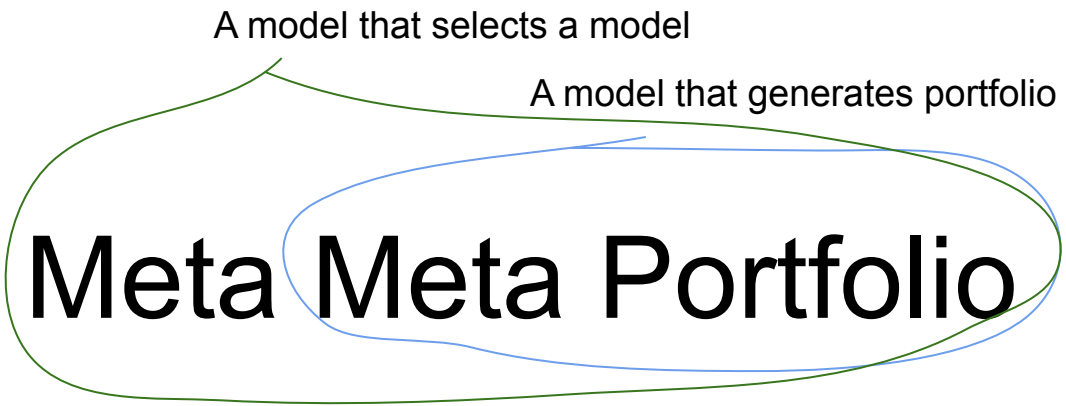

Heuristic Meta Meta Portfolio

Sungguk Cha

MINDs Lab

18th Algorithmic Trading Research Club
2021.04.24.

Abstract

- We present strong heuristic meta meta portfolio approach. In our backtests on Upbit KRW market with 110+ coins, it shows remarkable performance.

- We argue **using deep model is essential to consider more correlations** between securities.

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Contents

- Introduction
- Experiments
- Prototype Proposal
- Conclusion
- Discussion

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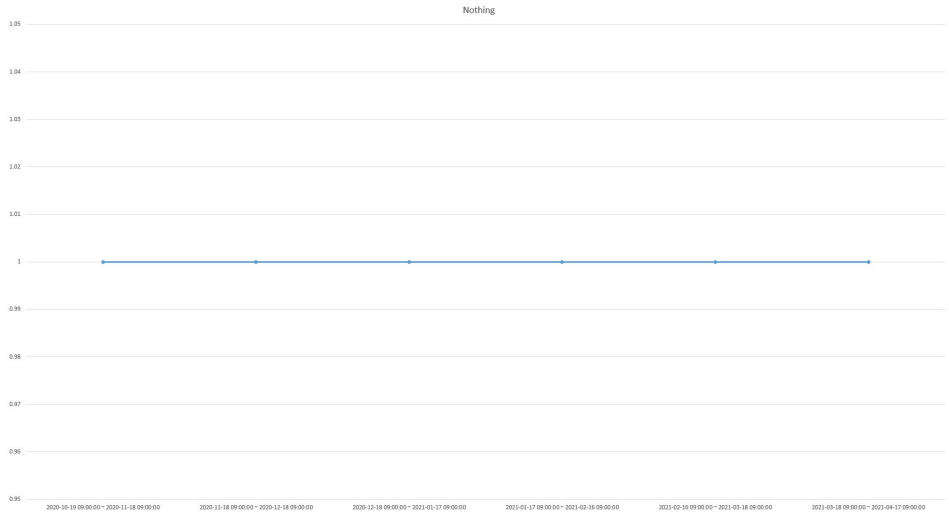
Introduction

Our goal is to have a portfolio that earns money everyday.



Monthly Earning rate over recent 6 months.

- Nothing
- BTC

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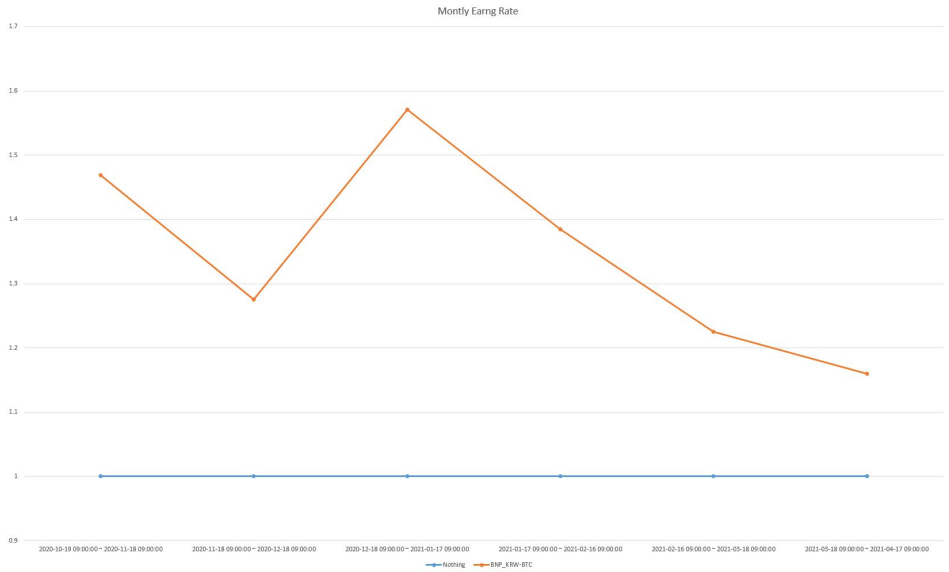
Introduction

Bitcoin can be a good security.



Monthly Earning rate over recent 6 months.

- Nothing
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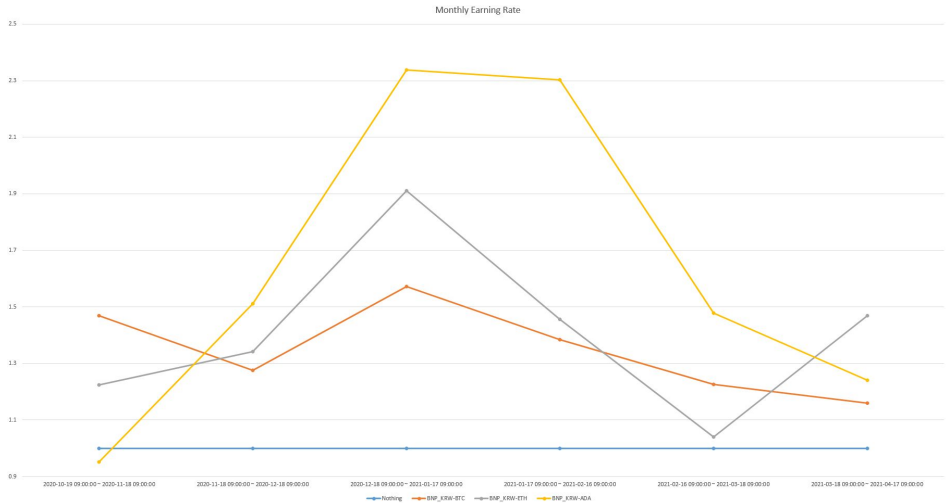
Introduction

ETH, ADA would be so as well.



Monthly Earning rate over recent 6 months.

- Nothing
- BTC
- ETH
- ADA

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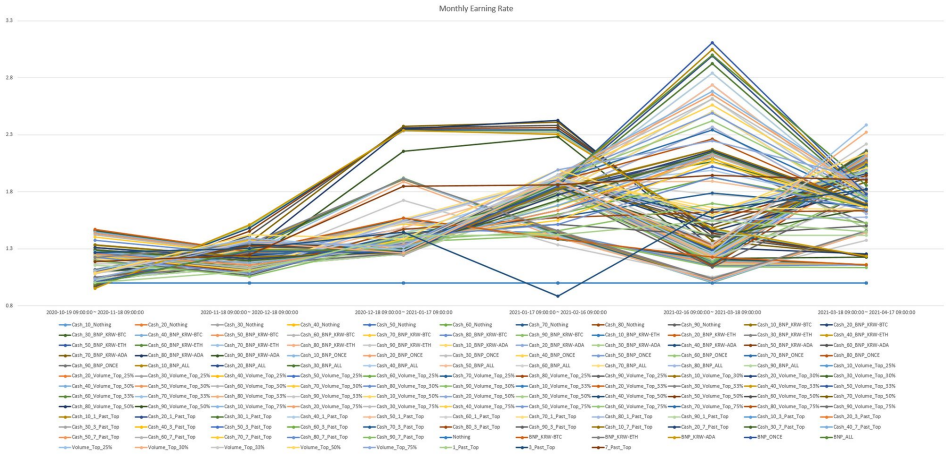
Introduction

We backtested 140 heuristic models that generate a portfolio with Upbit KRW market securities.



Monthly Earning rate over recent 6 months. Models do

- Nothing
- Buy BTC or ETH or ADA.
- Buy every securities identically.
- Buy high-volume coins identically.
- Hold cash with several ratio.
- Select a model that made a highest return during past X days.

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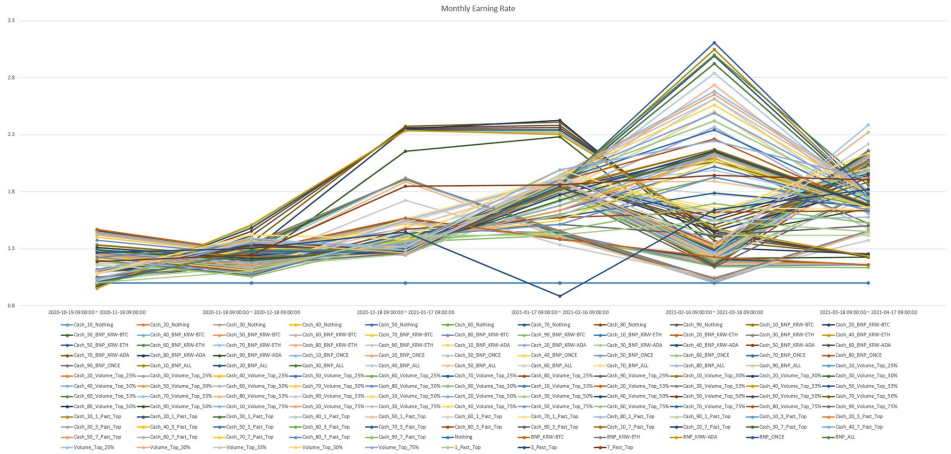
Introduction

Analyzing experimental results, we provide a deep model prototype considering following aspects.

- Price
- Volume
- Correlation
- Momentum



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Experiments: Backtest Framework

We used Upbit Open API to crawl *recent 200 days dataset*.

In our experiments, models trade once a day.

Trading fee is considered.

All trades are *taker* and conclude instantly (market impact ignored).

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Experiments: Models

- Nothing
- BNP-BTC
  - Buy and pray BTC
- BNP-ETH
- BNP-ADA
- BNP-ALL
  - Buy all security identically. Rebalance everyday.
- BNP-ALL-ONCE
  - Buy all security identically once.
- Volume-Top-X
  - Buy top-X % volume coins identically

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Experiments: Meta Models

- Cash-X
  - holds cash X %
  - e.g., Cash-50 BNP-BTC

- Yesterday-Top-X
  - Select a model with highest earning rate during past X days.
  - e.g., Yesterday-Top-1, Yesterday-Top-3, Yesterday-Top-7

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Experiments: Setting: Models

```
    _models = [nothing, bnp_btc, bnp_eth, bnp_ada, bnp_once, bnp_all, volume_25, volume_30, volume_33, volume_50,
volume_75, yesterday_top, past_3_top, past_7_top]
    models = list()
    for model in _models:
        for ratio in range(10, 100, 10):
            models.append(Cash(money=budget, model=model, ratio=ratio))
    models += _models
```

14 base models

Cash-X: 14 * 9 models

Total 140 models (110 heuristic models, 30 meta models)

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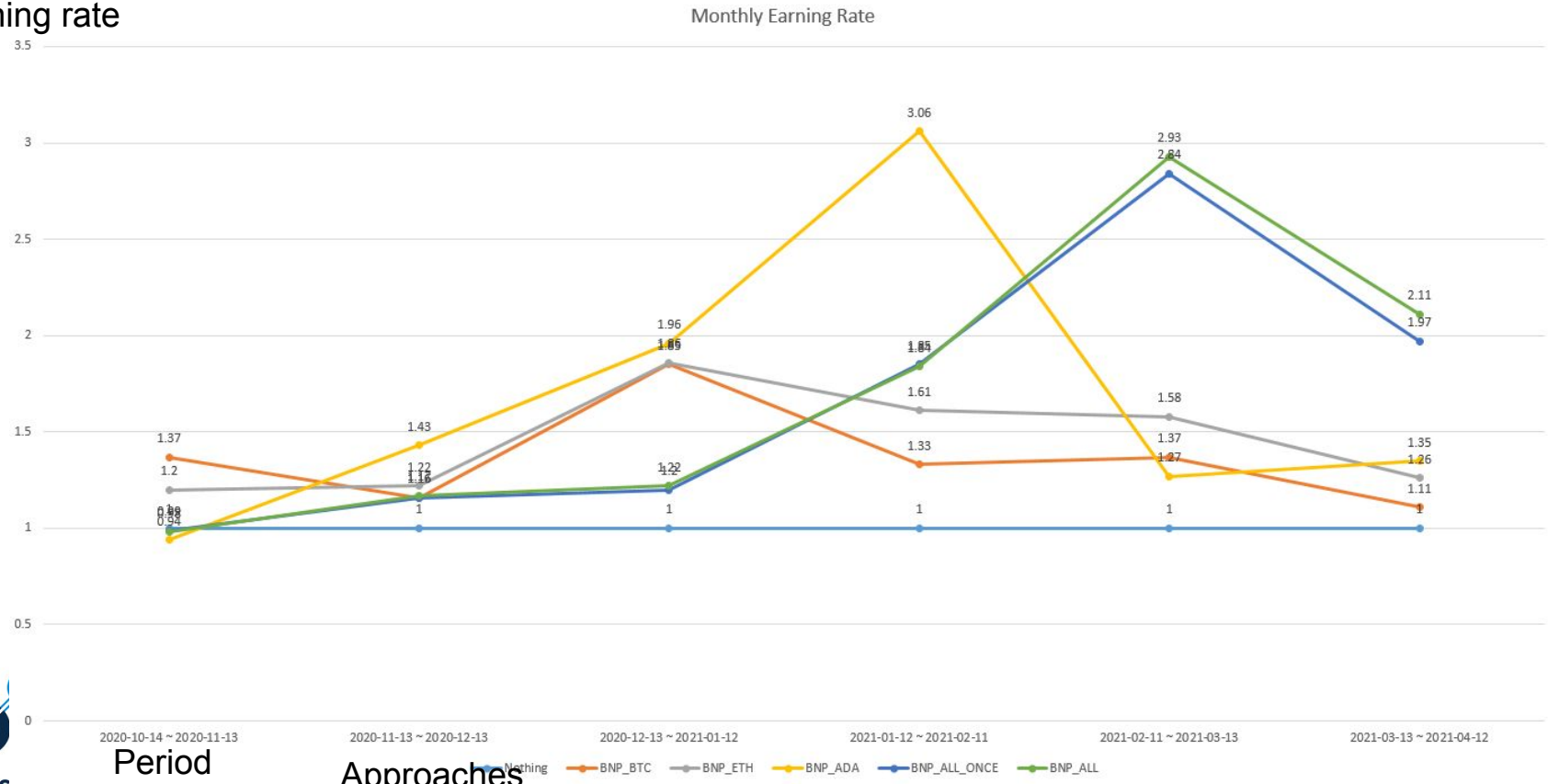
Experiments: Setting

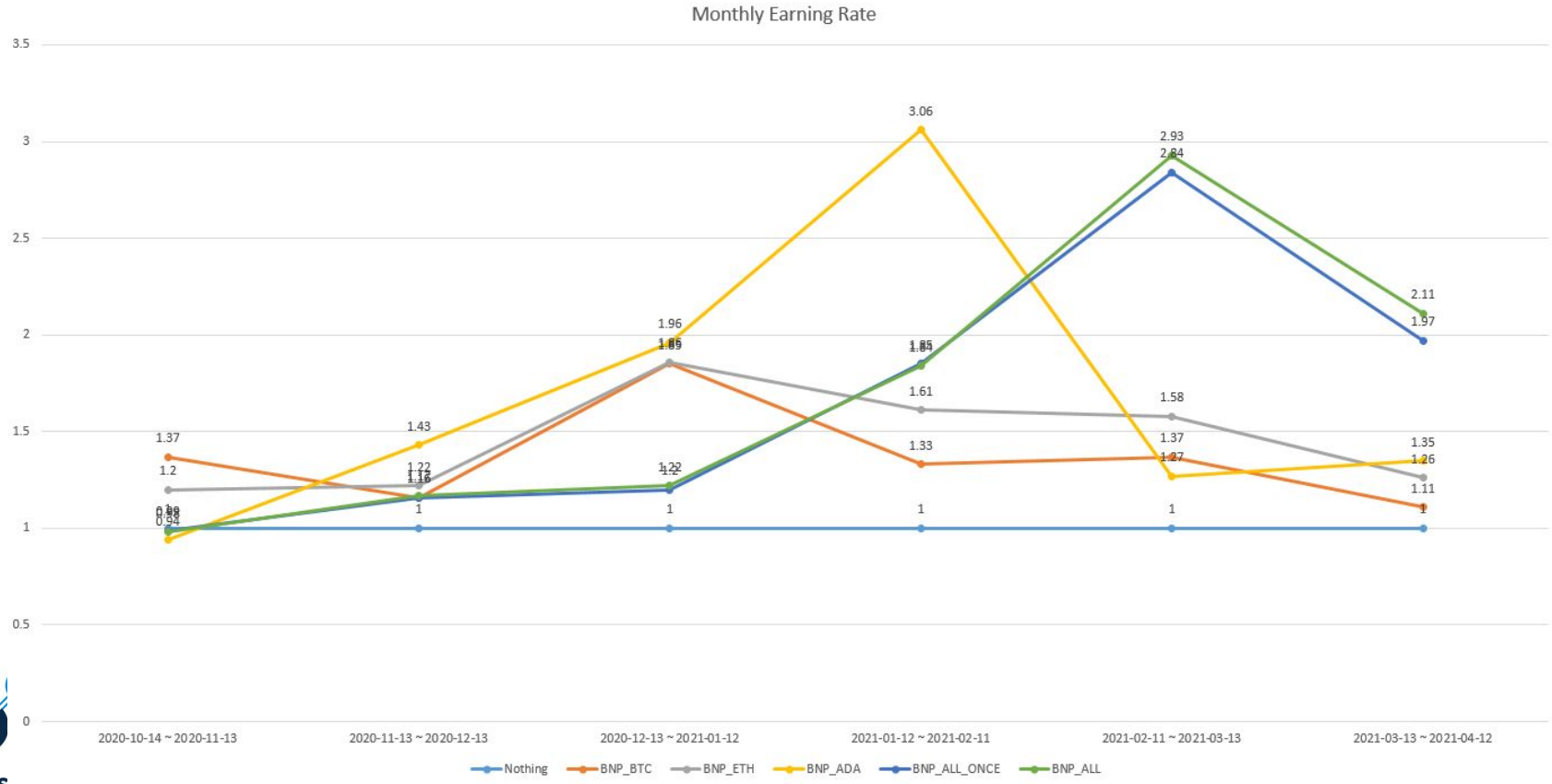
Earning rate



Period

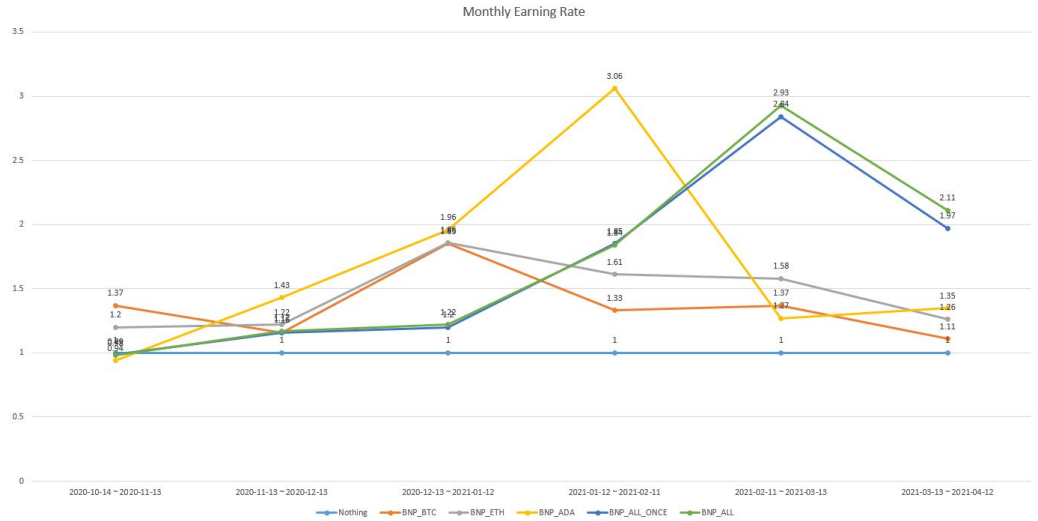
Approaches

Experimental Results



Experimental Results

아직 광기가 있어 아무거나 다 사도 되겠구나!



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Experimental Results

아직 광기가 있어 아무거나 다 사도 되겠구나!

원화 BTC USDT 보유 관심

한글명	현재가	전일대비	거래대금
룸네트워크 LOOM/KRW	131	-11.49% -17.00	15,454백만
시빅 CVC/KRW	511	-5.19% -28.00	15,384백만
솔브케어 SOLVE/KRW	243	-11.31% -31.00	14,882백만
스토리지 STORJ/KRW	1,800	-2.70% -50.00	14,453백만
플레이댑 PLA/KRW	373	-11.61% -49.00	14,420백만
왁스 WAXP/KRW	184	-8.00% -16.00	11,932백만
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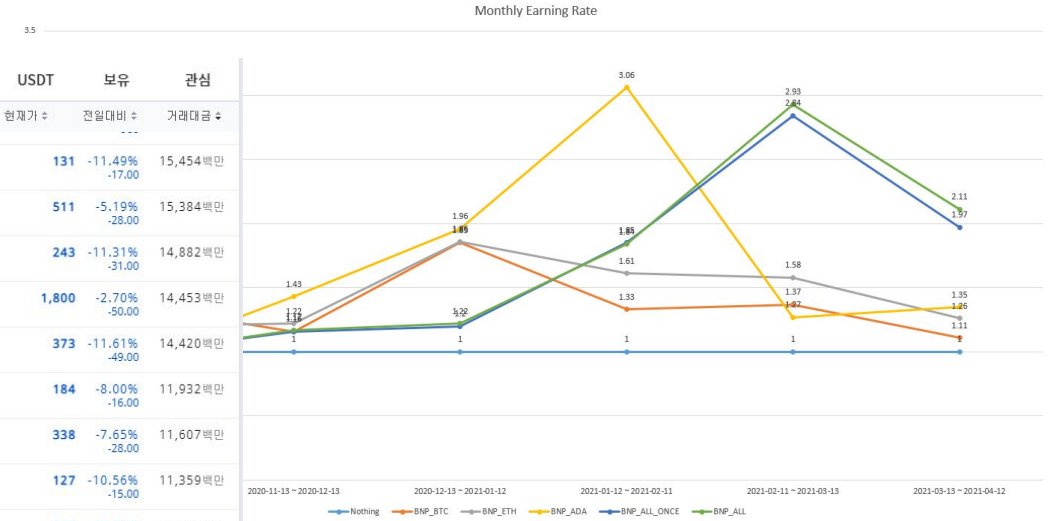

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Experimental Results

아직 광기가 있어 아무거나 다 사도 되겠구나!

거래량 하위권은 항상 파란불인데,
거래량 상위권만 거래해볼까?
(Middle of April)

원화 BTC USDT 보유 관심

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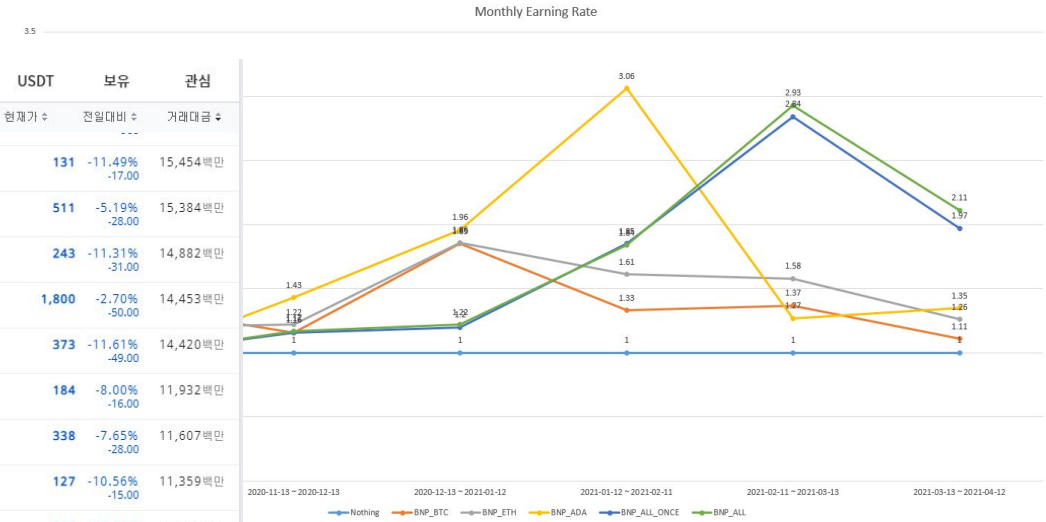

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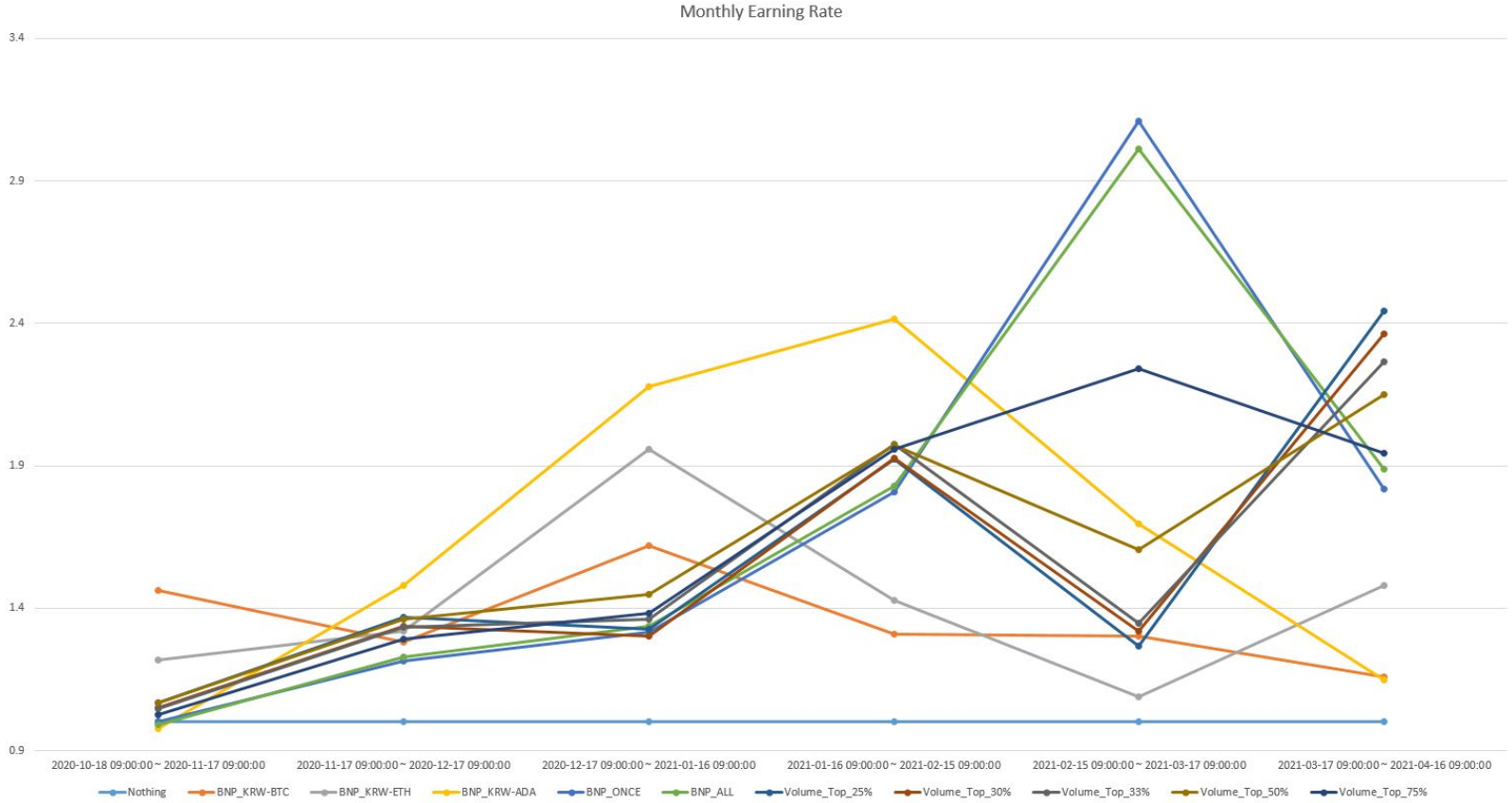
Experimental Results



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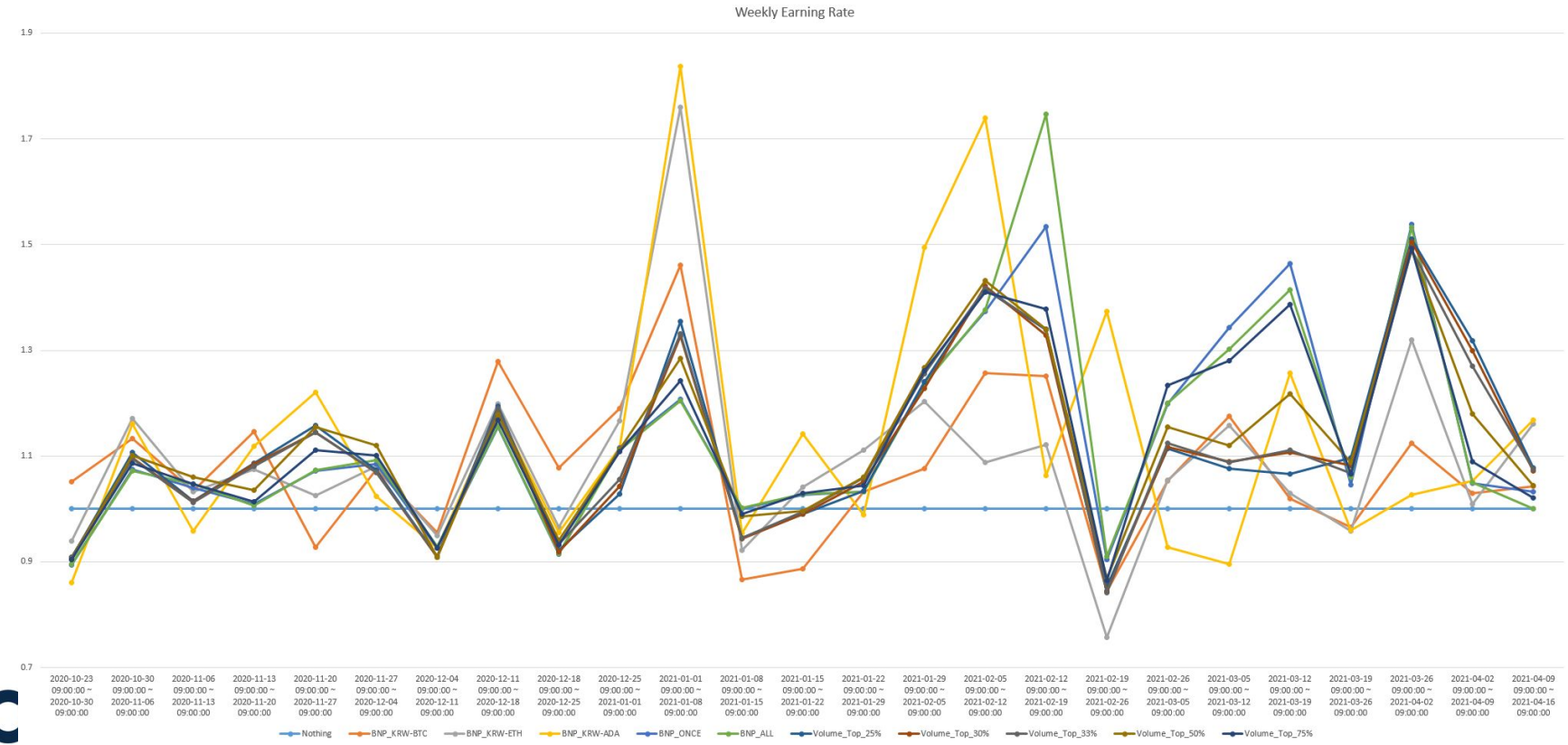
Experimental Results



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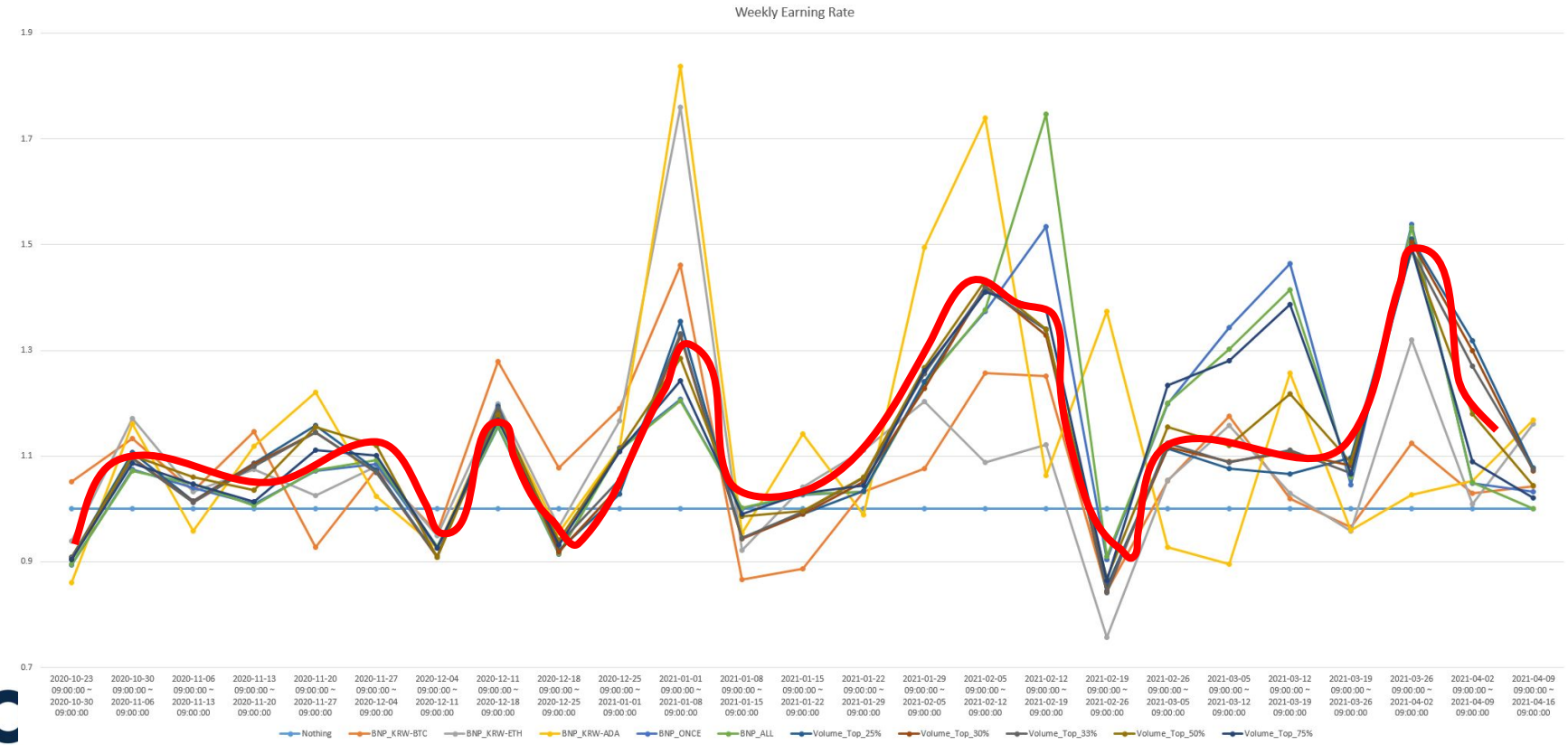
Experimental Results



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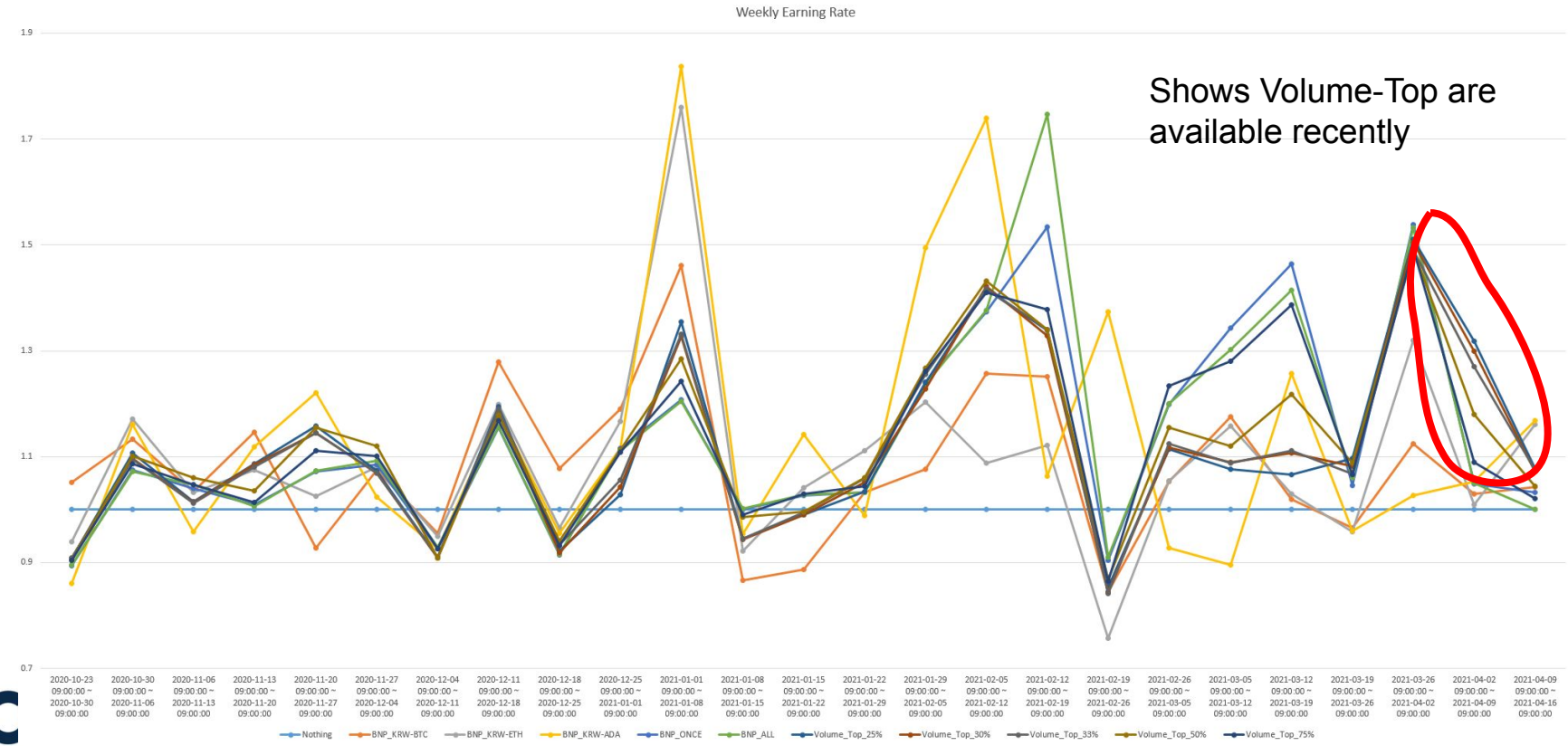
Experimental Results



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Experimental Results

What about choosing a model that earns more recently?

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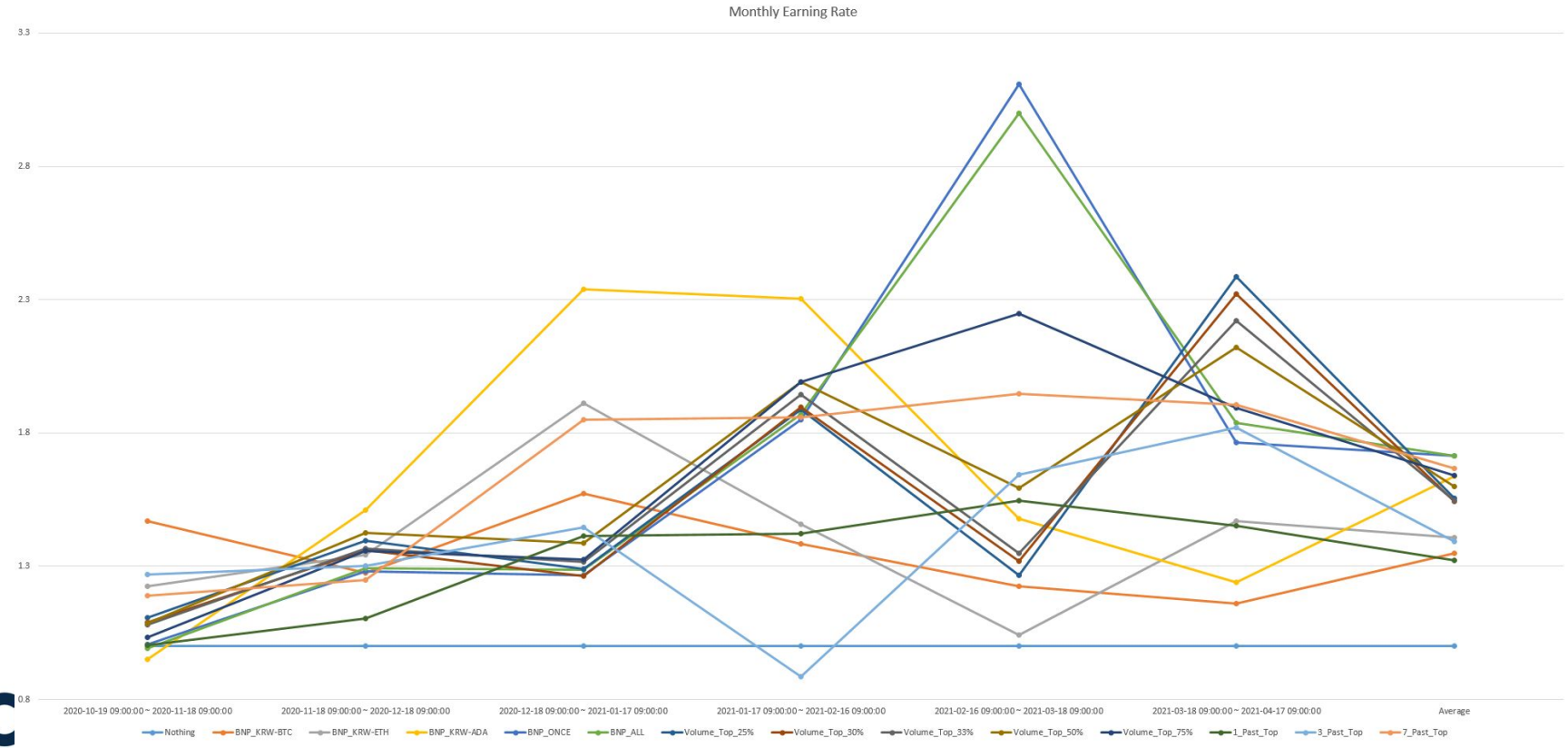
Experimental Results



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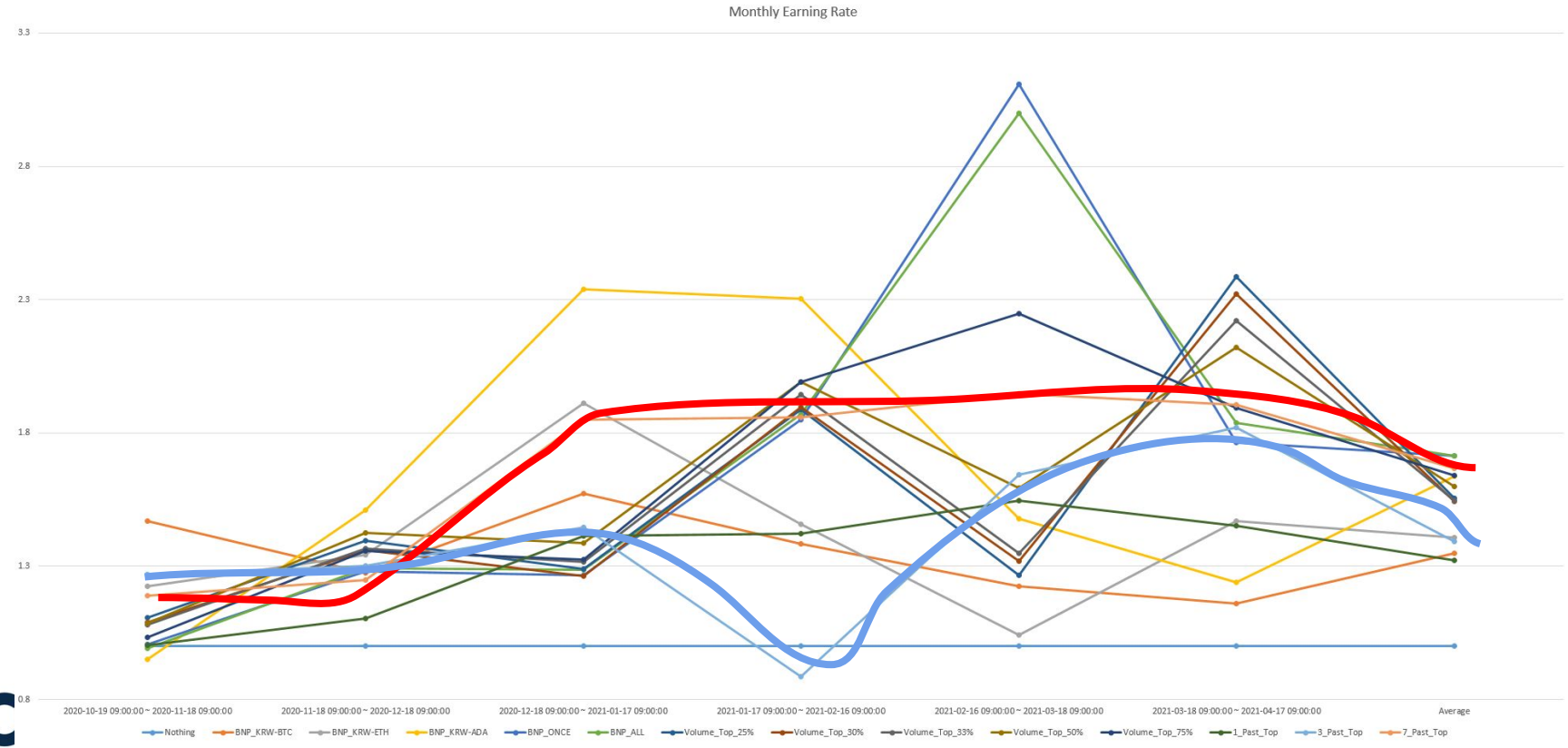
Experimental Results



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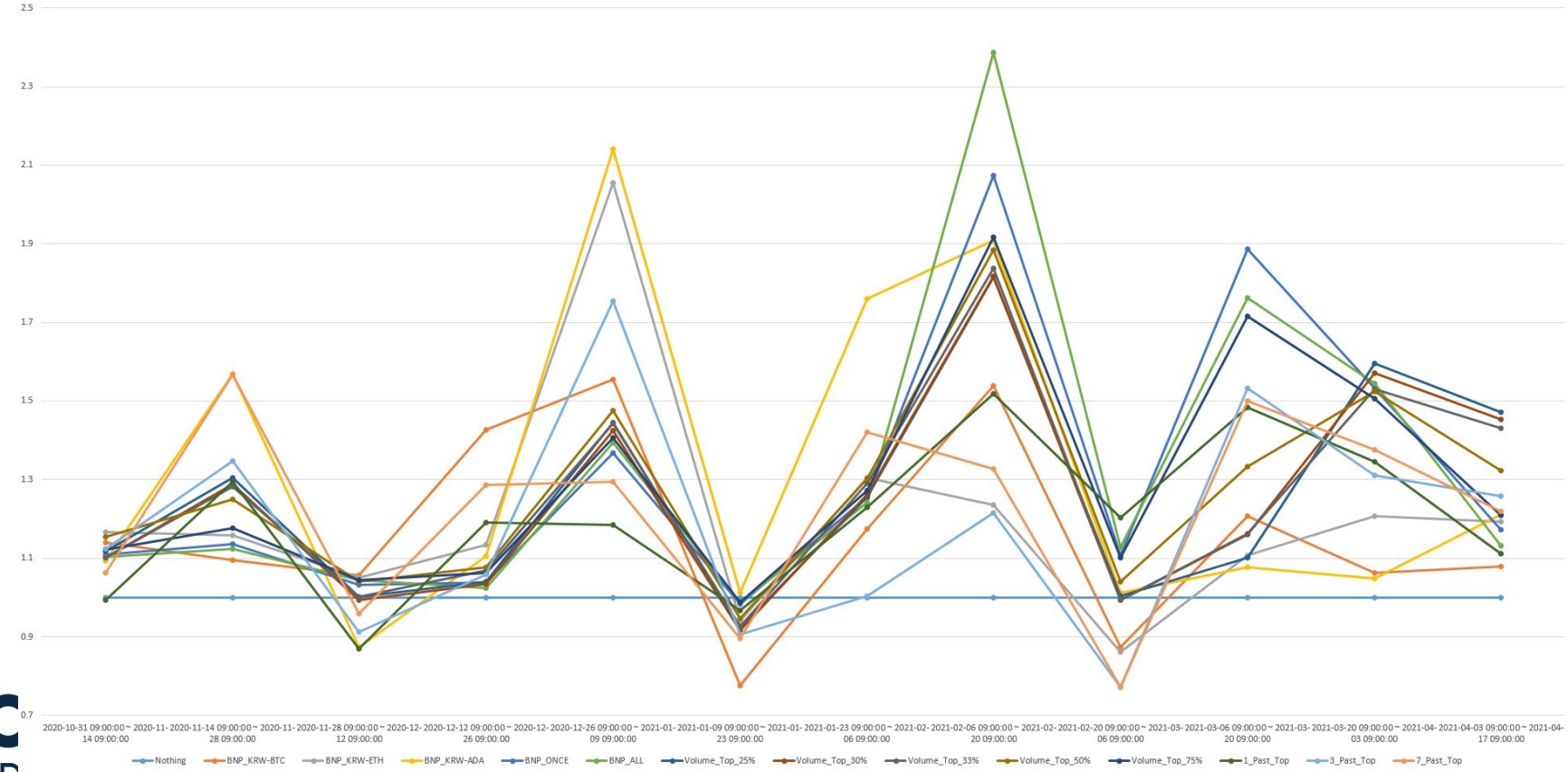
Experimental Results: 14 days



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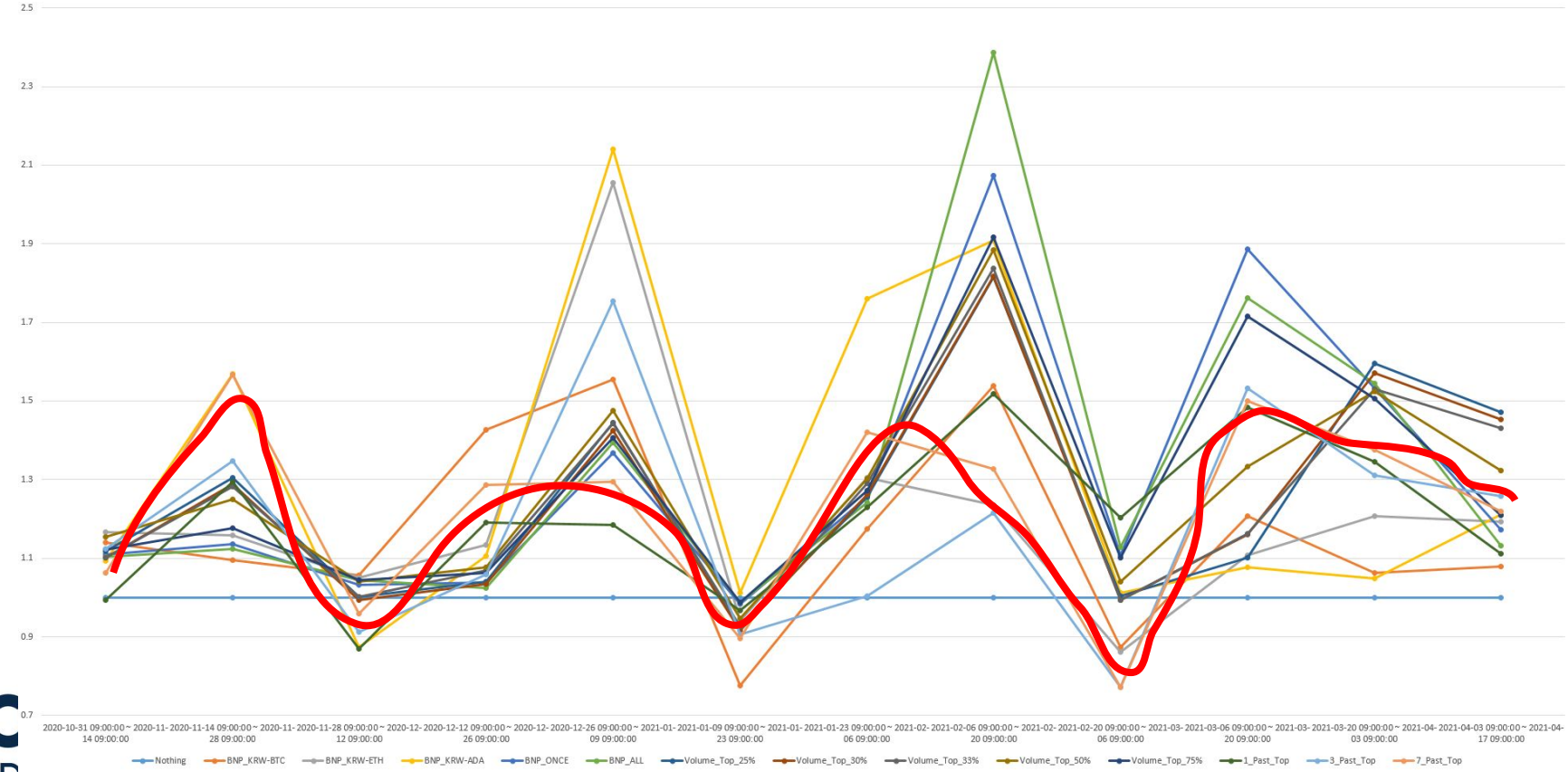
Experimental Results: 14 days



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Experimental Results

잃을거면, 현금 비중 갖는 것을 고려해보자

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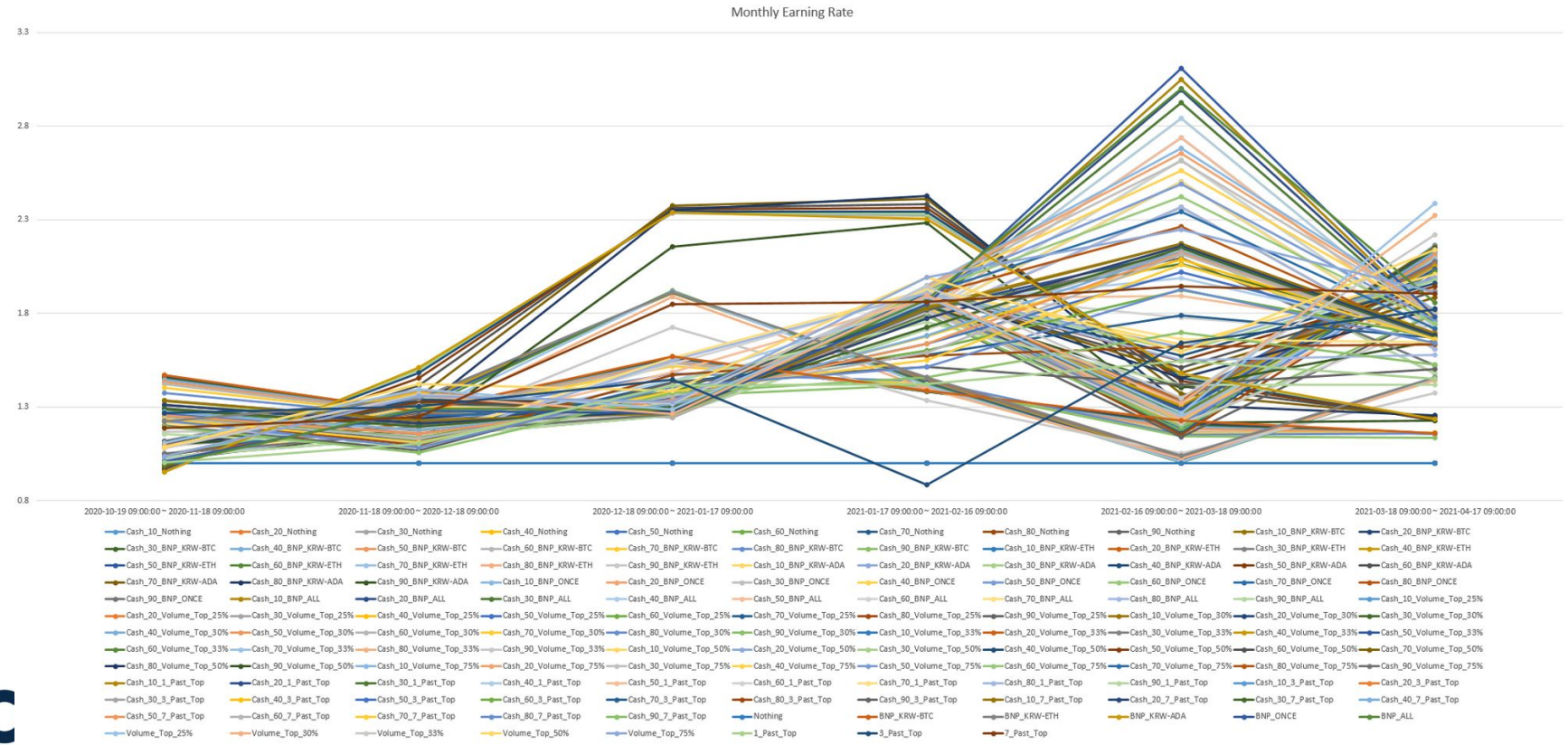
Experimental Results



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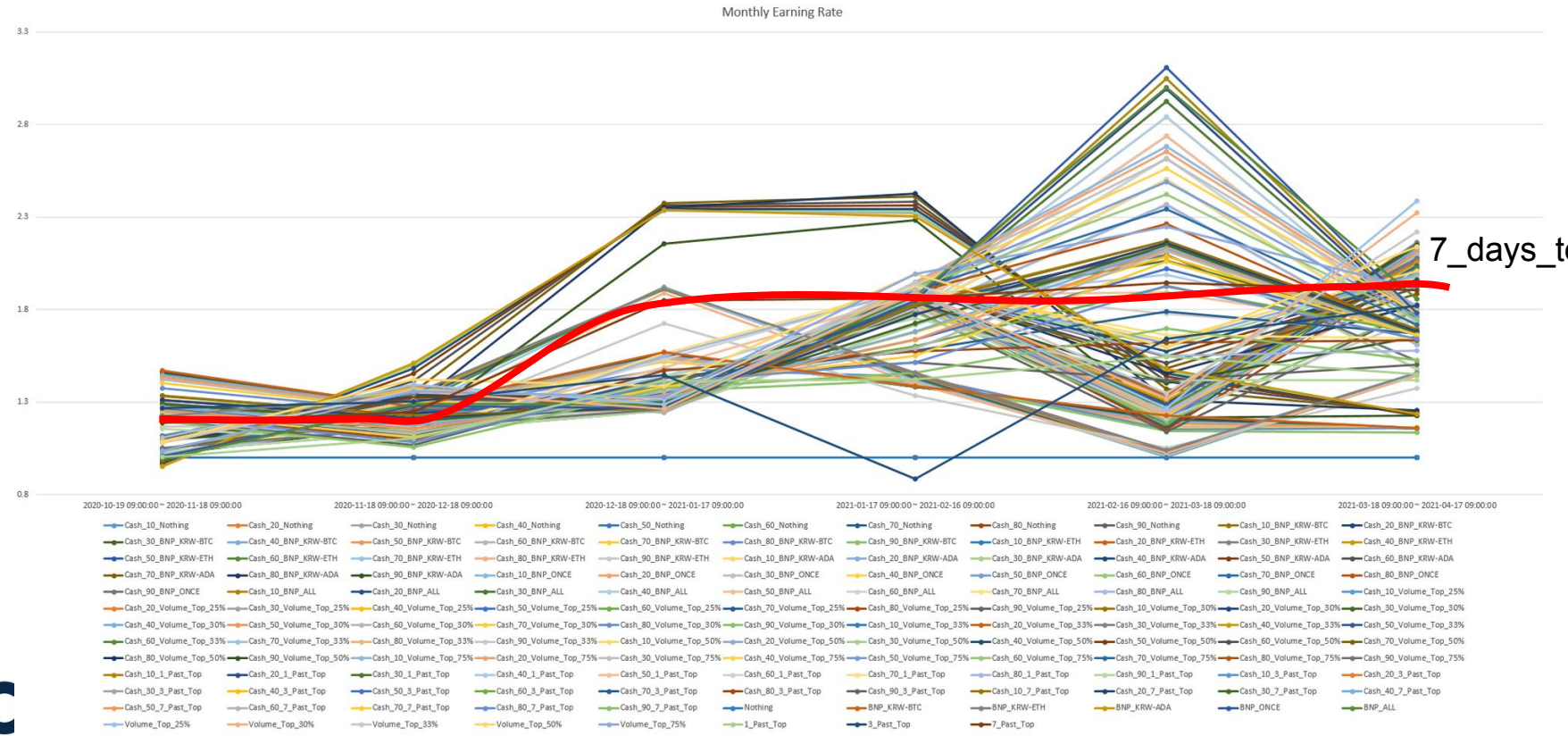

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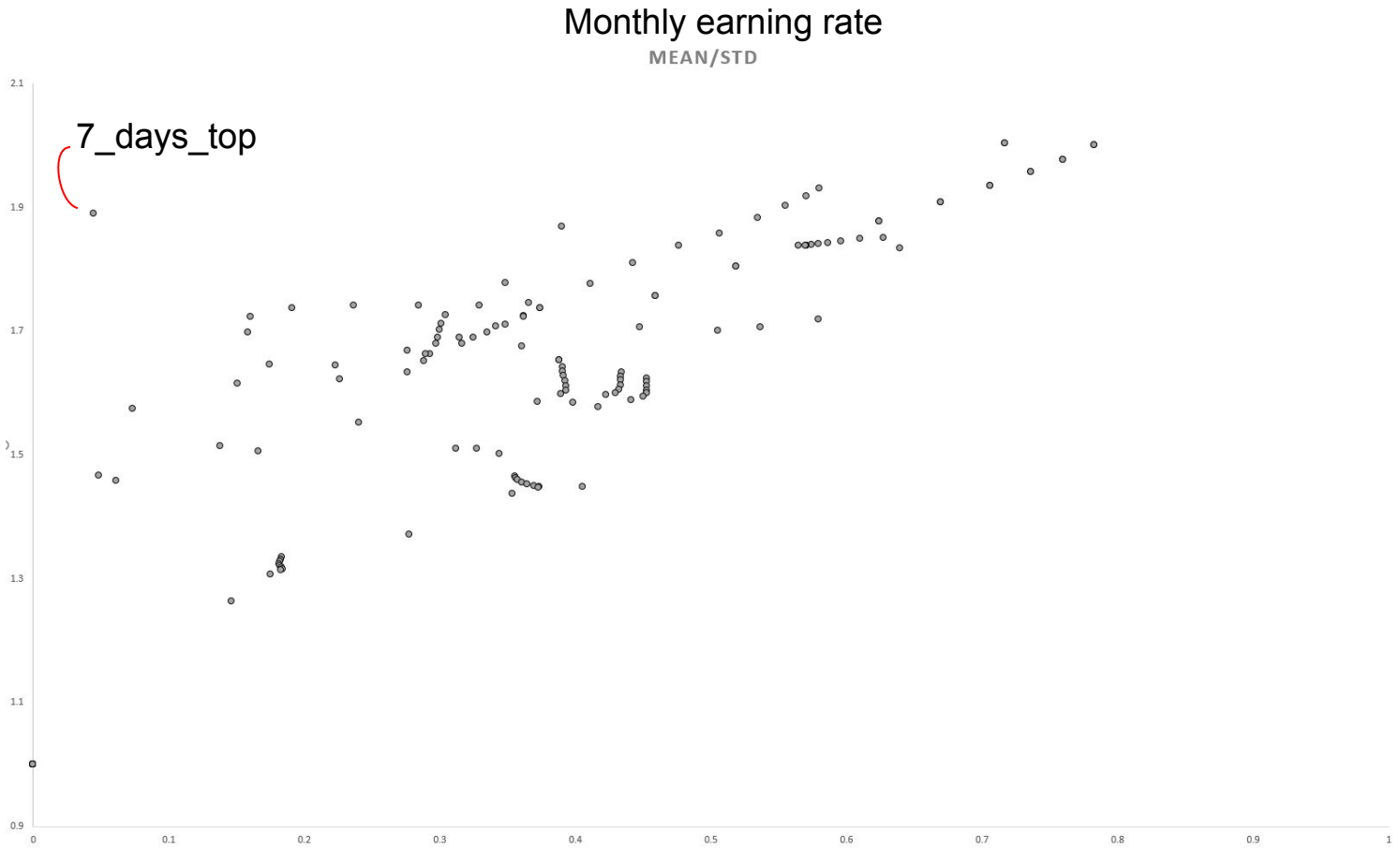

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Experimental Results

We compared heuristic models considering following features:

- Price
- Volume
- Momentum

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Experimental Results

We compared heuristic models considering following features:

- Price
- Volume
- Momentum

They have critical limitations in:

- Correlation
- Computation efficiency
  - Given n optional models, O(n!) computation required to consider every correlations.

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Prototype Proposal

We can think of a deep model that takes [time, coin, features] as input and returns [portfolio]. (Online reinforcement learning model can be a good option.) It can consider:

- Price
- Volume
- Momentum
- Correlation

with **fast computation time in practice**.

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Conclusion

We showed simple but strong **heuristic meta meta portfolio approach**.

We argue **using deep model is essential to consider more correlations** between securities.

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Discussion

In practice,

- **Trading strategy is essential** as our trading has impacts on market.

- To defend bearish market, we need to consider long-**short** portfolio.
  - April 7, April 14 ~ today

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