

LCI 20

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1 Outline

Our index Lykke Crypto Index 20 (LCI 20) is a weighted average of current market capitalization.

Some Text.¹

We focus on weighted average but have maximum weights

Trimborn and Härdle (2016)

Perfect for ETFs: An equal-quantity portfolio with $q_{i,t} = c$, $c \in \mathbb{R}$, is a one-to-one replication of our LCI (20). Perfect for building ETFs - no rebalancing costs.

1.1 Definition

Let t denote time index starting at time t_0 , $t = t_0, t_1, t_2, \dots$. And let \mathcal{C}_t denote the set of coins that are traded at time t .

- Price $p_{i,t}$: price of asset i at time t
- Quantity $q_{i,t}$: overall number of shares/items per asset i at time t
- Market Capitalization of asset i at time t is $c_{i,t}$

$$\text{LCI20}_t = \frac{\sum_{i \in \mathcal{C}_t} w_{i,t} c_{i,t}}{\text{Divisor}}$$

One disadvantage of the real-time re-weighting is that

1.2 Addressing splits

For anticipated splits/forks we propose an adaptive smoothing technique for addressing “insane” price movements in direct aftermath.

¹Code and .tex-files can be found at <https://github.com/onnokleen/crypto-index>

1.3 Calculating LCI 20

1. Calculate each coins market share $s_{i,t}$.
2. Truncate market shares by maximum \bar{s} : $\bar{s}_{i,t} = \max\{s_{i,t}, \bar{s}\}$
3. Rescale them, so weights sum up to one: $w_{i,t} = \frac{\bar{s}_{i,t}}{\sum_{i \in \mathcal{C}_t} \bar{s}_{i,t}}$. Note that $w_{i,t}$ is afterwards greater than 0.25 due to rescaling.

4.

$$\widetilde{\text{LCI20}}_t = \sum_{i \in \mathcal{C}_t} w_{i,t} c_{i,t}$$

5. The initial value of the weighted sum is given by

$$\widetilde{\text{LCI20}}_{t_0} = \sum_{i \in \mathcal{C}_t} w_{i,t_0} c_{i,t_0}$$

6. $\text{Divisor} = \widetilde{\text{LCI20}}_{t_0} * 100$

1.4 Questions to address

- Why 20 currencies? 19-09-2017 14:41 20th market capitalization (STEEM) is only \$286.382.955 and 24 hour trading volume of \$686. Further, the 20 currencies with the highest market capitalization have a share of 92 % of the total market capitalization and a 24 hour trading volume of 94 % of the total trading volume of September 22, 2017. If we add another 30 currencies, the 24 hour trading volume increases by 2 percentage points where we think that a smaller but better traceable index outweighs an index with a larger but more volatile currency base.
- “Dead coins” a problem?
- If there is a split (like Bitcoin), new currency is part of Lykke 20 but is part of constituents-check at the end of the week.
- Basis: 100 Punkte?
- How to get market capitalization of public float?
- Maximal weight maybe 20%? DAX: Maximum weight 10%.

Table 1: Table explaining differences: proposal vs. example

Issue	Our Proposal	Example
Frequency	Real-time	Daily
Split-smoothing	See Subsection 1.2	Not necessary due to daily data
Public float	Only use coins that have been traded the last 4 years - weekly updated (real-time tracking difficult)	nothing
“Zombie coins”	Only use coins that have been traded the last 4 years	only use 0.30%

Notes: In this table differences in implementation of our example and our actual proposal are reported.

Wikipedia: In general, the large holdings of founding shareholders, corporate cross-holdings, and government holdings in partially privatized companies are excluded when calculating the size of a public float.

<https://www.coindesk.com/rethinking-bitcoin-market-cap/>: In 2014, NVIDIA engineer John Ratcliff theorized that approximately 30% of the current bitcoin supply is made up of “zombie” bitcoins that have been inactive for more than a year. This number includes bitcoins connected to inaccessible wallets, government-seized bitcoins, “burned” bitcoins and bitcoins abandoned during the early days of bitcoins, including Nakamoto’s mythical stash of over a million bitcoins.

1.5 How does it work in other indices

- DAX: Weighting based on market capitalization of public float (be- deutet Streubesitz, keine Aktien von Langzeitanlegern wie Familie Porsche/Quant).

1.6 Features

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- Constituent changes each week. Maybe Friday? Maybe based on trade volume in last 7 days? Good against “dead coins”.

2 Example

Data is from <https://www.kaggle.com/sudalairajkumar/cryptocurrencypricehistory> or CoinCap.io via Rest API

Something nice to illustrate:

- Volatility in August (Bitcoin-split versus July). Show new composition after split.

3 Splits

References

TRIMBORN, S. and HÄRDLE, W. (2016). CRIX: an index for blockchain based currencies, *SFB 649 Discussion Paper 2016-021*.