
# Bitcoin and News Around the World in Twenty-Six Languages

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**"Big Data and Machine Learning in Finance"**

*Politecnico di Milano, 11 June 2021*

Joint
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# Contents

# Problem definition

- Cryptocurrencies are famous for their high volatility
- Is volatility driven by fundamentals or by other factors
- Price discovery “noisy” for cryptos wrt other asset classes
- → **What is the role of sentiment in news for cryptos pricing**

# The data

- Time span: April 16, 2014 to August 31, 2020
- High frequency data on BTC quotes from Kaiko
- Sentiment scoring of news extracted from a large variety of sources and languages, from EC's Europe Media Monitor

# The data: Price data (1)

- 6 exchanges: three in Asia (OkCoin in China, Bitfinex in China (Hong Kong), and Quoine in Japan), one in Europe (Bitstamp in Luxembourg), and two in US (Coinbase and Kraken).
- We choose these exchanges because they have long trading history to match with our EMM sample period, and high enough trading volume to alleviate liquidity issues.
- **Returns**
- **Netbuy**

# The data: Europe Media Monitor (EMM) (1)

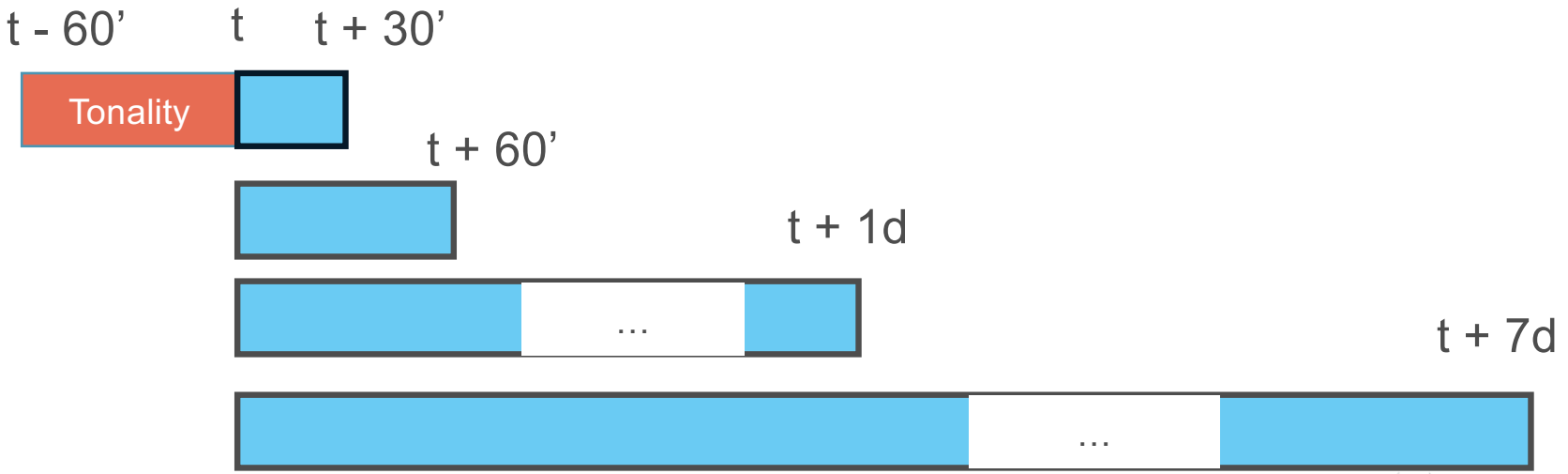
- EMM newsbrief is an automatic system that collects and analyses news media.
- Monitors a selected list of sources for news items, in up to 72 languages.
- Generates structured (meta) data (entities, events, categories …)
- Includes three methods for sentiment, emotion, tonality
- “JRC tonality” algorithm: +/- 1 for slightly positive/negative terms, +/- 4 for strongly positive/negative terms. Normalized by word count.

# The data: Europe Media Monitor (EMM) (2)

- Articles belonging to “Bitcoin” category (inclusion based on appearance of keywords and criteria determined by subject matter experts).
- List of sources include most major online newspapers, and a set of specialised news outlets
- 403,112 articles in 26 languages (184,354 of which in English).
- **Time-stamp** (retrieval), **language**, “JRC **tonality**”
- Aggregate in 1-hour intervals, for English and all other languages Retain all intervals with articles both in English and other languages
- About 30 thousand 1-hr time intervals (67% of available)

# Methods:

- Divide every day in 24 1-hour time intervals t. (t = 0 : 23)
- Calculate tonality over period (t-1hr:t)
- Calculate returns and netbuy of periods (t:t+k), where k = 30’, 60’, 1d, 7d



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# Methods:

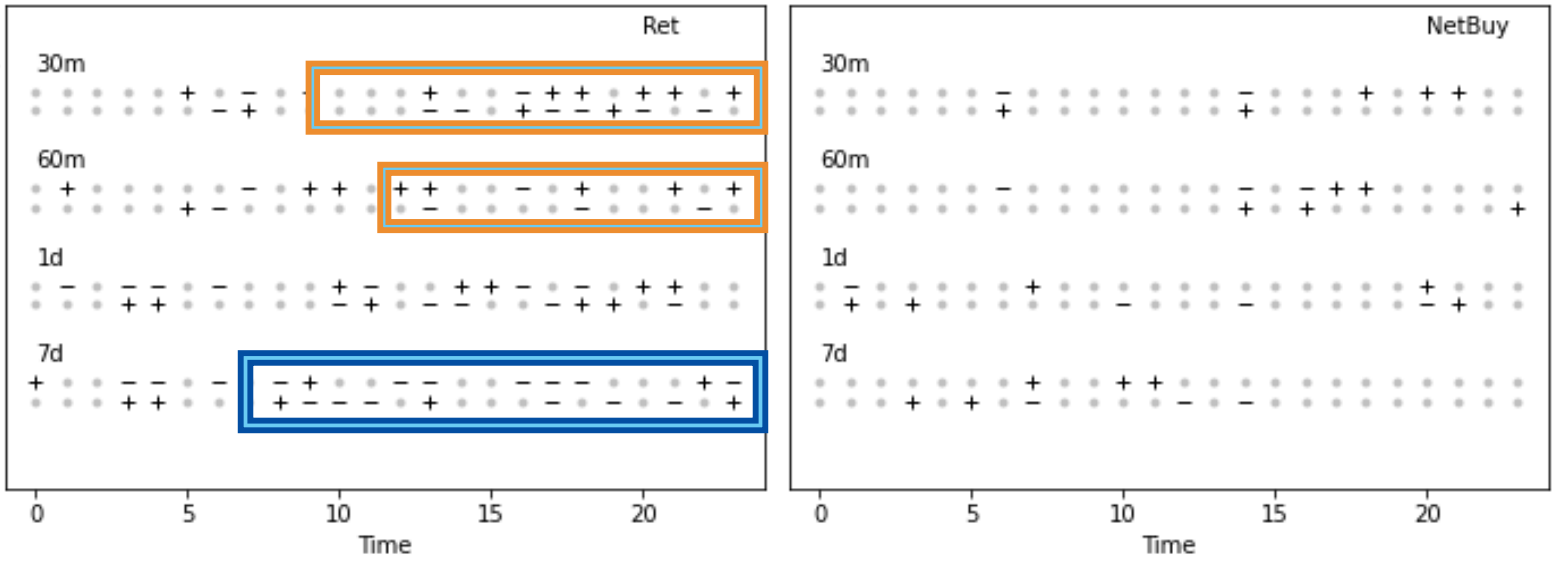
$$\text{Sign}(\text{Ret}_{t+k}) = \text{Logistic}(\alpha + \beta_1 \text{TonalityEN}_t + \beta_2 \text{TonalityOT}_t + \gamma \text{Controls}_t + \epsilon_{t+1})$$

$$\text{NetBuy}_{t+k} = \alpha + \beta_1 \text{TonalityEN}_t + \beta_2 \text{TonalityOT}_t + \gamma \text{Controls}_t + \epsilon_{t+1}$$

- Ret(t+k) and NetBuy (t+k) with k = 30 mins, 60 mins, 1 day, and 7 days, starting from the end of the time interval t. 24, 1-hour time intervals.
- TonalityEN(t) is the average tonality of all English news over time period t. TonalityOT(t) is the average of tonality of news published in other languages over the same time interval.
- Controls include a macroeconomic sentiment index constructed by the Federal Reserve Bank of San Francisco.
- For each time block, dummies for “excess difference” between EN and OT tonality.
- Also estimated with fixed effects by Exchange, and with different slopes by exchange
- Mainly interested in the **SIGN** of significant coefficients for news sentiment in EN and OT

# Results: returns and netbuy (pooled and FE)

$\beta_1$ (EN)
$\beta_2$ (OT)




- 24 time slots; **+**, significant, positive; **-** , significant, negative; top line (EN), bottom line (OT)
- On average, returns positively correlated with news tonality at short time intervals, and negatively correlated at the longest time interval
- Netbuy volume more muted relation.



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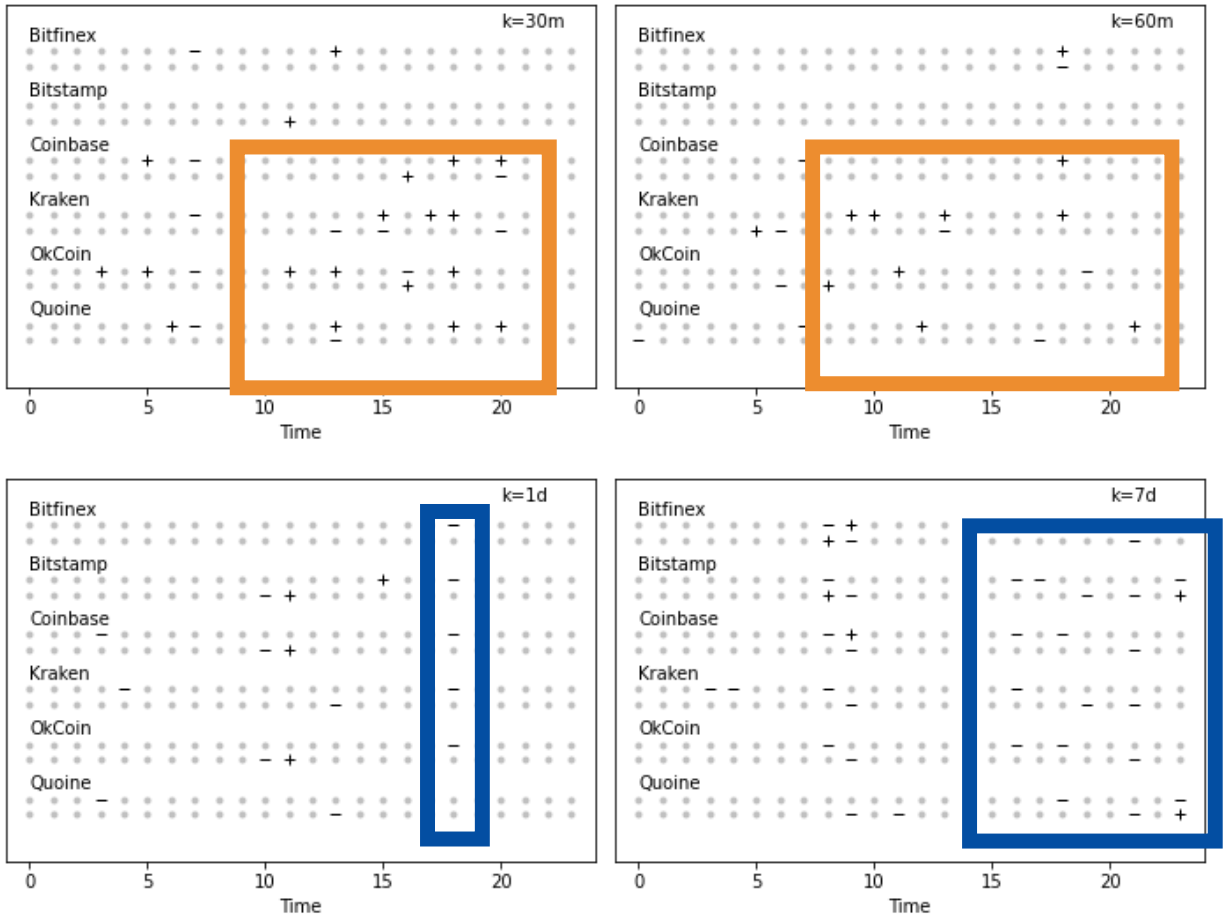
# Results: returns (by exchange)




- On average, returns positively correlated with news tonality at short time intervals, and negatively correlated at the longest time interval
- For bitfinex and Bitstamp short term relationship disappears



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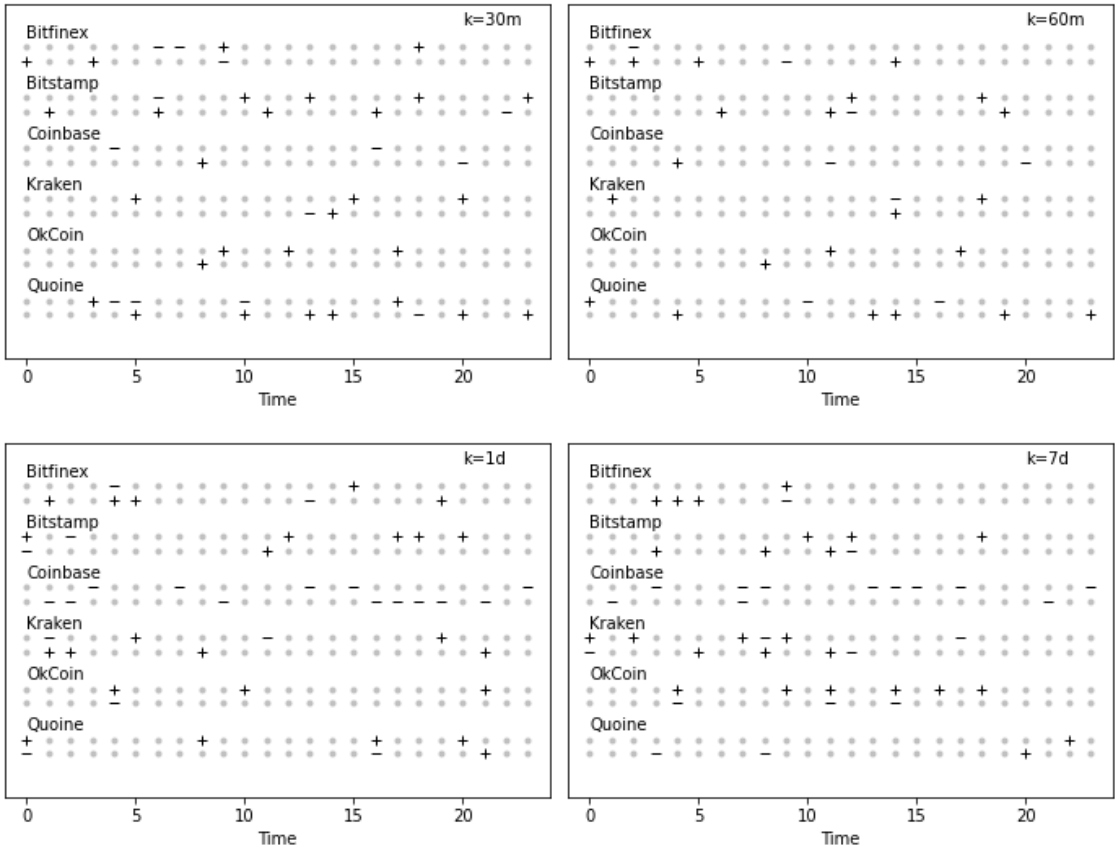
# Results: netbuy (by exchange)




- More significant coefficients when exchange specific intercepts are allowed
- Some exchanges seem to have a prevalence of one sign … artefact or …



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# Conclusions:

- Positive correlation between tonality of news articles in English and return on BTC over the next 30' and 60'
- agree with previous research pointing to a role for sentiment in determining returns in crypto-currencies, and with the fact that news sentiment could affect short term and intraday returns
- evidence of a reversal of these effects over longer time horizons, especially 7 days . This is suggestive of the fact that these dynamics could be tied to extensive noise trading on BTC markets.
- further supported by the analysis of results at individual exchange level, where the effects seems to disappear on Bitfinex, which is reportedly a more efficient BTC exchange.
- NetBuy dynamics more muted at aggregate level, but different exchanges seem to respond more to news.

# Further research:

- Relationships seems to be inverted for non-English language news. This result could point to a different use of news by noise traders in different countries, or to the existence of dynamics in news tonalities across different languages and will need to be investigated further.

- Netbuy dynamics might be compatible with interest and noise driven dynamics, and/or with different roles for different exchanges, or BTC trading for other purposes

- Subject of further investigation to understand if more extreme cases of market “one sidedness” could be the object of prediction.

- Introduce social media sentiment (e.g. Reddit, Twitter) …

# Thank you





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# The data: Europe Media Monitor (EMM) (3)

**Table 1: Summary Statistics of Tonality**

| Hourly Block | TonalityEN | TonalityOT | Hourly Block | TonalityEN | TonalityOT |
|---|---|---|---|---|---|
| 0 | -2.638 | -0.119 | 12 | -1.186 | 0.357 |
| 1 | -3.408 | 0.364 | 13 | -1.182 | 0.385 |
| 2 | -3.259 | 0.022 | 14 | -1.592 | 0.337 |
| 3 | -3.226 | 0.218 | 15 | -1.945 | 0.251 |
| 4 | -2.596 | 0.232 | 16 | -1.661 | 0.257 |
| 5 | -2.023 | 0.511 | 17 | -2.152 | 0.294 |
| 6 | -2.246 | 0.495 | 18 | -2.285 | 0.026 |
| 7 | -2.274 | 0.432 | 19 | -2.134 | -0.104 |
| 8 | -1.839 | 0.445 | 20 | -2.563 | 0.275 |
| 9 | -1.626 | 0.458 | 21 | -2.451 | -0.061 |
| 10 | -1.797 | 0.476 | 22 | -2.868 | 0.033 |
| 11 | -1.860 | 0.866 | 23 | -3.029 | 0.139 |
| | | | | | |
| | | | All | -2.164 | 0.292 |

Notes: Entries to the table are the average tonality of all hourly time blocks.

# The data: Price data (2)

**Table 2: Summary Statistics of Return and NetBuy**

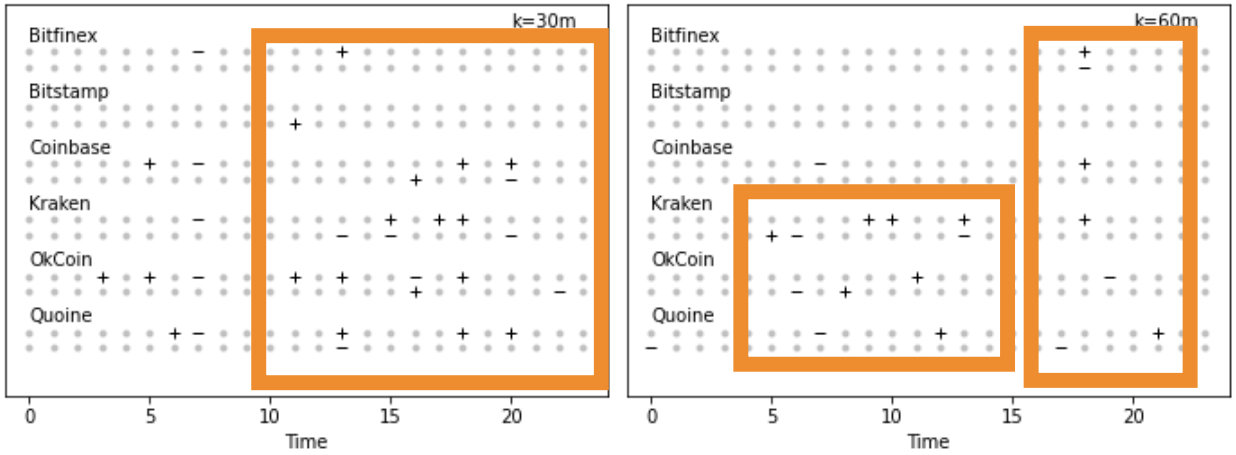
| Ret | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 30 mins | | 60 mins | | 1 day | | 7 days | |
| | N | Mean | N | Mean | N | Mean | N | Mean |
| Bitfinex | 30148 | 2.68E-05 | 30146 | 7.84E-05 | 30098 | 1.75E-03 | 29930 | 0.016 |
| Bitstamp | 30103 | 2.29E-05 | 30100 | 8.15E-05 | 30036 | 1.85E-03 | 29802 | 0.017 |
| Coinbase | 28479 | 9.80E-06 | 28463 | 6.81E-05 | 28360 | 2.22E-03 | 28237 | 0.018 |
| Kraken | 29439 | 3.12E-05 | 29369 | 5.56E-05 | 28989 | 2.02E-03 | 28795 | 0.017 |
| OkCoin | 26106 | 7.20E-05 | 26091 | 6.93E-05 | 25943 | 1.52E-03 | 25621 | 0.014 |
| Quoine | 27257 | -8.95E-05 | 27167 | 6.27E-05 | 26681 | 2.39E-03 | 26519 | 0.019 |

| NetBuy | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 30 mins | | 60 mins | | 1 day | | 7 days | |
| | N | Mean | N | Mean | N | Mean | N | Mean |
| Bitfinex | 29934 | -0.004 | 30061 | -0.009 | 30150 | -0.020 | 30140 | -0.023 |
| Bitstamp | 25893 | 0.074 | 25897 | 0.073 | 25976 | 0.054 | 26090 | 0.048 |
| Coinbase | 28363 | 0.084 | 28388 | 0.078 | 28638 | 0.068 | 28604 | 0.063 |
| Kraken | 27407 | 0.009 | 28041 | 0.003 | 30143 | -0.011 | 30153 | -0.017 |
| OkCoin | 25120 | -0.055 | 25615 | -0.056 | 26240 | -0.068 | 26439 | -0.061 |
| Quoine | 24189 | -0.028 | 25379 | -0.034 | 28347 | -0.019 | 28977 | -0.019 |

Notes: Entries are the statistics of $Ret_{t+k}$ and $NetBuy_{t+k}$ for $k$ =30 mins, 60 mins, 1 day and 7 days.

# Results: returns (by exchange – 30’ and 60’)

**Table 5: Tonality Predicts Homogeneous Future Returns at Different Exchanges.**

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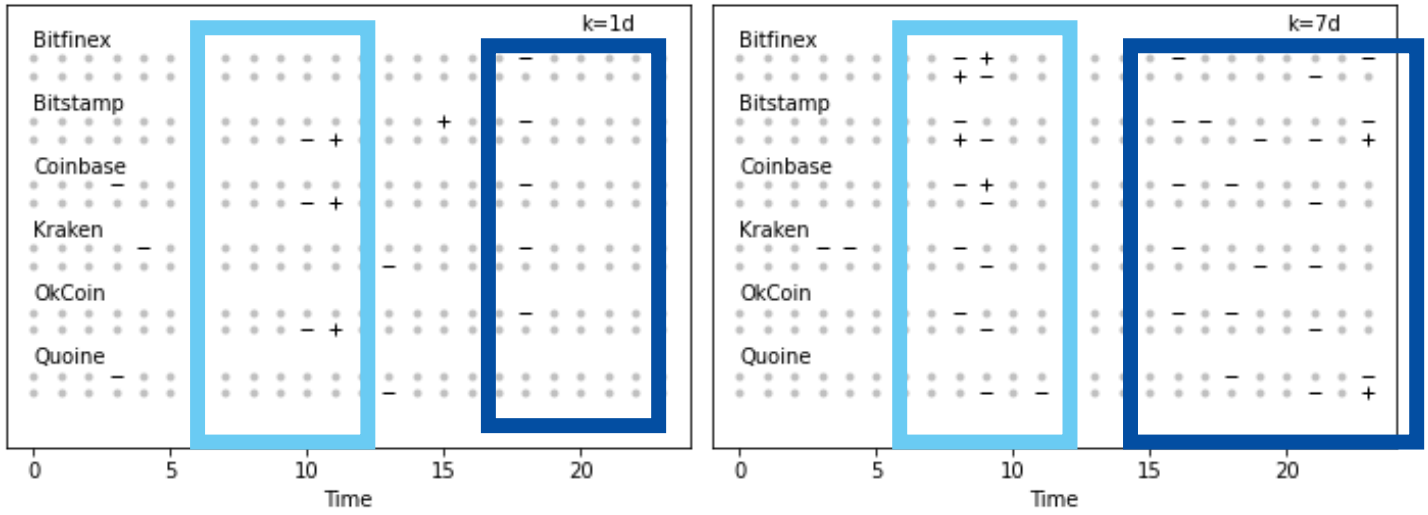
# Results: returns (by exchange – 1d and 7d)

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