

Cryptocurrency Brings New Battles into the Currency Market

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ABSTRACT

In this paper, we concern ourselves with cryptocurrency and how cryptocurrency affects the cryptocurrency market as well as the fiat currency market. The whole topic will be separated into two sections: competition among different currencies, as well as competition among exchanges[2]. We aim at figuring out the current circumstance of cryptocurrency which as a casual visitor in the market, and additionally we will also look at the prospect of cryptocurrency and the currency market. Cryptocurrency with many new features has an uneasy development after entering into the financial market, although it is not yet powerful to compete with fiat currency, the effects of cryptocurrency and cryptocurrency exchange in financial market will still be full of meaning.

Keywords/Schlüsselworte

Cryptocurrency, Bitcoin, fiat currency, digital wallet, cryptocurrency exchanges

1. INTRODUCTION

Even though the first decentralized digital currency Bitcoin is created in 2009, it caught the interest of the mainstream media only in 2012[2]. Because of several special features cryptocurrencies are often compared to fiat currencies, hence, the first major part of this paper is to show the current developments within the cryptocurrency system, the competition within different cryptocurrencies and with fiat currencies as well. Such developments and competition may have an important impact not only on the future development of currency market but also on the success of technology innovation. In this part, we first have a look at the difference among the most important or successful cryptocurrencies and their differences. Apart from the competition among cryptocurrencies, the battle between cryptocurrency and fiat currency will also affect the financial market. Hereby the advantage and disadvantage of each currencies will be analyzed one by one, we expect that Bitcoin is the most competitive cryptocurrency, we also find that cryptocurrency is still in infancy so that it can not compete against or even replace fiat currency, and finally we figure out a conclusion. In the second major part of this paper, we move our focus to competition among cryptocurrency exchanges and competition between digital wallet and bank. The market is changing, as well as the top exchange in the cryptocurrency market, although OKCoin

seems to be the best exchange today, it is still hard to tell whether OKCoin will keep this status for a long time or not. Additionally, there are some factors which effect the competition among exchanges. Except from cryptocurrency exchange, we introduce here a new idea — the digital wallet, i.e. a wallet of digital currencies or a bank of digital currencies, where people can take control of their coins like transfer their coins overall the internet. At the end of this part, we figure out the strength of the digital wallet in comparison with bank and its present situation in the currency market.

2. BRIEF BACKGROUND OF CRYPTOCURRENCY

2.1 Definition

In Wikipedia, cryptocurrency is defined as a medium of exchange using cryptography to secure the transactions and to control the creation of new units. Cryptocurrencies are a subset of alternative currencies or specifically of digital currencies[5].

2.2 Features

The first common feature in cryptocurrency is decentralized control, which means they have no central authority[2], they are distinct from a centralized electronic money system such as Paypal. Instead, they use cryptography to control transactions, increase the supply and prevent fraud[2]. Another common feature is that transactions are publicly recorded in a ledger. An example is bitcoin, where all transactions are recorded in the block chain[5].

2.3 Brief Historical Background

The first cryptocurrency was Bitcoin(BTC), it was created in 2009 by a pseudonymous developer named Satoshi Nakamoto. One of Satoshi Nakamoto's works is the most famous article named "Bitcoin: A Peer-to-Peer Electronic Cash System". With the publication of this article, Bitcoin as the first cryptocurrency was known more and more widely.

Apart from Bitcoin, there are also many other cryptocurrencies which named altcoin altogether. For example, Namecoin(NMC), the first altcoin was created in April 2011 which was due to form a decentralized DNS to make internet censorship more difficult[1]. And soon in October 2011, Litecoin(LTC) was released and became the first successful cryptocurrency to use scrypt as its hash function rather than SHA-256[1]. Thereafter more and more different kinds of

cryptocurrency came into the market such like Peercoin(PPC), Feathercoin(FTC), Novacoin(NVC), Terracoin(TRC) and so on.

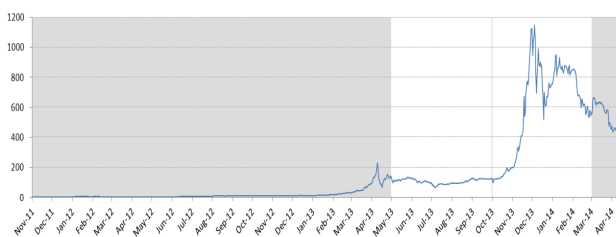


Figure 1.1 Bitcoin prices (in USD) over time. Shading highlights the first period (May–Sep 2013) and the second period (Oct 2013–Feb 2014) of our analysis.
(Source: <http://www.coindesk.com/price>)

During the development of cryptocurrency there are two significant periods (Figure 1). The first period is from 2 May 2013 to 30 September 2013, and the second period is from 1 Oct 2013 to 28 February 2014. Since May 2013, Bitcoin's price to USD had a rise, and in Oct 2013, Bitcoin's price began to skyrocket especially after the shutdown of silkroad.com. Silkroad is an online black market, where merchants are allowed to make deals using Bitcoin. After the shutdown of Silkroad, about 26 000 Bitcoins in worth of 3 200 000 Dollars are confiscated by government, and this led to reduction of the supply of Bitcoin, which causes the increase of Bitcoin's price. In Dec 2013 Bitcoin's price reached \$1,240 at the peak. In February 2014 \$350 million worth of Bitcoins were stolen from Mt.Gox which causes the loss of confidence in Bitcoin and thereafter Bitcoin's price began to fall continuously. Nowadays, Bitcoin's price to USD is around \$350/BTC[3]. Additionally, the price of Bitcoin is very volatile or unstable in the second period, some factors or events affect the price of Bitcoin in this period, for example the quick development of altcoins, or people have a new aspect on Bitcoin and so on.

3. CRYPTOCURRENCY AS A NEW COMPETITOR IN THE CURRENCY MARKET

3.1 Cryptocurrencies

In this part, we first focus on major cryptocurrencies, the brief introduction of Bitcoin, the difference of major cryptocurrencies, their features and their competitions.

3.1.1 Bitcoin

As mentioned above, Bitcoin is the first and the most successful cryptocurrency, it gains the most popularity in the cryptocurrency market and media coverage has mostly focused on Bitcoin either. Bitcoin as a leader of cryptocurrency has several features and advantages. Firstly, a bank account is not necessary. Secondly, it enables anonymous purchase. Thirdly, it wholly replaces state-backed currencies with a digital version which is tougher to forge. Bitcoin enable to cut across international boundaries, can be stored on personal hard drive instead of in a bank, and won't be easily manipulated by Federal Reserve [6].

Except these common features, Bitcoins are scarce as well, but their scarcity is algorithmic. New Bitcoins are added only by "mined", and there are also only a certain amount of Bitcoins — 21 million — can be mined, and that's why Bitcoin won't get the trouble with inflation theoretically, and people now are used to invest Bitcoins as an asset in the late period.

3.1.2 Other Major Cryptocurrencies and Difference

In fact, many of the altcoins like Litecoin and Peercoin were developed to fix the shortcomings of Bitcoin[2]. In the early period, these altcoins attract only a few users, but lately as people's view to digital coin has changed, there has been a surge in entry into the digital coin market, and since then people has begun to invest different sorts of digital currencies.

Except Bitcoin, the most successful cryptocurrency is Litecoin. It was firstly created on October 7th, 2011 and can be mined using Scrypt — another algorithm, and there are 84 million litecoins in total, that means Litecoin generates four times as many coins, and the transactions are added to the block chain four times faster than Bitcoin[2]. Such advantages make Litecoin the most competitive altcoin against Bitcoin.

Peercoin, another important altcoin. It relies on proof-of-stack in addition to proof-of-work to record transactions in the blockchain[2]. The most difference to Bitcoin or Litecoin is that Peercoin does not have a limit on the total number of coins generated[2]. So merchants do not have to worry that Peercoin will be all mined one day, but it may cause inflation which will affect the price of Peercoin as well as its store of value.

3.1.3 Competition among Cryptocurrencies

Market capitalisation values for different "coins" are quite skewed, total market capitalisation in digital currencies was approximately \$8.1 billion till 26 February 2014. Bitcoin accounts for approximately 90% of total digital currency market capitalization. Litecoin takes the second place with approximately 5% and Peercoin accounts for only 1% of total market capitalization[2]. As the interest of cryptocurrency has grown quickly especially in 2013, more new cryptocurrencies entered into the market, so the competition between different kinds of cryptocurrencies became more intense. As the article "Competition in the Currency Market" postulates, there are two motivations for the introduction of new cryptocurrencies — fixing shortcoming of Bitcoin and capitalising on potential popularity [2]. The character of cryptocurrencies is not only pure as a currency but also as financial assets. Refers to the article "Competition in the Cryptocurrency Market", it postulates that cryptocurrencies play both roles nowadays in the market and with different effects.

The first effect is the reinforcement effect. This is the result of the one-sided network-effect, which means if something becomes more popular, then more people will believe in it, and such things like Bitcoin will win the "winner-take-all", this means it always gains more and more popularity. The second effect is the substitution effect. This is the result of speculative dynamics. This means, merchants in the cryptocurrency market regard cryptocurrencies as financial assets, they invest in other cryptocurrencies than Bitcoin because of their fear of volatility of Bitcoin. They do not want to put all their eggs in one basket.

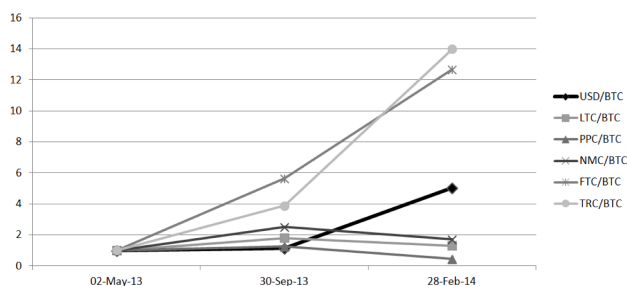


Figure 2. Changes in exchange rates of various currencies against BTC over the threshold dates in our data. Rate on 2 May 2013 is normalized to 1.

Through some data (Figure 2) we can see changes in prices which are good measures of changes in demand, and we can tell which effect is more dominant in each period.

In the first period (from 2 May 2013 to 30 September 2013), the value of all cryptocurrencies against Bitcoin increases relatively more slowly and gently in comparison with the second period. When Bitcoin becomes more valuable against USD, it also becomes more valuable against other cryptocurrencies. Additionally, Peercoin retains its value over the first period very stable, its value has hardly any significant changes against Bitcoin in the first period, and so do Litecoin and Namecoin, so we call them successful cryptocurrencies. In the second period, Feathercoin and Terracoin have significant loss in their value against Bitcoin, but at the same time, those successful coins in this period increase their value against Bitcoin, because since the second period merchants increasingly accept altcoins like Litecoin as an alternative to Bitcoin in order to reduce investment risk of Bitcoin, this means the demand of such altcoins raises more quickly than Bitcoin, so their price raises against Bitcoin as well. On the other side, such behavior of merchants also indicates that the financial function of cryptocurrencies becomes more prominent, so the substitution effect seems to be more dominant in this period.

Except from development trend of cryptocurrencies, the market capitalization is another proof of the competition among cryptocurrencies. According to the statistic of “24 Hour Volume Ranking”(on 10.12.2014)[9], we can see that Bitcoin has the most market capitalization, with 80.26%, Litecoin with 10.58% and Ripple with 3.80%. They are three major cryptocurrencies in trades with more than 90% market capitalization.

1. Bitcoin (80.26 %)

#	Source	Pair	Volume (24h)	Price	Volume (%)
1	Bitfinex	BTC/USD	\$ 7,130,960	\$ 349.56	32.52 %
2	OkCoin Intl.	BTC/USD	\$ 5,391,550	\$ 348.34	24.59 %
3	Bitstamp	BTC/USD	\$ 4,336,740	\$ 348.60	19.78 %
4	BTC-E	BTC/USD	\$ 1,906,900	\$ 344.46	8.70 %
5	LakeBTC	BTC/USD	\$ 1,590,710	\$ 351.46	7.25 %
6	Kraken	BTC/EUR	\$ 705,984	\$ 353.64	3.22 %
7	iBit	BTC/USD	\$ 329,682	\$ 350.50	1.50 %
8	BTC38	BTC/CNY	\$ 142,871	\$ 347.73	0.65 %
9	HrBTC	BTC/USD	\$ 118,531	\$ 348.95	0.54 %
10	BTC-E	BTC/RUR	\$ 97,220	\$ 346.24	0.44 %

Figure 3. “24 Hour Volume Ranking” – Bitcoin/Litecoin (Accessed on 10.12.2014) (Source: <http://coinmarketcap.com/currencies/volume/24-hour/>).

2. Litecoin (10.58 %)

#	Source	Pair	Volume (24h)	Price	Volume (%)
1	OkCoin Intl.	LTC/USD	\$ 2,047,790	\$ 3.52	70.83 %
2	BTC-E	LTC/BTC	\$ 287,866	\$ 3.51	9.96 %
3	Bitfinex	LTC/BTC	\$ 163,968	\$ 3.52	5.67 %
4	BTC-E	LTC/USD	\$ 126,989	\$ 3.46	4.39 %
5	BTC100	LTC/CNY	\$ 67,908	\$ 3.51	2.35 %
6	Bitfinex	LTC/USD	\$ 64,132	\$ 3.53	2.22 %
7	Virtex	LTC/USD	\$ 28,538	\$ 3.51	0.99 %
8	Cryptsy	LTC/BTC	\$ 21,370	\$ 3.49	0.74 %
9	HrBTC	LTC/BTC	\$ 14,369	\$ 3.53	0.50 %
10	BTC38	LTC/CNY	\$ 14,295	\$ 3.50	0.49 %
Total/Avg			\$ 2,891,060	\$ 3.52	

Figure 4. “24 Hour Volume Ranking” – Bitcoin/Litecoin (Accessed on 10.12.2014) (Source: <http://coinmarketcap.com/currencies/volume/24-hour/>).

3. Ripple (3.80 %)

#	Source	Pair	Volume (24h)	Price	Volume (%)
1	Ripple Charts	XRP/BTC	\$ 248,985	\$ 0.015510	23.99 %
2	BTC38	XRP/CNY	\$ 227,961	\$ 0.015725	21.97 %
3	Ripple Charts	XRP/JPY	\$ 216,041	\$ 0.015953	20.82 %
4	Ripple Charts	XRP/USD	\$ 205,416	\$ 0.015489	19.79 %
5	Ripple Charts	XRP/CNY	\$ 67,294	\$ 0.015498	6.48 %
6	Cryptsy	XRP/BTC	\$ 24,091	\$ 0.017117	2.32 %
7	Poloniex	XRP/BTC	\$ 17,471	\$ 0.016049	1.68 %
8	Kraken	XRP/BTC	\$ 15,739	\$ 0.016228	1.52 %
9	AllCoin	XRP/BTC	\$ 14,695	\$ 0.016049	1.42 %
10	Cryptsy	XRP/USD	\$ 84	\$ 0.016002	0.01 %
Total/Avg			\$ 1,037,778	\$ 0.015710	

Figure 5. “24 Hour Volume Ranking” – Ripple (Accessed on 10.12.2014) (Source: <http://coinmarketcap.com/currencies/volume/24-hour/>).

Although merchants accept more altcoins than ever before, Bitcoin is still no doubt their first choice, its scarcity and store of value attracts a lot of merchants. The reinforcement effect makes Bitcoin retain the largest market capitalization, and the substitution effect enables a quick development of altcoins. Under both effects the competition in the cryptocurrency market seems to be more unpredictable, maybe someday they will find a balance.

Generally, Bitcoin has an absolute superiority over other cryptocurrencies not only in price but also in market capitalization, it keeps its top position all the time, and it will probably keep this position for a very long time in the future. Even though after Mt.Gox incident, people prefer to treat Bitcoins as financial assets rather than as currencies.

3.2 Cryptocurrencies and Fiat Currencies

The appearance of cryptocurrencies, especially Bitcoin, has more or less impact on fiat currency market. On the one hand, the impact may be positive, on the other hand, it may be negative, accurately, the entry of cryptocurrencies into the market is a double-edged sword.

When Bitcoin’s value suddenly skyrocketed in 2013, people pressed forward to purchase Bitcoins. Now we wonder, if cryptocurrencies will replace fiat currencies someday. Obviously, there is no certain answer, but at least the relationship between cryptocurrencies and fiat currencies should not be ignored. At the same time, as cryptocurrencies become more and more familiar to people, the relationship between cryptocurrencies and fiat currencies will get more and more closer. At this moment, cryptocurrency as a new member enter into financial market, it seems to be a strong competitor against

fiat currencies. In my opinion, although there is competition between cryptocurrencies and fiat currencies, in general, they could also be able to coexist as mutual optimisations of one another. In another word, cryptocurrencies do not have to replace fiat currencies in order to be successful, I think the “win-win” should be the best common goal to achieve.

3.2.1 Cryptocurrency is a New Competitor

As a new competitor to fiat currency, cryptocurrency has several advantages which attract a lot of merchants at the beginning.

At first, merchants can transfer their coins directly to another person without bank or clearinghouse. This means merchants can minimize their fees in transaction. Sometimes they may pay fees with transaction to receive priority processing, but this payment is still very low. This advantage also benefits those people who do not have a bank account but want to transfer their money. The second advantage is the free payment, merchants can send and receive any amount of money anywhere in the world. No borders, no limits, efficient, merchants can be in full control of their coins. This is rather attractive for people who usually transfer money abroad. Thirdly, there are fewer risks for merchants, because cryptocurrency transactions are secure, irreversible and do not contain any users’ sensitive information, and this protects merchants from losses by fraud. Additionally, merchants can protect their money with backup and encryption, and another point, because cryptocurrency is decentralized, the price of each cryptocurrency will not be controlled or influenced by government or Federal Reserve, and cryptocurrencies do not have inflation because of its certain supply amount.

Three-Quarters of US Consumers Are Unfamiliar With Bitcoin

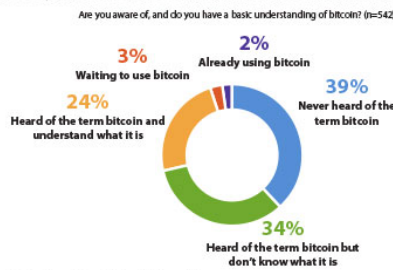


Figure 6. [4]

Geschätztes Transaktionsvolumen
Quelle: blockchain.info

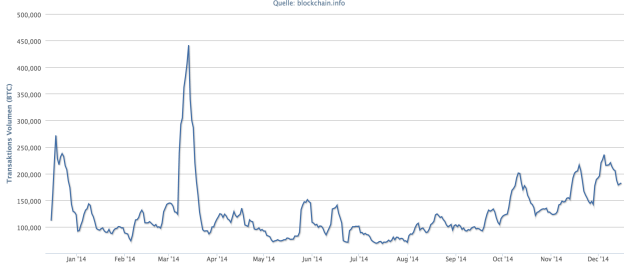


Figure 7. Estimated Transaction Volume. (Source: <https://blockchain.info/de/charts/estimated-transaction-volume>)

Except from these advantages, cryptocurrencies have disadvantages as well. There are still a lot of people unaware of cryptocurrencies, although more businesses accept them because

they want the advantages of doing so. Cryptocurrencies are not manipulated by government, but this does not mean that the price of cryptocurrencies is very stable. In contrast, cryptocurrencies are very volatile. The total amount of cryptocurrencies in circulation and the number of businesses using cryptocurrencies are still very small. Therefore, even small events, trades or business activities can significantly affect the price[14]. If the adoption increases, the volatility will reduce. Furthermore, cryptocurrencies are still in infancy, they are currently in an ongoing development with many incomplete features. The Figure 6 also shows a very low acceptance of Bitcoin, which is actually a significant weakness of Bitcoin. There are too many things like security and services have to be improved, and the cryptocurrency business is very new. In another word, it is quite risky to do business with cryptocurrency, with the risks like policy risk, legal risk, speculative risk, money laundering and so on. The shutdown of Silkroad is a sign for warn and such an event brought a very negative effect on cryptocurrencies.

During the following long-term development, there are many unpredictable risks, it may be security issue like theft or fraud, it may be regulatory from government and some policies against cryptocurrencies.

At this moment, it is rather hard to tell the prospect of cryptocurrencies or to distinguish whether cryptocurrencies will be better than fiat currencies in the future, but there is one thing for sure, that cryptocurrencies have slowly become a competitor to fiat currencies.

3.2.2 Cryptocurrencies vs. Fiat Currencies

Cryptocurrencies are now a competitor to fiat currencies no matter if they are powerful enough. Since the existence of cryptocurrencies, they affect more or less on fiat currencies.

We know that fiat currencies have inflation or deflation, and cryptocurrencies do not have such a problem, but, currency exchanges allow transaction between cryptocurrencies and fiat currencies. This means, that cryptocurrencies may break the supply-demand-balance in the fiat currency market. Moreover, the rate of trading pairs in each exchange makes difference to other exchanges, and such difference will generate arbitrage opportunities and triangular trading opportunities. This means, the merchant will buy Bitcoins on exchanges with lower rate and sell them on exchanges with higher rate, so they can earn money from the difference of rate, and these opportunities may consequently harass the balance in financial market and even exchange rate between two fiat currencies. Here arises a question whether cryptocurrencies replace fiat currencies or coexist with each other.

According to the present situation, the possibility that cryptocurrencies will replace fiat currencies will hardly appear. At first, cryptocurrencies have limitation, for instance, there are only 21 million Bitcoins. Secondly, cryptocurrencies are technology-based[15], they must be mined, so people have pretty big requirement on technology. Cryptocurrencies are complex[15], not only due to their algorithmics, but also because most people do not really understand how they work. Besides, cryptocurrencies are nowadays not pure currencies any more. Merchants treat them as well as financial assets. Merchants prefer to invest than to use. In the case of Bitcoin, there are totally about 13.5 million Bitcoins have already been

mined, but there are now only about 200,000 Bitcoin in transaction each day in December (Figure 6), the transaction volume is very low. Merchants treat cryptocurrency as financial assets more than as currency, which makes cryptocurrency seem to be like gold or silver, so that cryptocurrency will slowly lose its function as currency.

At present, Cryptocurrencies provide a new possibility for people to do their business and a new lifestyle, an easy and efficient way, but it will not replace fiat currencies, at least in a short period will not.

Coexistence is no doubt the best consequence of the battle between these two completely different kinds of currencies, both of them can play to their strengths.

Cryptocurrency can optimize fiat currency[7], this means, cryptocurrency can fix the shortcoming of fiat currency. For example, with the help of cryptocurrency, people are able to transfer their money abroad, they do not need to worry about any extra condition of banks. In another word, it will be more efficient and easier if banks can provide services such as free abroad transaction.

Fiat currency can optimize cryptocurrency as well[7]. With the help of fiat currency, the acceptance of cryptocurrency will increase more quickly. The volatility of cryptocurrency will also be improved, so that people can concern more with payment for goods and services than speculative investment.

Nothing is impossible, according to the coexistence of cryptocurrencies and fiat currencies, we look forward to a new world in a hybrid economy, where customers and merchants alike must be able to get into and out of cryptocurrency quickly, easily and securely.

3.2.3 Cryptocurrency Security

As we learn about cryptocurrency, we will find that the security is one of the most significant features. As I mentioned before, firstly, cryptocurrencies such like Bitcoin verify transactions with the same state-of-the-art encryption that is used in military and government applications. Secondly, all transactions are anonymous, nobody can get merchant's real personal information or even steal their coins in the account, and that's why theoretically the merchants should not pay attention to their cryptocurrency account. But, cryptocurrencies is still not mature enough. It is not perfect, so some people still try to break the transaction system of cryptocurrencies exchange in order to steal coins from other people. It was revealed in February 2014 that more than \$350 million worth of Bitcoins were stolen from Mt.Gox which led to the shutdown of this exchange! After this event, the price of Bitcoin felt from more than 800\$ in January down to 577.52\$ at the end of February. Because of this event, the merchants of cryptocurrencies reconsider about the security of cryptocurrencies and exchanges, and exactly since then people begun to treat Bitcoin as assets more than as currencies. The Mt.Gox incident led to loss of merchant's confidence in cryptocurrencies, and such serious consequences indicate that the Mt.Gox incident caused irreparable harm to the credibility of the entire Bitcoin system.

All of above, the security of cryptocurrency is not so stable as people thought before, it still needs to be improved. It seems that cryptocurrencies slowly lose their strengths compare to fiat

currency and this is also one of the reasons why cryptocurrency cannot really replace fiat currency.

4. COMPETITION IN CURRENCY EXCHANGE

Bitcoin is the largest cryptocurrency in market capitalisation, volume, acceptance and notoriety, but it's not the most valuable coin. Litecoin takes the second place after Bitcoin[1]. But since the Mt.Gox incident and the shutdown of Silkroad, the prospect of Bitcoin does not seem to be very optimistic. Many alternatives to Bitcoin suddenly appeared in the meantime and several new exchanges entered the market at the same time as well, hence the competition not only between cryptocurrencies but also between currency exchanges became much more intense than ever before.

Until mid-2013, Mt.Gox was the dominant exchange and by November 2013, it was still an important player with 27% of the trade, but it is no longer a dominant exchange. That means some other exchanges sprung up, for example, BTCChina, with 35% of the trades, Bitstamp, with 24% of the trade, and BTC-e, with 14% of the trade[2]. Because cryptocurrencies can be exchanged into different fiat currencies on each different exchange, apart from competition between different cryptocurrencies, there is also competition between different fiat currencies, and sometimes it seems that merchants may have arbitrage opportunities due to such differences.

In this chapter, we are mainly concerned with the competition between different exchanges and the competition between cryptocurrency wallets and bank.

4.1 Competition among Different Exchanges

As I mentioned before, since Mt.Gox ceased operations, in large part due to a security breach — and a huge loss of Bitcoins, a large number of new exchanges appeared in the market and a large percentage of trade occurred at those new exchanges like BTCChina, OKCoin. In this chapter, we look at the competition among different exchanges after the Mt.Gox incident as well as factors which may influence such competition. Here, we only observe the data on 10.12.2014.

4.1.1 Competition in the Bitcoin Market

In the case of trades involving BTC, the following figure[9]

Name	Last Update	Trading Pairs	Total Volume	Logarithmic
BTCChina	2 min, 37 sec	2	168,959.56 BTC	
Bitfinex	5 min, 11 sec	6	20,789.19 BTC	
OKCoin	11 min, 7 sec	4	19,969.77 BTC	
Bitstamp	4 min, 15 sec	1	12,111.22 BTC	
BTC-e	1 min, 38 sec	23	7,108.91 BTC	
CEX.IO	10 min, 25 sec	7	3,431.53 BTC	
Kraken	1 min, 29 sec	29	1,912.27 BTC	
BTC38	7 min, 46 sec	51	1,867.49 BTC	
Bter	2 min, 47 sec	170	910.50 BTC	
hitbtc	7 min, 18 sec	20	542.04 BTC	
Bitfinex	4 min, 19 sec	970	474.77 BTC	
Cryptsy	1 min, 8 sec	482	455.50 BTC	
EXMO	5 min, 45 sec	29	396.98 BTC	
Poloniex	11 min, 25 sec	288	363.06 BTC	
C-Cex	0 sec	658	348.34 BTC	
VirWox	246 days, 29 min, 37 sec	1	247.95 BTC	
Bitfury	6 min, 1 sec	478	221.80 BTC	

Figure 8. Cryptocurrency Exchange / Markets List
(Accessed on 10.12.2014) (Source:
<http://www.cryptocoincharts.info/markets/info>).

shows the current ranking in trades of Bitcoin. We can see that in 24 hours, BTCChina gains the most total volume with 168,959.56 BTC, Bitfinex takes the second place with 20,789.19 BTC, the third is OKCoin with 19,969.77 BTC, the fourth and the fifth are Bitstamp with 12,111.22 BTC and BTC-e with 7,108.91 BTC. These five exchanges hold the most current Bitcoin capitalisation in the market, the other exchanges are active in the market as well, but the volume traded is extremely small. That means, the competition is mainly occurred among these five exchanges. Because each of these exchanges has different trading pairs, it is difficult to compare these exchanges very exactly. In the following part of this subchapter we will consider more details of cryptocurrency exchanges within one trading pair.

In the case of trades involving BTC and the USD (Figure 3), by mid-December 2014 there are three major exchanges: Bitfinex, OKCoin, and Bitstamp. Bitfinex has about 32.52% of the volume and in value of \$ 7,130,960 for the currency pair BTC/USD, while OKCoin has about 24.59% of the volume in value of \$ 5,391,550 and Bitstamp has about 19.78% of the volume in value of \$ 4,336,740 for this currency pair. These three current major exchanges occupy more than 70% of the total volume in trades of BTC and the USD, and their total trading volume reaches the worth of \$ 16,859,250. Additionally, if we look at the ranking by mid-February 2014, BTC-e was the first of three major exchanges and Bitfinex took only the third place at that time, but now BTC-e takes only the fourth place on the ranking with 8.70% of the volume. Such a quick change indicates that the cryptocurrency market is always keeping changing, the strength and potential of each exchange should not be underestimated no matter how extremely small its volume was treaded before. The competition among three major exchanges is still very intense due to their tiny difference of volume.

Apart from the USD, the only global currency, Chinese yuan also takes an important role in the financial market nowadays. Especially after the Mt.Gox incident, a large percentage of trade occurred at two exchanges in China: BTCChina and OKCoin. BTCChina and OKCoin are two major cryptocurrency exchanges in trade of BTC/CNY, and there are still a little difference between BTCChina and OKCoin, BTCChina only allows the Chinese yuan as the only fiat currency, but OKCoin allows both Chinese yuan and US dollar as fiat currencies. In Chinese market, on December 2013 the People's Bank of China announced banning financial institutions from processing transactions in Bitcoin, the once-dominant BTCChina lost a lot of volume and the price of Bitcoin fell by more than half, in contrast, the initially small exchange OKCoin gained a lot of volume[10] because it allows the transaction with USD. Even though the BTCChina is still the largest Bitcoin exchange in China, and OKCoin is still the most powerful competitor. In the recent 24 hours (on 10.12.2014), BTCChina has already treaded 168,959.56 BTC but OKCoin has very little trading volume for BTC/CNY.

At last, the case of BTC/EUR should be considered about as well, although Euro does not play such an important role as US dollar and Chinese yuan plays, it still has a significant percentage of trade at most exchanges. Comparing to US dollar and Chinese yuan, Euro has a relative small percentage in the Bitcoin market, the largest exchange which allows Euro as fiat

currency in trade is Kraken, and it has about 3.28 % of the volume and in worth of \$ 600,329 for currency pair BTC/EUR. The second largest exchange in trade of BTC/EUR is itBit with only about 0.23% volume for this currency pair. The competition for trading pair BTC/EUR seems less intense than for other two major trading pairs.

4.1.2 Competition in the Litecoin Market

The data of Bitcoin market alone may be not convincing enough, so in this subchapter we will look at the data of Litecoin market as a represent market of altcoin market.

In the Litecoin market, there is much less trading volume than in the Bitcoin market. Among those exchanges (Figure 4), we observe that OKCoin has the largest trading volume with \$ 2,047,790 for the trading pair LTC/USD and has about 70.83% of the total volume in the Litecoin market. The following exchange is BTC-e. which has \$ 287,866 worth trading volume, and it has only about 9.96% of the total volume in the Litecoin market. Obviously, OKCoin has an absolute position in the Litecoin market. I think there will not be any other exchanges in the Litecoin market which could surpass OKCoin temporarily.

4.1.3 Influence Factors in the Competition among Exchanges

Through all the data above, we can find that OKCoin has a very strong competitiveness in both Bitcoin market and Litecoin market, and the major exchanges have usually more than 70% of the volume or even more in each cryptocurrency market. This means the difference of trading volume between major exchanges and other exchanges is quite large. Given these data and discoveries, the question arises why the difference is so large or what the reason is.

In my opinion, the first reason may be the motivation of arbitrage, the profitable opportunities from trading the same pair of currencies on two different exchanges, because the prices of the same cryptocurrency on different exchanges is different. There are tests for trading opportunities across exchanges[2], which examine potential trades involving USD/BTC and compare the exchange rate between the USD and BTC on BTC-e and Bitstamp, the former largest exchange trading BTC/USD. The result of these tests shows that on most days, Bitcoin was cheaper on BTC-e than on Bitstamp, and on half of the days, the difference in prices would yield more than 2% gain[2]. Apart from this result, the data of these tests also shows that for 5% of the day the prices at midnight on these two exchanges were different by more than 4%[2]. These tests examine trading opportunities for Litecoin as well. Finally, all the data suggest that gross trading opportunities were much greater across exchanges than within exchanges.

The second reason may due to the presence of "winner take all" effect. This means, the more volume traded within one exchange, the more safer and reliable this exchange will be, and the more merchants will exchange their currencies on this exchange.

Besides these two reasons which refer to the market itself, there are also some causes due to intervention of government. The reduction of Bitcoin trading volume on BTCChina on 5 December 2013 is an example of such a case. Although cryptocurrencies are decentralized currencies, the attitude of government could still have impact on their trading volume and

even their prospective development. This kind of situation may be more obvious and easier in China, because there's just one government entity to deal with rather than the collection of state and federal agencies in the U.S.

Taken all, different price, different security and different reaction of government may be three main factors which have the most impact on currency exchanges and the competition among them.

4.1.4 Prospect of Cryptocurrency Exchanges

All in all, among these exchanges, OKCoin seems to be the most competitive cryptocurrency exchange not only in the US dollar market but also in the Chinese yuan market. It's high percentage of volume in both markets ensures its top position in cryptocurrency market. From my point of view, OKCoin will be a leader among cryptocurrency exchanges, at least in a short-term future.

After observing different performances of cryptocurrency exchanges, most cryptocurrency exchanges put much more focus on US dollar market than on any other currency markets. There is no doubt that US dollar is the most powerful fiat currency in cryptocurrency market, but focusing only on US dollar market may restrict the expand of cryptocurrencies and cause potential loss of users and opportunities, so I think some exchanges should allow more fiat currencies in transaction and this will be also helpful to expand acceptance and to gain more popularity.

Additionally, many exchanges have a limited number of cryptocurrencies which are allowed in trade. Maybe it benefits increase in volume of transaction of target cryptocurrencies or it may be easier to control all the transaction within this exchange, but more currencies bring more opportunities.

However, no matter how many currencies are allowed in transaction within each exchange, from the perspective of development, I think there are two main points which should be concerned with: security and popularity. Since Paypal and Microsoft build partnerships with Bitpay and Coinbase, cryptocurrencies have here a giant leap into the mainstream financial market and therefore have a better prospect than ever before.

With the support from enterprises and cryptocurrency merchants, with a better improvement in security, cryptocurrency exchange will find its new position in financial market.

4.2 Competition Between Digital Wallet and Bank

Once cryptocurrencies appeared in the market, some medias released articles which expressed the doubt about cryptocurrency exchanges or the worry about the future of bank. In this section, we investigate the competition between cryptocurrency wallets and banks. We will compare the advantages and disadvantages of both cryptocurrency wallets and banks, especially the risks in cryptocurrency wallets.

4.2.1 Digital Wallet or Bank?

What is digital wallet? There is on exact definition of digital wallet, but on the webpage www.blockchain.info/wallet there is a vivid subtitle of digital wallet: Be your own bank. As the name

suggests, digital wallet is another kind of bank. Merchants and sellers can trade their currencies using this wallet. At this moment, there are two different kinds of wallet, the first one is a local wallet, in which people can store their coins locally on the computer or template, for example, Bitcoin Core. The second one is an online wallet where people can store their coins online, and such kind of wallet is more like online banking, for example, Green Address. The current biggest Bitcoin wallet is coinbase. Due to the large amount of cryptocurrencies, we only observe Bitcoin wallet in this section.

As an emerge product, Bitcoin wallet has several advantages which attract a lot of cryptocurrency merchants and sellers. At first, there is no additional transaction fee using Bitcoin wallet, this means using Bitcoin wallet can minimize the extra fee which is usually paid to bank. Secondly, transaction using Bitcoin wallet is very quick and easy, for example, people can send Bitcoins via email, SMS and even Facebook. Thirdly, it is safe to use wallet, because people can store their coins locally so that your wallet won't be stolen easily. Fourthly, using Bitcoin wallet enable transactions world wide, a borderless transaction. There is no reversible transaction using Bitcoin wallet.

As the transaction volume of Bitcoin is getting more and the use range of Bitcoin is getting wider, users can purchase most things such as books, foods, games, servers with cryptocurrencies. It seems that Bitcoin has a optimistic prospect, but it still has several flaws and some of them are even so fatal, that Bitcoin wallet does not have enough power to compete with banks.

The question, about which the users of Bitcoin wallet care at most is no doubt the security of Bitcoin wallet. Today, the security of Bitcoin wallet is still further less than banks. Banks have nowadays rather stable, safe and mature online banking system, but the online Bitcoin wallet is still in infancy. On 2 July 2013, an online Bitcoin wallet named Input.io was stolen by a hacker, and it lost about 4100 Bitcoin in worth of \$ 1.4 millions. Analogous also happened several times on other online Bitcoin wallets. Recently, after a system update of the world's largest Bitcoin exchanges and Bitcoin wallet provider — Blockchain.info lost some of their client's wallets and information[12]. In one word, Bitcoin wallet users have to continue concerning with their security risks.

Of course, there are some others factors which limit the competitiveness of Bitcoin wallets as well, for example, the reaction of government, and new changes in the financial market. A few days ago, one of the most popular ways for users to buy and sell bitcoins — localbitcoin.com has announced on Twitter that it will be no longer available in Germany due to regulatory reason[13].

Besides, the acceptance of Bitcoin has also impact on Bitcoin wallet, in the initial period, the acceptance of Bitcoin was very low, hence the Bitcoin wallet had hardly power, but now this situation is turning better, Bitcoin gains more popularity today and even Paypal, one of the biggest currency transaction system accepts Bitcoin. Since this September, Paypal took its first venture into the world of all-digital money, this means merchants can now start accepting Bitcoin as payment[11], and I think, such a behaviour of Paypal may

accelerate the acceptance of Bitcoin, especially on eBay, that could be also helpful for Bitcoin wallet.

In comparison with Bitcoin wallet, bank may be threatened by Bitcoin wallet but it still has absolute advantage against Bitcoin wallet, like its absolute high acceptance, its security, and people can get interests when they put their money in bank. Merchants can do much more business through banks than using Bitcoin wallet.

Unfortunately, since a serious financial crises, the trust between people and banks becomes weaker, some people do not trust central bank any more, in another word, the crisis of confidence is the most urgent issue which banks are facing now. Such a crisis can help cryptocurrencies and digital wallet to get more benefits and to gain more popularity.

Generally, the advantage of banks is much greater than the disadvantage of banks, people are used to own a bank account or even more, and it is too hard to change the way people used to behave.

All of above, we observe that the competition between Bitcoin wallet and bank is still not so obvious or intense currently, the number of users is growing but still much lower than the number of bank account holders, and the development of digital wallet is surely being influenced by the development of cryptocurrencies. At the same time, banks have also urgent issues which need to be solved. The world is changing, thus the trend of Bitcoin wallet should not be underestimated by banks.

5. CONCLUSION

After a five-year-development, cryptocurrency has experienced ups and downs, it may have a large long-term effect on both currency and payment systems or bank, but these cryptocurrencies are currently still in their infancy, there are still a lot improvements need to be done, and there are still lots of difficulties which have to be overcome.

There are two important periods within the development of Bitcoin: May-September 2013 and October 2013-February 2014. In the first period, Bitcoin's price was relatively stable, while in the second period it was very volatile.

The anonymity and P2P transaction brings benefits as well as troubles, although cryptocurrency is decentralized, the regulatory of government influenced its development and the competition against fiat currency. In the view of the existing condition, Bitcoin maintains the dominant position in the competition against other cryptocurrencies, but if it compares to fiat currency, Bitcoin has only a few power. Cryptocurrency can not replace fiat currency right now, and it does not need to replace currency too. When money becomes data, the better solution for both cryptocurrency and fiat currency should be hybrid economy, that both kinds of currencies can play to their strengths and optimize each other.

In the competition among cryptocurrency exchanges, OKCoin has a top position not only in the Bitcoin market but also in the Litecoin market. China is now one of the biggest market for cryptocurrency, the transaction of BTCChina is the best prove. Although US dollar has a dominant position in trade with cryptocurrency, the potential of other currencies like Chinese yuan and euro should not be underestimated. In addition, through the comparison of digital wallet and bank, we

observe that the digital wallet is still not very competitive against bank or other payment systems, it has potential to improve and to make progresses.

Clearly, cryptocurrency and its exchange have optimistic prospect yet. As more and more payment systems such as Paypal support the payment with cryptocurrencies, and if cryptocurrency can make itself more user-friendly, it will have a better development, and as the adoption of cryptocurrency increases, its volatility may have significant improvement. In the long-term, it is not sure whether the advantages of cryptocurrency will be sufficient to gain more volume of the financial market and have a good cooperation with fiat currency and payment systems, but we look forward that someday it is able to change and improve our lifestyle as a model for other technology innovations.

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