The effect of exchange policies on liquidity of cryptocurrency market

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Abstract

Bitcoin has much attention nowadays by investors in recent years, although there remains a lack of understanding of this cryptocurrency. However there was a little attention on exchanges where the cryptocurrencies are traded. We therefore examined the effect of different exchange policies on the trading volume of cryptocurrency as a proxy of liquidity. The result reveals that as the taker fee increased and maker fee decreased trading volume increased. In addition, the availability of margin trade also statistically affect the trading volume with positive direction. This finding can be adopted to the exchange policies and its regulation.

1. Introduction

Cryptocurrency is a decentralized electronic currency system, which represents a dramatic change in financial market system after Satoshi Nakamoto introduced [1]. Bitcoin one of the cryptocurrencies is characterized as its innovative features, simplicity, transparency and its increasing popularity [2]. In addition, Bitcoin stands for an IT innovation based on the advancement in peer-to-peer networks and cryptographic protocols. Due to its properties, Bitcoin is not managed by any governments or bank. The characteristics have posed great challenges and opportunities for policy makers, economists, entrepreneurs, and consumers [3].

The previous research on such kind of cryptocurrencies was initially dominated by studies on the safety, ethical and legal aspects of Bitcoin, although there is little attention on an economic viewpoint. The efficient market hypothesis (EMH) is one the key issue in finance as introduced by Fama[4]. Liquidity in market is one of the key measure for the efficiency hypothesis. In previous research on traditional market microstructure fields, it is often argued that increased trading volume implies increased liquidity [5]. It is therefore reasonable to select trade volume as an explanatory variable for this research. This choice is further supported by the findings of Moore and Christin [6] which is that increased trading volume on a bitcoin exchange reduce the risk of it failing, suggests that trade volume, incorporated as an explanatory variable, will likely provide knowledge about its ability to explain the price liquidity of bitcoin.

2. Goal of the present study

In the current study, we evaluate the effect of trading fee and margin trading availability, which refers to as exchange characteristics for market liquidity as a proxy of trading volume. The number of target exchanges are total 47 with 196 different cryptocurrencies.

The primary goal of this research is to examine the effect of specific exchange policies, in this case maker fee, taker fee and leverage on the market liquidity. Thus this study offers the following research questions:

RQ1: To what extent are trading fee related to the market trading volume?

RQ2: To what extent are availability of margin trading related to the market trading volume?

RQ3: Does the location of headquarter or characteristics of different coin affect the market liquidity?

Based on the previous literature review of market liquidity and cryptocurrencies, we hypothesized that the market liquidity increased if the margin trade is available and the maker fee is less. The current price and characteristics of each coin also affect the trading volume to be controlled for the robustness.

3. Method

3.1 Exchanges

The dependent variable, trading volume, was collected from the cryptocurrency aggregation website which is called CoinMarketCap (*https://coinmarketcap.com*). They provide information of market capitalization of 169 cryptocurrency market exchanges. The exchanges listed on the website treated different kind of cryptocurrencies for example, BitMEX deals with only bitcoin where the fiat currency was US dollar whereas The Bithumb treats total 11 different coins such as Bitcoin, Ethereum, Ripple, and etc. Each coin have different trading volume with different minimum trading size available. The total sample size was 535 coins, but reduced to 525 after eliminating data by using the Cook distance outlier test.

3.2 Measures

We crawled the monthly volume rankings from the website. The gathered trading volume was divided by the weighted price since the unit of the dependent variable was initially dollar volume. Price, price of the coin, was measured the average of the price of each exchange during the period. *NumCoin* was measured the number of total coin treated in each exchange. Location is a country which the headquarter of the exchange is located. *TakerFee* and *MakerFee* were gathered from the website of each exchanges. The *MakerFee* is charged when traders submitted their (buy or sell) order as a limit order. In this case, their order is listed on the orderbook of exchanges making liquidity. The *Takerfee* was charged when traders submitted their order at the market price right now. The market order was executed right after the order was submitted at the market price. These kind of order ‘takes’ market price listed rather than listed on the orderbook. In each exchange, there are minimum amount order size, which is *MinTrade*, is this analysis. Recently, some of exchanges are available for the margin trading using borrowed funds from a broker to trade a financial asset, which forms the collateral for the loan from the

broker. Since such use of financial leverage can potentially magnify gains but could also saddle the trader with devastating losses, leverage has the well-deserved reputation of being a double-edged sword. The amount of leverage was collected as *Leverage* and used for this analysis.

3.3 Analytic approach

To examine the effect of the trading fee, minimum amount of the order size, and the availability of margin trading on the trading volume which is used as a proxy for the market liquidity in this analysis, ordinary least squared regression was applied with the sample size of 525. The trading volume used as an independent variable has a right skew and converted the values as a log scale to fit the normality assumption.

4. Result

4.1. Multicollinearity

The Table 3 shows the correlation matrix of each variable utilized in this paper. The largest correlation coefficient is 0.67 between *MakerFee* and *TakerFee* since the two trading fees are decided by exchanges at the same time. It is common that if *MakerFee* in an exchange is high (low) relative to the other exchanges then *TakerFee* at the exchange are relatively high (low) as well and vice versa. It arises the positive correlation. However, the two fees can affect different impact to the market theoretically, we utilized both kinds of fee in this study. For The robustness, all the variables were tested using VIF (Variance Inflation Factor) analysis. All the variables have VIF number less than 10, which infers that a multicollinearity issues in this analysis is less likely.

Table 2
Correlation matrix of the variables

		1	2	3	4	5	6	7	8	VIF
1	CurRatio	1.000								1.5
2	NumCoin	-0.329	1.000							2.0
3	TakerFee	0.086	-0.176	1.000						5.9
4	MakerFee	-0.007	-0.063	0.667	1.000					4.1
5	Leverage	0.256	-0.184	-0.168	-0.167	1.000				1.3
6	MinTrade	-0.036	-0.111	-0.079	-0.130	0.072	1.000			1.2
7	log_prc	0.436	-0.514	0.137	0.040	0.153	0.077	1.000		1.8
8	log_vol	-0.048	-0.008	-0.117	-0.141	0.048	0.056	-0.545	1.000	3.7

4.2. Trading fee

Table 3 reports the OLS and regression among the study variables. With respect to RQ1, as shown in Table 3, taker and maker fee predict the trading volume. The Column (4) indicated that each additional percentage increases in taker fee and maker fee affect the trading volume with the size of 3.83% and -3.23% respectively after controlling the coin and country specific characteristics and the coefficients are statistically significant with the significant level of 0.05. The result is consistent with the previous research. As the maker fee increased, people are likely to use marker order to trade their shares rather than stacking their order on the orderbook because of the trading promptitude. In the case of the taker fee, people are less like to submit their order as a market order because of its high fee. They preferred the limit order, and result in abundant stacks on the orderbook. In this manner, as the maker fee decreases and taker fee increases, liquidity of the market increases.

4.3 Availability of margin trading

To address RQ2, we examined the effect of the level of leverage used in margin trading. For every unit increase in *Leverage*, the trading volume increased by 4.4% with the confidence level of 95%. The more the leverage is available, the trading volume as liquidity proxy increased. The result also consistent with the previous literature review as well.

4.4 Additional findings

To examine the RQ3, we added some additional variables for control the endogenous effect on trading volume. The price and the number of coins treated at the exchanges were added on the regression model as shown in the Table 3 Column (3). The effect of price of coin on the trading volume is that the increase 1% of price result in the 0.61% decrease of trading volume. Investors are more likely to trade at the exchange which give lower price compared to other exchanges. This arises the decrease in trading volume at the exchange.

The characteristics of coin and country where headquarter is located also affects the market trading volume. As shown in the Table 3 Column (4), we added the coin fixed effect and country fixed effect. The R^2 of the model increase by 20% after the control. The effect sign of the number of coins at exchange is changed to positive from negative.

To invest the characteristics of coin, we classified the coins into two group based on the aggregated number of coins traded. For example, The Bitcoin is can be traded at the all of the exchanges whereas the Litecoin can be traded at the 28 exchanges. We classified the coins as *BigCoin* and labeled as “1” if more than 5 exchanges dealt with the coin, otherwise the coin labeled as “0”. The difference between two groups is illustrated in the Table 4. All average value of the factors used in this regression analysis are statistically different based on the classification. It refers that the characteristics of coin itself should be controlled.

Table 3

OLS and regression result of exchange policy on market liquidity (trading volume)

	OLS (1)	OLS (2)	OLS (3)	OLS (4)
Dependent Var.	log_vol	log_vol	log_vol	log_vol
Intercept	10.101***	10.377***	12.6274***	9.902***
	(33.015)	(38.708)	(37.209)	(10.017)
MinTrade	9.803	19.4350**	12.8487**	8.608*
	(0.333)	(2.316)	(1.656)	(1.199)
Takerfee	-1.200	2.417*	0.6633	3.838***
	(-0.720)	(1.725)	(0.509)	(2.839)
Makerfee	-3.309**	-4.404***	-4.0353***	-3.293**
	(-1.830)	(-2.941)	(-2.92)	(-2.168)
leverage		0.084***	0.0496**	0.044**
		(3.255)	(2.067)	(2.067)
log_prc		-0.463***	-0.6059***	-0.758***
		(-15.610)	(-19.503)	(-21.259)
NumCoin			-0.009***	0.0018*
			(-9.673)	(1.567)
Coin Effect	NO	NO	NO	Yes
Country Effect	NO	NO	NO	Yes
Observations	525	525	525	525
R-squared	0.022	0.335	0.437	0.637
F-statistic	3.992	52.31	66.93	39.96

Table 4

Difference in coins based on frequency

	BigCoin (1)	SmallCoin (0)	T-statstics	p-value
The number of coins	13	185		
The number of samples	256	269		
MakerFee	0.149	0.120	2.715	0.007
TakerFee	0.171	0.179	3.523	< 0.001
MinTrade	7.156e-03	3.604e-03	2.517	0.012
Leverage	7.296	1.489	2.818	0.005
Log_prc	-1.155	5.987	27.0721	< 0.001
Log_vol	8.447	10.442	-6.299	< 0.001

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