Cryptocurrency Crashes: A Dataset for Measuring the Effect of Regulatory News in Online Media

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Abstract. Cryptocurrencies are novel means for transacting value, promising lower transaction costs and a complete transaction history, which cannot be manipulated. Systematic risks to such transaction systems are posed by regulatory actions that put strong restrictions on usage – up to complete bans of cryptocurrencies. Prior research has studied the effect of regulatory news on cryptocurrency pricing and found price effects of news of regulatory actions of authorities. We propose a novel dataset of news from online media that loosely relates to cryptocurrency regulation, but includes also opinions and rumors. The proposed dataset allows to study drivers of crashes and risks in cryptocurrency markets.

Keywords: Cryptocurrencies, Regulatory News, Online Media, Flash Crashes, Transaction System Risks.

1 Introduction

A potentially large systematic risk for financial transaction systems provided by cryptocurrencies arises from price flash crashes because they might result in a strong decrease in real world adoption as a store of value. Cryptocurrencies are novel, still mostly unregulated digital currencies and financial assets that have been increasingly subject to public attention and research (e.g., Corbet et al., 2018, Auer and Claessens, 2018). The most well-known and oldest digital currency is Bitcoin, founded in 2009 (Nakamoto, 2009). These digital currencies are organized decentrally by a computational network and a shared digital ledger. Potential benefits of digital currencies include almost zero transactions costs, worldwide availability, and near-instantaneous execution. Furthermore, due to the shared ledger, the full history of transactions can be looked up by anyone – and due to technical mechanisms, the manipulation of transactions is unlikely.

Despite promising advantages of cryptocurrencies, the real world adoption is still quite low. That is, these currencies are not yet used for everyday consumption transactions by retail users on a large scale. However, cryptocurrencies are subject to quite extensive speculation and the exchange rate to real world currencies (e.g., EUR, USD) has been fluctuating wildly. The price of Bitcoin decreased to almost a fifth of its value from more than 19,000 USD in December 2017 to less than 4,000 USD in November 2018 – with extensive up- and down-swings in between. An abrupt version of a down-swing is commonly known as a flash crash, i.e., a substantial price decrease in a short

period of time. An example of such a flash crash is provided by the Bitcoin price drop of 12% in only 24h, starting September 5, 2018. This flash crash was caused by a report that the investment firm Goldman Sachs had dropped its plan for a Bitcoin trading desk (Cryptovest, 2018). Beside news about real-world adoption of cryptocurrencies, regulatory news has been found by recent research to be a major driver of such flash crashes (Auer and Claessens, 2018). Regulatory news includes easing adoption or even bans of usage of cryptocurrencies.

Against this backdrop, our research addresses data engineering to help studying the effects of regulatory news on cryptocurrency prices, causing potentially large price drops. Specifically, the objective of our research is to propose a new dataset of regulatory news from online media that includes also rumors and opinionated content. Regarding systematic market risks, especially price decreases are interesting because they mean that Bitcoin miners receive less real world currency compensation for running computational nodes in the Bitcoin network. In case the number of nodes decreases (like in November 2018), the transactional capacity decreases and eventually, the whole network is at stake. To the extent, the network is used for transferring real world value, such events pose substantial real world implications. Therefore, price crashes in cryptocurrencies represent a systematic risk.

The paper proceeds as follows: We first discuss related work. Then, we describe our dataset. Finally, we conclude.

2   Related work

Empirical research found the ban for Chinese financial institutions to use Bitcoin in 2013 to have caused a negative price reaction (Fry & Cheah, 2016). A recent study supports this finding by identifying 151 regulatory news relating "to actions and statements made by authorities" in the period from beginning of 2015 until end of June 2018 (Auer & Claessens, 2018, p.54). Auer and Claessens found negative price impacts for Bitcoin (in USD) for general bans, treatments under securities law (possibly expecting a too tight regulation), and resistance to treat Bitcoin as currency. These price reactions were found to stretch over a 10-day period after the news release. Furthermore, they found positive price impacts for news regarding increasing legality and introduction of a defined legal status for cryptocurrencies and initial coin offerings. Interestingly, Bitcoin price reactions with respect to a collection of news from monetary policy makers of the Federal Reserve, European Central Bank, Bank of Japan, and Bank of England regarding regular currency were not found in an event study (Vidal-Tomas and Ibanez, 2018). This finding implies that there is no spillover from policy events regarding real economy to Bitcoin pricing. However, Vidal-Tomas and Ibanez also studied effects of news events that relate directly to Bitcoin such as the introduction of cryptocurrency financial instruments in established markets such as futures and options markets. They found negative Bitcoin-related news to have an effect on Bitcoin pricing but did find only limited evidence for effects of positive news.

In contrast to Auer and Claessens, our dataset covers a one year longer time span from November 2013 until end of May 2018 and has a different scope. Contrary to

Auer & Claessens we did not include official regulatory statements from authorities but rather price-relevant news from online media filed under "Bitcoin Regulation News" (Cointelegraph, 2018). Thus, our dataset includes information relating to actual regulation measures. Additionally, our dataset includes news about planned regulations, investigations, rumors, and opinions – potentially allowing to anticipate regulation measures and subsequent systematic price risks or transaction system risks.

3   Dataset

We describe the proposed dataset of regulatory news for identifying effects of such news on cryptocurrency returns.

The dataset consists of 69 unique regulatory news articles from online media (Cointelegraph, 2018; Figure 1) from November 2013 until end of May 2018. The articles refer to regulation in the following countries: Australia (4), Canada (1), China (14), EU (5), France (1), Germany (1), India (5), Japan (3), Philippines (1), Russia (9), South Korea (7), Taiwan (1), Turkey (1), UK (3), USA (11), and news without specific country (2). Articles were selected by one of the authors to be relevant for Bitcoin pricing and were categorized in a positive vs. negative price reaction expectation. 37 news were categorized as positive regarding the expected price impact and 32 news were categorized as negative regarding the expected price impact. The distribution of positive vs. negative news per year is displayed in Table 1.

Table 1. Distribution of news over years in our dataset.

Year	Number of positive news	Number of negative news
2013	2	2
2014	2	2
2015	6	4
2016	10	4
2017	12	12
2018	5	8
Total	37	32

An example for positive regulation news is "Canadian Senate Rules in Favor of 'An Almost Hands-Off Approach' to Bitcoin" (Cointelegraph, Jun. 19, 2015), referring to a report by the Canadian Senate. The report clearly shows the positive stance of the Canadian government on cryptocurrencies, by recognizing the benefits of the blockchain technology and by committing to policies, which promote a wider adoption. An example for negative news is "BREAKING: China May Cut Off Cheap Power To Bitcoin Miners?" (Cointelegraph, Nov. 14, 2017). According to the article one of China's state owned hydro based power companies was about to cut off its cheap power

supply to bitcoin mining farms, calling into question the legal status of the cryptocurrency.

Using regression, we plan to analyze the effect of positive vs. negative news in our dataset on Bitcoin prices.

4   Conclusion

Prior research has studied price effects of regulatory news referring to actions and statements of authorities with respect to cryptocurrencies (Auer and Claessens, 2018). Also price effects of policy making news events of central banks and general Bitcoin-related news were studied (Vidal-Tomas and Ibanez, 2018). Price effects can be very substantial in case of news relating to the ban of cryptocurrencies. In case of (rumors of) bans, market crashes can be induced. Considering that cryptocurrencies pose means for transacting value in a decentralized manner, such crashes can be seen as systematic risk. Our work contributes towards understanding the driver of such crashes and systematic risks. We constructed a unique dataset of regulatory news to help to empirically study the effects on Bitcoin pricing. In contrast to prior work of Auer and Claessens, our dataset was sourced from online media that may only loosely refer to actual regulatory actions of authorities, but also includes rumors and opinions related to such actions.

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