

Cryptocurrency Pump-and-Dump Schemes

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Overview

Cryptocurrency Pump-and-Dump schemes (P&Ds) leverage encrypted messaging services to organize P&D events, with participants receiving information too late to realize any profit.

P&Ds schemes are pervasive in the cryptocurrency market and lead to short-term bubbles, lowering the informativeness of prices.

Empirical evidence suggests that group organizers act before scheduled time, absorbing all possible profits.

Results also indicate the persistent advantage of some P&D groups over others, suggesting further unfairness besides that which occurs between insiders, and outsiders.

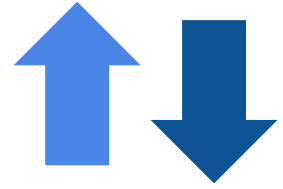
Bans, such as the Bittrex ban have been ineffective in reducing P&Ds overall, but effective in reducing them on platforms where they are banned, resulting in higher prices and volumes of tokens.





What are P&Ds?

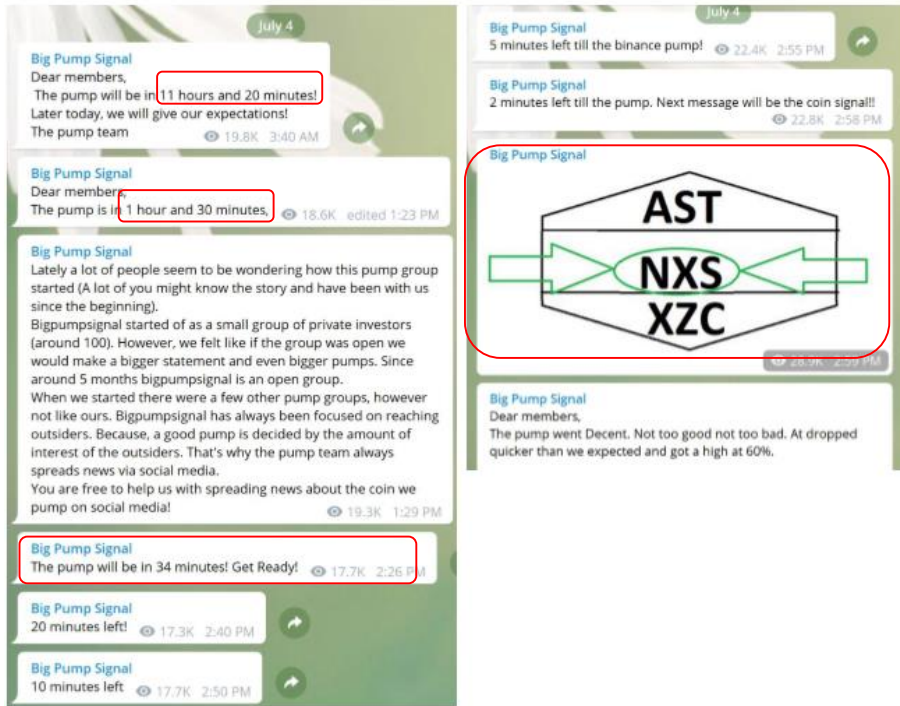
What are P&Ds?



- P&D is a form of price manipulation that involves **artificially inflating** an asset price before selling the cheaply purchased assets at a higher price.
- These schemes are often organized using **encrypted messaging apps** such as Telegram.
- “Pump groups” use **social media platforms** to attract investors.



A typical pump broadcast



1. Pump time announced
 2. Countdown to pump with reminders
 3. Reminder to spread the news once targeted token is announced
 4. Target token announced
-



Cryptocurrency and stock market P&Ds

A comparison of characteristics and regulation

Crypto vs. Stock market P&Ds



Duration	Minutes	Can take months
Information release	None	Release of false info
Regulation	Weak to none	SEC regulated - Illegal
Identification	Easy (Pump groups)	Difficult



Research aims & data collection

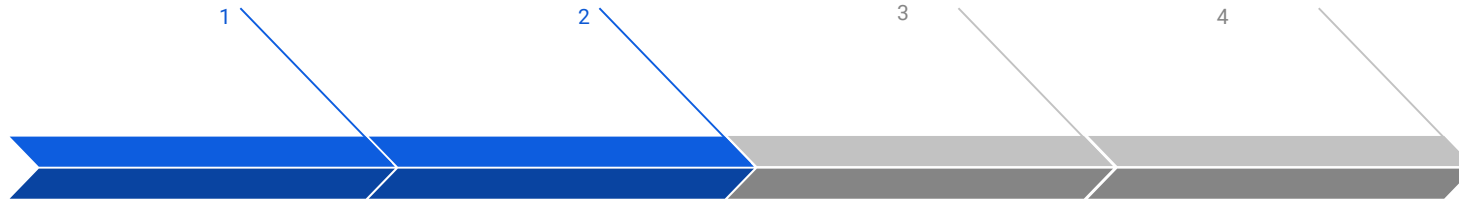
Aim of the study



- To provide evidence of P&Ds detrimental effects
- Provide explanation on why 'outsiders' are willing to participate



Data collection



Identify P&D groups

List of P&D groups collected from Reddit & BitCoinTalk

Internet search for additional groups

Identify tokens

Read all messages in P&D groups to obtain:

- Token name
- Target exchange
- Target time
- Number of message viewers

Restrictions

Only tokens traded at least once in the period from 37 - 8 days before the P&D announcement

Only P&Ds from active channels

Exchange trading data

Free Binance API

Yobit & Bittrex data purchased from Kaiko

Additional trade data for cross-listed tokens from CoinMarketCap



Potential problems with the data

Potential problems with the data

- No access to data from **closed Telegram** channels – analysis of inactive channels resulted in similar results to those of active channels indicating that closed channels might also perform similarly.
- Yobit & Bittrex had **some incomplete data** - an analysis of Binance only complete data yields similar results.
- Our sample channels were **picked from Reddit & BitcoinTalk** - it appears however that most Telegram channels are active on Reddit & BitcoinTalk.





Targeted and non-target tokens

A comparison of characteristics

Characteristics of targeted and non-targeted tokens

Using the t-value calculated on time series averages to compare tokens targeted by P&Ds, and those which are not reveals that targeted tokens tend to exhibit **higher trading volumes**, **lower volatility**, and are **more likely to be covered by CoinMarketCap**. These results are measured on each day that a pump occurs.

	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			

Social media index is the log of social media activity points computed by CryptoCompare.com

Persistent advantages of select Telegram groups

An empirical analysis of the top 10* pump groups announcement times.

(*Measured by the number of all P&Ds which they participate in)

Are all P&D groups equal?

Analysis of channel level data reveals that certain Telegram channels enjoy persistent advantages over others. Reported results are based on two samples:

- All P&D channels targeting Binance, Bittrex, and Yobit.
- All other channels for which trading data is available.

Results in panel A indicate significant heterogeneity in receiving pump signals across groups.

In panel B we regress a channel's delay in receiving a P&D signal on its lagged delay to test for persistence in delays. All results show strong persistence in delays, indicating additional unfairness besides that which occurs between insiders and outsiders.

Announcement delay times measured in seconds, positive indicates announcement occurred after the scheduled time.

Panel A. Delay in announcement (seconds)

Pump group name	All P&D channels				P&D channels with trading data			
	N	Average	Median	% Early	N	Average	Median	% Early
Alt the Way	303	9.79	7	12.5%	62	16.21	14	4.8%
Crypto Mega Pumps Yobit	244	6.90	5	25.0%	44	13.70	9	15.9%
The Pumps	220	7.33	4	21.8%	37	15.43	16	8.1%
Superb Pumps	180	7.05	6	20.6%	40	11.05	12	25.0%
YoBit Pumps	159	4.45	1	39.0%	31	14.74	30	22.6%
Bittrex Signals	148	5.83	2	38.5%	25	16.56	19	16.0%
World Pumps	130	6.65	3	16.9%	7	1.86	3	14.3%
Crypto VIP Signals	116	4.99	1	38.8%	23	14.61	25	21.7%
Premium Yobit Pump	107	11.29	9	11.2%	53	10.13	6	7.5%
PumpZone	89	0.73	0	13.5%	27	0.96	1	0.0%
Other channels	788	7.15	4	27.9%	439	6.38	4	25.1%

Results of regression analysis, in which dependent variable is either delay time or Early, dummy.

Panel B. Persistent advantages

Dependent variable	All P&D channels				P&Ds with trading data available			
	Delay time (1a)	Early dummy (1b)	Early dummy (2a)	Early dummy (2b)	Delay time (3a)	Early dummy (3b)	Early dummy (4a)	Early dummy (4b)
Lagged delay time	0.293*** (15.17)	0.152*** (8.62)			0.341*** (9.85)	0.109*** (2.99)		
Lagged Early dummy			0.302*** (15.64)	0.301*** (13.46)			0.290*** (8.24)	0.348*** (7.09)
Constant	4.962*** (16.62)		0.171*** (17.82)		6.052*** (9.74)		0.136*** (8.86)	
P&D fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,433	1,901	2,433	1,901	746	377	746	377
Adj. R-squared	0.09	0.87	0.09	0.59	0.11	0.87	0.08	0.52

Significance levels *** 5%, ** 10%, * 15%

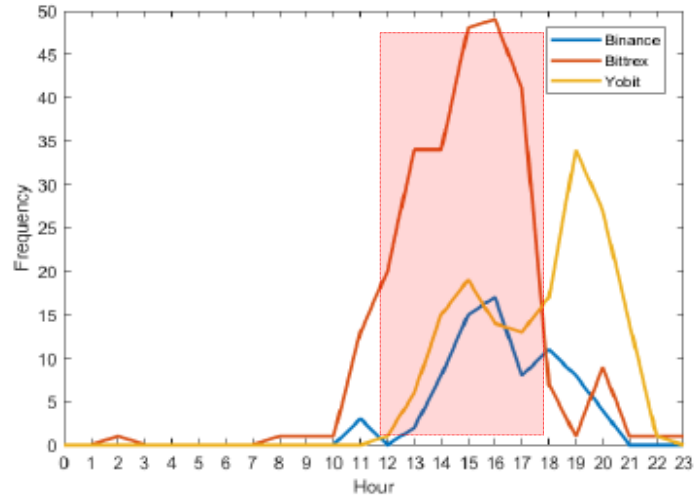
Performance of P&Ds

An empirical analysis of 80 active pump groups, covering 507 unique pump events, on 239 unique tokens from 15 May 2017 - 26 Aug 2018.

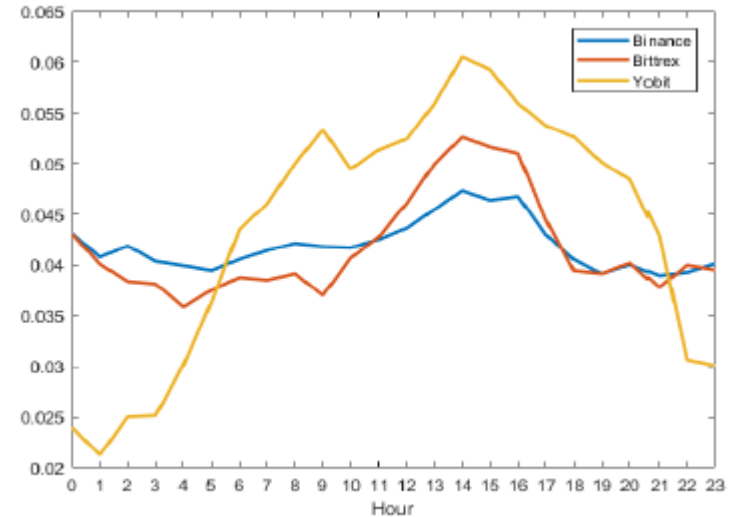
Distribution of P&Ds



Distribution of P&D events by hour reveal that Binance & Bittrex pumps they tend to occur between 13:00 and 16:00 (UTC), corresponding to US day time. Yobit pumps peak at 19:00.



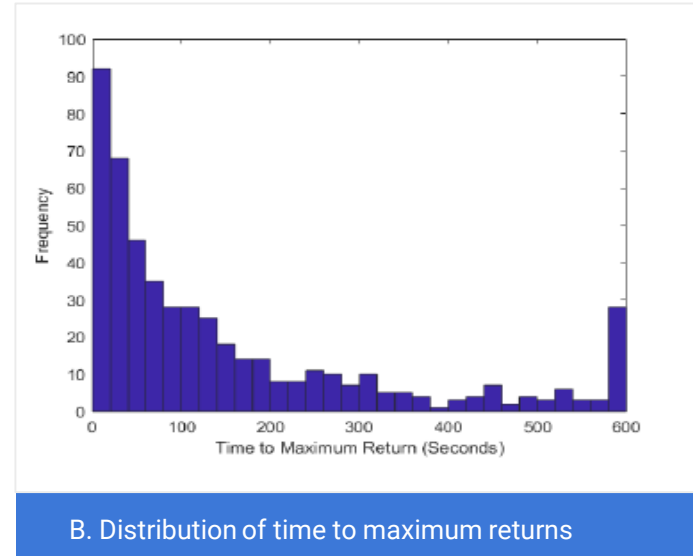
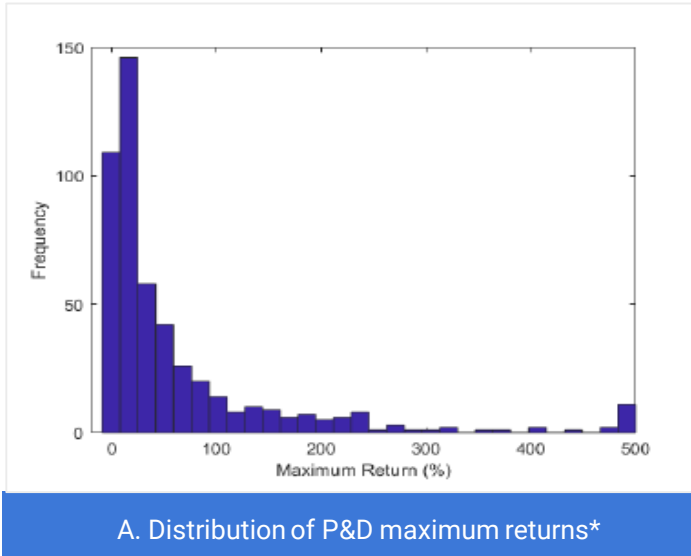
A. Distribution of P&D events by scheduled hour and exchange



B. Fraction of trading volume by hour and exchange

Distribution of maximum returns

Distribution of P&Ds maximum returns indicate that in most cases the price of the token does increase. The average maximum return is 68.94%, while the median is 24.39%. On average it takes 2.6 minutes for prices to reach the maximum level indicating that one needs to be fast to make profits.

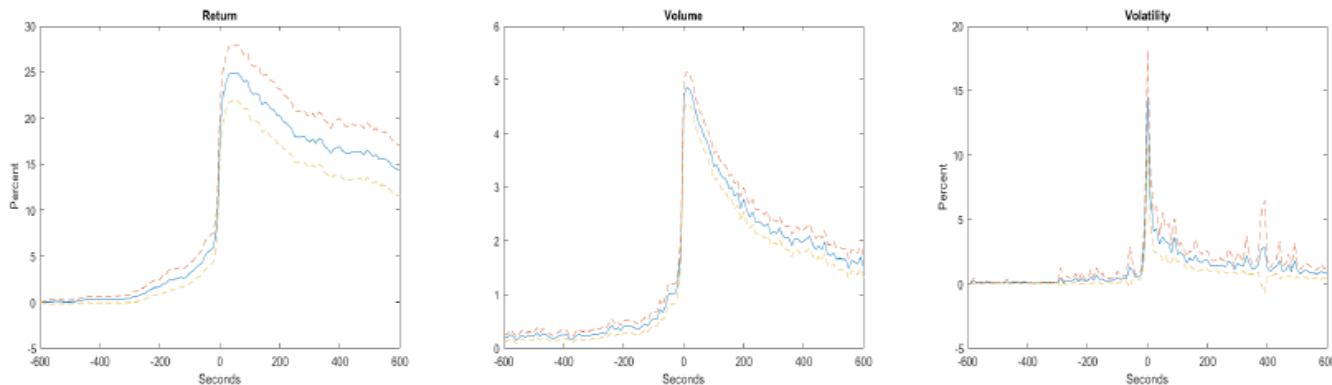


*A P&D's maximum return is defined as the ratio of the highest price achieved within 10 minutes after the pump announcement and the price ten minutes before the announcement minus 1

Return, Volume and Volatility Around Pump and Dumps

Cumulative returns show strong evidence that P&Ds move token prices and generate abnormal trading volumes. Changes in price begin before announcement time, suggesting potential leakages of information, possibly driven by VIP members of pump groups who tend to receive signals in advance.

Blue lines represent the mean across all targeted tokens, orange and yellow are the corresponding 95% confidence interval.



- Time 0 indicates 10 second interval from announcement
- Return := log change in price from 600 seconds before the announcement of P&Ds
- Volatility: = absolute value of returns in each 10-second interval

Average returns by purchase & sale time

An analysis of the mean achievable return for each purchase time-delay combination across P&Ds reveals that returns depend critically on when an investor buys and sells. Investors who buy before P&D (10 minutes before announcement) realize great returns. These results will likely overestimate investors' real performance as the returns will also be dependent on real-time liquidity.

	Purchase time, in seconds												
Delay time	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

Values highlighted in bold have significant t-values

Delay time:= Seconds waited before selling
 Purchase time is relative to announcement
 Before P&D is the 10 minutes before announcement - 'insiders'

Summary statistics

Characteristics of P&D events 15 May 2017 - 26 Aug 2018 indicate that on average announcements are delayed by 24.5 seconds which is outside of the 20 second time frame needed for the expected return to be positive.

<i>Event-level</i>	All (N=500)		Binance (N=76)		Bittrex (N=263)		Yobit (N=161)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Earliest channel's delay time (seconds)	21.7	4	20.1	5	14.0	4	34.9	3
Average delay time (seconds)	24.5	5.2	31.2	8	14.3	4.5	38.0	5.5
Average number of channels	1.58	1	1.42	1	1.08	1	2.45	1
Total number of viewers	5,941.5	2,094	22,445.0	3,049	3,887.1	2,382	1,507.0	1,038
Average number of viewers per channel	4,295.6	1,633	13,915.1	2,973	3,649.7	2,373	787.8	523.5

<i>Channel-level</i>	All (N=788)		Binance (N=108)		Bittrex (N=285)		Yobit (N=395)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Target return	211.5%	200%	69.0%	51.2%	246.9%	100%	233.0%	200%
Regular scheduled time	89.5%	100%	86.1%	100%	84.2%	100%	94.2%	100%

Definitions:

- Earliest channel's delay time = Earliest announcement - actual pump time
- Target return := pre-specified return before a P&D announcement
- Regular scheduled time := 1 if a channel's P&D announcement is scheduled at the regular pump time and 0 otherwise

Impact of a P&D ban

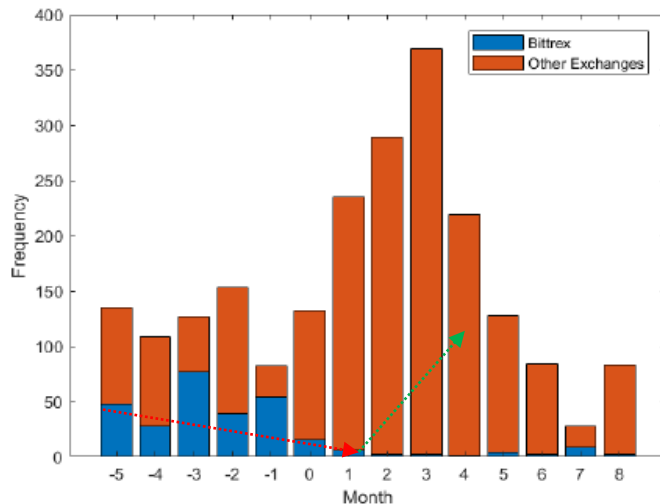
Case study : Bittrex ban of November 2017

Did the Bittrex ban have an impact?

In November 2017 Bittrex sent a notice to its customers warning that market manipulation tactics could lead to users being banned of having their accounts frozen.

The ban on Bittrex reduced P&Ds on Bittrex, although volumes on other exchanges increased.

Bans will likely only be effective **if all exchanges adhere to bans.**



Frequency of P&Ds around the ban

Did the Bittrex ban have an impact?

A difference-in-differences approach was used to examine the effects of the ban on prices and trading volumes.

Treatment group : All coins listed on Bittrex

Control group : All other tokens on CoinMarketCap not listed on Bittrex.

In both regressions the interaction term (Bittrex x Post) is both economically and statistically significant.

The Bittrex ban increased the prices and volume of its tokens by 40.1% and 63.9% respectively.

$$DV_{i,t} = \alpha + \beta_1 Bittrex_i + \beta_2 Post_t + \beta_3 Bittrex_i * Post_t + \epsilon_{i,t}$$

Dependent variable	Volume		Price	
	(1)	(2)	(3)	(4)
Bittrex × 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

DV is either volume or price

Bittrex is a dummy equal to 1 for Bittrex tokens and 0 for control tokens

Post is a dummy equal to 1 if it is after the ban and 0 otherwise



Why do outsiders participate in P&Ds?

Why are outsiders willing to participate?

- P&Ds attract overconfident investors that believe they can time the market better than others. (Daniel, Hirshleifer, and Subrahmanyam, 1998; Scheinkman and Xiong, 2003; Daniel and Hirshleifer, 2015)
- Salient thinking or prospect theory suggests that investors overweight the high returns experienced within the first 20 seconds of P&Ds when deciding to participate. (Barberis and Huang, 2008; Bordalo, Gennaioli, and Shleifer, 2012, 2013; Wang, 2018)



Conclusion

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P&Ds schemes are pervasive in the cryptocurrency market and lead to short-term bubbles, lowering the informativeness of prices.

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