“Why Will Bitcoin Destroy Order in International Finance?”

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Econ 4432W
Final Draft
May 6, 2015

ABSTRACT

Ever since Bitcoin was introduced to the world, there have been many affects Bitcoin caused in the global economic market. Exchange Rate, The Purchasing Power Parity theory, and Money Market theory will be used to specify the negative influences Bitcoin has on international finance and analyze the cause of the global Exchange Rate War, an international action that countries take to keep their exchange rate lower artificially to maintain competitiveness in exporting amongst many countries. The background before the appearance of Bitcoin will be discussed broadly to illustrate why the utilization of Bitcoin will be not suitable in financial systems.

I. Introduction

Bitcoin, introduced in 2009, is the most sophisticated and daring digital money human beings have ever made. Bitcoin offers anonymity through encrypt-transaction and a reliable decentralized transaction system. However, the digital currency has a money supply system that prompt speculations and worry over the legal position of the currency as assets. It is not guaranteed that Bitcoin will subsist in the future, but it is valid to say that any form of digital currency will be significantly successful in the future since there is continual demand for online virtual currency and enough technology to satisfy the demand. Thus, the digital currency provokes the monopoly central governments have on issuing currency. In the settlement process of the digital currency, it is impossible to keep complete transaction anonymity and to avoid random political intervention, which Bitcoin seeks. Therefore, Bitcoin still has critical problems to be considered as fiat money and the economically powerful nations, such as the United Kingdom, the United States, China, and so on, use this currency as their advantageous weapon in this period of the exchange rate wars.

This paper begins with a discussion of the economics terms; Purchasing Power Parity and Money Market Theory. The gravity of the usage of Bitcoin in the exchange rate war between the United States and China will be explained by utilizing those terms. It will also explore the reason why the exchange rate war between the U.S. and China started and describe the relationship between exchange rate and Bitcoin. The consequences of the utilization of Bitcoin and how it negatively affects the international finance will be examined as a result.

II. Purchasing Power Parity Theory

The definition of the Absolute Purchasing Power Parity (PPP) is that the exchange rates between two countries are in equilibrium when their purchasing power is at the same level. In other words, both of the exchange rates should equal to the ratio of both countries' price levels of a fixed basket of goods. Therefore, if a domestic price level in a country increases, exchange rate of that country depreciate in order to return to the PPP. This is the absolute PPP and its equation is defined below:

$$E_{H/F} = P_H / P_F \qquad (1)$$

In the Equation (1), the H variable stands for home country and the F variable stands for foreign country. In addition, $E_{H/F}$ represents home country's exchange rate compared to the foreign country. P_H represents a price level of home country, and P_F represents a price level of foreign country.

Relative PPP describes the rates of changes of the price level, which is the equivalent of inflation rates. In other words, the rate of appreciation of a currency is the same as the difference in inflation rates between home country and foreign country. Relative PPP is derived from Absolute PPP If we assume that the equation of absolute PPP is true for levels of exchange rates and prices, then it is also true in rates of change:

$$E_{H/F} = P_H / P_F$$

$$\frac{\Delta E_{H/F,t}}{E_{H/F,t}} = \frac{E_{H/F,t+1} - E_{H/F,t}}{E_{H/F,t}}$$

$$\frac{\Delta P_{H,t}}{P_{H,t}} - \frac{\Delta P_{F,t}}{P_{F,t}} = \left(\frac{P_{H,t+1}}{P_{H,t}}\right) - \left(\frac{P_{F,t+1}}{P_{F,t}}\right)$$

$$\frac{\Delta E_{H/F,t}}{E_{H/F,t}} = \pi_{H,t} - \pi_{F,t} \qquad (2)$$

Thus, Equation (2) is the Relative PPP, meaning that the rate of depreciation of the exchange rate is same as the inflation differential. Hence, the PPP theory states that price levels in different countries and exchange rates are related to the rates of inflation change. The PPP illustrates how the two different nations' exchange rates affect the price level of a product. Therefore, the relationship between those exchange rates and price levels influences the two different countries' inflation change. The difference between two countries' inflation rate will be related to their economy. In general, some positive number is considered as good in economy, but huge number of inflation rate will be related to a country's bad economy.

III. Money Market Theory

In order to understand, we need to explore the supply of money and the demand for money. The supply of money increases if the central bank issues a currency. The central bank controls the money supply using interest rate polices. The demand for money, known as quantity theory, states that amount of transactions is proportional to the nominal income in dollar;

$$M^d = (P \times Y) \times \bar{L} \qquad (3)$$

where M^d represents the demand for money, P represents a price, and Y represents an income. Moreover, $\bar{L}$ represents a constant number in terms of supply of money,

so that $(P \times Y)$ represents a nominal income. Hence, the demand for money must equal the supply of money. By rewriting the equation (3), thus;

$$\frac{M^d}{P} = Y \times \bar{L} \qquad (4)$$

where left-hand side represents the demand for real money. Therefore, the demand for real money equals to a constant times by the real income level. In the long run, prices are not sticky. Therefore, prices adjust to equal the demand of real money to the supply of money. If we solve the equation (3) for the price level, then;

$$P = \frac{M}{Y \times \bar{L}} \qquad (5)$$

Equation (5) represents the fundamental equation for the monetary model for the price level, and it expresses that the price level P is the ratio of nominal money supplied M to nominal money demanded (LY). Thus, we can conclude that prices rise if there is more money chasing fewer goods. Recall that equation (1), PPP, states the relationship between the price level and exchange rates. If we plug equation (5) into equation (1), then we get the Fundamental equation for the monetary model of the exchange rate;

$$E_{H/F} = P_H/P_F = \frac{\frac{M_H}{\bar{L}_H \times Y_H}}{\frac{M_F}{\bar{L}_F \times Y_F}} = \frac{(M_H/M_F)}{(\bar{L}_H Y_H/\bar{L}_F Y_F)} \qquad (6)$$

$$E_{H/F} = \frac{(M_H/M_F)}{(\bar{L}_H Y_H/\bar{L}_F Y_F)} \qquad (7)$$

The equation (7) can be also expressed in terms of fates of change. Suppose growth rate for money supply M is μ. Growth rates basically are expressed as the difference between present value and past value divide by past value, then the numerator in the equation (7) can be;

$$\mu_{H,t} = \frac{M_{H,t+1} - M_{H,t}}{M_{H,t}} \quad (8)$$

The equation (8) represents the rate of money supply growth in a home country. Now, let the growth rate of real income Y be g. In the same vein in equation (8), the denominator in the equation (7) can be;

$$g_{H,t} = \frac{Y_{H,t+1} - Y_{H,t}}{Y_{H,t}} \quad (9)$$

The equation (9) represents the rate of real output growth in a home country.
We substitute equation (8) and (9) into the equation (5), price level equation, then;

$$P_{H} = \frac{M_H}{L_H \times Y_H}$$

$$\pi_{H,t} = \mu_{H,t} - g_{H,t} \quad (10)$$

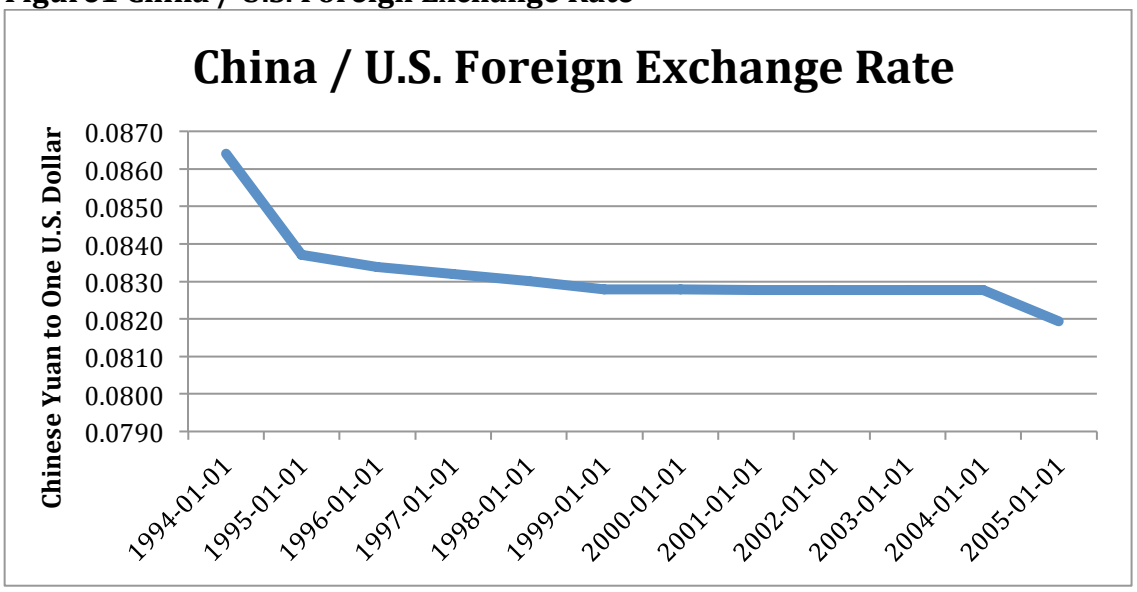
Therefore, equation (10) represents that inflation equals to the excess of money growth over real output growth.

Therefore, the Money Market Theory shows that if the money supply has large number and the growth rate of real income Y stays same, the inflation rate will be larger.

IV. Exchange rate War

The exchange rate war between the U.S. and China started almost two decade ago. China government unified its dual exchange rates, also known as official rates and swap center rates, and created a socialist market economy in 1994 (*Economist*). Although the official rates decreased, most (about four fifths) of the Chinese foreign trade rate remained untouched. China maintained the fixed RMB[1] rate of 8.28 RMB/$ from 1998 to 2005. While other neighboring countries devalued their exchange rate, China has kept it fixed. China was applauded by many others due to this after the East Asia Crisis[2].

Figure1 China / U.S. Foreign Exchange Rate



Source: Board of Governors of the Federal Reserve System (US)

[1] RMB stands for Renminbi. RMB is the official currency of China.

[2] East Asia Crises is a series of currency devaluations in Asia. So the currency market failed. Thus, the countries had helped by International Monetary Fund and World Bank.

As demonstrated in the numerical graph above, the Chinese Yuan to U.S. Dollar exchange rate stays constant in the period between 1998 and 2005. However, the U.S. started to push the Chinese government to reevaluate the stationary exchange rate in 2003. The Treasury Secretary of the United States, Jon Snow, even pressured China by talking about the RMB issues in the Treasury Report (*Forbes*.) Moreover, Senators Schumer and Graham even proposed to establish 27.5% tariffs against all Chinese products if China does not agree to revalue its currency in 2005 (*New York Times*). These actions were taken because of America's economic depression.

When the United States was suffering from recessions, China was having its economic boom. In order to improve its economy, the U.S. had to sell its domestic products to China. However, the prices of U.S's products in China were higher because of the dollar appreciation. Consequently, President Obama criticized China's currency policy at G20 Summit in Seoul in November 8, 2010 (*New York Times*). In other words, the U.S. government called for the appreciation of the RMB. China knew that the appreciation would affect its economy negatively and massively, based on the Japan's example of Yen/Dollar Agreement[3] in 1984 and Plaza Accord[4] in 1985. In the Japan's case, Japan used to be one of the great economic powers for the last 30 years, but has only averaged about 1 percent real GDP growth after 1990.

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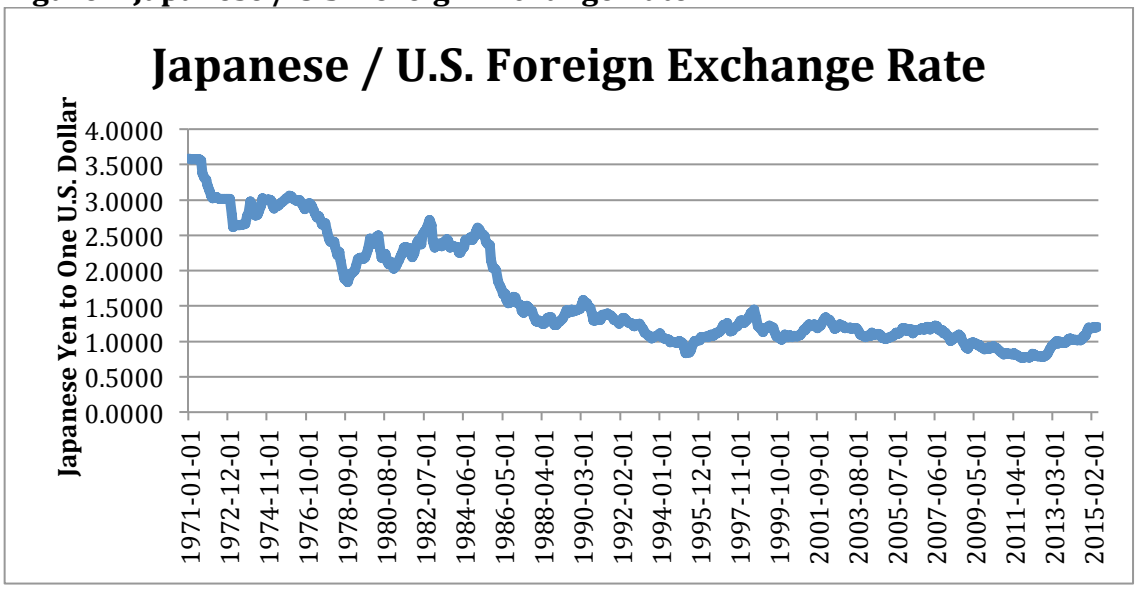
[3] Yen/Dollar Agreement is an agreement between U.S. government and Japanese government in 1984. Its purpose was to allow the Japanese undervalued yen to appreciate.

[4] Plaza Accord is an agreement among the G-5 nations (U.S., U.K., France, Germany, and Japan) to influence U.S. dollar exchange rate depreciated to Japanese yen and German deutsche mark to adjust the trade imbalance between the U.S. and Japan and the U.S. and Germany.

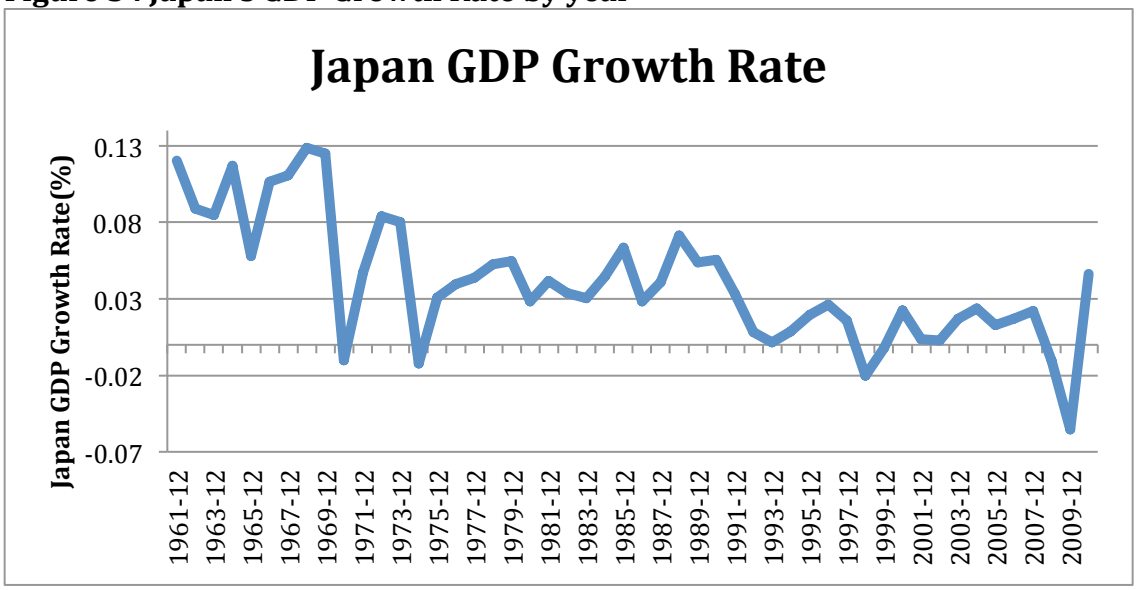
Many economists portray how the Yen appreciation negatively influenced Japan's potential growth, since other powerful countries had no problem successfully developing their economy. As a result, the Japanese economy's size today is similar to its size in the early 1990s. This circumstance is called Japan's Lost Decades.

Figure 2 Japanese / U.S. Foreign Exchange Rate



Source: Board of Governors of the Federal Reserve System (US)

Figure 3 : Japan's GDP Growth Rate by year

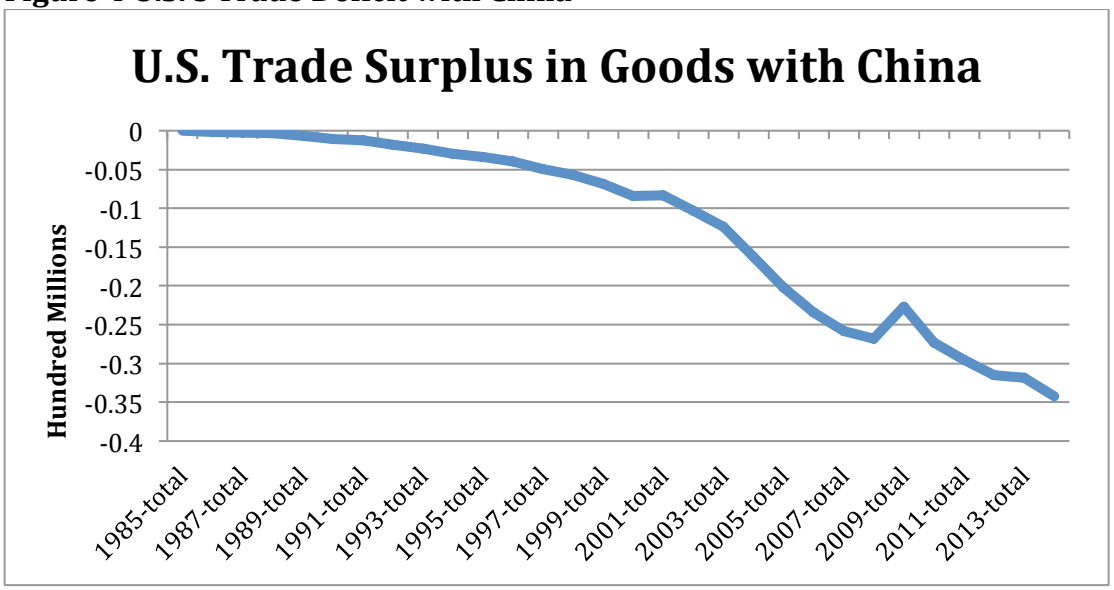


Source: World Bank

The two numerical graphs above demonstrate that the Japanese yen has appreciated; its GDP growth has averaged around 1 percent after 1980s. Therefore, since Japan experienced a bad effect from appreciation of yen in its economy, China takes this as a lesson of what not to do.

Furthermore, U.S. has recorded deficit in the trade with China since 1985. Therefore, the U.S. wants to record surplus, especially in this recession period.

Figure 4 U.S.'s Trade Deficit with China



Source: United States Census

Figure 4 describes that the trade surplus between the U.S. and China since 1985. Therefore, the way the U.S. dominates the trade surplus in advance is the appreciation of China's currency, or evaluating the currency higher in the market.

V. Appearance of Bitcoin

In this time era, Bitcoin came into light. Bitcoin is a virtual currency that limits its volume so that no one can control it. This currency provides foreign

exchange services online. According to The Wall Street Journal, Federal Reserve chairman Ben Bernanke indicated his positive position to Senators that Bitcoin "may hold long-term promise, particularly if the innovations promote a faster, more secure and more efficient payment system" at the congressional hearing on virtual currencies in the Homeland Security and Governmental Affairs Committee (H.S.G.A.C) in 2013. Since Bernanke spoke about Bitcoin in public as a post-currency, next key currency, the aftermath of the Bitcoin is no longer the post-currency. It became the official money used in international trade. Bitcoin has its own exchange rate, called a Bitcoin rate.

Table1: Statistic of Sale, Purchase, and Volume between the U.S. and China

Market	One Bitcoin Rate to CNY (Yuan)	One Bitcoin Rate to USD (Dollar)	24 Hour Volume	Total Trade Value In Dollar
BTC-E	1,483.33	239	6,031.14	1,441,442.46
BITSTAMP	1,483.28	238.99	8,922.22	2,132,321.358
Bitfinex	1,486.38	239.49	25,952.73	6,215,419.308
Conbase	1,489.80	240.04	9,397.29	2,255,725.492
OkCoin	1,481.99	238.78	79,489.99	18,980,619.81
HuoBi	1,465.95	236.2	44,181.19	10,435,597.08
BTTCChina	1,480.95	238.49	104,951.41	25,029,861.77
ChBTC	1,481.10	238.64	52,548.78	12,540,240.86
OkCoinlnt'l	1,487.44	239.66	21,162.47	5,071,797.56
796Week	1,507.86	242.95	19,020.16	4,620,947.872
BTCTrade	1,482.32	238.84	59,029.89	14,098,698.93
OKThisWeek	1,482.96	239.13	231,855.00	55,443,486.15
BitVCWeek	1,457.00	234.76	108,320.99	25,429,435.61
YunBi	1,481.00	238.62	987.42	235,618.1604
BitBaysCN	1,483.04	238.95	4,024.92	961,754.634
BitBays	1,479.62	238.4	3,454.35	823,517.04
Bter	1,481.40	238.69	57.72	13,777.1868
BTC100	1,486.48	239.51	45,452.99	10,886,445.63
BTC38	1,482.70	238.9	135.42	32,351.838
CoinSave	1,488.18	239.78	67.75	16,245.095

BTCIG	1,479.88	238.44	298.70	71,222.028
BTCB	1,500.00	231.25	342.93	79,302.5625
Jubi	1,484.66	239.21	14,897.27	3,563,575.957
BitCVNWeek	1,446.37	232.77	4,635.05	1,078,900.589
BitYes	1,486.94	239.58	8,315.68	1,992,270.614
OKQuarter	1,479.74	238.61	98,160.00	23,421,957.6
BItVCQuarter	1,468.00	236.53	353.24	83,551.8572
BTCQMonth	1,495.63	230.98	13,477.14	3,112,949.797
OKnextWeek	1,479.93	238.64	37,234.00	8,885,521.76
Total	42,973.93	6903.83	1,002,757.84	238,954,556.6
MEAN	1,481.859655	238.0631034	34,577.85655	8,239,812.297

Resource: Btckan

Table 1 illustrates one Bitcoion exchange rate to U.S.'s dollar and China's Yuan. Also, it shows that the total exchange volume between dollar to yuan for the day based on May 5, 2015. At first column, the market is where people want to trade dollar with yuan. Second column and Third column show that Bitcoin exchange rate to each yuan and dollar. Last column is total volume in dollar. Therefore, total cumulative traded volume in the day 238 million dollars. Thus, it is too notable to deserve ignore. Since Chinese government intervenes exchanging yuan to other currencies, this breaks the law of money supply and money demand. However, it is not easy for Chinese government to control the Bitcoin rates because Bitcoin is virtual digital money. Thus, it is a great route to exchange yuan to other currencies. Therefore, Chinese currency can be traded with U.S. dollar through Bitcoin. Hence, appreciation of the R.M.B. was caused by Bitcoin. As a result, the China government prohibits using Bitcoin transactions in its nation (*Bloomberg.*)

VI. Bitcoin break the law of PPP and Money Market Theory

So, why is Bitcoin popular? As money supply increases, the tradable goods are worther by the conclusion in equation (5). Governments control their inflation rates every year. Some positive inflation is better than deflation because deflation could have higher probability to have a crippling impact on economy. On the other hand, there is no inflation for Bitcoin since its supply is limited to around 21 million Bitcoins. While the U.S. dollar, Chinese yuan, and other currencies are becoming common due to constant issue, Bitcoins will become never common due to its limited supply. Thus, Bitcoin is more preferred. Developed countries where there are lower interest rates will be more interested in the digital currency. This is because Central banks issue not only money but also bonds. Bonds in powerful countries get traded often, thus more expensive, because they insure against shocks that affect global economy. Since those bonds in powerful countries are more expensive compared to less strong nations, the powerful central banks can maintain a low interest rate.

If Bitcoin becomes official money, then the inflation rate will be recorded in wrong way. According to equation (10);

$$\pi_{H,t} = \mu_{H,t} - \mathcal{G}_{H,t}$$

Since the customers in the U.S. and China keep using the Bitcoin to have each currency, we assume $\mathcal{B}$ be the trade on Bitcoin growth rate. Therefore, with the Bitcoin, now considered as official key currency, the equation can be;

$$\pi_{H,t} = (\mathcal{B} + \mu_{H,t}) - \mathcal{G}_{H,t} \qquad (11)$$

Equation (11) means that the inflation rate will be larger as much as some positive number $\mathcal{B}$. This equation will work on both U,S, and China case. However, the nations where ban the use of Bitcoin, will be yielded their inflation rate much smaller than the two countries. Therefore, the use of the Bitcoin will destroy the way of measuring inflation rate and money supply growth rate. This will affect even on GDP growth rate. Hence, we can conclude that the use of Bitcoin trade between customers in the U.S. and China break the law of Money Market Theory driven from the PPP theory.

IV. Conclusion

Even though Bitcoin is a great virtual currency, there is an appalling flaw in the Bitcoin system to be real money. Use of Bitcoin looks a good tool to trade with other currencies, especially trading to Chinese yuan. Since China's government control the all the exchange rate, people who want to have China currency have less chance to trade freely. Therefore, the exchange through Bitcoin gives them new road to trade to yuan indirectly. This will be good to U.S. government because it affects appreciation of China currency so that the U.S. government will have less deficit in trading to China. However, using Bitcoin is negatively affect the law of Money Market Theory driven from PPP theory. If we assume that Bitcoin as key currency, the money supply growth naturally increased as much as the growth rate on Bitcoin traded. Thus, a country's inflation rate level is yielded in exaggerated. As a result of this, all the economical theories do not hold. Hence, the use of BItcoin will destroy the international financial order

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