

Testimony of Mark T. Williams¹
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Introduction

Good afternoon Chairman Sam Graves and other distinguished committee members. My name is Mark Williams and for the last 12 years I have been on the Finance faculty of Boston University where I have specialized in banking, capital markets and risk management related matters. In 2010, I wrote *Uncontrolled Risk*, a book about the fall of Lehman Brothers and what caused the 2008 real estate asset bubble www.uncontrolledrisk.com. Prior to my academic career, I was a senior executive for a Boston-based commodity-trading firm and have worked as a field examiner for the Federal Reserve Bank in San Francisco and Boston. On occasion, I have also been a consultant to small businesses.

Through my academic and work experiences I have gained a strong understanding of how the capital markets function, the role of currency, how

¹ Mark T. Williams has only a de minimis financial interest in Bitcoin and no direct investment in Bitcoin-related startups.

businesses operate and how unaddressed risks can result in financial harm.

For the last 18 months, I have closely studied, researched, and more recently written on Bitcoin, its structure and its highly-risky nature.

I appreciate the opportunity to testify today and I view this committee room as an extension of the Boston University classroom. My interest and fascination with Bitcoin started in 2011. Initially it was part of an in-class lecture, later a homework assignment, and ultimately, morphed into a full classroom debate. At that time, Bitcoin was trading for 32 cents. Over the last three years, this pseudo currency has taken on a life of its own. In 2013 its speculative value increased from \$13 to a market high of \$1,200.

Most Recent Events

One month or even one week in the Bitcoin world can be equivalent to a decade in other markets. The price risk associated with Bitcoin is extreme and unlike any other volatile commodity. Despite the dramatic rise in 2013, prices have not been a one-way space rocket to the moon. Since November 2013, Bitcoin has slid by over 60 percent to \$462.² China's decision on December 5, 2013 to prohibit its banks and money transmitters from

² Market price of \$462 on March 30, 2014 ($\$738/\$1,200$) = 62 percent.

accepting Bitcoin was the pin that has begun to prick the Bitcoin Bubble.³ On this date, the world's second largest economy warned that virtual currencies carry substantial risk.⁴ Other market disruptions have occurred. On January 19, 2014 Alibaba, the Chinese equivalent of Amazon stopped accepting Bitcoin. Two weeks later, Charlie Shrem, the Vice Chairman of the Bitcoin Foundation, located a stone throw from these Chambers, was indicted by the FBI for money laundering. Then on February 6, 2014, Russia declared the use of Bitcoin illegal stating that the Ruble was the sole official currency. That same week, Mt Gox of Japan, formerly the world's largest Bitcoin exchange, accounting for 80 percent of trading volume, announced it had been hacked, and later disclosed customer losses of more than \$400 million. The other two major exchanges, Bitstamp, located in Slovenia and BTCe, located in Bulgaria, were also impacted by this attack. The scale and scope of the Mt Gox virtual-bank heist further rattled market confidence, raising new questions about safety and the need for basic consumer protection standards. In February, cyber hackers broke into Silk Road, the defunct deep-web purveyor of illegal goods and services, stealing over \$2.7 million worth of e-coins, proving that criminals can also steal from criminals.

³ On December 4, 2013, former Federal Reserve Bank Chairman Alan Greenspan indicated publically that Bitcoin was a bubble.

⁴ China on December 5, 2013 declared that Bitcoin was not a virtual currency but a virtual commodity.

On March 11, 2014, the U.S. Financial Industry Regulatory Authority released a stern warning to investors about the dangers of buying and using virtual currencies. Shortly after, on March 24, 2014, the Internal Revenue Service dealt a further blow to Bitcoin, ruling it is not a foreign currency but should be taxed as property. This IRS ruling gives investors with a low-cost basis an added incentive to hoard coins instead of using them for transactional purposes. This further diminishes the already low level of market liquidity. Casting more doubt on the prospects of Bitcoin, on March 14, 2014, famed investor Warren Buffett stated “Stay away. Bitcoin is a mirage.” His comments supported remarks made by Charlie Munger, Vice Chairman of Berkshire Hathaway a year earlier, when Munger declared Bitcoin “rat poison.”⁵ Despite these significant market disruptions, scandals and pessimistic comments made by well-respected investors, Bitcoin promoters continue to trumpet the virtues of this volatile, nationless and anonymous currency. Some advocates have declared this period as the Bitcoin Revolution (2000s), equivalent to the early stages of the internet (1990s). Although I do not view Bitcoin as “rat poison,” this virtual currency does pose significant risks to small business owners. These risks need to be carefully

⁵ Stated on Fox Business May 6, 2013

evaluated before deciding whether or not to venture into these new, uncharted waters.

U.S. Small Business - Market Innovation

Small businesses fuel growth. Decisions by owners have broad impact. Presently, U.S. small business accounts for over half of private sector gross domestic product and employment. Since the 1970s, small businesses provide 55 percent of all jobs and 66 percent of all net new jobs. Businesses that are willing to adopt and utilize new technology, such as virtual currencies, may gain a distinct competitive advantage (e.g., cost savings, increased sales) over their competitors. However, blindly adopting technology without understanding the full risk implications can be hazardous to a company's financial health. Bitcoin is an example of new technology that has clear promise, but also poses a multitude of risks for both businesses and consumers.

In my testimony today I will not focus on the promise of virtual currencies as I will leave that to the other hearing witnesses. Instead my focus will be on the significant and currently unaddressed risks associated with Bitcoin. Sound business and regulatory decisions can only be made when

these identified risks and promised benefits are examined, and weighed against each other in the light of day.

Once the facts are fully laid out, my hope is to leave this Committee with one simple question to ponder: **what net benefits, if any, does Bitcoin actually provide to legitimate U.S. small businesses?**

How Risky is Bitcoin to Small Businesses?

This question is best summarized by looking at the disclosure statement provided by Coinbase, a San Francisco based money transmitter who is servicing an increasing number of the nation's small businesses. As part of the new account set-up process, Coinbase describes Bitcoin as a virtual currency that could drop to the price of zero. In order to fully assess the risks of Bitcoin, small business owners should take note of this particularly revealing disclosure prior to deciding whether or not to accept Bitcoin. Indeed, if the U.S. dollar carried a similar risk disclaimer, how many small business owners would be willing to use the greenback to conduct commerce?

The 10 Major Risks for U.S. Small Businesses

In determining whether to accept Bitcoin when selling goods and services or for meeting payroll or paying vendors, small business owners need to first assess these 10 major risks. If this panoply of risk is not fully understood or controlled, it has the potential of exposing a business to greater earnings uncertainty, losses and fraud.

These 10 major risks are discussed below.

1. Bitcoin Is Not Legal Tender

Small businesses need to clearly understand that Bitcoin is not legal tender. It is not created or supported by a sovereign --- it is nationless. Unlike the U.S. dollar, there are no laws that require businesses or individuals to accept Bitcoin to settle private or public debts. Bitcoin is also not backed by taxing power, ability to assemble an army, assets or other natural resources customarily owned or controlled by nation states. In contrast to legal tender, the use of Bitcoin is limited to those willing to accept it. Presently the group of Bitcoin users is minuscule relative to the U.S. population (1 million out of 317 million). Globally, these numbers are even smaller. If businesses or individuals suddenly decide not to accept it, Bitcoin will become worthless.

2. Extreme Price Risk

Since inception, Bitcoin has experienced extreme annual price volatility topping 140 percent.⁶ Bitcoin is 7 times more risky than gold and 8 times more risky than the S&P 500. Compared to currencies it is 7 times more risky than the unstable Argentinian Peso and 15 times more risky than the U.S. dollar. As a result, it could be argued that small businesses that blindly accept Bitcoin are not actually in commerce but are in the high-risk speculative trading business. In contrast to small businesses, a Wall Street trading company might be willing to assume the triple-digit price risk posed by Bitcoin but only with experienced staff, sophisticated systems, strong controls and a large balance sheet to buffer against daily price swings.



⁶ In 2009, annual volatility was approximately 160 percent. Using price data from 2010 forward from Mt Gox, Bitstamp and BTCE, annual volatility through 2014 was approximately 140 percent.

In a single day, it is not uncommon for Bitcoin prices to move by 10 percent. At current price levels, Bitcoin can drop by \$50 or more in a single day. In December 2013, in a 48-hour period, Bitcoin plummeted by 50 percent. Since the November 2013 market peak, Bitcoin prices have dropped by over 60 percent. On February 14, 2014, during a flash crash, one block of 6,000 coins fell, in seconds, by over 80 percent to \$102 before rebounding.⁷

3. Extreme Price Movements Can Quickly Erase Company Profit Margins

The profit margins of U.S. small businesses are dependent on numerous factors including the nature of the industry, competition, location, number of employees, technology employed, cost of capital and level of management skill and experience. Although net profit margins can be 10 percent or less, more profitable companies earn margins in the 15 to 20 percent range. Examples of higher profit margin professions include CPAs, chiropractors, and dentists, lawyers, portfolio managers and optometrists.⁸

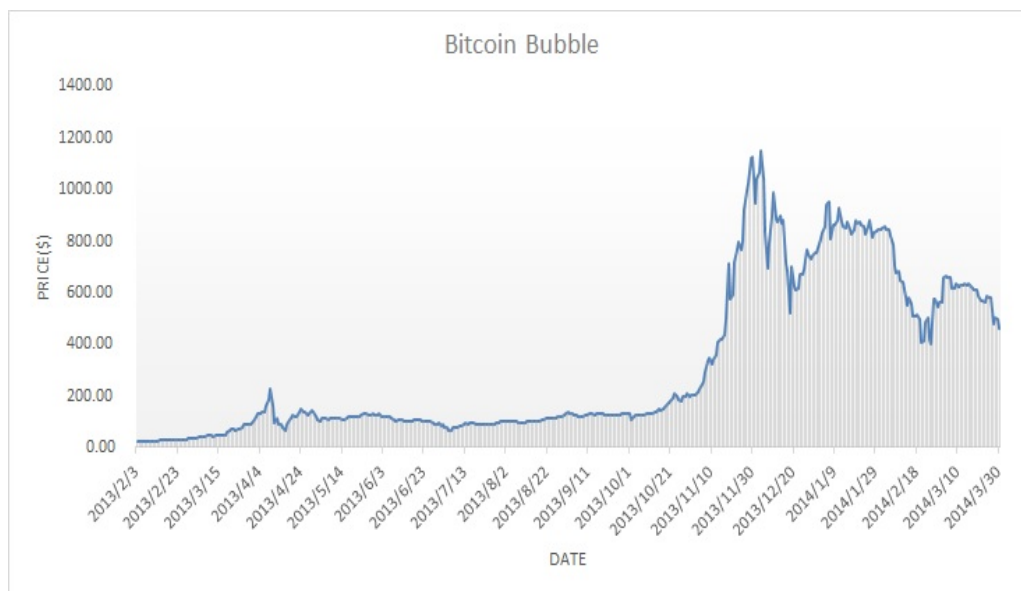
Given that the daily price movement of Bitcoin can be as high as 10 percent, a small business owner who accepts this form of payment could see profit margins reduced or completely erased in a matter of days.

⁷ Prices plunged on the BTCe to \$102 before rebounding to over \$600.

⁸ Nelson, Brett, The Most Profitable Small Businesses, Forbes, February 10th, 2011

4. Bitcoin is an Asset Bubble in the Process of Deflating

Small business owners need to be cognizant of the fact that Bitcoin prices were only \$13 at the start of 2013 and could easily drop to the same low level in the near future. In an efficient capital market, capital flows to its highest and best use as investors seek a tradeoff between desired risk and desired return. When investors receive timely, accurate and transparent information, the likelihood of an asset bubble is diminished. However, even in efficient and well-developed financial market, it is not uncommon to experience bubbles (e.g., Dotcom 2000, Real Estate 2007).



All asset bubbles are similar in that they have three phases: growth, maturity and pop. However, not all asset bubbles see prices collapse during the final phase; sometimes prices deflate over an extended period allowing

investors to experience lower losses and softer landings. Bitcoin entered the growth stage in 2011, the maturity stage in 2013 and now is in the pop stage. Since December 2013 rapid price swings continue to demand that owners watch prices on a daily and even hourly basis. If small business owners are willing to accept Bitcoin they need to stay vigilant in monitoring the high probability of a pronounced price collapse.

In December 2013, when prices were still over \$1,000, I indicated that Bitcoin could drop to \$10 or below (<http://cognoscenti.wbur.org/2013/12/05/bitcoin-currency-mark-t-williams>). This prediction was based on several observations including the underlying option value of this new and uncertain technology, price level at the start of 2013 and the percentage price drop associated with the 1637 Tulip Mania Bubble⁹. On January 24, 2014, Nobel prize-winner economist Robert Shiller stated “it is a bubble, there is no question about it... it’s just an amazing example of a bubble.” As articulated by Coinbase, as part of its new customer disclosure statement, business owners have to be prepared for the chance that Bitcoin prices could drop to zero.

⁹ The price dropped once the bubble burst was 99 percent.

5. Growing Concentration and Bankruptcy Risk to Financial Middlemen

Increasingly, small businesses, in an effort to avoid the extreme price risk of Bitcoin, are using the risk-mitigation services of Coinbase and BitPay. However, in relying on these startups, there is a growing exposure to concentration and bankruptcy risk.

Both Coinbase and BitPay, as financial middlemen, accept price risk for a fee and allow businesses to receive their most preferred currency.

Merchants are given a fixed Bitcoin conversion rate linked to a window of time. For example, BitPay provides a locked price quote for only 15 minutes.

The fee for basic entry level service is 1 percent of transaction value.¹⁰

Customers pay in Bitcoin but merchants can elect to receive U.S. dollars.

Extreme daily price swings have created a niche for Coinbase and BitPay but also have created a potentially dangerous level of industry concentration risk.

It is important to note that Coinbase and BitPay do not eliminate overall

Bitcoin price risk but simply warehouse this risk on their books. This is of

particular concern given that these two fledgling firms are lightly regulated,

thinly capitalized, and not required to operate with minimum capital

requirements. Without these important safeguards, it is uncertain what this

¹⁰ BitPay has a four tier customer structure with fees ranging as low as 1 percent of transaction value to monthly fees of up to \$3,000 for extremely large transactions.

price mitigation guarantee is really worth? Adding to this concentration risk, no derivatives market exists to off-load this significant risk.

As the number of small business customers increases, the amount of Bitcoin price-risk retained by these financial middlemen will also grow. For Coinbase or BitPay, a single-day price drop of 20 percent or a prolonged price decline on a large enough Bitcoin position could be financially devastating.¹¹

Coinbase also has multiple business lines that present an inherent conflict of interest. In offering price-risk mitigation and Bitcoin-for-sale services, Coinbase has an economic incentive to sell Bitcoin at the highest market price while customers have an economic incentive to buy Bitcoin at the lowest market price. Without strong regulatory oversight it is unclear how Coinbase effectively balances this dual and conflicted loyalty.

If these financial middlemen were to declare bankruptcy, no longer able to honor their obligations, and accounts receivable owed to merchants were not paid, such a scenario could be extremely costly.

¹¹ Since December 2013, there have been several days where daily intra and inter-day price movements have exceeded 10 percent, increasing to 15, 20 percent or more.

6. Bitcoin Exchange Bankruptcy Risk

Business owners can also sell coins and open e-wallets through Bitcoin exchanges. Since Mt Gox trading was halted on February 7th, 2014, and its subsequent bankruptcy two weeks later, the bulk of Bitcoin trading has been concentrated in the hands of two exchanges: Bitstamp and BTCe. To sell on these exchanges, U.S. small businesses must send instructions and trust that their requests will be honored. These exchanges operate under no regulation and are outside of the reach of U.S. regulators. With no regulatory oversight, it is not unusual for certain well connected buyers and sellers to gain preferential treatment in terms of price execution. Front-running is not uncommon.¹² In a weak corporate governance environment are customer funds adequately protected from internal or external fraud? In this “wild-west” atmosphere many exchanges have failed. It is estimated that of the 40 Bitcoin exchanges that have been started since the inception of Bitcoin, almost half (18) have failed.¹³ When exchanges close, customers tend to lose everything. In November 2013, GBL, based in Hong Kong, closed its doors, costing investors over \$4 million. In December 2013, the European Banking Authority also warned of the dangers of other exchanges failing and of the lack

¹² Practice of a self-interested firm executing trades in its own account after having advanced market information, sometimes trading at the detriment of the customer positions.

¹³ Moore, Tyler, Christin, Nicolas, Beware the Middleman: Empirical Analysis of Bitcoin-Exchange Risk, 2013

of investor protection laws. Should one or both of these exchanges go into bankruptcy, small businesses that store e-coins on either of these exchanges could experience substantial financial exposure.

7. Bitcoin Use Can Trigger Significant Tax Risk

Unlike legal tender, Bitcoin has been designated for tax purposes as property. This distinction is significant. Unlike legal tender, when accepting Bitcoin, business owners can be subject to additional taxes associated with the gains ---the difference in value on date received versus value on date sold.

On March 25, 2014, IRS issued a ruling that clarified the tax treatment of Bitcoin but, in doing so, created greater uncertainty about the e-coin's future. Bitcoin is now taxed as property and not as foreign currency. Any gains in Bitcoin value is taxed as ordinary income (as high as 39.6 percent) or at the capital gains (20 percent) tax rate. Given the high price run-up of Bitcoin during 2013, there are significant tax considerations which also influence the level of hoarding versus spending. If an e-coin was purchased for \$250 and it now trades for \$500, the owner is going to be less motivated to use it for transactional currency purposes, especially if doing so would trigger an additional tax event. For holders of Bitcoin, this IRS ruling reduces the incentive to use e-coins for transactional purposes, reducing transaction flow,

market liquidity and price stability. Prior to this ruling, over 90 percent of e-coins were hoarded. It is highly plausible this tax ruling will encourage even more hoarding.

Small business owners are now confronted with several other tax risks. If they decide to accept and retain Bitcoin, they will need to keep records of the market price on the day received and sold. Any increase in value from that date forward would be subject to income tax. If a merchant decided to pay its employees in Bitcoin, the firm also needs to withhold the required employment tax in U.S. dollars. Companies that pay employees in Bitcoin are also subjecting staff to increased tax risk should coins appreciate in value or if prices drop. Such a policy, given Bitcoin's extreme daily price volatility, would unfairly penalize employees.

8. Transaction Fraud Risk – Double Spending

Under Bitcoin protocol all new transactions are validated through the blockchain, a public ledger that is independently verified every 10 minutes. Validation is done to avoid a situation where a customer is able to fraudulently double-spend this e-coin. However, this 10 minute window poses potential risk should two businesses be paid with the same Bitcoin. If a double-spending incident occurred during this time gap, the last merchant to

report the transaction would have little recourse to collect on this payment.¹⁴

That merchant would then lose the value of the product or services sold. If the customer had used a credit card and not Bitcoin to commit the fraud, the business would have had recourse through the credit card company. One way merchants can attempt to mitigate this risk is by waiting until a full validation is completed before permitting customers to receive goods or services.

9. Bitcoin Slow Transaction Speed Increases Credit Risk

Credit cards such as Visa and MasterCard have higher upfront charges for small businesses; however, the transaction speed of the credit card network is superior to the existing transaction speed of Bitcoin. At point-of-sale, it still remains faster and more convenient for customers to swipe a card or input the card number on an internet e-commerce site than it is to use Bitcoin. The process of copying and pasting an e-coin alphanumeric string into another program and waiting for the confirmation is cumbersome and time-consuming. Merchants are also much more accustomed to receiving a point-of-sale credit card authorization and receipt within seconds of sale. With Bitcoin, merchants remain exposed if they deliver product or services before payment confirmation is fully verified.

¹⁴ Although the Bitcoin community has indicated that double-spending events are rare, and controls against it are strong, merchants still need to be prepared should such fraud be committed.

On the existing Bitcoin network, only 7 transactions per second can be processed compared to 2,000 transactions on the credit card network.¹⁵ If the number of Bitcoin transactions on the existing network continues to grow, and if the network is not accordingly scaled up, small businesses accepting Bitcoin could see transaction time lengthened and payment verification slowed. Although inconvenient for customers, to mitigate this risk, merchants may need to have customers wait until a transaction can be completely verified.

BitPay, a virtual currency payment facilitator provides small businesses with three speed setting to help manage the Bitcoin payment confirmation process. At the fastest speed, merchants assume total credit risk if they deliver the product in advance of receiving a completely verified payment confirmation. For small transactions like candy, coffee and newspapers this concern may be minimal. For larger transactions, the concern for credit risk may take precedence over customer inconvenience. This is especially true before retail customers are allowed to take possession of merchandise or a product is shipped from an internet-based enterprise.

¹⁵ Bitcoin advocates claim that in the future the Bitcoin payment network will be much quicker than the existing credit card network. However in 2014, transaction processing time for Bitcoin remains much slower as measured in time to confirmation.

10. Risk of E-Wallet Theft Remains High

Small business owners that decide to accept Bitcoin have to create an e-wallet, and determine whether to store it on one's own personal computer hard drive or relying on a third-party vendor such as Blockchain or Coinbase. Third-party vendors that create and hold e-wallets perform a deposit-type function. However, unlike banks, these vendors lack regulatory oversight, minimum capital standards and don't provide consumer protection against loss or theft. Once created, e-wallets generate a public and private key. Small businesses need to have strong controls in place around the storage of e-wallets and of the private key.¹⁶ This is particularly important given that Bitcoin is an anonymous currency that is irreversible once transferred.¹⁷ Bitcoin features make it an ideal target for cyber criminals. If an e-wallet is hacked and coins stolen or transferred by mistake, they are lost forever. If a computer is infected with a virus, it could wipe out the hard drive and the stored value of all e-coins.

Relying on third-party vendors also has its drawbacks, as it requires confidence that adequate controls are in place to minimize the likelihood of

¹⁶ Some businesses to gain maximum control have taken paper copies of private keys and placed them in locked boxes. E-wallets can also be taken off line. This control technique is called cold storage.

¹⁷ These secrecy features also raise the question of what business need these benefits unless they have something they want to hide.

cyber-attacks or internal employee fraud. It is not uncommon for e-wallet service providers to go out of business. This was evidenced by the dramatic and costly Mt Gox bankruptcy in February 2014. Last month, Flexcoin, a Bitcoin e-wallet bank, based in Canada also folded after being hit by a devastating cyber-attack.

Background

a) Forms of Payment

Forms of payment in commerce have evolved over many centuries including barter, shells, crude metal coins, precious metal coins, leather money, paper money, wampum, gold, gold-backed dollars, charge plates, checks, wires, credit cards, debit cards and prepaid cards. Each manifestation has occurred in response to consumer demand for more convenient ways to conduct commerce. In the process, businesses have expanded and financially benefited.

Virtual currencies, Bitcoin in particular, are being presented as the newest attempt at payment innovation. Bitcoin promoters claim it is a safer, faster and cheaper form of payment than existing forms including credit cards. These claims have yet to be fully proven.

b) Facilitating Commerce

It is widely known that businesses can increase sales by expanding the availability of customer payment options. Credit cards remain the primary form of payment used by consumers when entering brick and mortar businesses or when shopping online. Unlike cash or debit cards, credit cards facilitate greater purchasing by delivering a fast, short-term loan to consumers. In a cash only economy, businesses would not sell as many products or services, and profits would fall. Credit cards also increase impulse buying. To encourage even greater purchasing, some credit card companies establish reward programs, enhance product warranties and provide free loss/damage insurance on products purchased. In addition to credit cards, PayPal makes it convenient for customers by providing the option of quickly transferring money from either personal bank accounts or credit cards.¹⁸ PayPal has made significant inroads into e-commerce, now representing 18 percent of the market or \$315.3 million in daily payment activity.

The cost of processing plastic is higher and small businesses attempt to manage higher fees especially on smaller purchased items by imposing credit card minimums or by establishing a cash or credit card price. The average

¹⁸ The predecessor company to PayPal was founded in December 1999. On October 3, 2002, PayPal became a wholly owned subsidiary of eBay.

cost of credit card transactions to merchants ranges from 2 to 3 percent. In the last year, small businesses have also gained greater relief from credit card fees. Since January 27, 2013, U.S. merchants have been permitted to pass on to consumers a surcharge when using a credit card. Presently, few merchants have exercised this right.

Small businesses have also received meaningful fee relief when accepting debit cards. Since the Dodd Frank Act and with the adoption of the Durbin Amendment, per-swipe fees have dropped by about 50 percent to 21 cents. This cost savings of an estimated \$8 billion per year has been advantageous to small business.

c) Credit Cards Fees Come With Merchant Benefits

Credit cards have fees but with these fees come services and benefits to both merchants and customers. Consumers using credit cards are more likely to spend than those who only have cash. Business owners at point-of-sale receive instantaneous assurance that a card is valid and its owner has sufficient funds available to make a purchase. Credit card companies also work with merchants to reduce the chance of fraudulent purchases. Consumer sales are increased through the use of loyalty program, enhanced guarantees and damage insurance. As a financial middleman, credit card

companies also handle dispute resolution, gathering facts from merchants and customers. The chargeback protection (disputed purchases) also increases the likelihood of credit card use and thus a greater number of purchases.

d) Evolving Payment Landscape – Business Transactions

Currently, two-thirds of all point-of-sales transactions in the U.S. are completed either with credit, debit or gift cards. A little over twenty-five percent of sales are completed with cash and this rate is projected to decline to only 23 percent by 2017.¹⁹ Technology continues to make it easier for merchants to accept credit card transactions as older swipe machines and dedicated phone lines continue to disappear. Innovative firms such as Square, WePay and PayPal are making it more convenient to accept plastic or to make bank account direct transfers.

There is also significant growth in the use of prepaid cards. In 2013, Starbucks reported that one-third of the company's U.S. sales or \$2.5 billion was conducted through this payment method. Annually, over \$65 billion in U.S. sales is conducted through prepaid cards. This convenient and inexpensive payment method is projected to double in consumer use in the next two years.

¹⁹ Javelin Strategy & Research 2012

Most Small Businesses Don't Accept Credit Cards

Internet commerce continues to grow rapidly where the preferred payment methods are either credit card or the use of PayPal-type services. In 2013, U.S. E-commerce sales increased by 17.22 percent to \$380.6 billion accounting for 6 percent of total sales. Despite this market trend, more than half (55%) of the nation's 27 million small businesses do not accept credit cards.²⁰ Some businesses argue that credit card-related fees (2 to 3%) or PayPal fees (2.2 to 2.9%) remain too high, while other small companies prefer cash over the transparency and reporting requirements associated with the use of credit cards.

Cash-only businesses also increase the chance for tax under-reporting. The Internal Revenue Service estimated that under-reporting by small businesses represents about \$140 billion in annual uncollected taxes. It is also estimated that 56 percent of sole proprietors' cash receipts are not disclosed for tax purposes. Since 2012, the IRS has devoted more resources to address tax under-reporting by small businesses.²¹

²⁰ McClue, T.J., Why Don't More Small Businesses Accept Credit Cards, Forbes, August 16, 2013.

²¹ IRS requires payment processors to annually file form 1099-k, a record of system transaction history.

Why Small Businesses Might Utilize Bitcoin?

There are two major reasons why U.S. small businesses might either accept Bitcoin as payment and/or use it for paying employees, and vendors:

1. Illegitimate Purposes – Silk Road, the deep web purveyor of drugs, guns and prostitution, accepted payment only in Bitcoin. The FBI shutdown Silk Road in October of 2013. The Silk Road Case elevated public awareness of Bitcoin as the designer currency of choice for the criminally-inclined. The anonymous nature of Bitcoin and the fact that transactions are irreversible, make it an ideal way for criminals to launder money, buy illicit goods and avoid taxation with little chance of detection.
2. Legitimate Purposes
 - a. Gain Marketing Exposure – Bitcoin has gained increased media attention. As a result, more small businesses view accepting Bitcoin as a way to gain market exposure. Posting a sign on a door front, on a website or gaining local media coverage increases free advertising and brand awareness. For example, Grass Hill Alpacas, a Massachusetts lama farm and purveyor of wool socks,

has gained considerable visibility being an early acceptor of Bitcoin.

- b. Reduce Transaction Costs and Gain New Customers - Bitcoin represents a new possibly less expensive, private payment form to sell goods and services and possibly expanding sales by reaching new customers.

How do Small Businesses Obtain Bitcoin?

There are four legitimate ways businesses can obtain Bitcoin:

1. Buying through an exchange (BTCe) or money transmitter (e.g., Coinbase)
2. Accepting as a form of payment for goods and services
3. Receiving as a gift
4. Mining coins

To obtain Bitcoin, assuming there is no interest in mining coins, businesses first have to setup e-wallets, either through third-party vendors (e.g., Blockchain) or by storing them on the hard drive of a personal computer, which then allows for the receiving and sending of coins.

Additional Background

There are over 190 virtual currencies traded in the marketplace totaling \$6.5 billion in stated value. <http://coinmarketcap.com/mineable.html>. Of these traded e-currencies, Bitcoin, is the dominant player representing about \$6 billion or 92 percent of this total stated value.

In 2009, a programmer by the pseudonym Satoshi Nakamoto²² supposedly designed Bitcoin, a computer generated “virtual currency” produced by solving progressively complex mathematical equations.²³ The code-protocol for Bitcoin is open source, allowing it to be easily viewed, commented on and if a majority of programmers agree, changes are adopted. In this regard, Bitcoin is very transparent.²⁴ Bitcoin, the pseudo currency and Bitcoin, the low-cost payment system, are dependent on each other and are inseparable. Bitcoin is the locomotive while the payment system is the track that allows it to move back and forth. The Bitcoin infrastructure is decentralized and based on a peer-to-peer structure. Individuals in a

²² In March, Newsweek presented facts in an attempt to prove the founder is Dorian S. Nakamoto who currently lives east of Los Angeles. When confronted by reporters, Mr. Nakamoto denied having any connection with the creation of Bitcoin.

²³ Bitcoin has not been recognized by any of the G20 countries as meeting the definition of currency as it lacks price stability and does not provide a stable store of value. As a result it is a speculative virtual commodity with no tangible value.

²⁴ The Bitcoin community has argued that this open source unregulated peer-to-peer approach is a strong control as it allows a large community of computer scientists, software engineers and cryptologists to watch over the system and insure its integrity.

multitude of locations, using powerful computers to solve pre-determined equations, authenticate e-coins and help keep a general ledger of ongoing transactions. A continuous blockchain is used and maintained to record Bitcoin ownership. New transactions are authenticated every ten minutes. Unlike in credit card transactions, the peer-to-peer network was designed to eliminate the need for the financial middleman or the associated fees. These individuals verify transactions and provide the backbone control to ensure that e-coins are authentic and are not double-spent. As a reward for their efforts, they earn blocks of e-coins. This process is referred to as mining and those that do it are called miners. Interestingly, using such terminology also gives the false impression that something of tangible value is being created such as gold being mined out of the ground. Some enthusiasts have claimed that Bitcoin is gold for geeks. Initially, the entry-level barrier to become a miner was low. Overtime, this barrier has risen and those who are already mining have a competitive advantage and greater market power.

At first miners were rewarded with 50 coins per block. Initially Bitcoin prices were in pennies. More recently, a block is equal to 25 coins. The block/coin ratio will continue to halve as time goes on. It takes approximately 10 minutes to mine a block and approximately 4,000 new e-coins are

generated globally per day. Currently over 12.3 million Bitcoins have been minted and by year 2140, the 21 million limit will be reached. A preset quantity limitation creates scarcity which puts upward pressure on price. This is especially true as long as new investors can be recruited to buy newly minted e-coins. Although commodity scarcity is dictated by predetermined rules, it is unclear what mechanism or controls are in place to guarantee that rules will be followed and that incentives to cheat the system will be eliminated.

Theoretically, the Bitcoin mining and authenticity process is decentralized, keeping collusion between miners to a minimum.²⁵ As new e-coins are minted they are added to the blockchain and when trades occur, existing e-coins are authenticated against this blockchain. As more Bitcoins are mined, the blockchain grows longer in complexity and the verification time increases. In February 2014, a series of cyber-attacks occurred on the Bitcoin infrastructure, targeting three of the largest exchanges, resulting in significant trading disruption. While the integrity of the blockchain remained intact, several third-party vendors were significantly impacted. Mt Gox eventually filed bankruptcy and the other two largest exchanges, Bitstamp

²⁵ However, in practice, as prices have skyrocketed, there has been a greater economic incentive for miners to band together in pursuit of increased profits. As a result, this remains a clear weakness in the Bitcoin infrastructure.

and BTCe were immobilized for a week. During this attack, markets and Bitcoin prices suffered.