The Impact of Tether Grants on Bitcoin

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Abstract

In recent years, Tether issuances (or 'grants') have increased significantly, which correlated broadly with a significant rise in Bitcoin valuation. This paper examines the impact of cryptocurrency issuances on subsequent cryptocurrency returns. It is argued that as Tether is the undisputed 'stable coin', the minting of new Tether acts similarly to monetary expansion in cryptocurrency markets, inflating the prices of Bitcoin. We construct a VAR model and show contrary to investor expectations, Tether issuances do not impact subsequent Bitcoin returns, however, they do impact traded volumes. We also document an increase in Tether trading following a subsequent decrease in Bitcoin returns. This illustrates investor preferences for lower volatility crypto-assets in periods following negative Bitcoin returns.

JEL classification: C01, G12, G14.
Keywords: Bitcoin, Tether, Cryptocurrency

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1 Introduction

Following the meteoric rise of Bitcoin in 2017, cryptocurrencies have caught the attention of regulators and the imagination of investors. Academic research in this field has focused largely on valuation and market efficiency. For instance, Peterson (2017) and Van Vliet (2018) employ Metcalfe's Law and show that the size of the user network is a driving factor for cryptocurrency traded price. Urquhart (2016) show that bitcoin markets are inefficient and Wei (2018) document that market inefficiency is negatively related to market liquidity on a cross-sectional basis across crypto-assets. However, it is well known that cryptocurrency markets are not without controversies. In October 2013, the FBI shut down the darknet marketplace, Silk Road, that operated entirely using Bitcoin as the medium of exchange. In February 2014, one of the largest Bitcoin exchanges, Mt.Gox, was hacked, and the exchange was subsequently forced to file for bankruptcy after 850,000 BTC was stolen. Several academic papers have subsequently documented some of these controversies. Gandal et al. (2018) examine the suspicious trading activity by two Mt.Gox trade bots over a 10 month period in 2013 prior to the collapse of the exchange. Feng et al. (2018) show informed trading in Bitcoin markets ahead of announcements.

We examine Tether, a cryptocurrency that is pegged to the USD and with all of its coins backed by US dollars. In December 2017, the US federal regulators issued a subpoena and in January 2018, an anonymous author wrote 'the Tether Report'[1], claiming that Tether Limited was printing Tether coins (a leading stable altcoin) in a bid to artificially raise the price of Bitcoin. Several other articles appeared with similar claims that Tether was issuing new coins that were not backed by US dollars, and were timing these issuances to manipulate the price of Bitcoin. Little public information is available on how Tether coins are created and to date the company has not been audited. The academic literature to date has not examined the impact of cryptocurrency issuances on subsequent cryptocurrency prices. In this short paper, we examine the influence of Tether issuances, also known as Tether grants, on Bitcoin valuation, and in particular, its hand in the late 2017 Bitcoin rally.

[1] www.tetherreport.com

2 Background on Tether

Tether is the biggest 'stable coin' in the cryptocurrency ecosystem, and currently has a combined market value of circa 2.3bn USD[2]. Stable coins are used by online crypto-exchanges as it allows them to price cryptocurrencies in USD without having to set up a USD bank account. This is particularly useful given the difficulties with online exchanges in maintaining banking relationships.

For an investor, the key purpose of a 'stable coin' such as Tether is for the conversion and exchange into other cryptocurrencies, particularly on exchanges that do not accept traditional fiat currencies. Tether is anchored at 1 USD, and is not widely accepted online for the purchase of goods and services, hence there is no reason for investors to hold Tether aside from potentially transacting it in the future for other cryptocurrencies. Tether is often used to convert from one cryptocurrency to another. At the time of writing, the Tether-Bitcoin crypto pairs dominate volume on some of the world's largest exchanges, eg. OKEx (circa 27%), Binance (circa 20%), Huobi (circa 18%) and Bittrex (circa 15%). There is also 330mil USD worth of Tether held in Bittrex, 435mil USD in Binance and 359mil USD in Huobi[3].

Unlike most cryptocurrenices, Tether is not mined. This gives Tether Limited significant control in determining the size and timing of issuances. Our paper does not focus on whether Tether coins are in fact backed by USD or indeed 'created out of thin air'. This is for regulators and auditors to determine. Instead, we focus on the impact of Tether grants (or issuances) on Bitcoin valuation, Given Tether's poor liquidity back into fiat currencies[4], we hypothesize an increase in Tether leads to aggregate positive flows into Bitcoin. Since Bitcoin supply is inelastic in the short run, the price of Bitcoin is expected to subsequently rise. We employ a VAR model to test our hypothesis using daily data from Bitcoin and Tether trading activity.

3 Data

Daily traded price, aggregate traded volume across cryptocurrency pairs and market capitalization data on Bitcoin and Tether are sourced from www.coinmarketcap.com. Prices are calculated as the

[2] As at 22nd of April, 2018

[3] Sourced from https://wallet.tether.to/richlist

[4] We examined the top 200 cryptocurrency pairs using Tether on coinmarketcap.com and could not find a single pair involving USD or any other fiat currency.

volume weighted average of all active currency pairs converted to USD. Currency pairs traded on cryptocurrency futures exchanges are excluded from the calculation.

Data on Tether grants are obtained from Omni Explorer, which lists all the Tether issuing addresses and when they issue new Tether coins. This is also validated with the dataset provided by an anonymous researcher on www.tetherreport.com. In Figure 1, we plot the cumulate Tether coins from Tether grants from Dec 2016 to March 2018. In our dataset, we find Tether Limited has at least issued 2bn USD worth of Tether coins.

[Insert Figure 1]

4 VAR model

Balcilar et al. (2017) examine Bitcoin volumes and found it had predictive power on returns. In this paper, we focus on the impact of Tether activity on Bitcoin returns. We construct an unrestricted vector autoregression (VAR) model between i) Tether grants g_t, ii) daily aggregate Tether trading volume w_t, iii) daily aggregate Bitcoin trading volume v_t and iv) Bitcoin returns r_t at daily frequency. Tether returns are ignored as Tether price is pegged at 1 USD. Given the trending nature of traded volume in our sample period, v_t or w_t are integrated by first order and differenced in our VAR model. Table 1 documents their summary statistics and their augmented Dickey-Fuller tests.

[Insert Table 1]

We treat Tether grants to be endogenous, as the decision for Tether Limited to issue new coins is likely influenced by prevailing conditions in Bitcoin trading. Following the Hannan-Quinn information criterion, we select 3 lags for our model.

The Bitcoin return and traded volume equations are,

$$r_t = \alpha_1 + \sum_{k=1}^{3} \beta_{1,k} r_{t-k} + \sum_{k=1}^{3} \gamma_{1,k} \Delta v_{t-k} + \sum_{k=1}^{3} \delta_{1,k} \Delta w_{t-k} + \sum_{k=1}^{3} \zeta_{1,k} g_{t-k} + \epsilon_{1,t}$$

$$\Delta v_t = \alpha_2 + \sum_{k=1}^{3} \beta_{2,k} r_{t-k} + \sum_{k=1}^{3} \gamma_{2,k} \Delta v_{t-k} + \sum_{k=1}^{3} \delta_{2,k} \Delta w_{t-k} + \sum_{k=1}^{3} \zeta_{2,k} g_{t-k} + \epsilon_{2,t}$$

The Tether traded volume and grant equations are,

$$\Delta w_t = \alpha_3 + \sum_{k=1}^{3} \beta_{3,k} r_{t-k} + \sum_{k=1}^{3} \gamma_{3,k} \Delta v_{t-k} + \sum_{k=1}^{3} \delta_{3,k} \Delta w_{t-k} + \sum_{k=1}^{3} \zeta_{3,k} g_{t-k} + \epsilon_{3,t}$$

$$g_t = \alpha_4 + \sum_{k=1}^{3} \beta_{4,k} r_{t-k} + \sum_{k=1}^{3} \gamma_{4,k} \Delta v_{t-k} + \sum_{k=1}^{3} \delta_{4,k} \Delta w_{t-k} + \sum_{k=1}^{3} \zeta_{4,k} g_{t-k} + \epsilon_{4,t}$$

where $\epsilon_{1,t}, \epsilon_{2,t}, \epsilon_{3,t}$ and $\epsilon_{4,t}$ are uncorrelated white noise error terms. $r_t, \Delta v_t, \Delta w_t$ and g_t are standardized for coefficient interpretability as the magnitudes between returns and changes in volume are different. Table 2 tabulates our VAR parameter estimates.

[Insert Table 2]

We document four key findings from our VAR model. First, our VAR estimates debunk the claims that Tether grants had a meaningful impact on the 2017 Bitcoin rally. We find no empirical evidence supporting the notion that Tether grants cause subsequent Bitcoin returns to rise on a daily basis. In fact, when we examine the Bitcoin return equation of our VAR model, none of the lagged variables, impacts Bitcoin returns. This suggest Bitcoin returns are showing greater signs of market efficiency than previously studied on older datasets. For instance, unlike Balcilar et al. (2017), we do not find evidence that trading volume have any predictive power on returns.

Second, we do find a positive relationship between Tether grants and increased crypto-trading in the following day. Our VAR estimates show that both Bitcoin and Tether trading increases following Tether grants. However, these increases in trading volume do not directly lead to increases in Bitcoin returns. The effect is short-lived, and trading volumes return to normal within 5 days. This confirms that post Tether grants, investors or perhaps the issuer itself, are trading off the newly minted Tether coins to purchase Bitcoins (and potentially other coins). However, the size of these Tether grants are simply not large enough to cause price manipulation in the Bitcoin market.

In figure 2, we plot the impulse response functions from a unit tether grant shock.

[Insert Figure 2]

Third, we find Tether grants are strongly autocorrelated. This suggests Tether Limited is intentionally breaking down large grants into smaller blocks to be issued over several days, perhaps in a bid to reduce price impact on Bitcoin exchanges. It may also suggest demand for Tether coins are clumped and exhibit time clustering.

Lastly, we find evidence that Tether trading increases following prior day negative Bitcoin returns. It is possible that investors switch from volatile cryptocurrencies to 'stable coins' in times of excess market volatility in a bid to reduce the overall risk of their portfolio. We also notice that Tether grants are more likely to be issued following a fall in Bitcoin price. This seems to be in agreement with the anonymous analyst in 'the Tether Report' that Tether Limited is timing its issuances to correlate with low Bitcoin prices, so that it can subsequently purchase Bitcoin cheaply with its newly minted Tether coins. However, it can also be the case that Tether grants are in response to greater Tether (or stable coin) demand in periods where Bitcoin returns have fallen.

5 Conclusions

There has been significant skepticism in the cryptocurrency community over the world's biggest stable coin, Tether. In December 2017, the US Commodity Futures Trading Commission issued a subpoena to Tether Limited, and in January 2018, an anonymous report appeared claiming the cryptocurrency company was printing coins to artificially raise the price of Bitcoin. Our paper does not examine whether the newly issued Tether coins are indeed backed by US dollars or not, but by utilizing an unrestriced VAR, we examine the impact of these cryptocurrency issuances on subsequent cryptocurrency price. In conclusion, we do not find any evidence suggesting that Tether issuances cause subsequent increases in Bitcoin returns. However, we do find that Tether issuances are highly autocorrelated and cause subsequent increases in Bitcoin (and Tether) trading volume over the short term.

References

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Figures and Tables

Figure 1: Cumulative Tether Grants across Time

Cumulative Tether grants $\sum_{i=0}^{t} g_i$ across time t issued by Tether Limited since December 2016. Data is sourced from Omni Explorer.

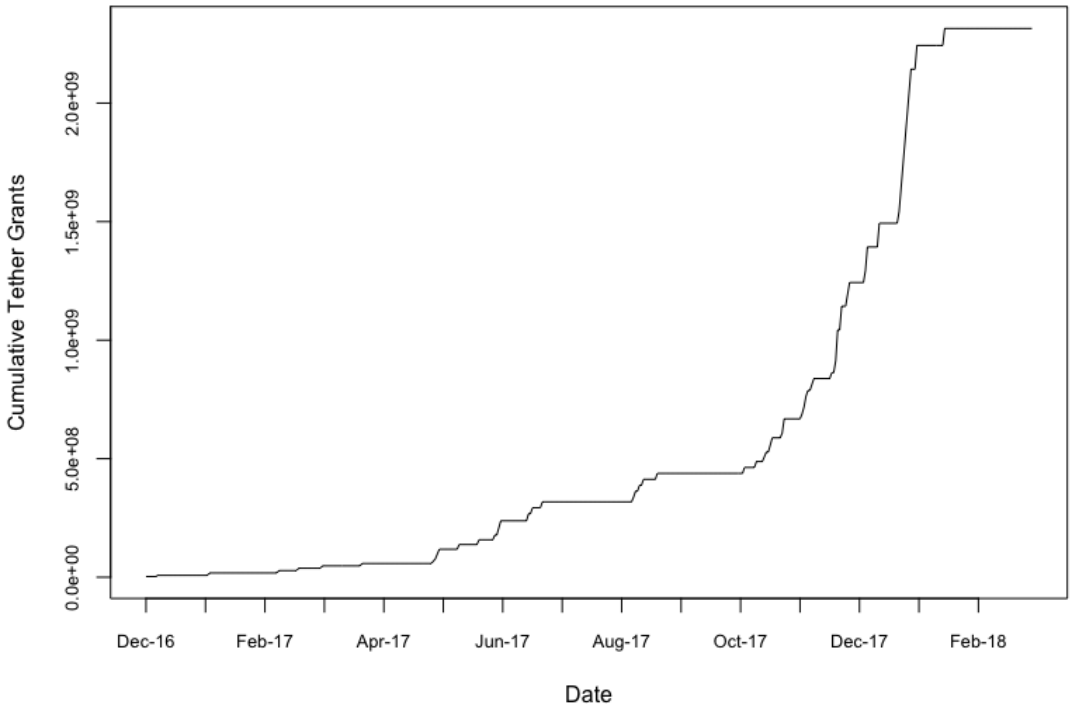
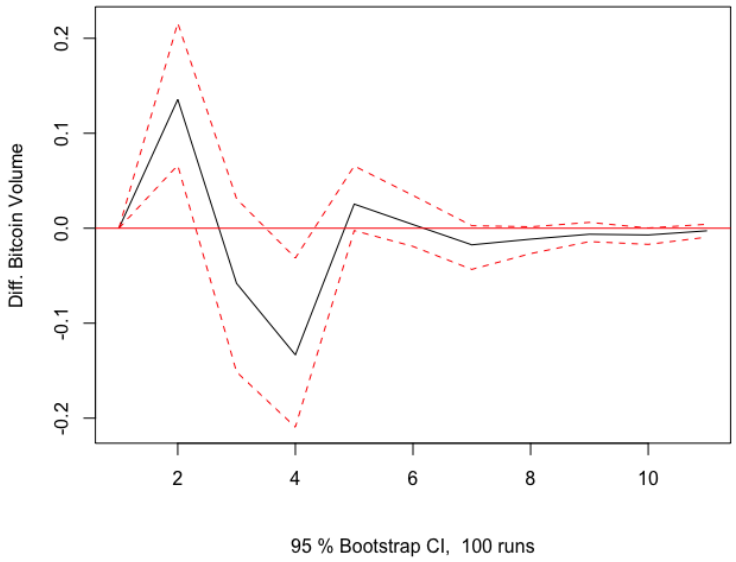


Figure 2: Orthogonal Impulse Response from a Unit Tether Grant Shock

We plot the Impulse response functions of changes in Bitcoin trading and Tether grant issuances after a unit Tether grant shock.



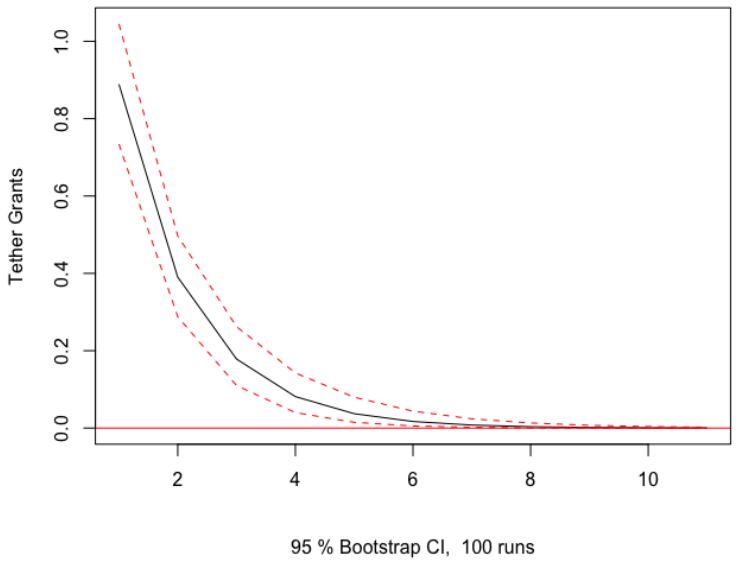


Table 1: Variable Summary Statistics

Summary statistics over the period 30-Dec-2016 to 20-Feb-2018. Volume data are differenced daily and are denominated in respective cryptocurrency units.

Variable		Mean	Std. Dev	Skewness	Kurtosis	ADF test	p-value
Bitcoin Return	r_t	0.003	0.040	-0.227	8.525	-9.489	< 0.01
Diff. Bitcoin Volume	Δv_t	524.366	118806.1	0.045	10.845	-14.749	< 0.01
Diff. Tether Volume	Δw_t	1.946e+6	2.557e+8	-0.272	58.345	-15.809	< 0.01
Tether Grant	g_t	2.079e+6	1.171e+7	7.241	60.071	-8.263	< 0.01

Table 2: VAR Model Estimates

VAR coefficient estimated using daily data from www.coinmarketcap.com and Omin Explorer from 30-Dec-2016 to 20-Feb-2018. Volume data are differenced and all variables are normalized. '***' represents $p < 0.01$, '**' $p < 0.05$ and '*' $p < 0.1$

Coefficients		Bitcoin Return r_t, $i = 1$			Diff. Bitcoin Volume Δv_t, $i = 2$			Diff. Tether Volume Δw_t, $i = 3$			Tether Grants g_t, $i = 4$		
		Estimate	t-stat	p-value	Estimate	t-stat	p-value	Estimate	t-stat	p-value	Estimate	t-stat	p-value
Bitcoin Return	$\beta_{i,lag=1}$	0.024	0.473	0.637	-0.090	-1.924	0.055*	-0.097	-2.149	0.032**	-0.094	-2.165	0.031**
Diff. Bitcoin Vol.	$\gamma_{i,1}$	0.045	0.602	0.548	-0.305	-4.456	0.000***	0.027	0.418	0.676	-0.008	-0.119	0.905
Diff. Tether Vol.	$\delta_{i,1}$	-0.020	-0.268	0.789	-0.041	-0.587	0.558	-0.415	-6.245	0.000***	0.065	1.017	0.310
Tether Grants.	$\zeta_{i,1}$	-0.062	-1.062	0.289	0.160	2.998	0.003***	0.137	2.656	0.008***	0.309	6.264	0.000***
	$\beta_{i,lag=2}$	-0.011	-0.211	0.833	0.057	1.209	0.227	0.042	0.912	0.362	0.044	0.996	0.320
	$\gamma_{i,2}$	-0.020	-0.265	0.791	-0.267	-3.887	0.000***	0.005	0.072	0.942	-0.088	-1.390	0.165
	$\delta_{i,2}$	0.028	0.366	0.715	0.040	0.570	0.569	-0.304	-4.478	0.000***	0.175	2.690	0.007***
	$\zeta_{i,2}$	0.032	0.530	0.596	-0.069	-1.259	0.209	-0.030	-0.559	0.576	0.136	2.666	0.008***
	$\beta_{i,lag=3}$	0.005	0.103	0.918	0.053	1.110	0.268	0.057	1.239	0.216	0.031	0.710	0.478
	$\gamma_{i,3}$	0.133	1.805	0.072*	-0.144	-2.124	0.034**	-0.068	-1.039	0.299	-0.100	-1.598	0.111
	$\delta_{i,3}$	-0.109	-1.454	0.147	-0.049	-0.710	0.478	-0.257	-3.839	0.000***	0.039	0.615	0.539
	$\zeta_{i,3}$	-0.051	-0.894	0.372	-0.155	-2.935	0.004***	-0.166	-3.251	0.001***	0.191	3.902	0.000***
	α_i	-0.002	-0.037	0.971	-0.001	-0.019	0.985	-0.002	-0.036	0.971	0.001	0.023	0.982
	Adj. R^2	0.018			0.138			0.203			0.265		