regulation, offer the benefit of ease of enforcement and monitoring because they offer the opportunity to conduct upfront investigation of Bitcoin issuers and exchanges.¹⁴³

¹³⁹ *Id.*

¹⁴⁰ HM Revenue & Customs, Revenue and Customs Brief 9 (2014): Bitcoin and other Cryptocurrencies (March 3, 2014), <https://www.gov.uk/government/publications/revenue-and-customs-brief-9-2014-bitcoin-and-other-cryptocurrencies/revenue-and-customs-brief-9-2014-bitcoin-and-other-cryptocurrencies>.

¹⁴¹ Benjamin M. Lawsky, Superintendent of Fin. Serv., Speech: NYFDS Announces Final Bitlicense Framework for Regulating Digital Currency Firms (June 3, 2015), available at <http://www.dfs.ny.gov/about/speeches/sp1506031.htm> (discussing 23 NYCRR §200.1 et seq. available at http://www.dfs.ny.gov/legal/regulations/revised_vc_regulation.pdf).

¹⁴² For more detail as to the specific actions of those states, see Daniel Cawrey, *5 US States Poised to Promote Bitcoin Friendly Regulation*, COINDESK (Aug. 31, 2014 11:00), <http://www.coindesk.com/5-us-states-poised-promote-bitcoin-friendly-regulation/>.

¹⁴³ *Id.*

III. BLOCKCHAIN AND BITCOIN: POTENTIAL IMPLEMENTATION AS NEW CORPORATE GOVERNANCE TOOLS

This section analyzes the potential benefits and detriments deriving from implementing Bitcoin together with or independently from the blockchain technology in corporate governance. This paper suggests that the present features of Bitcoin and its current under-regulation do not necessitate its implementation because of the extreme exposure to volatility risks and hacks. However, the paper suggests the blockchain technology, as distinguished from Bitcoin, may instead offer a viable tool in areas of corporate governance like voting.

The following subsections explore the relative benefits and disadvantages deriving from implementing Bitcoin or the blockchain in the corporate governance of companies as tools for enhanced transparency, voting, accounting, and self-executing contracts (smart contracts).

A. Transparency of Ownership and Trading Value

Transparency and disclosure are at the base of good corporate governance models in that they enable shareholders and stockholders to make informed decisions and hold corporate executives accountable, thus limiting the agency costs associated with asymmetry of information.¹⁴⁴ In line with this perspective, countries globally have moved towards implementation of legislation aimed at enhancing corporate disclosures in a broad attempt at curtailing a greater role for shareholders in corporate governance.¹⁴⁵

¹⁴⁴ See, e.g., Benjamin Fung, *The Demand and Need for Transparency and Disclosure in Corporate Governance*, 2 UNIVERSAL J. MGMT 2, 72-80 (2014), <http://www.hrpub.org/download/20140105/UJM3-12101630.pdf>.

¹⁴⁵ For example, in the United States, the Sarbanes-Oxley Act of 2002 requires publicity of information including roles of and responsibilities of board and management executives and the Williams Act of 1968 requires disclosures regarding tender offers. Sarbanes-Oxley Act of 2002, 107 P.L. 204 (2002); Williams Act, Securities Exchange Act of 1934, 90 P.L. 439 (1968).

Transparency can be considered to be based on five pillars: (1) truthfulness, (2) completeness, (3) materiality of information, (4) timeliness, and (5) accessibility.¹⁴⁶ Implementing distributed ledgers as a corporate governance tool could, at a minimum, result in enhanced timeliness and accessibility of corporate information. Indeed, as discussed in the previous section, users given access to the ledger would be able to track changes in the ledger as they occur thus allowing for timely transmission of information to shareholders. Shared ledgers would also address the accessibility pillar of transparency in that information stored on the ledgers would be readily accessible to all authorized users. The use of shared ledgers does not directly affect truthfulness and completeness of shared information, however they would allow users to easily monitor transactions as well as recognize possible breaches to the system.¹⁴⁷ Conversely, the same result may not flow from using Bitcoin because of its anonymous features as further discussed hereunder. Accordingly, this paper suggests use of blockchain, but not Bitcoin, in corporate transaction recording to foster enhanced transparency.

In the United States, Bitcoin is undergoing regulation and exchangers are thus implementing amendments to their systems to comply with the BSA and, consequently, certain minimum identity requirements are now necessary for subscription as an exchange user.¹⁴⁸ However, it is not mandatory for companies wishing to use Bitcoin in their governance to use local exchanges only. Indeed, just like a company may have international shareholders, it may decide to use an international Bitcoin exchange that allows reduced identity checks. Accordingly, because local regulation of Bitcoin exchanges are highly diverse in type and thoroughness, if any, using a foreign blockchain may result in non-transparent ownership. This would be so because of lack of disclosure requirements as well potential anonymous accounts.

Use of local exchanges respecting the BSA could still not be sufficient to ensure complete transparency of ownership. Possible implementation of closed blockchains, accessible to authorized users

¹⁴⁶ Fung, *supra* note 144, at 75-76.

¹⁴⁷ See, *supra*, Section II-B, at 274.

¹⁴⁸ See *supra*, Section II.

only, or of side chains, would *de facto* frustrate the goal of inspiring shareholders and investors' trust in the company by way of allowing transparent and easy access to ownership arrangements and instantaneous changes thereof.

Assuming full transparency is implementable, it would have remarkable effects on the behavior of players such as managers, investors, and shareholder activists. Using executive compensation as an illustration, this paper discusses the consequences of complete transparency. Specifically, regardless of the driving forces producing the final arrangement, managers' compensation is often a combination of salary and equity.¹⁴⁹ Currently, public companies are required to file with the SEC disclosures including executive compensation, however those filings do not necessarily come in a format easily comprehensible to non-sophisticated investors.¹⁵⁰ Implementation of blockchain technology could render executive compensation more easily traceable and quantifiable for lay investors because of its user-friendly interface. Indeed, while theoretical problems regarding whether executive compensation is optimal or whether the specific boards are beholden to the executives in their choices, complete transparency coupled with easier understanding would at least allow shareholders real time monitoring. This would enhance the shareholders' role of serving as a check on both board decisions, generally, and executive compensation, specifically.

Depending on the percentage distribution of each component, managers' incentives tend to flow towards, more or less, shareholder-centered strategies. Indeed, acquisition and liquidation of managers' equity in the company have become of central importance, especially after the enactment of the Sarbanes-Oxley Act in 2002.¹⁵¹ Among other things, the act has reduced filing periods for managers to disclose their acquisition and disposition of company shares.¹⁵² Indeed, while originally managers had to make such disclosures

¹⁴⁹ Lucian A. Bebchuk & Jesse M. Fried, *Pay without Performance: Overview of the Issues*, 30 J. CORP. L. 647, 443 (2005).

¹⁵⁰ *See generally*, Press Release, U.S. Securities and Exchange Commission, SEC Adopts Rule for Pay Ratio Disclosure (Aug. 5, 2015), available at <https://www.sec.gov/news/pressrelease/2015-160.html>.

¹⁵¹ Sarbanes-Oxley Act.

¹⁵² *Id.*

within ten days from the acquisition of disposition, the Sarbanes-Oxley Act has reduced this disclosure window to two business days.¹⁵³

While enhancing shareholders awareness, registration of company shares on a public ledger could undercut the effectiveness of equity-based compensation because trades observable in real time would have a lower value to executives as they could lose trade leverage or edge as a consequence.¹⁵⁴ This might result in increased salary-based compensation of executives given the loss of value of their equity compensation.¹⁵⁵ Furthermore, registration of shares on the blockchain would also result in higher consciousness by shareholders of when company shares are pledged as collateral for loans or in connection with derivative hedging product.¹⁵⁶ These typical managerial moves may seem alarming to an inexperienced and uninformed market observer even when fully sound according to business judgment and could thus result in unwarranted market drops. Accordingly, while registration on the blockchain and the heightened transparency flowing from it can increase the role of shareholders in the governance of companies, it may also result in inefficiencies and obstacles in a board's execution of its strategic and managerial role within the company.¹⁵⁷

On the other hand, assuming full transparency is achieved by implementing direct public blockchain systems, as opposed to side chain, the positive effects of transparency could still be undermined if Bitcoin is used. In fact, using Bitcoin to assess the value of transactions, here of compensation, and given the volatile value of Bitcoin, it would be quite possible to circumvent true reporting simply by assessing the transaction during low Bitcoin value trading. This would effectively enhance likelihood of circumvention of accounting fraud and misreporting frustrating the purpose of

¹⁵³ *Id.*

¹⁵⁴ David Yermack, *Corporate Governance and Blockchains*, (NYU Stern Sch. of Bus. & Nat'l Bureau of Econ. Research, Working Paper No. w21802, 2015), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2703207.

¹⁵⁵ *Id.*

¹⁵⁶ *Id.*

¹⁵⁷ *See, id.*; Jill E. Fish, *Taking Boards Seriously*, 19 CARDOZO L. R. 265, 272-275 (1997).

legislation such as the Sarbanes-Oxley Act. Accordingly, while intermediary fees usually associated with banking transactions may be avoided, this would be at the cost of providing executives with an additional method to circumvent honest accounting.

Lastly, regardless of the blockchain used (Bitcoin-based or simple shared ledger) registering a company's shares on the blockchain, would possibly also translate into added management costs, especially up front in the form of accountants and executive training, and system transitioning. Implementation of the blockchain could, at least initially translate in an additional layer of diversification of the board. Indeed, while accountants may be tasked with the mechanical registration on the ledger, the board should be aware of the consequences of certain timing of transactions. However, these costs do not seem justified given the high level of doubt surrounding the effectiveness of blockchain for corporate governance purposes.

Accordingly, Bitcoin should not be used to record transactions, specifically executive compensation, because of its still unclear status and unstable nature. The blockchain technology behind it instead may promote enhanced transparency. But this heightened transparency may actually come at the detriment of shareholders, especially in the case of inexperienced investors that may not be familiar with typical corporate strategies and might misinterpret perfectly innocent board decisions. Accordingly, given the limited additional benefits of registration on public blockchain as compared to the current disclosures required by the SEC, it is advisable the blockchain too not be used, at least in this field.

B. Voting

Corporate elections, given diverse and spread ownership structures, are commonly held through corporate proxy systems. Currently, vote tabulation are subject to a considerable degree of inaccuracy resulting in certain cases in the inability to verify the question "who won?"¹⁵⁸

¹⁵⁸ Marcel Kahan & Edward B. Rock, *The Hanging Chads of Corporate Voting*, GEORGETOWN L. J. 96, 1227, 1279 (2008). *See also*, *A Call for Change in*

Studies have found that proxy voting, while solving the issue of reaching quorums even though shareholders may be absent from the voting meeting, has flaws such as inexact voter lists, incomplete distribution of ballots, and problematic vote tabulation.¹⁵⁹ Implementation of blockchain could solve these issues given its accuracy and reliability levels deriving from availability of copies of ledgers to all users. In practice, voting via blockchain would be achieved by allocating eligible voters tokens (also called “vote coins”) in a number that represents their voting power.¹⁶⁰ Voters would then transmit to addresses on the blockchain their vote, which would then be registered on the ledger.¹⁶¹

Additionally, implementation of blockchain voting may defeat empty voting practices. Empty voting occurs when “an investor uses borrowed shares or certain combinations of derivative securities to acquire voting rights temporarily, without economic exposure to the cash flow rights connected to a share.”¹⁶² These voting strategies mostly rely on secrecy and, while legally doubtful, the difficulty connected to their monitoring and enforcement continues to enable them. Accordingly, a transparent system like shared ledger would effectively render empty voting impossible.

However, empty voting is not necessarily a negative tool. Supporters highlight the efficient effects of the strategy in that it effectively permits pricing of voting rights according to the marginal benefit attributed to the highest-valued voter.¹⁶³ Empty voting is also a great tool for minority shareholders in that it provides them with an opportunity to maximize their profit by selling or temporarily renting their voting rights.¹⁶⁴ This view assumes that shareholders’ interests

the Proxy Advisory Industry Status Quo 50-61 (Ctr. on Exec. Compensation (White Paper c11-07b, Jan. 2011), <http://online.wsj.com/public/resources/documents/ProxyAdvisoryWhitePaper02072011.pdf>).

¹⁵⁹ A Delaware attorney “estimates that, in a contest that is closer than 55 to 45%, there is no verifiab[ility]” of the election results. Kahan & Rock, *supra* note 158, at 1277-1281.

¹⁶⁰ *Id.*

¹⁶¹ *Id.*

¹⁶² Yermack, *supra* note 154.

¹⁶³ *Id.*

¹⁶⁴ *Id.*

are more focused on their profits per se than on actual active participation in the decision making process of the company. Indeed, whether empty voting is considered an acceptable practice also depends on what level of shareholder participation in corporate governance one believes appropriate.¹⁶⁵

Opponents of empty voting, instead, point out the potential undemocratic effect of disjoining ownership and voting rights, which could, especially where it is the minority that rents or sells its voting rights, turn against the very shareholders that are attempting to benefit from the practice.¹⁶⁶ Indeed, where minority shareholders have, as it is common, opposite interests to the majority and control shareholders, selling or renting their voting rights to those parties may result in the support and passage of a resolution not in their best interests.¹⁶⁷ Accordingly, the benefit of empty voting is strongly based on whether one considers shareholders' interests to be those of immediate profit making, or long term and active participation in company governance.

Independently from how one views empty voting, given the relatively straightforward use of the blockchain in the context of voting, this could be an area in which the blockchain could be tested for potential further implementation in governance. The removal and independence of voting from share value avoids the evaluation issue discussed above in the context of Bitcoin blockchains and could render implementation of such model feasible too. In fact, the tokens would be automatically assigned and would not be representative of value. Thus, the analysis above regarding Bitcoin's volatility would not apply, rendering this specific use quite implementable even in the regulatory status quo.¹⁶⁸

Accordingly, voting via blockchain would effectively solve ambiguities about election outcomes and thus reduce opportunities to manipulate such results and would therefore be an advisable corporate governance tool.

¹⁶⁵ Onnig H. Bombalagian, *Can Borrowing Shares Vindicate Shareholders Primacy?*, 42 U.C. DAVIS L. REV. 1231, 1238-1257 (2009).

¹⁶⁶ Yermack, *supra* note 137.

¹⁶⁷ *Id.*

¹⁶⁸ *See supra* Section II.

C. Accounting

Commentators have suggested companies may successfully transition to blockchain accounting and voluntarily post all their ordinary business transactions on distributed ledgers.¹⁶⁹ This result may be achieved both through use of Bitcoin as a means of exchange for transactions or by reflecting the value of transactions via token amounts using blockchain technology. However, neither method implements a truly transparent system. Instead, both would allow for managerial manipulation because of the value assessment issues posed by Bitcoin and mentioned in Section III-A.

Implementation of blockchain accounting could reduce accounting and auditing costs in that various units of a company would be able to directly and centrally record transactions into the ledger and thus there would be no need for an auditor to examine the books of every unit to then assemble them *ex post*.¹⁷⁰ Furthermore, blockchain accounting would also lower the cost of auditing in that auditors and governmental agencies would have direct access to the ledger and be able to examine the regularity of transactions as they occur. This system would thus require extended access to the ledger by certain institutional players, such as taxing agencies, raising the issue of who is entitled to access those records. Accordingly, the the question of whose interests companies must pursue and what the objectives of corporate governance are affect the resolution of this issue. A possible solution to avoid overbroad access to confidential records could be to grant access to only those market player that would have access to SEC disclosures. However this could frustrate

¹⁶⁹ Ryan Lazanis, *How Technology Behind Bitcoin Could Transform Accounting as We Know it*, (Jan. 22, 2015), TECHVIBES, <http://www.techvibes.com/blog/how-technology-behind-bitcoin-could-transform-accounting-as-we-know-it-2015-01-22>.

¹⁷⁰ Oliver Staley, *The Unsexy Future of Blockchain is Accounting*, QUARTZ (Mar. 3, 2016), <http://qz.com/629662/the-unsexy-future-of-blockchain-is-accounting/>; *see, also, Blockchain Technology: A Game-changer in Accounting?*, DELOITTE, https://www2.deloitte.com/content/dam/Deloitte/de/Documents/Innovation/Blockchain_A%20game-changer%20in%20accounting.pdf (last accessed May 10, 2016); Matthew Spoke, *How Blockchain Tech will Change Auditing for Good*, COINDESK (July 11, 2015, 15:00), <http://www.coindesk.com/blockchains-and-the-future-of-audit/>.

the very purpose of blockchain accounting by denying access to more confidential information needed by taxing agencies.

Furthermore, commentators pushing for adoption of blockchain accounting stress that this method would ensure complete transparency as the entire ledger would be immediately visible, assuming no restrictions to access are set by management, to all stakeholders, from shareholders to creditors, and from lenders to interested parties.¹⁷¹ While back-dating of transactions or amortizing operation expenses over long periods is not feasible given the time-stamped nature of the transaction blocks, forward dating can be achieved by simply keeping a parallel undisclosed accounting system.¹⁷² Indeed, parallel accounting, be it on a side ledger or in paper form, would still offer companies an “under the table” opportunity to circumvent reporting duties. Accordingly, this system does not accomplish the result it purports to achieve: spotting and impeding self-interested and fraudulent transactions.¹⁷³ Indeed, proponents of this type of accounting forget to take into account human nature. They assume a perfect reality where voluntariness to report all transactions at the moment they occur is the rule and self-interests are nonexistent or not pursued. But how can a voluntary reporting system ensure transparency in a system, especially in big corporations, where ownership and management are quite separate? Considering transition costs as well as the above-described pitfalls, feasibility of blockchain accounting seems utopic and impracticable.

D. Smart Contracts

A smart contract is a “computerized protocol that executes the terms of a contract.”¹⁷⁴ Smart contracts are not a wholly new concept, however, the advent of virtual currencies and Bitcoin have offered a way to reinvent this transactional product. Given Bitcoin’s rapid success among consumers, smart contract providers have

¹⁷¹ Yermack, *supra* note 154. *See also*, DELOITTE, *supra* note 170.

¹⁷² *Id.* at 17.

¹⁷³ *Id.*

¹⁷⁴ Nick Szabo, *Smart Contracts*, (1994) unpublished manuscript, available at <http://szabo.best.vwh.net/smart.contracts.html>.

quickly developed and offer user-friendly interfaces.¹⁷⁵ Accordingly, consumers may engage in smart contracts that vary from easy daily sales to substantive investments without going through traditional intermediaries.

Technically speaking, the same concept at the basis of smart contracts applies from daily tasks like operating a mechanical soda machine to more sophisticated exchange market operations. The premise on which a smart contract is based is assuring performance.¹⁷⁶ Applicability of this mechanism to blockchain technology translates in execution of contracts based upon the occurrence or non-occurrence of specific verifiable events varying from the passage of time to sophisticated contingencies such as financial outcomes.¹⁷⁷

While smart contracts may succeed and prove valuable to private individuals' where timing and certainty of execution are key,¹⁷⁸ they may not prove successful as corporate governance tools. While smart contracts may reduce agency costs associated with debt, they would impose on corporations, and thus on boards, tight boundaries for strategic actions. As one commentator noted, the willingness of a company to enter into a smart contract in regard to a loan may be limited as it "represents a pre-commitment not to behave opportunistically in the future and it would protect a lender against fraud strategies by a debtor such as pledging the same collateral to two borrowers."¹⁷⁹ This effect may also prove legally unfeasible considering directors' fiduciary duties to shareholders as in the context of hostile takeovers and relative Revlon duties.¹⁸⁰

¹⁷⁵ See, e.g., SMARTCONTRACT, <http://about.smartcontract.com/#1-naming-and-description>.

¹⁷⁶ *Id.*

¹⁷⁷ *Id.*

¹⁷⁸ Sue McLean & Simon Deane-John, *Demystifying Blockchain and Distributed Ledger Technology – Hype or Hero?*, MORRISON FOSTER (Apr. 5, 2016), <http://www.mofo.com/~media/Files/ClientAlert/2016/04/160405Blockchain.pdf>.

¹⁷⁹ Allen, *supra* note 46.

¹⁸⁰ *Revlon, Inc. v. Mecandrews & Forbes Holdings, Inc.*, 506 A.2d 173 (Del. 1986).

Furthermore, the private nature of smart contract providers and consequent access to bankruptcy mechanisms for those providers, in addition to Bitcoin's volatility, increases the risks of market bubbles and chaos were some of the providers to fail suddenly. Accordingly, however efficient, smart contract use does not necessarily translate into corporate governance benefits warranting the risks associated with committing to a set and irreversible course of action (once a smart contract is active and the set occurrences happen, execution is automatic). Accordingly, without prior regulation of the status of smart contracts within the realm of investment instruments, companies should not engage in such transactions so as to better safeguard shareholders' interests as well as the overall company's stability. Lastly, the complete automation of execution overburdens companies' boards, thus, without a possibility to provide for "fiduciary out" mechanisms, smart contracts are not an appropriate corporate governance tool and should be left to the realm of private transactions.

IV. CONCLUSION

Bitcoin's current under-regulated status and the lack of confidence deriving from the absence of assurances derived from a centralized bank and government backing, renders use of Bitcoin as a corporate governance tool unjustifiably risky. However, the distributed ledger technology of blockchains, as distinguished from Bitcoin, can, in some fields, represent an efficient solution. During a question-and-answer session with the Commonwealth Club Chair George Scalise, Federal Reserve Chairwoman Yellen herself recognized that, while Bitcoin is not within the scope the Federal Reserve's authority,

“[Blockchain] is a very important, new technology that could have implications for the way in which transactions are handled throughout the financial system. We're looking at it in terms of its promise in some of the technologies we use ourselves and many financial institutions are looking at it. It could make a

big difference to the way in which transactions are cleared and settled in the global economy.”¹⁸¹

Chairwoman Yellen has consistently pointed out that “[blockchain] could have very significant implications for the payment system and the conduct of business.”¹⁸² Although the Federal Reserve is not currently exploring regulation, Yellen has explained that the Federal Reserve is, importantly, “trying to understand the nature” of fintech” and that she believes “innovation using these technologies could be extremely helpful and bring benefits to society.”¹⁸³ Accordingly, regardless of political views and affiliations, the blockchain represents an opportunity to be pursued.¹⁸⁴ Indeed, this article argues that blockchain technology is more suited than Bitcoin to be implemented in the realm of corporate governance because of its more reliable nature.

In regard to the registration of shares to enhance transparency of ownership and shareholders’ confidence, neither Bitcoin nor the blockchain would better the current situation. Indeed, companies may implement closed side chains to hide, at least temporarily, some transactions and thus defeat the goal of enhancing the respective managing and monitoring roles of boards and shareholders.¹⁸⁵ Furthermore, in the case of Bitcoin, its volatile value does not create trust in that transactions may be conveniently recorded during low trading value so as to allow executives to pursue self-interests and gain on the edge.¹⁸⁶ Moreover, while the blockchain may avoid this edging issue, potential shareholders’ panic may still be a problematic consequence of complete transparency.¹⁸⁷ Thus, while companies could create diversified access levels by creating different

¹⁸¹ Stan Higgins, *Fed Chair Yellen: Blockchain is an ‘Important Technology’*, COINDESK (Jan. 18, 2017 22:00), <http://www.coindesk.com/fed-yellen-blockchain-important-tech/>; For the full speech, see, Commonwealth Club, *Federal Reserve Chair Janet Yellen*, YouTube (Jan. 18, 2017), <https://www.youtube.com/watch?v=ktBgb4xHKGY>.

¹⁸² *Id.*

¹⁸³ *Id.*

¹⁸⁴ See, *above*, part II(a) for Trump’s administration embracing attitude towards Bitcoin and blockchain.

¹⁸⁵ TASCAs, *supra* note 73.

¹⁸⁶ Yermack, *supra* note 154; see *supra* pp. 293-296.

¹⁸⁷ Yermack, *supra* note 154; see *supra* p. 289.

keys, transparency, the very benefit that the technology purports to achieve would be capped at the outset similar to the status quo. Accordingly, implementation of either Bitcoin or the blockchain in this area is not warranted, as it does not enhance the current status of the SEC, and other similar, disclosures.

The arena of corporate voting is, instead, one where implementation of distributed ledgers, and possibly Bitcoin, may bring about a better corporate governance model. Indeed, in this area, the actual market value of shares is unnecessary in the computation of shareholders' voting rights.¹⁸⁸ Accordingly, the time stamping and accuracy level guaranteed by block chain technology would probably bring about a better voting system. While use of Bitcoin in this area does not pose the risks and issues it poses in areas such as transaction reporting and accounting where value is key, Bitcoin's use should, at least until further regulation is enacted, be paused in favor of block chain technology not using virtual currencies.

Accounting represents the most problematic area in which block chain or Bitcoin could be implemented within corporate governance. Bitcoin's volatile value is detrimental to implementation in at least two ways. First, fluctuations in Bitcoin's value may actually further illegal and evasive acts of boards attempting to circumvent accounting laws instead of encouraging transparent and truthful accounting.¹⁸⁹ Indeed, registering transactions at a later date would permit, through exchange rates, modification of the actual value of a company's assets and liabilities.¹⁹⁰ Second, and this applies to blockchain generally as well, this system of accounting is based on the false premise that boards are made of individuals perfectly able to withhold self-interests.¹⁹¹ Instead, managerial evasion of shareholder monitoring would still be possible, especially given the voluntary blockchain reporting mechanisms. Also, implementation of such a radically different method of accounting would result in great costs,

¹⁸⁸ Kahan & Rock, *supra* note 158.

¹⁸⁹ *Supra* pp. 293-296.

¹⁹⁰ Yermack, *supra* note 154; *see also supra* p. 294.

¹⁹¹ *Supra* p. 296.

thus, its relative benefits are not warranted, regardless of whether Bitcoin or mere distributed ledgers are used.¹⁹²

Lastly, while blockchain-based smart contracts represent an interesting evolution in the area of self-executing contracts, implementation in the corporate governance arena is not warranted because of board's fiduciary duties issues. This is so regardless of whether the smart contract is based on Bitcoin currency, though in that case, implementation would pose the added dangers deriving from value volatility and lack of supporting infrastructure discussed with regards to accounting.

Accordingly, because of its private and unpredictable nature as well as its current under-regulation, Bitcoin does not present great enough benefits to offset the risks deriving from its implementation. This is so especially in the American market and economy, which do not suffer from lack of consumer confidence in the national currency like other currencies. Instead, the block chain can achieve a progressively relevant status as a corporate governance tool. Accordingly, this paper discourages, at least in the current regulatory atmosphere, implementation of blockchain accounting and ownership reporting but does support blockchain as a corporate voting instrument aimed at ending empty voting and enhancing accuracy.

¹⁹² *Supra* p. 291.