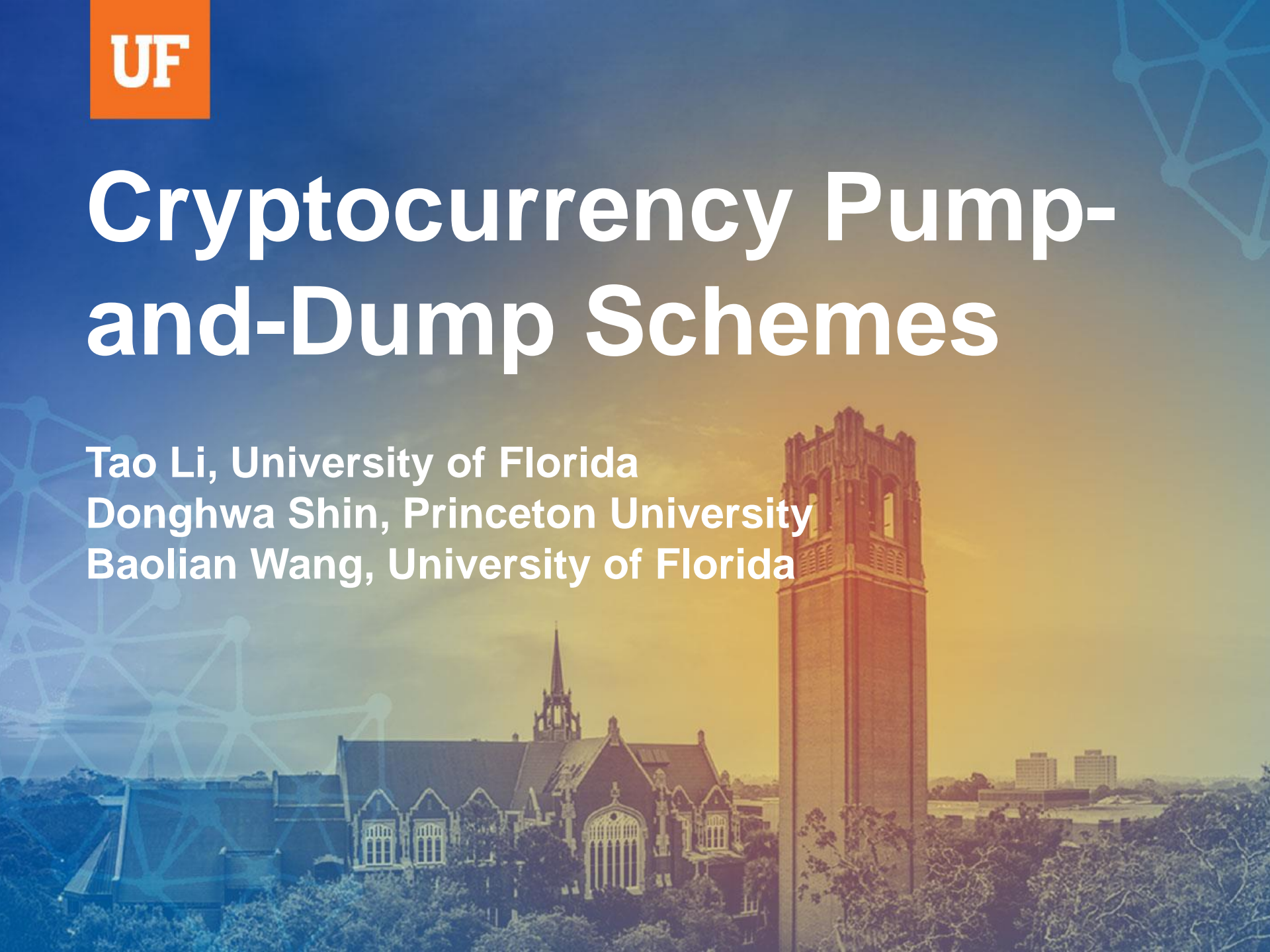


Cryptocurrency Pump-and-Dump Schemes

Tao Li, University of Florida

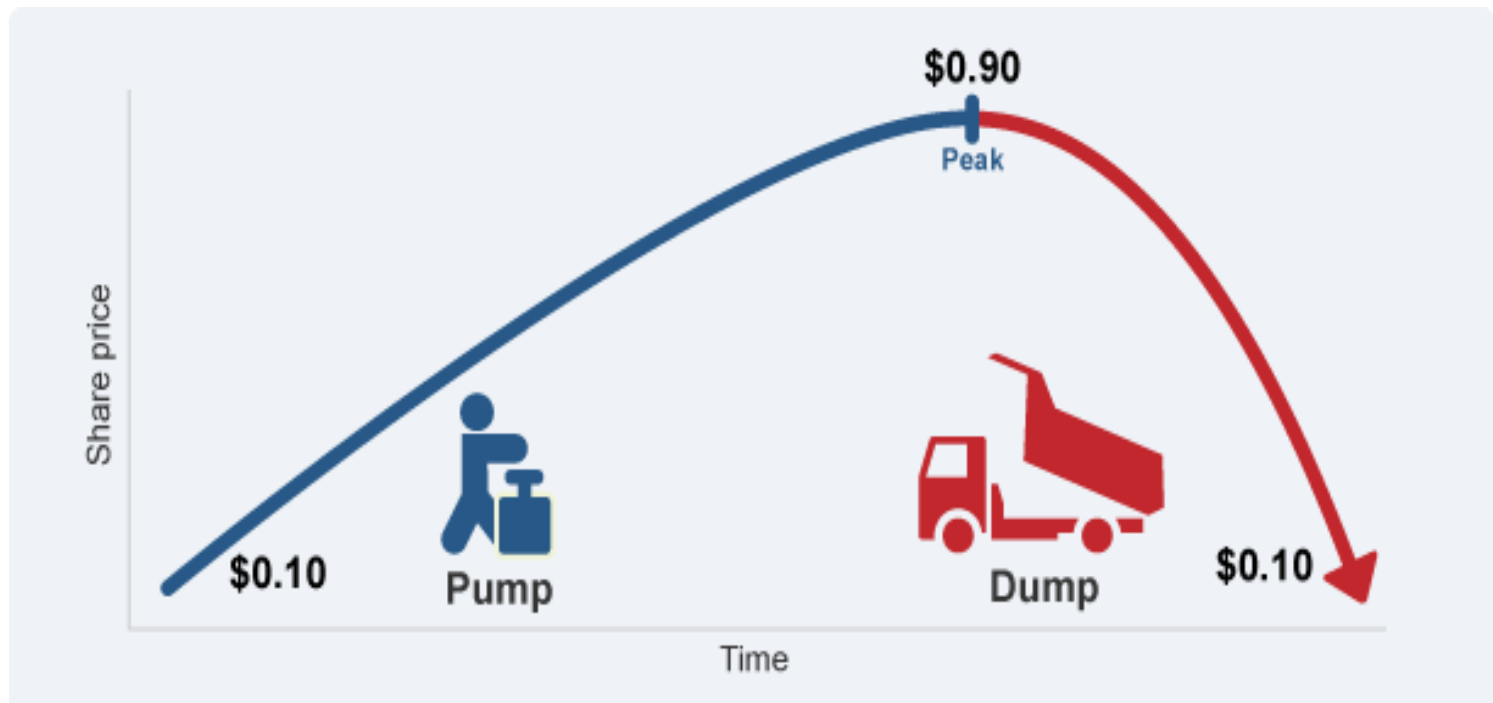
Donghwa Shin, Princeton University

Baolian Wang, University of Florida



Pump and dump

- “Pump-and-dump” schemes (P&Ds) are a form of price manipulation.



Background

- Such schemes are most common with microcap stocks and have recently become popular in cryptocurrencies.
- Standard narratives:
 - Information-based: spread false information
 - Action-based: actions other than buy and sell
 - Trade-based: only buy and sell

Why is P&D interesting to researchers?

- Important policy implications.
- Informative for
 - Manipulation theories
 - Bubbles
 - Investor behavior

Why cryptocurrencies?

- Will blockchain be the next technology breakthrough of human society?
 - Initial coin offerings (ICOs) raised over \$5 billion across nearly 800 blockchain startup deals in 2017, exceeding traditional venture capital investment in funding blockchain projects.
- P&Ds are popular in this market.
- Clean setting to study manipulation.
 - No confounding false information
 - No fundamental-relevant actions
 - Identification of P&Ds is also easier

How are P&Ds organized?

- Telegram is a cloud-based instant messaging service
 - end-to-end encryption
 - one of the most heavily-encrypted messaging platforms
- Telegram channels
 - Operators can broadcast messages (similar to radio stations)
 - Members can join for free
 - access the entire message history
 - Messages timestamped with viewer counter



Pump channels

- They do not use the word “dump”, but they do use “pump”.
- Manual collection of pump groups from Reddit and BitcoinTalk.
 - 210 groups
 - 3000+ P&Ds

Pump group name	N
Alt the Way	303
Crypto Mega Pumps Yobit	244
The Pumpers	220
Superb Pumps	180
YoBit Pumpers	159
Bittrex Signals	148
World Pumps	130
Crypto VIP Signals	116
Premium Yobit Pump	107
PumpZone	89
Other channels	788

July 4

Big Pump Signal

Dear members,

The pump will be in 11 hours and 20 minutes!

Later today, we will give our expectations!

The pump team

19.8K 3:40 AM

Big Pump Signal

Dear members,

The pump is in 1 hour and 30 minutes, 18.6K edited 1:23 PM

Big Pump Signal

Lately a lot of people seem to be wondering how this pump group started (A lot of you might know the story and have been with us since the beginning).

Bigpumpsignal started of as a small group of private investors (around 100). However, we felt like if the group was open we would make a bigger statement and even bigger pumps. Since around 5 months bigpumpsignal is an open group.

When we started there were a few other pump groups, however not like ours. Bigpumpsignal has always been focused on reaching outsiders. Because, a good pump is decided by the amount of interest of the outsiders. That's why the pump team always spreads news via social media.

You are free to help us with spreading news about the coin we pump on social media!

19.3K 1:29 PM

Big Pump Signal

The pump will be in 34 minutes! Get Ready! 17.7K 2:26 PM

Big Pump Signal

20 minutes left! 17.3K 2:40 PM

Big Pump Signal

10 minutes left 17.7K 2:50 PM

July 4

Big Pump Signal

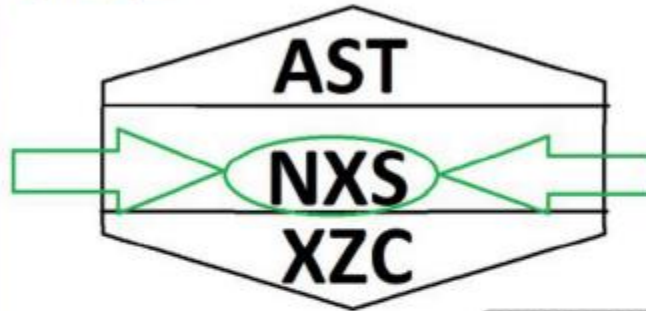
5 minutes left till the binance pump! 22.4K 2:55 PM

Big Pump Signal

2 minutes left till the pump. Next message will be the coin signal!!

22.8K 2:58 PM

Big Pump Signal



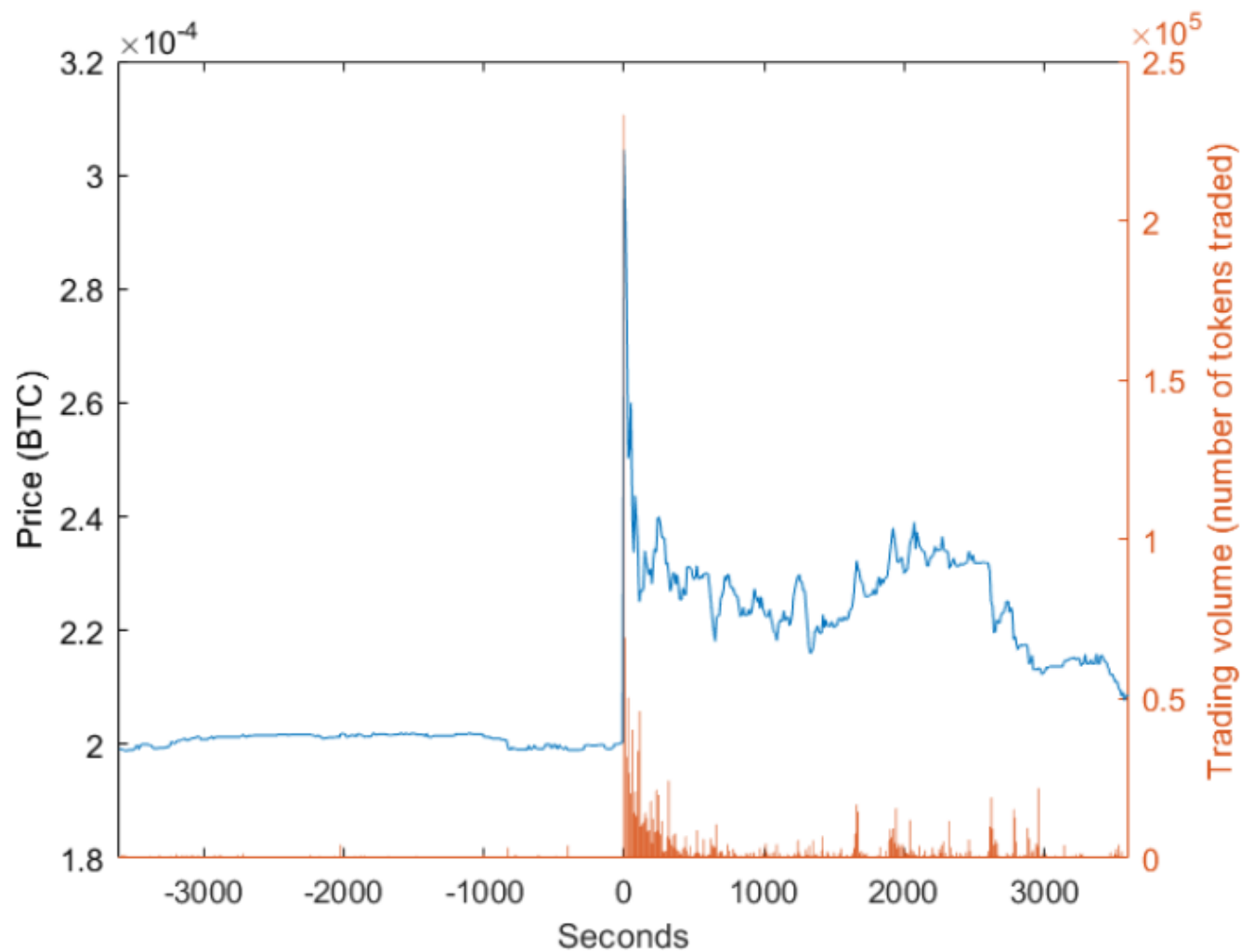
28.9K 2:59 PM

Big Pump Signal

Dear members,

The pump went Decent. Not too good not too bad. At dropped quicker than we expected and got a high at 60%.

What happened?



Data

- 500 P&Ds (239 unique tokens) from three exchanges: Binance, Bittrex, and Yobit.
 - In trading volume, 1st, 36th and 27th.
 - Asia, US, and Russia.
- Exchange trading data
 - Similar to Trade and Quote (TAQ) data.
 - Timestamped at least to seconds.
 - We download trading data from Binance using their API
 - We buy such data of Bittrex and Yobit from Kaiko Data.
 - Mostly, price quoted in BTC.
- Sample period: May 15, 2017 to August 26, 2018

Data issues

- Closed Telegram channels
- Trading data from Bittrex and Yobit do not cover all the listed tokens
- Our sample may overrepresent recent Telegram channels and the ones that actively advertise on Reddit and BitcoinTalk.

P&D events

Panel A. Pump-and-dump events

<i>Event-level</i>	All (N=500)	
	Mean	Median
Earliest channel's delay time (seconds)	21.7	4
Average delay time (seconds)	24.5	5.2
Average number of channels	1.58	1
Total number of viewers	5,941.5	2,094
Average number of viewers per channel	4,295.6	1,633
<i>Channel-level</i>	All (N=788)	
	Mean	Median
Target return	211.5%	200%
Regular scheduled time	89.5%	100%

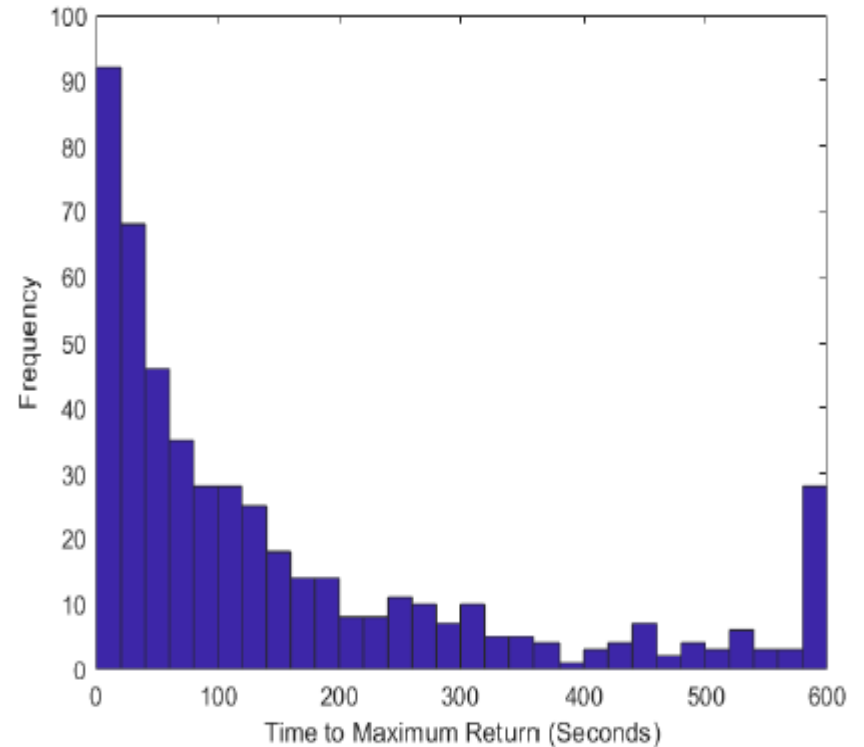
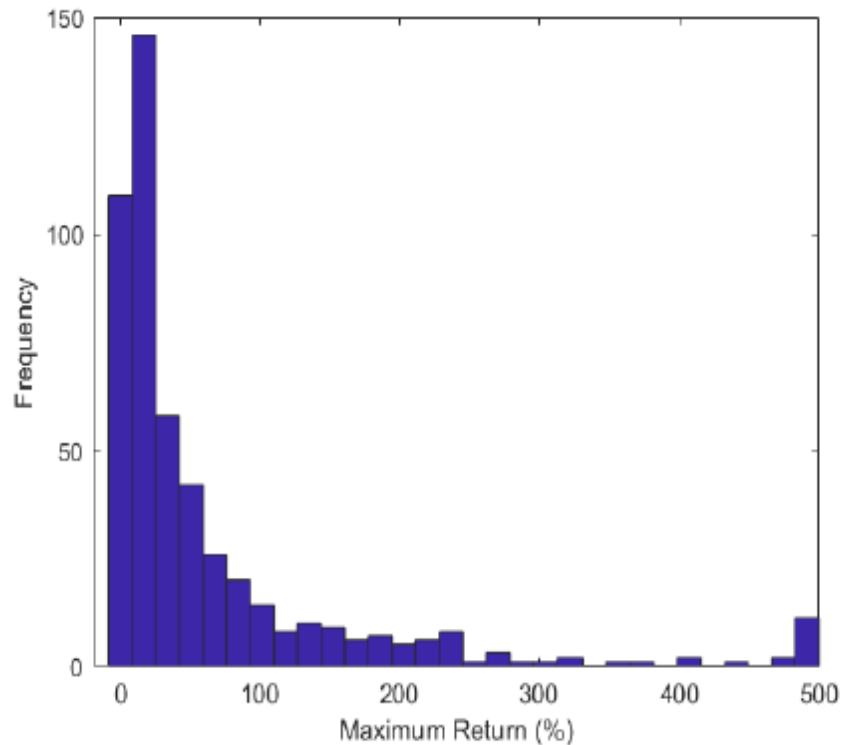
Target tokens

- Relative to stocks
 - Market cap: 10th percentile
 - Volatility: 99th percentile

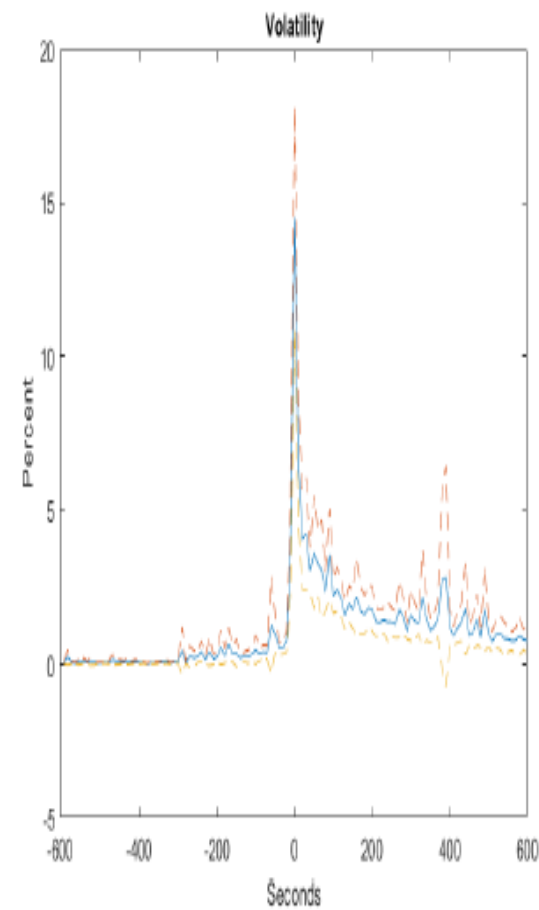
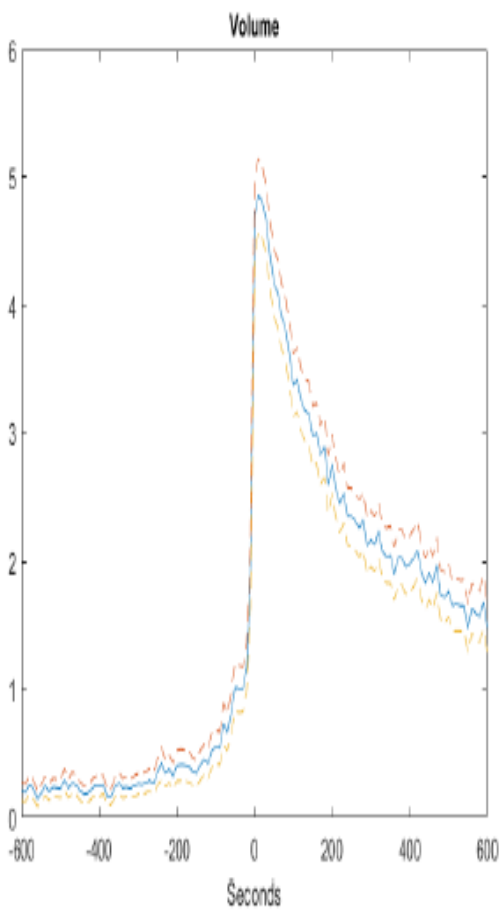
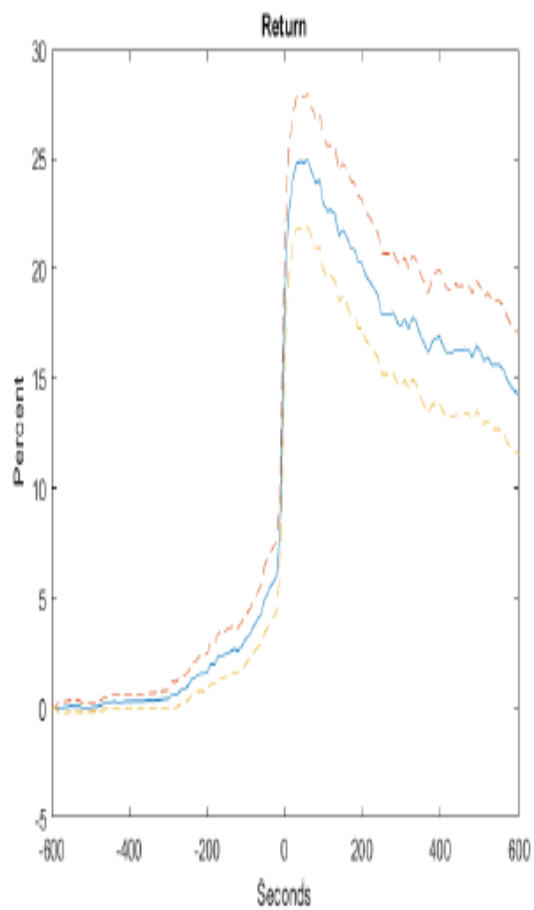
Panel B. Characteristics of tokens

	Target tokens	Non-target tokens	Difference	<i>t</i> -stat. of Diff.	Percentile
ln(Market capitalization (dollar))	16.078	16.375	-0.219*	-1.72	49.63
ln(Volume (Bitcoin))	4.538	3.345	1.193***	5.96	58.00
Volatility	12.830%	14.072%	-1.242%***	-3.13	45.29
Covered by CoinMarketCap	0.590	0.524	0.066***	3.10	56.11
Token age (in years)	1.667	0.950	0.717***	11.53	60.47
Social media index	8.102	7.518	0.585***	3.62	59.56
Average number of tokens per day	2.02	684.0			

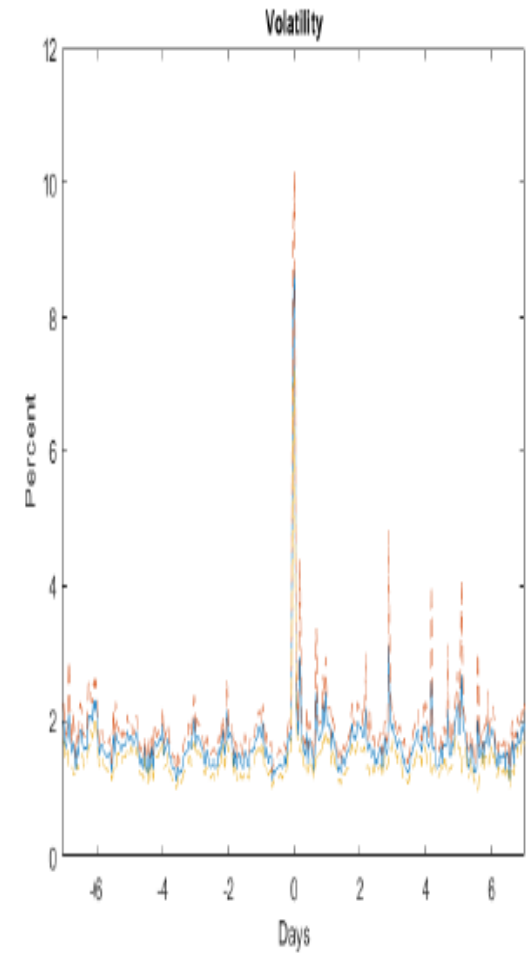
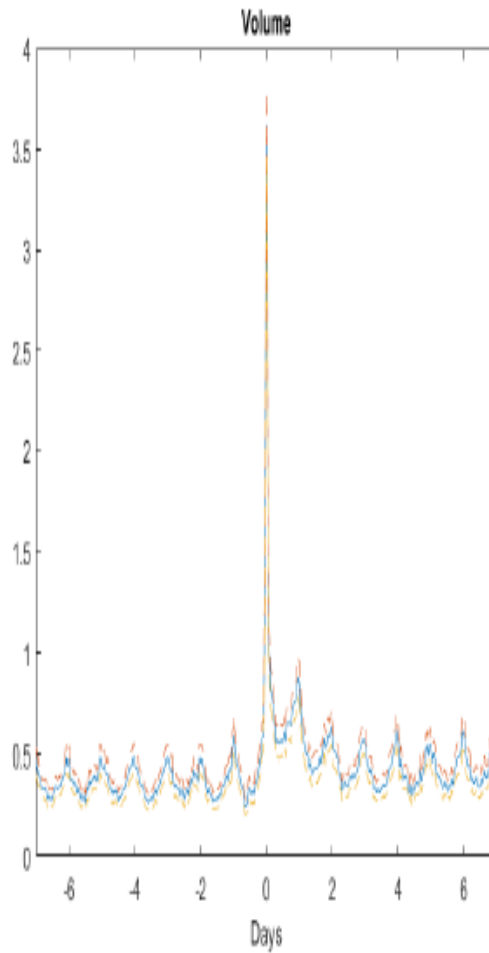
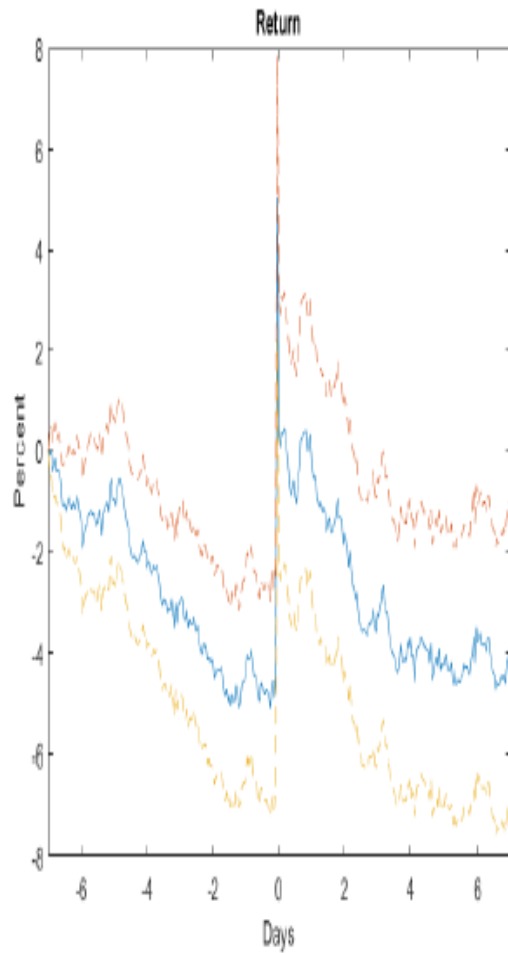
Max return and time to max



Main findings

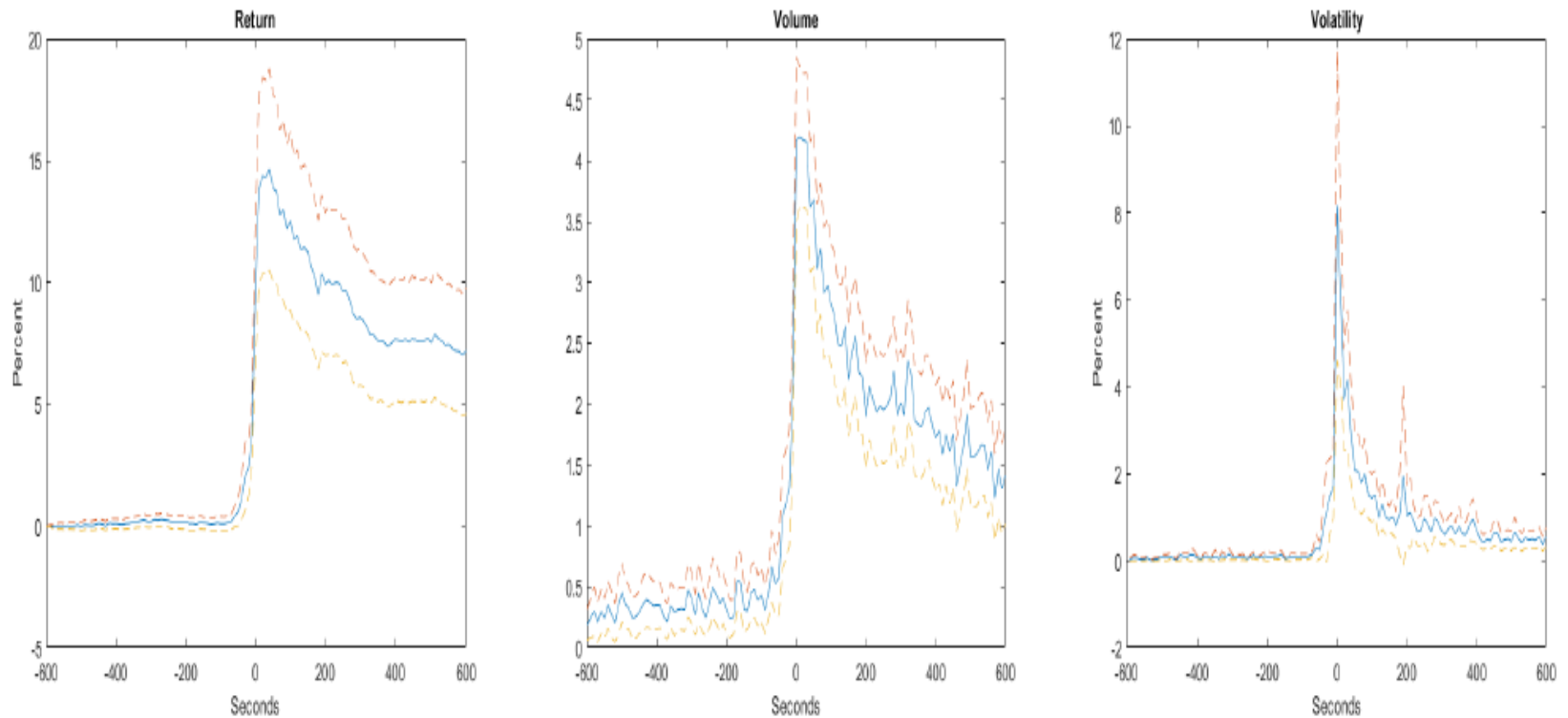


Longer-term



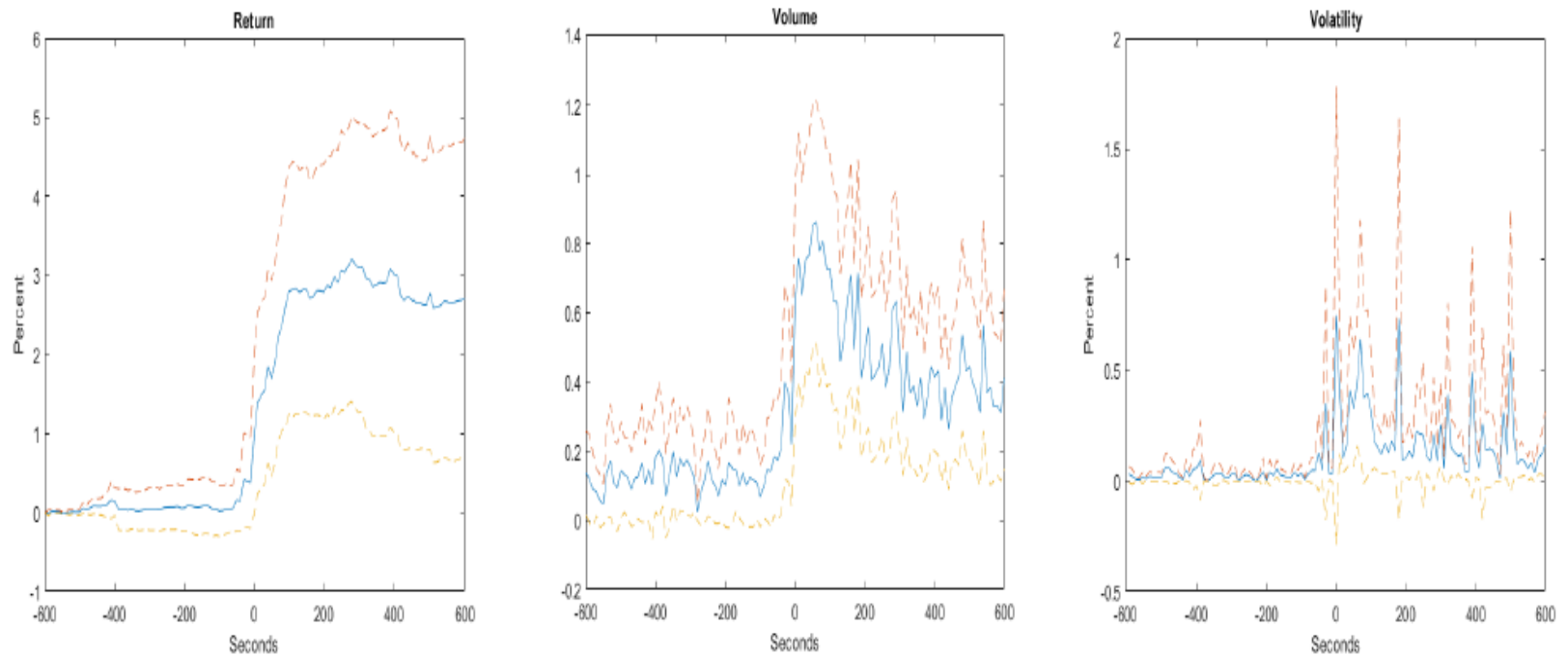
Spillover to Ethereum pairs

Panel A. Ethereum pairs



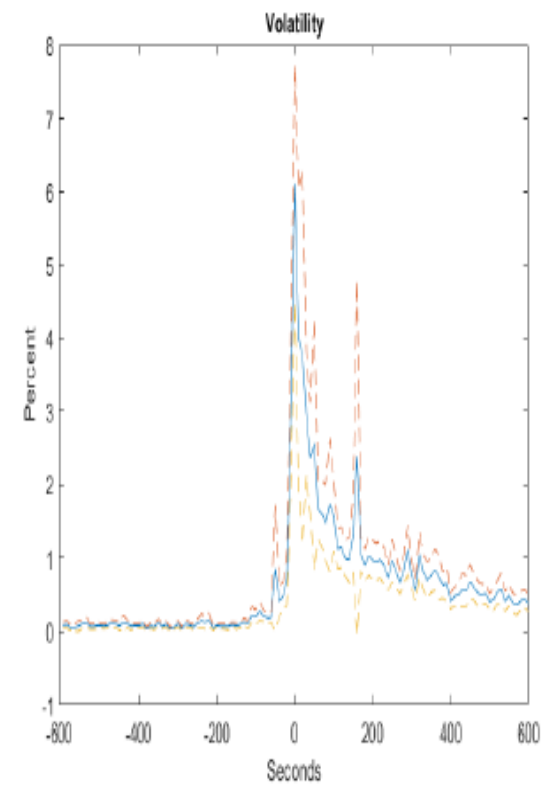
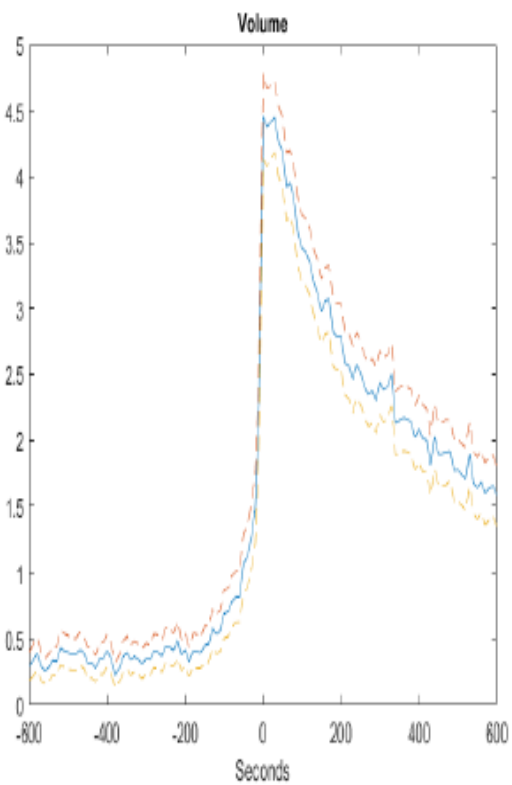
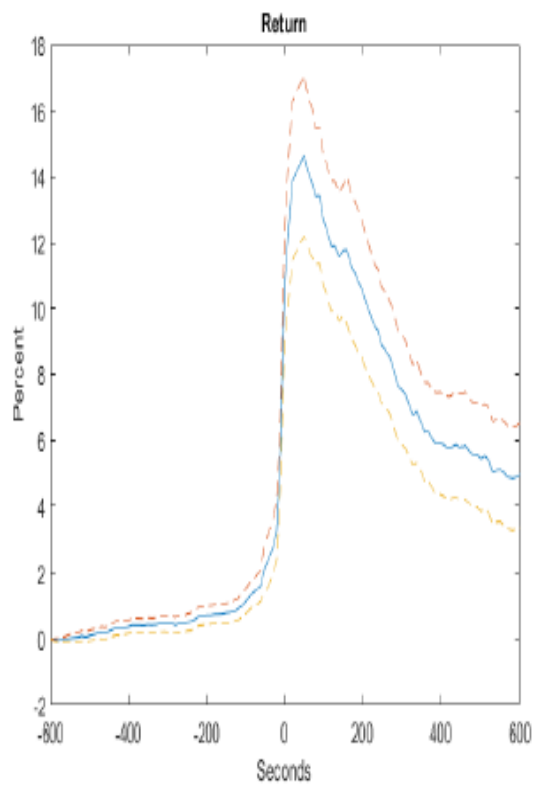
Bitcoin pairs on other exchanges

Panel B. Bitcoin pairs on other exchanges



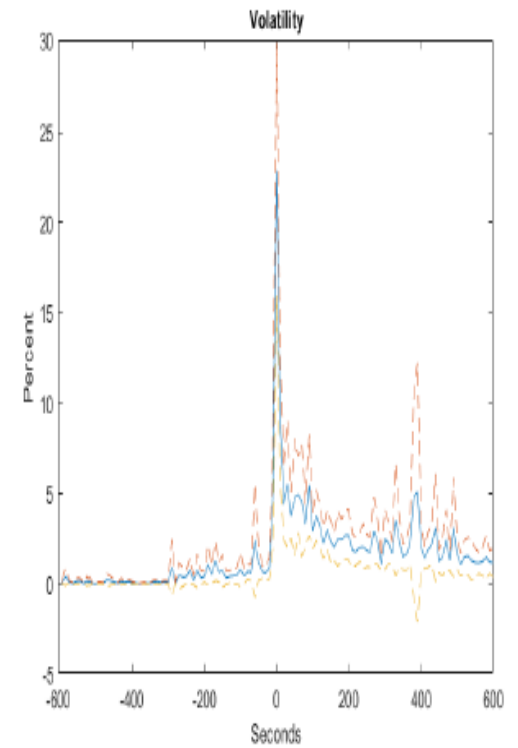
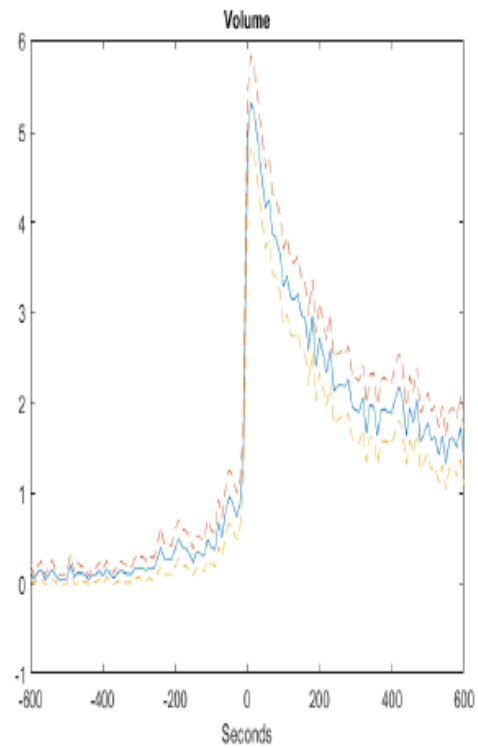
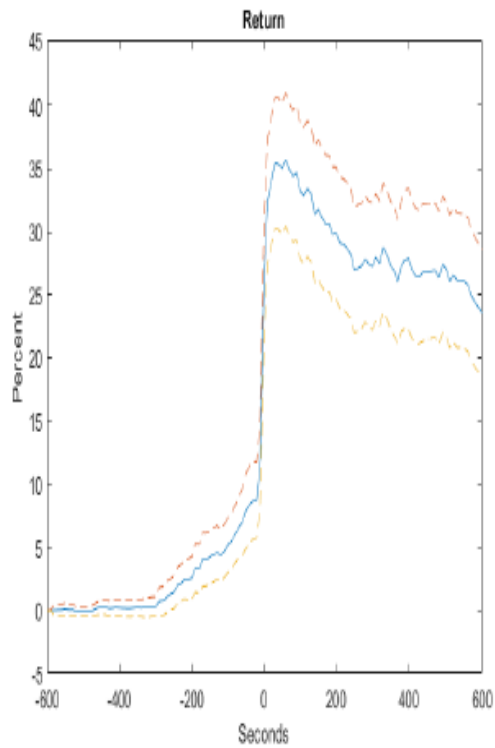
Liquid tokens

Panel A. Liquid tokens



Illiquid tokens

Panel B. Illiquid tokens



Magnitude

- 25% price increase;
- 14800% volume increase;
- 15% 10-second absolute return;
- 18% insider returns;
- -2.34% for an average outsider (most are Telegram channel followers);
- Per event, average profit of 1BTC (\$8,000).
- Thousands of them each year

Performance by purchase time

Delay time	Purchase time, in seconds												
	Before P&D	10	20	30	40	50	60	70	80	90	100	110	120
0	13.926	5.619	1.309	-0.063	-0.921	-1.272	-1.184	-1.051	-1.589	-0.015	-1.375	-0.703	0.048
10	18.387	6.505	1.594	-0.579	-1.516	-1.849	-1.050	-2.005	-1.959	-0.708	-1.890	-0.557	-0.186
20	18.395	6.534	1.180	-0.995	-1.494	-2.683	-2.143	-2.180	-2.736	-1.066	-1.606	-0.863	-0.917
30	18.436	5.405	0.709	-1.408	-1.837	-3.638	-2.541	-2.936	-3.030	-1.021	-1.969	-1.525	-1.411
40	17.806	4.659	0.200	-2.008	-2.643	-3.719	-2.347	-3.449	-2.931	-1.558	-2.702	-2.100	-1.783
50	16.989	4.195	-0.717	-2.931	-2.903	-4.267	-2.741	-3.339	-3.509	-2.128	-3.129	-2.346	-2.430
60	15.883	4.222	-1.258	-2.775	-3.383	-4.680	-2.704	-4.028	-3.979	-2.324	-3.437	-2.824	-2.884
70	14.964	3.538	-1.368	-3.105	-3.658	-4.751	-3.266	-4.361	-4.437	-3.267	-4.111	-3.540	-3.804
80	13.894	3.516	-1.698	-3.378	-3.683	-5.253	-3.723	-5.003	-4.598	-3.790	-4.863	-4.133	-4.035
90	12.626	2.876	-2.119	-3.603	-4.318	-5.786	-4.651	-5.732	-5.042	-4.470	-5.255	-4.498	-4.553
100	11.534	2.268	-2.453	-4.099	-4.910	-6.505	-5.824	-6.222	-5.864	-4.743	-5.530	-4.932	-4.714
110	11.087	1.963	-3.136	-4.612	-5.535	-5.999	-6.351	-6.941	-6.211	-4.981	-6.091	-5.108	-4.778
120	11.077	1.320	-3.352	-5.178	-6.388	-6.467	-7.082	-7.181	-6.437	-4.893	-6.204	-5.307	-5.346
130	10.596	0.887	-4.130	-6.146	-5.951	-6.838	-7.229	-6.706	-6.898	-4.711	-6.466	-5.743	-5.383
140	10.045	0.403	-3.511	-6.416	-6.648	-6.727	-7.471	-6.726	-6.028	-5.153	-6.304	-5.899	-5.682
150	9.974	-0.745	-3.935	-6.974	-7.024	-6.613	-8.021	-6.689	-6.399	-5.710	-6.588	-5.644	-5.621
160	9.368	-1.216	-4.492	-7.394	-7.251	-6.802	-7.930	-6.912	-6.547	-5.994	-7.055	-5.558	-5.988
170	8.724	-1.221	-4.363	-7.542	-7.580	-6.963	-8.238	-7.496	-7.008	-5.892	-7.023	-6.076	-6.181
180	8.213	-1.290	-4.615	-7.653	-7.747	-7.105	-8.753	-7.910	-7.458	-5.817	-7.463	-6.429	-6.584

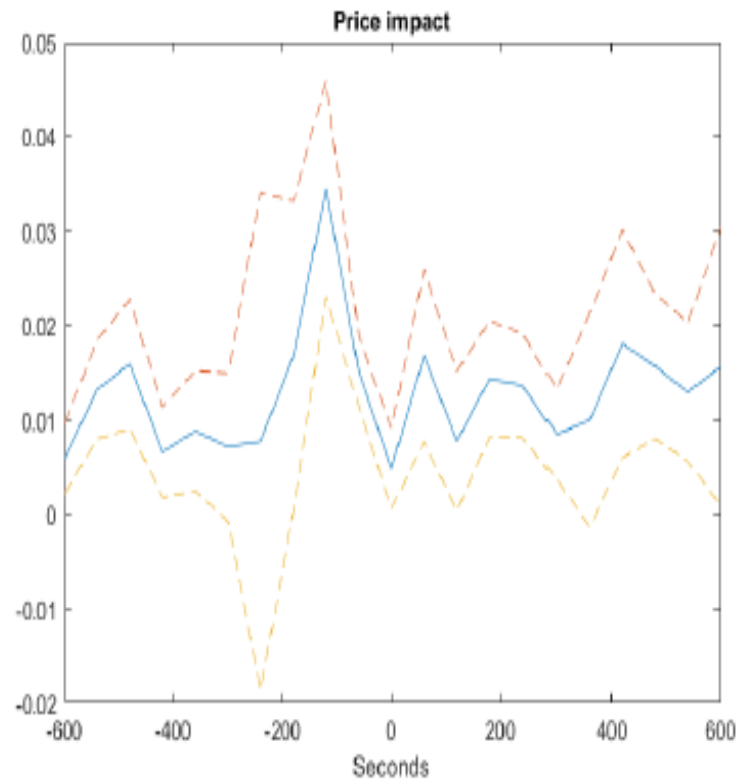
Persistent unfairness

Pump group name	All P&D channels			
	N	Average	Median	% Early
Alt the Way	303	9.79	7	12.5%
Crypto Mega Pumps Yobit	244	6.90	5	25.0%
The Pumpers	220	7.33	4	21.8%
Superb Pumps	180	7.05	6	20.6%
YoBit Pumpers	159	4.45	1	39.0%
Bittrex Signals	148	5.83	2	38.5%
World Pumps	130	6.65	3	16.9%
Crypto VIP Signals	116	4.99	1	38.8%
Premium Yobit Pump	107	11.29	9	11.2%
PumpZone	89	0.73	0	13.5%
Other channels	788	7.15	4	27.9%

Persistent unfairness--regressions

Dependent variable	All P&D channels			
	Delay time		Early dummy	
	(1a)	(1b)	(2a)	(2b)
Lagged delay time	0.293*** (15.17)	0.152*** (8.62)		
Lagged Early dummy			0.302*** (15.64)	0.301*** (13.46)
Constant	4.962*** (16.62)		0.171*** (17.82)	
P&D fixed effects	No	Yes	No	Yes
Observations	2,433	1,901	2,433	1,901
Adj. R-squared	0.09	0.87	0.09	0.59

Price impact



In contrast to standard trade-based manipulation narrative

- Standard narrative: Manipulators can make profits only if the price impact is greater when they buy than when they sell.
- Manipulators do not have to push the price up

Why outsiders are willing to participate?

- Overconfidence
- Gambling/skewness preference/probability weighting/salience

Determinants of Max return

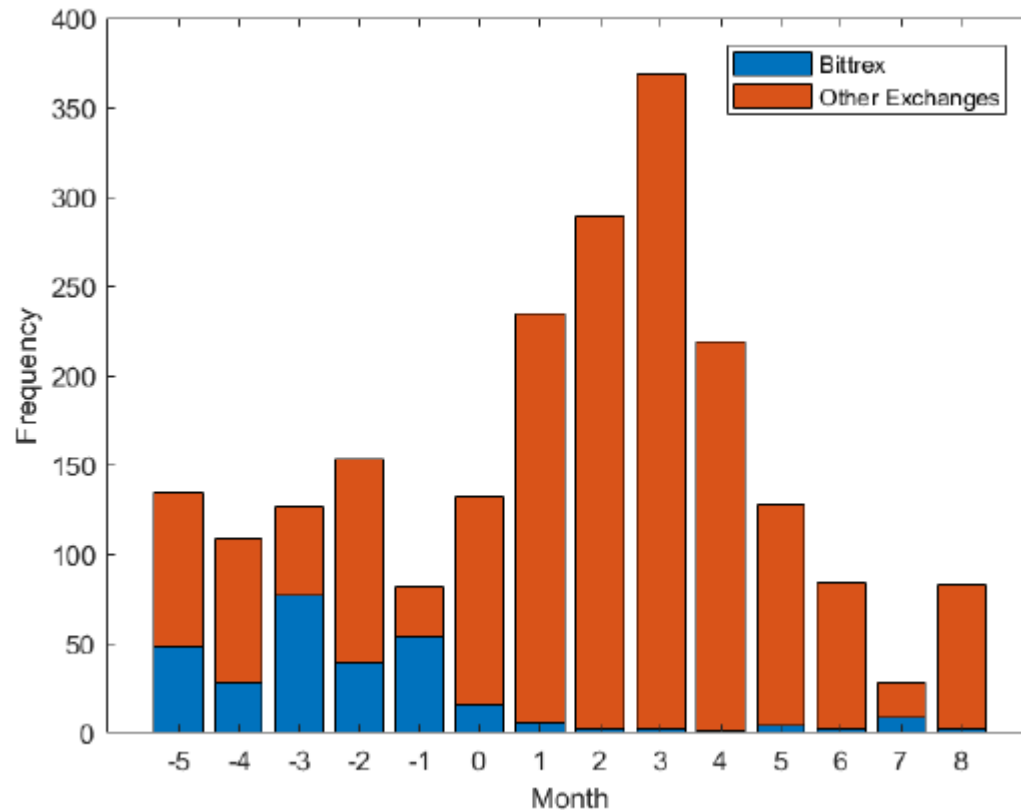
Dependent variable	Ordinary least squares					
	Maximum return			Minimum target return among channels		
	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)
Pre-pump liquidity	-0.114*** (-7.04)	-0.123*** (-7.19)	-0.107*** (-5.61)	-0.073*** (-2.85)	-0.073*** (-2.61)	-0.061* (-1.86)
Price run-up		-0.903*** (-4.24)	-0.767*** (-3.95)		0.023 (0.05)	-0.584 (-1.16)
Multiple Telegram channels			0.824*** (5.00)			1.038** (2.31)
Token age			-0.062** (-2.17)			-0.130 (-1.53)
Social media index			0.076* (1.69)			-0.018 (-0.17)
Delay in announcement			0.003 (1.06)			0.018*** (2.58)
Constant	1.041*** (9.76)	1.158*** (9.46)	0.358 (1.16)	2.370*** (20.99)	2.367*** (19.52)	1.703* (1.82)
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	500	500	500	229	229	229
Adj. R-squared	0.19	0.22	0.30	0.45	0.45	0.47
% (Dep variable = 1)						

Investor learning?

Dependent variable	$\Delta \text{Log (No. of channel viewers)}$				
	(1)	(2)	(3)	(4)	(5)
Average recent pump return	-0.010 (-1.05)	-0.009 (-0.92)	-0.009 (-0.84)	-0.009 (-0.84)	-0.010 (-1.04)
Average recent abnormal volume		0.011 (0.98)	0.011 (1.00)	0.011 (1.00)	0.013 (1.11)
Pre-pump liquidity			0.002 (0.29)	0.002 (0.29)	-0.004 (-0.32)
Price run-up				0.007 (0.09)	-0.012 (-0.15)
Multiple Telegram channels					-0.071** (-2.46)
Token age					0.012 (0.75)
Social media index					0.009 (0.60)
Delay in announcement					0.002 (1.36)
Constant	0.108 (0.80)	0.105 (0.80)	0.101 (0.74)	0.105 (0.76)	0.035 (0.20)
Month fixed effects	Yes	Yes	Yes	Yes	Yes
Channel fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	720	720	720	720	720
Adj. R-squared	0.05	0.06	0.06	0.06	0.07

Consequences of banning P&Ds

- On Nov 24, 2017, Bittrex banned P&Ds.

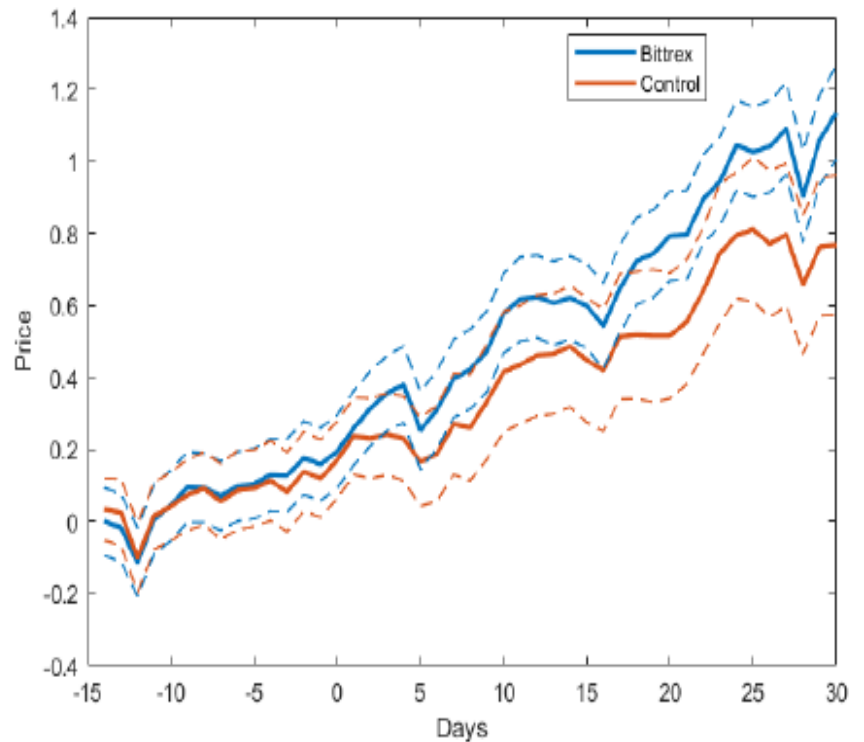
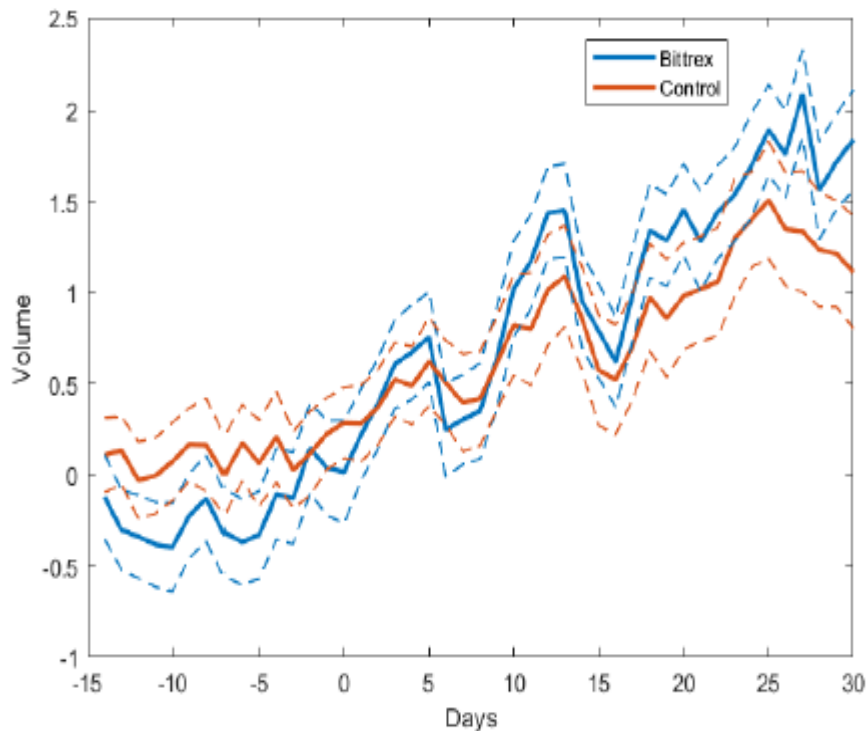


Method

- Difference-in-differences
- Treatment: tokens listed on Bittrex
- Controls: tokens on other exchanges, with similar trading volume over the period running from 60 days to 31 days before the ban
- 189 treated and control pairs

Volume and price

- Changes occurs almost exactly at 0.



Regressions

- Volume: 60%
- Price: 40%

Dependent variable	Volume		Price	
	(1)	(2)	(3)	(4)
Bittrex \times Post	0.639*** (5.25)	0.639*** (5.26)	0.401*** (3.88)	0.401*** (3.89)
Post	0.880*** (8.34)	0.880*** (8.35)	0.734*** (7.65)	0.734*** (7.66)
Bittrex	-0.311** (-2.15)		-0.033 (-0.49)	
Constant	0.096 (0.93)		0.033 (0.69)	
Token Fixed Effects	No	Yes	No	Yes
Observations	754	754	750	750
Adj. R-squared	0.14	0.78	0.23	0.60

Conclusions

- P&Ds are pervasive in the nascent cryptomarket.
- Significant wealth transfer
- Burgeoning cryptocurrency/Bitcoin literature
 - Blockchain technology
 - Bitcoin ecosystem
 - ICOs
 - Cryptocurrency price/risks/arbitrage
 - Other manipulations
 - Gandal, Hamrick, Moore, and Oberman (2008)
 - Griffin and Shams (2018b)

Policy implication

- Regulation
 - P&Ds are detrimental
 - Technological feasible
 - Wealth transfer
- Kyle and Viswanathan define “illegal” manipulations
 - Makes prices less accurate as signals for efficient resource allocation
 - Makes markets less liquid for risk transfer