

The art of blade grasp: historical drawdown statistics on common cryptos

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ABSTRACT: Historical drawdown statistics in magnitude, length and frequency shed light on trading decisions and portfolio risk management, particularly so in the emerging markets. We present in this article the historical drawdown magnitudes and frequencies of top 50 cap cryptos since mid 2013, design a stability score based on these metrics and give their rankings accordingly.

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1 Introduction

Blade grasp, also know as Shirahadori, is a legendary defense technique to catch falling blades with bare hands, at least in cartoons. The real life technique of this name, however, does not involve blocking a sword but rather preventing the opponent from drawing his sword. More importantly, we would like to point out that your feet are much more trustworthy against any armed opponents than your bare hands in almost all scenarios. In case it is really too late to run, a wiser move is to dodge, rush in and seize your opponent's sword or hand while he stops at the end of swing or draws back, instead of catching the flat of a blade at 40 mph. This is however NOT to offer a fencing advice, you are responsible for your defense decisions at your own risk.



The crypto market has been growing rapidly for a few years, as the world is getting to know the value and profound influence of the blockchain technology. What are the rules of thumb in crypto investments, if any? We constructed a few passive investing strategies in Ref. [1] and discussed the importance to invest with spare cash passively. This is the only way to profit for most investors.

On the other hand, much like 'catching a falling knife', bottom-copying is widely regarded as a risky investment approach. It is however strongly favored by value investors and reversion speculators under certain circumstances, who buy good stocks in the plunge and hold on until recovery or hitting new highs. From a more quantitative point of view, market or strategy declines are always watched over closely in all trading groups as one of the most important indicators for strategy assessment out-of-sample or even a regime change. Both require knowledge of historical drawdowns. An extraordinary drawdown in magnitude, length or multiple downs in higher frequency raises red flags and might require prompt measures in risk management.

We present in this article the historical drawdown statistics for top 50 cap cryptos since mid 2013. Section 2 breaks down the drawdown occurrences in magnitude ranges. Section 3 defines and gives crypto stability scores on period length, down magnitude and frequency, followed by conclusions in Section 4.

2 Historical drawdown statistics

If $X = X(t)$, $t \geq 0$ is the cumulative return with $X(0) = 0$, the max drawdown at time T , $MDD(T)$ is the measure of decline in percentage from historical peak to trough as in Eq. 2.1, and a drawdown is the max drawdown percentage between any two nonadjacent new highs at t_1 and t_2 , see Eq. 2.2. Note the cycle containing a new high, drawdown and the next new high only has one drawdown by this definition, and we do not include any internal cycles in between, e.g. Bitcoin movement between the end of 2013 and early 2017 is counted only as one single drawdown.

$$MDD(T) = \max_{\tau \in (0, T)} \left[\frac{\max_{t \in (0, \tau)} X(t) - X(\tau)}{\max_{t \in (0, \tau)} X(t)} \right] \quad (2.1)$$

$$MDD(t_1, t_2) = \max_{\tau \in (t_1, t_2)} \left[\frac{\max_{t \in (t_1, \tau)} X(t) - X(\tau)}{\max_{t \in (t_1, \tau)} X(t)} \right] \quad (2.2)$$

We picked the cryptos among the top 50 cap as of February 2018, removed anchor currencies like USDT and any cryptos with a history less than half a year for fairer and more relevant assessments, and collected statistics on their drawdown magnitudes and frequencies starting mid 2013. Since newly launched cryptos are highly volatile and not of statistical significance, we removed the first month of price movements upon inception. We also disregard all drawdowns below 5%, as they are commonly observed and do not offer much insight in crypto stability.

| crypto | 5-10% | 10-15% | 15-20% | 20-30% | 30-40% | 40-50% | 50%+ |
|------------|-------|--------|--------|--------|--------|--------|------|
| Bitcoin | 8 | 1 | 6 | 3 | 3 | 0 | 3 |
| Ethereum | 6 | 3 | 4 | 3 | 1 | 1 | 5 |
| Ripple | 1 | 4 | 4 | 1 | 1 | 0 | 6 |
| BCH | 2 | 0 | 0 | 1 | 1 | 0 | 3 |
| Litecoin | 4 | 6 | 0 | 4 | 2 | 0 | 3 |
| Stellar | 4 | 1 | 1 | 5 | 3 | 2 | 6 |
| NEO | 3 | 3 | 1 | 5 | 1 | 1 | 4 |
| EOS | 2 | 0 | 1 | 1 | 2 | 0 | 1 |
| IOTA | 2 | 0 | 2 | 1 | 0 | 0 | 2 |
| Dash | 6 | 6 | 4 | 4 | 5 | 3 | 6 |
| NEM | 9 | 10 | 5 | 6 | 2 | 1 | 4 |
| Monero | 8 | 8 | 4 | 3 | 1 | 3 | 4 |
| ETC | 1 | 4 | 1 | 5 | 3 | 0 | 3 |
| Lisk | 4 | 2 | 1 | 8 | 4 | 2 | 6 |
| Qtum | 3 | 0 | 0 | 4 | 0 | 0 | 3 |
| Vechain | 2 | 2 | 0 | 2 | 1 | 0 | 2 |
| ZCash | 1 | 0 | 0 | 2 | 0 | 0 | 2 |
| OmiseGo | 1 | 2 | 1 | 5 | 1 | 0 | 2 |
| Raiblocks | 4 | 4 | 1 | 5 | 0 | 2 | 4 |
| Steem | 1 | 1 | 1 | 2 | 2 | 2 | 4 |
| BNB | 1 | 2 | 1 | 4 | 0 | 1 | 2 |
| Populous | 4 | 2 | 1 | 4 | 1 | 0 | 2 |
| Bytecoin | 11 | 6 | 3 | 15 | 4 | 3 | 7 |
| Stratis | 8 | 9 | 3 | 3 | 1 | 1 | 4 |
| Verge | 5 | 9 | 7 | 11 | 20 | 12 | 16 |
| Siacoin | 5 | 4 | 8 | 7 | 2 | 1 | 4 |
| Status | 0 | 0 | 1 | 0 | 3 | 0 | 3 |
| Dogecoin | 2 | 2 | 4 | 1 | 2 | 1 | 5 |
| BitShares | 5 | 2 | 2 | 4 | 0 | 1 | 3 |
| Waves | 5 | 1 | 2 | 2 | 0 | 1 | 3 |
| WTC | 1 | 3 | 0 | 1 | 2 | 3 | 2 |
| Aeternity | 3 | 0 | 1 | 2 | 2 | 2 | 2 |
| Augur | 5 | 4 | 7 | 5 | 1 | 2 | 5 |
| Veritaseum | 1 | 3 | 2 | 0 | 0 | 2 | 2 |
| HShare | 2 | 0 | 0 | 1 | 1 | 0 | 2 |
| 0x | 2 | 2 | 0 | 0 | 0 | 0 | 2 |
| Decred | 12 | 6 | 4 | 4 | 2 | 3 | 4 |
| Ardor | 4 | 8 | 2 | 2 | 1 | 1 | 2 |
| DigixDao | 4 | 2 | 5 | 5 | 1 | 2 | 4 |
| Komodo | 0 | 4 | 3 | 5 | 1 | 0 | 3 |

Table 1. Drawdown statistics on top 50 cap cryptos.

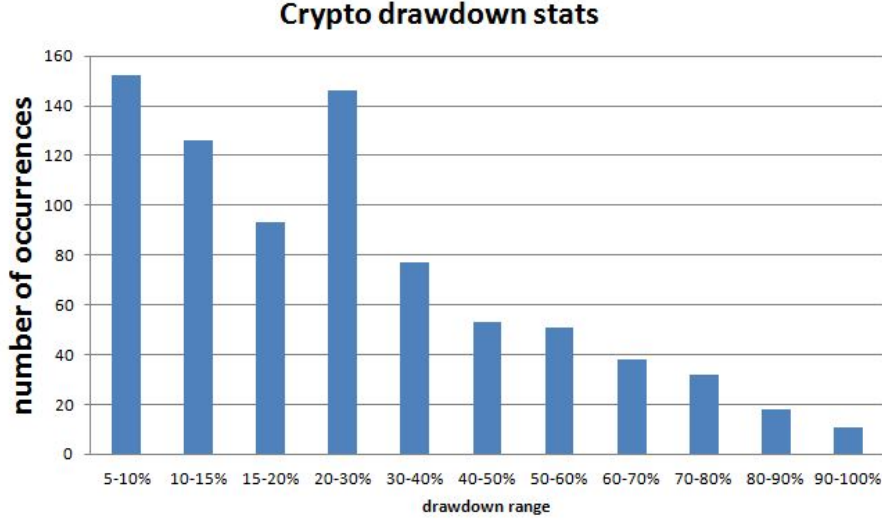


Figure 1. Drawdown frequencies break-down on top 50 cap cryptos. The x-axis is the magnitude and y-axis the number of occurrences.

The statistics is shown in Table 1, where we present the number of downs in corresponding magnitude ranges for all cryptos in consideration. Focusing on the plunges over 50%, we see Verge headed down in this magnitude for 16 times, way beyond the second tier in line. The next tier include: Bytecoin, 7 times; Ripple, Stellar, Dash, Lisk: 6 times, Ethereum, Dogecoin, Augur: 5 times. Most of them are small cap cryptos at the time of declines, which underlined the risks involved betting on smaller caps. Bitcoin sits at the stabler end of the spectrum with only 3 downs over 50%: December 2013, 2014-15 and the ongoing bear market starting end of 2017. As the first crypto with longest history, Bitcoins are relatively held more diversely, and whales are usually rational, firm believers in crypto prospects, resulting in fewer liquidations at times of turmoil.

In view of the strong correlation among all crypto prices much like the stock market, we concatenated all statistics from these cryptos and summarized the down distribution in magnitudes in Fig. 1. The x-axis is the down magnitude ranges, and the y-axis the number of observations accordingly. We see the frequencies of crypto downs roughly follow an exponential decay as the magnitude increases, as is expected of typical financial instrments, but with a fatter tail above 50%. This implies the bottoms in crypto market cycles tend to be lower than expected. Note the intervals below 20% are in 5% increments, and those above 20% are in 10% increments.

3 Stability scoring

Based on the drawdown statistics in Table 1, it is possible to evaluate the stability of these cryptos. We define the stability score (S) as the weighted average on a crypto's down occurrences O_i at interval i , with the mid value of each magnitude range as weight, see Eq. 3.1. Ranges below 20% are in increments of 5%, and above 20% in increments of 10%.

All downs less than 5% are again not counted for consistency. Note these cryptos have varied history in lengths, and a fair ranking must take into account the number of days upon inception - older cryptos naturally decline more than the new ones and deserve certain compensation. We take the final weight as the mid value in range (mid_i) divided by number of days (N) since launched, multiplied by 100 for better readability. The stability scores are shown in Table 2.

$$S = \sum_{i \in 5\%-10\%, \dots, 90\%-100\%} O_i * (\frac{mid_i}{N} * 100) \quad (3.1)$$

| crypto | stability | crypto | stability |
|-----------|-----------|------------|-----------|
| Litecoin | 28 | NEO | 98 |
| Bitcoin | 32 | Bytecoin | 101 |
| Ripple | 37 | Augur | 105 |
| BitShares | 38 | Decred | 106 |
| Dogecoin | 42 | Stratis | 118 |
| ZCash | 46 | Veritaseum | 120 |
| Monero | 55 | Komodo | 122 |
| Stellar | 61 | BCH | 126 |
| Waves | 67 | Qtum | 127 |
| Ethereum | 68 | HShare | 132 |
| Dash | 69 | Lisk | 133 |
| NEM | 78 | Vechain | 134 |
| EOS | 80 | Status | 142 |
| Steem | 81 | OmiseGo | 153 |
| IOTA | 87 | Populous | 156 |
| ETC | 88 | Aeternity | 159 |
| Ardor | 90 | BNB | 164 |
| 0x | 93 | Raiblocks | 177 |
| Siacoin | 95 | WTC | 231 |
| DigixDao | 96 | Verge | 233 |

Table 2. Stability scores for top 50 cap cryptos.

Note lower scores indicate better stability, i.e. fewer weighted drawdowns. We see old cryptos like Bitcoin, Litecoin, Ripple and BitShares passed the most volatile cycles upon inception and are hence relatively stable, whereas new participants like WTC, BNB, Verge, Vechain, or cyptos with unclear future like Raiblocks, HShare tend to soar and slump dramatically. Some may wonder how Dogecoin sneaks in the top 5 list, that is because its historical price features strong cyclicity, and according to our definition in Section 2, this crypto did not really go down very often - the stability score does imply certain predictability or cyclicity especially for old cryptos. Once again, we would like to remind our readers that the stability score here is solely based on drawdown statistics, and carries no direct

information from crypto volatility. It is but one dimension to understand the market risk from a quantitative point of view.

4 Conclusion

We collected the drawdowns in frequency and magnitude for top 50 cap cryptos, presented the concatenated occurrence break-down in magnitude ranges and calculated their stability score based on the drawdown statistics. We hope this analysis serves a complementary dimension for value investors, short-term speculators and portfolio risk managers in the crypto domain.

References

- [1] K. Lamperouge, *founder of cryptosmartbeta.com*,
<https://cryptosmartbeta.com/passive-crypto-investing/>, 2018.