



Fig. 3. Bread market price



Fig. 4. Dash market price

cryptomoneys from further analysis. Moreover, we observed that some of the altcoins contain only spam or advertorial tweets totally irrelevant to the information we are interested in. Without loss of information, we exclude corresponding altcoins from our analysis as well. In the following step, peak of each selected coin where they reach maximum price on the market are obtained.

Taking into consideration the facts mentioned above, we select six of these cryptomoneys (highlighted in Table II) to understand whether speculations on Twitter caused to change their exchange rate reasonably or not.

IV. ANALYSIS

Tweets concerning each selected altcoin are separated day by day to be compared to their daily market prices via statistical analysis. To do so, first of all, sentiment analysis via [13] is implemented for tweets of corresponding day and a quantitative score is obtained. The software produces a qualitative score for each tweet as very negative, negative, neutral, positive and very positive in terms of the sentiment it contains. We treated these results as -1, -0.5, 0, 0.5 and 1, respectively. Afterwards, by implementing sentiment analysis on the whole tweets of each altcoin for each day, we obtained daily scores reflecting the overall sentiment. Then data analysis plug-in of Microsoft Excel is exploited to perform regression analysis to see the effects of daily speculations on daily prices of alternative coins. Note that, market prices and sentiment scores are considered as dependent and independent variables in regression model, respectively. We focus on two parameters which are significance F and R-squared. Table III shows the

TABLE III
REGRESSION ANALYSIS RESULTS

Date	significance F	R-squared
Agrello	0,047	0,405
Bread	0,626	0,031
Bytecoin	0,410	0,076
Digibyte	0,033	0,449
Dogecoin	0,106	0,239
Icos	0,068	0,294

outcomes of regression analysis for corresponding parameters.

V. RESULTS AND DISCUSSION

The maximum value of R-squared, which is 1, denotes that all of the sentiment scores perfectly fit the line based on prices. This value is far away from the perfect case for Bread and Bytecoin altcoins. On the other hand, R-squared parameter is not bad in the case of Agrello, Digibyte, Dogecoin and Icos. Another parameter significance F represent the consistency between the dependent and independent variables and usually assumed to be considerable when it is less than 0,05. Therefore, we observe that regression result for Agrello, Bytecoin and Icos can be significant by taking into account their significance F results. These results show that price of an alternative coin may cruise in real world in parallel to the rumors in social media. In other words, it may be possible to predict bumps or pumps on cryptocurrency prices by means of monitoring the sentiments of people through micro-blogging sites wherein users feel free to express their feelings or opinions. Moreover, based on these results, price manipulation may also be possible as well through intended groups organized for self benefits.

VI. FUTURE WORK

The first thing to emphasize is that, this study reflects the results of a short term data. For this reason we had to exclude many of the alternative coins in in Table II since they generally contain spam tweets instead of opinions or sentiments of users which can increase the performance of regression analysis. A future work with a long term data containing rumors of an altcoin which experiences several bumps or pumps during this period would be more beneficial to see exact relationship between two variables. Moreover, Bayesian regression model could also be implemented on such a big data confidently to obtain more accurate results.

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