Quantitative strategies on High Frequency Data

presentation (in-sample quarters)

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academic year 2024/2025

Approaches undertaken

This part should describe **with all the details** what particular methods you used, all entry/exit techniques considered, all additional assumptions.

For **each group of assets separately** You should also explain **WHAT different parameters** you considered (e.g. memories of moving averages, types of moving averages, types of volatility measures, memory of volatility measures, types of additional indicators, memories of additional indicators, etc.), what (if any) additional filtering rules you applied.

You should also explain with details **HOW** you searched for the best combination of parameters for a particular group of assets.

Group 1 – summary of results (including out-of-sample)

Finally selected strategy for group 1

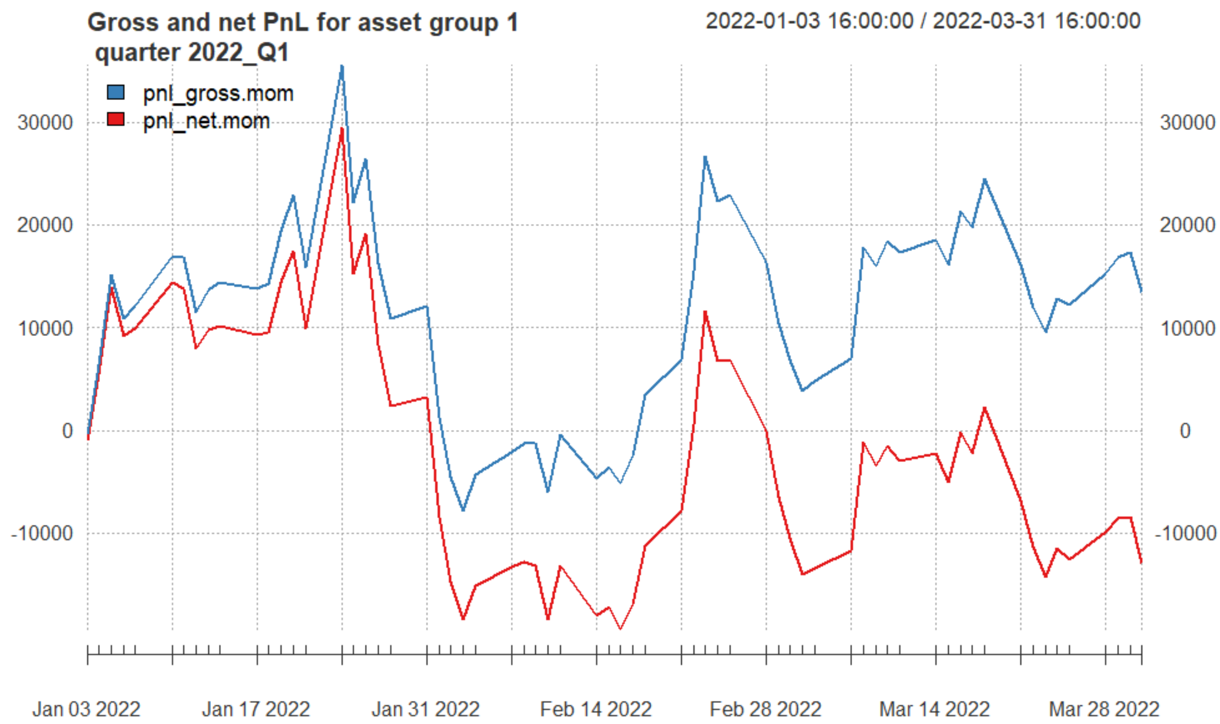
Provide **all the details** (approach and a set of **final parameters**) for assets from **group 1**. (e.g. momentum strategy, cross over of two exponential moving averages EMA10 and EMA60, additional filtering, methods or indicators used).

Summary of results for group 1

quarter	grossSR	netSR	av.ntrades	netCR	av.daily.ntrades	grossPnL	netPnL	stat
2022_Q1	0.60	-0.56	1.22	-1.04	33.78	13415.20	-12838.85	-2.65
2022_Q3	2.11	0.42	5.69	0.87	33.30	33224.48	6837.08	1.67
2022_Q4	-0.17	-1.54	-0.37	-3.01	35.78	-3303.82	-31290.12	-10.37
2023_Q2	0.28	-0.90	0.74	-1.88	18.97	3393.40	-11116.20	-4.54
2023_Q4	1.67	-0.56	4.11	-0.79	34.84	19603.29	-6882.81	-1.52
2024_Q1	-0.55	-2.50	-1.02	-2.99	34.72	-7102.70	-33662.00	-10.51
2024_Q2	0.29	-1.13	0.91	-2.44	34.03	5387.87	-21225.03	-7.46

your comments required !!!

PnL of results for group 1 – quarter 2022Q1



your comments required !!!

PnL of results for group 1 – quarter 2022Q2

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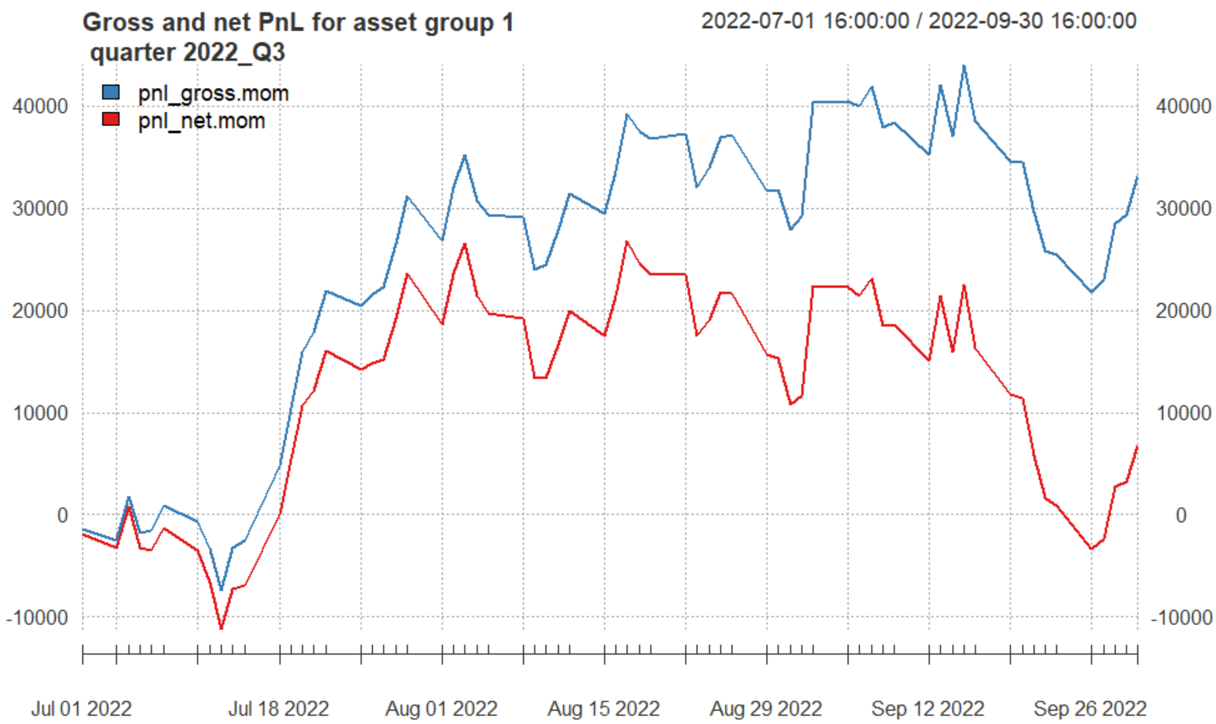
PnL of results for group 1 – quarter 2022Q3



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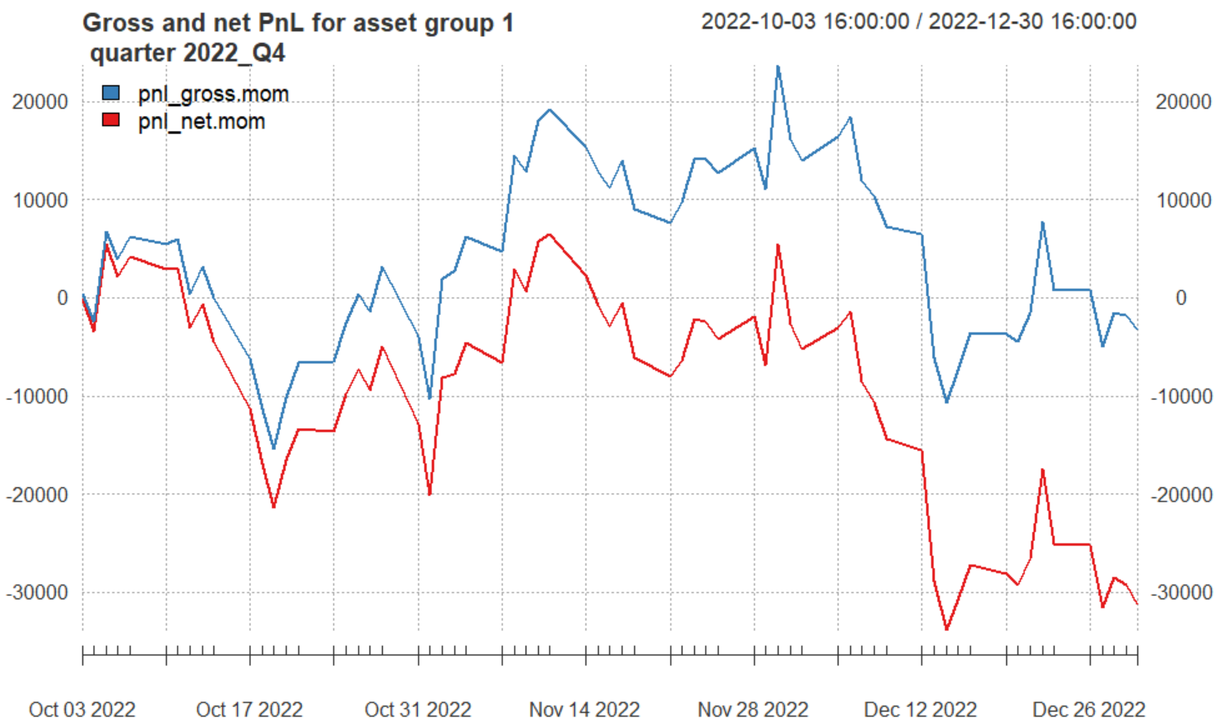
PnL of results for group 1 – quarter 2022Q4



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PnL of results for group 1 – quarter 2023Q1

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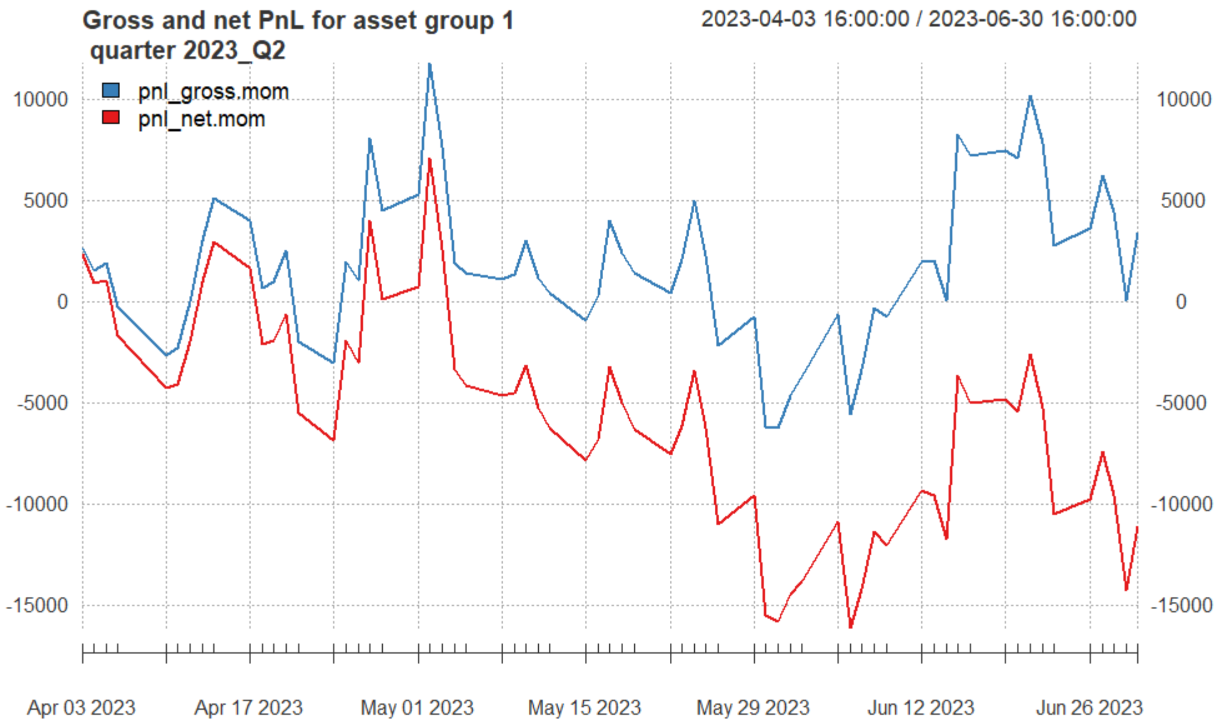
PnL of results for group 1 – quarter 2023Q2



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PnL of results for group 1 – quarter 2023Q3

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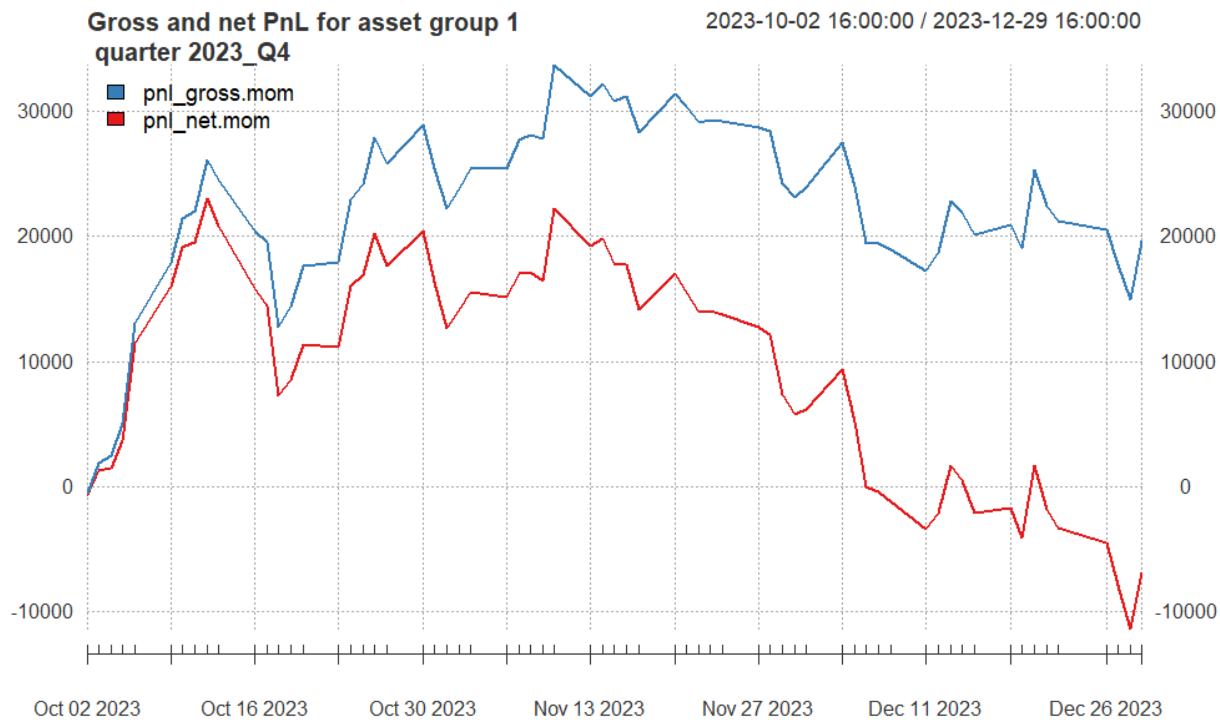
PnL of results for group 1 – quarter 2023Q4



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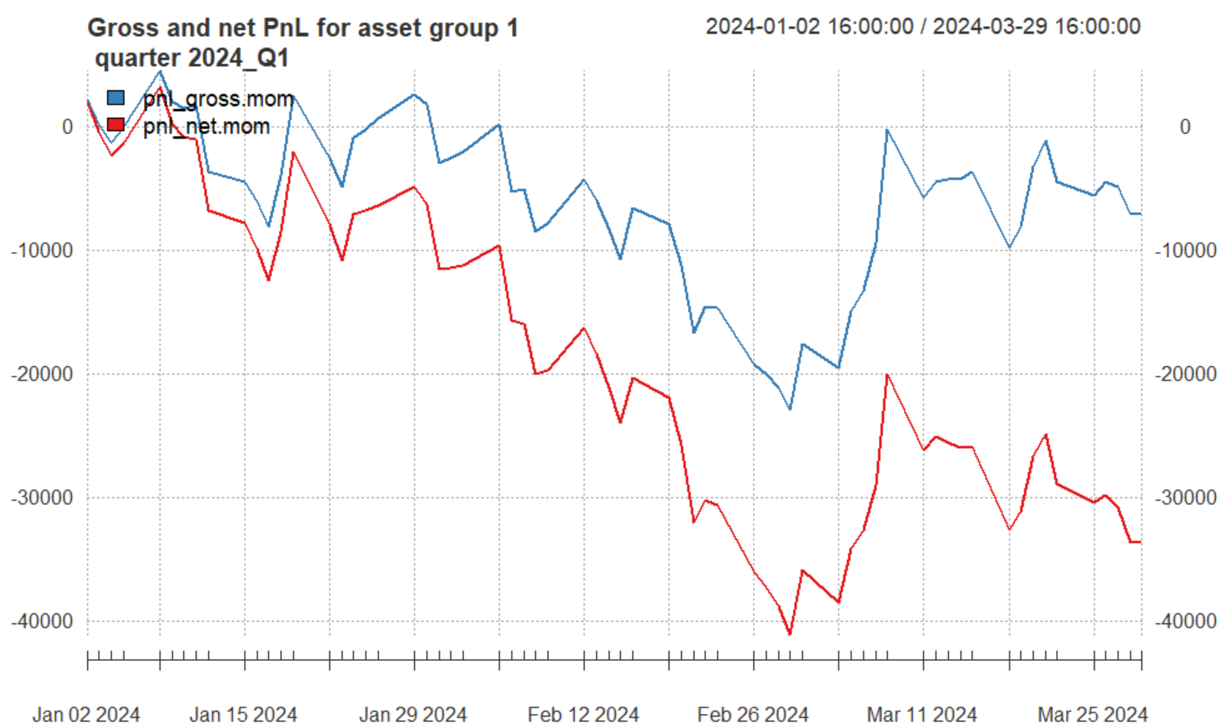
PnL of results for group 1 – quarter 2024Q1



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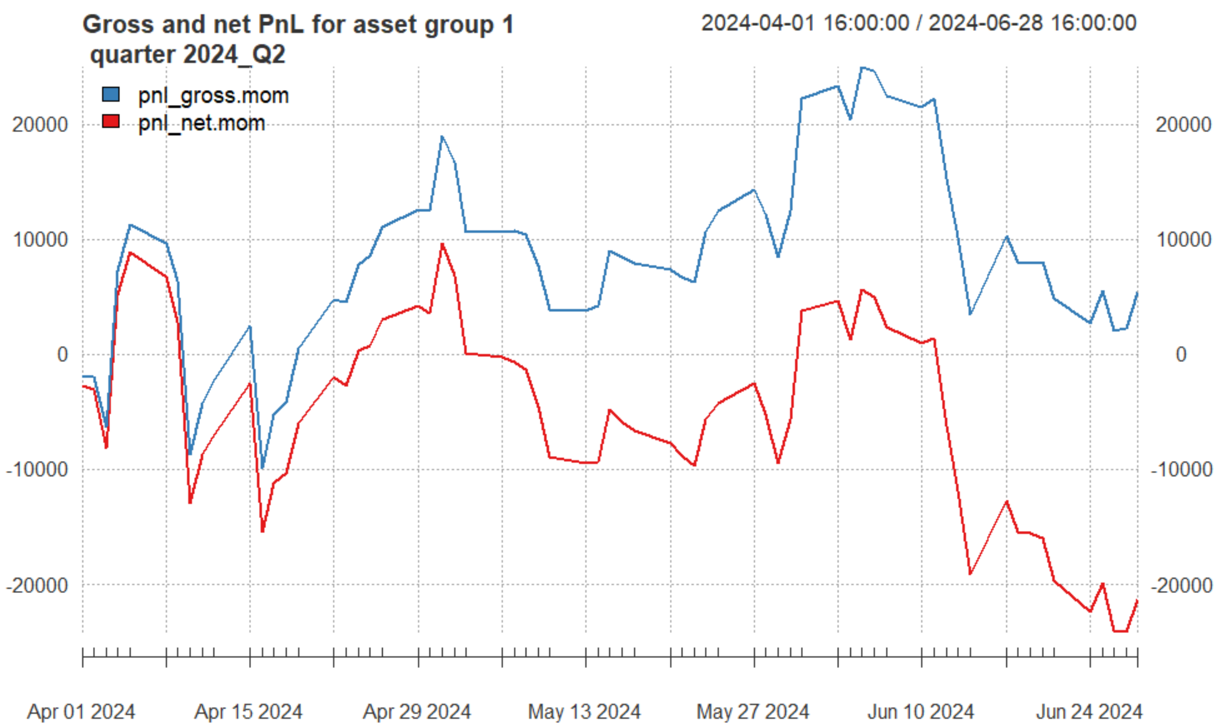
PnL of results for group 1 – quarter 2024Q2



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PnL of results for group 1 – quarter 2024Q3

your comments required !!!

PnL of results for group 1 – quarter 2024Q4

your comments required !!!

Group 2 – summary of results (only in-sample)

Finally selected strategy for group 2

Approach to strategy search

The approach to finding parameters of entry is the following:

- First of all, consider combinations of strategies (momentum, mean-reverting), overall 16 combinations for four instruments.
- For each combination (for example, all mean-reverting strategies), analyze each quarter separately.
- In each quarter, iterate through the space of strategy parameters.
    - For a given set of parameters, create a strategy with entry separately for each instrument.

  - Aggregate daily results for strategies in one portfolio (sum up gross/net pnl and number of transactions). For example, add daily gross pnl values of EMA(10, 60) for AUD, CAD, XAU, XAG.
  - Calculate statistics for this combination and remember it, combining all statistics for each set parameters and each quarter in one data frame.

- Select such a set of parameters that the sum of cumNetPnL across all quarters is the largest. Output this set as “the best strategy”.

Firstly, I searched for best parameters for 2EMA-crossover, and the best parameters were for the case when all strategies are mean-reverting.

Then, I decided to test volatility-breakout strategies, but only when all strategies are mean-reverting, to save time and based on 2EMA-crossover prediction.

Volatility-breakout strategy uses signal EMA to check for the breaches of the bands, defined by slow EMA and running volatility (standard deviation), multiplied by some number. So, each set consists of four parameters.

Strategy parameters

CAD	AUD	XAU	XAG	fast_ema	slow_ema	cum_net_pnl
mrev	mrev	mrev	mrev	105	500	33947.69

CAD	AUD	XAU	XAG	signal_ema	slow_ema	vol_sd	mult	cum_net_pnl
mrev	mrev	mrev	mrev	110	620	180	1.5	124788.7

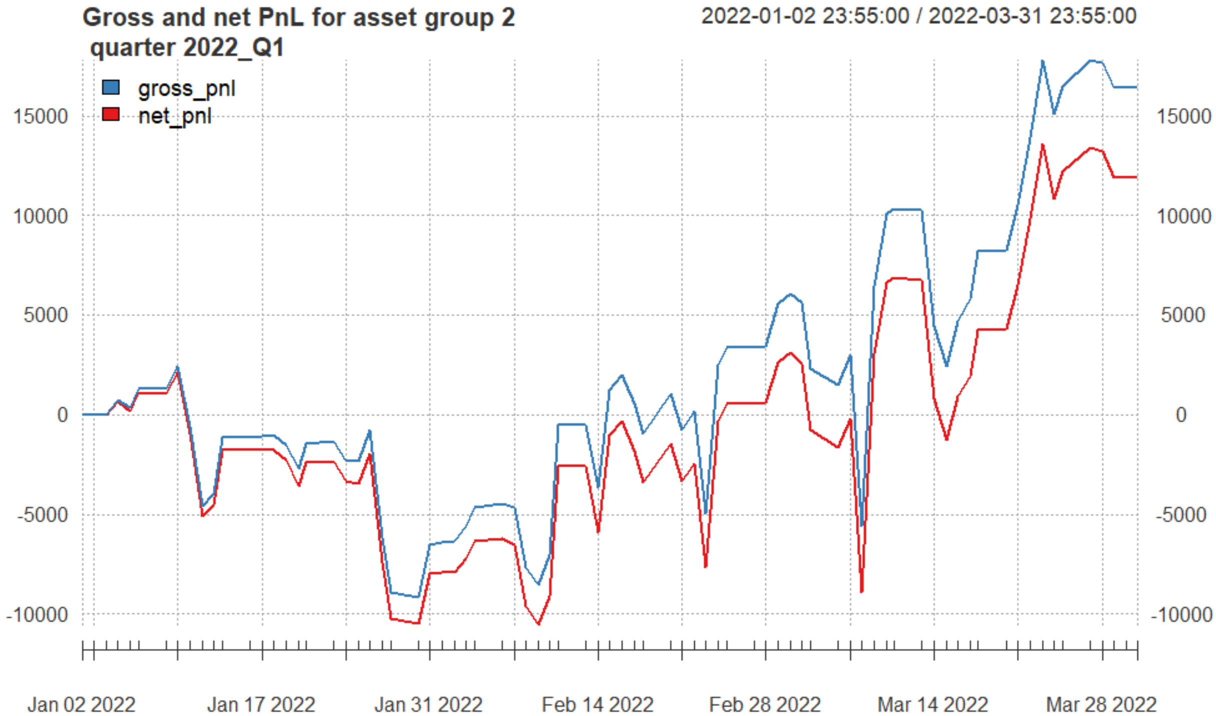
Volatility-breakout strategy is chosen as the best.

Summary of results for group 2

quarter	gross_sr	net_sr	gross_cr	net_cr	av_n_trades	cum_gross_pnl	cum_net_pnl	target_metric
2022_Q1	1.19	0.86	4.60	3.07	5.25	16403.50	11873.50	7.59
2022_Q3	2.20	1.85	7.15	5.63	5.27	29877.68	25177.68	18.15
2022_Q4	2.47	2.09	4.93	3.89	5.51	32236.58	27356.58	12.86
2023_Q2	1.35	0.96	4.13	2.72	5.14	15330.93	10900.93	6.50
2023_Q4	1.03	0.67	3.38	2.14	5.10	12791.42	8391.42	4.55
2024_Q1	1.29	0.90	2.08	1.41	4.99	14355.55	9960.55	3.24
2024_Q2	1.56	1.37	4.26	3.64	5.17	35638.06	31128.06	12.52

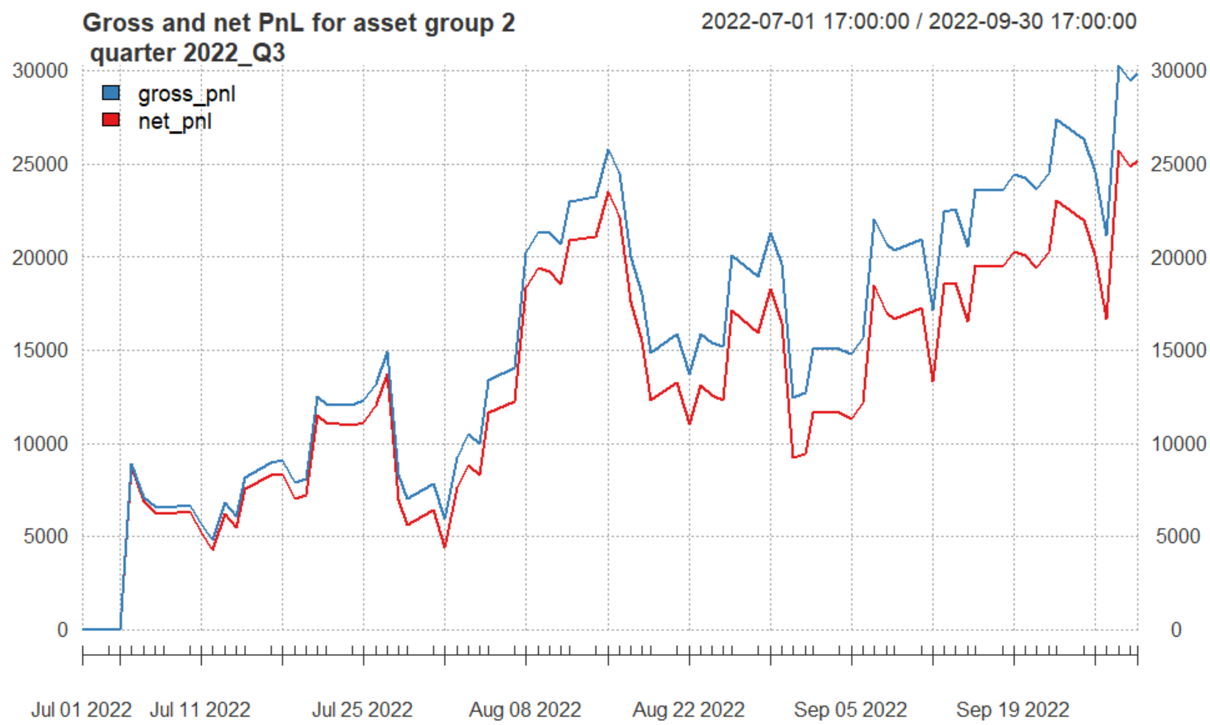
Overall, the strategy managed to achieve positive net PnL in every quarter without trading too much, which I consider to be a good result.

PnL of results for group 2 – quarter 2022Q1



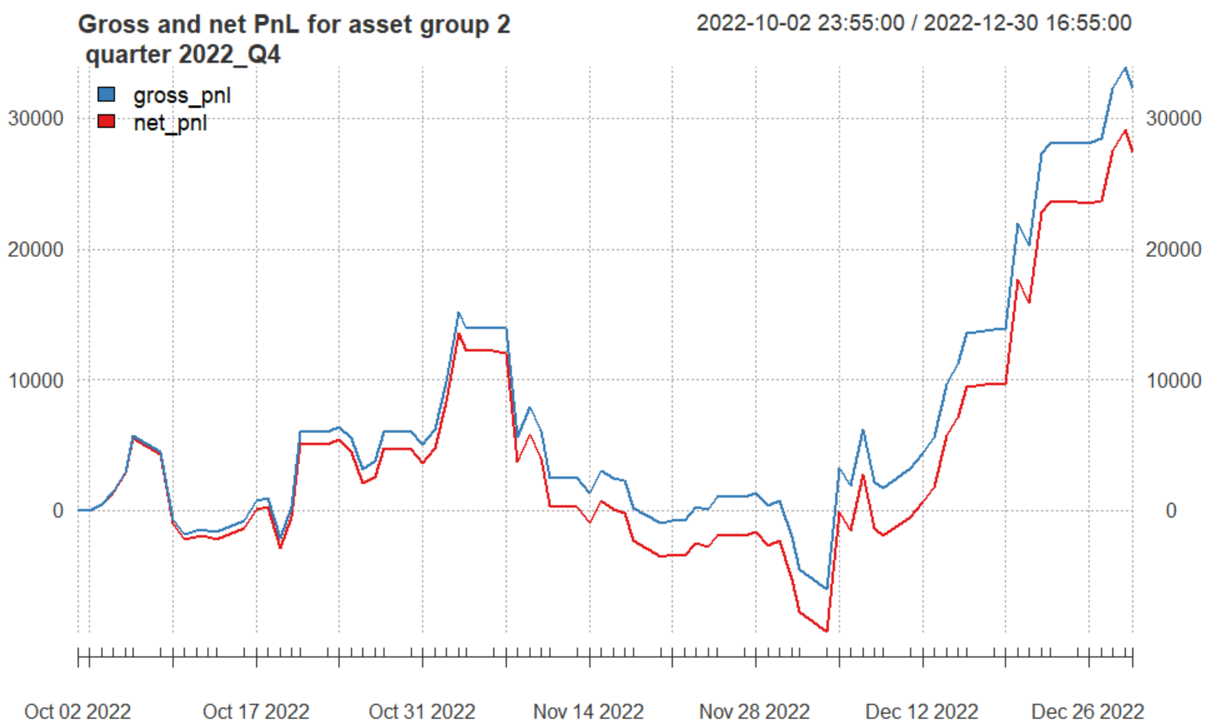
Strategy gained traction at the end of the quarter. Rather high volatility.

PnL of results for group 2 – quarter 2022Q3



PnL is mostly increasing. Volatility even higher.

PnL of results for group 2 – quarter 2022Q4

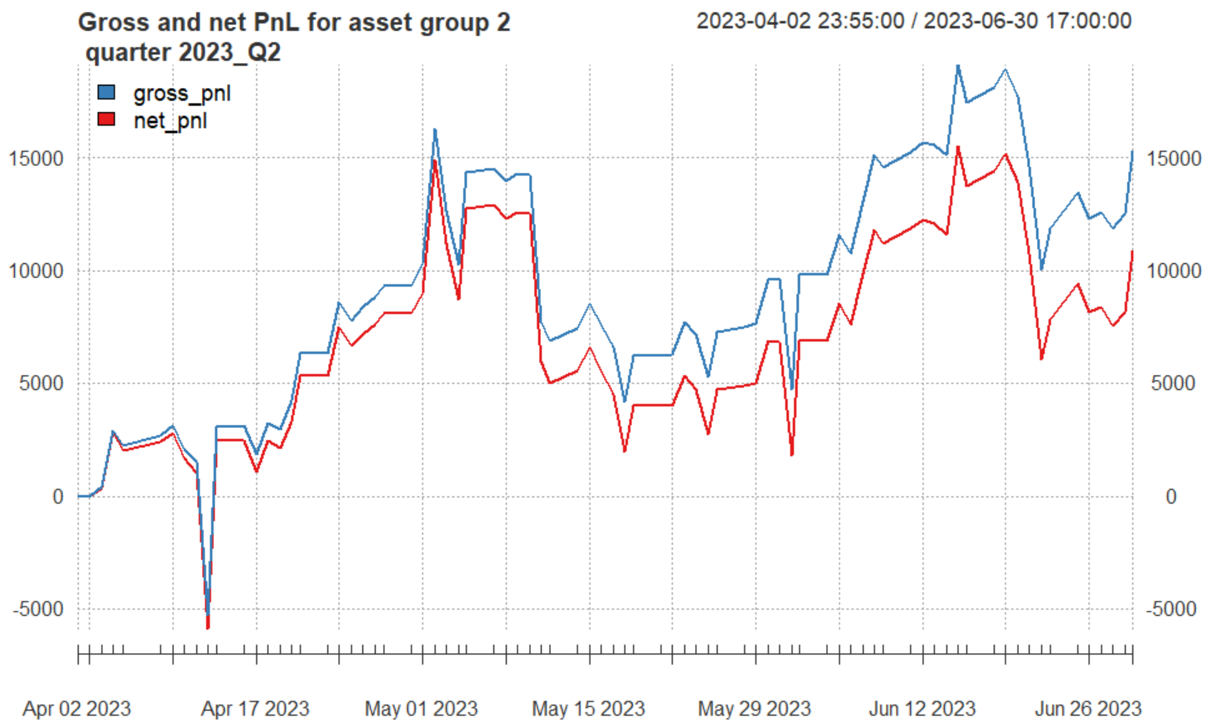


Only last month brought increase in PnL. Volatility is somewhat smaller.

PnL of results for group 2 – quarter 2023Q1

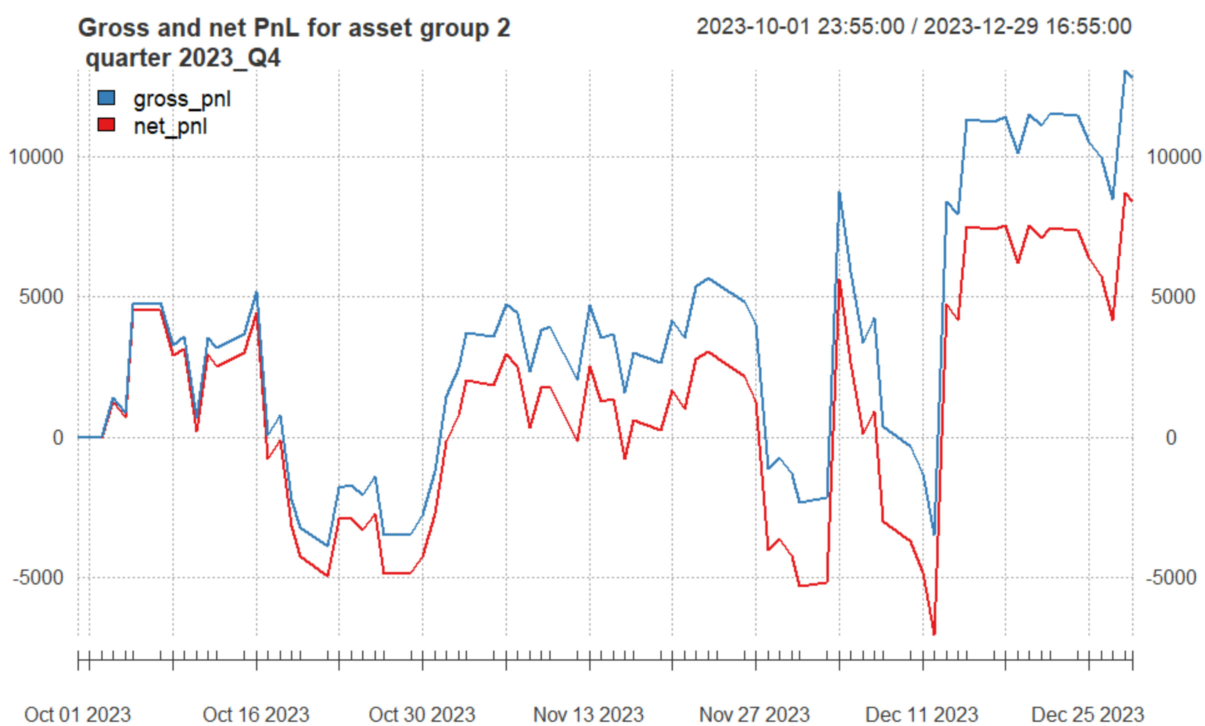
your comments required !!!

PnL of results for group 2 – quarter 2023Q2



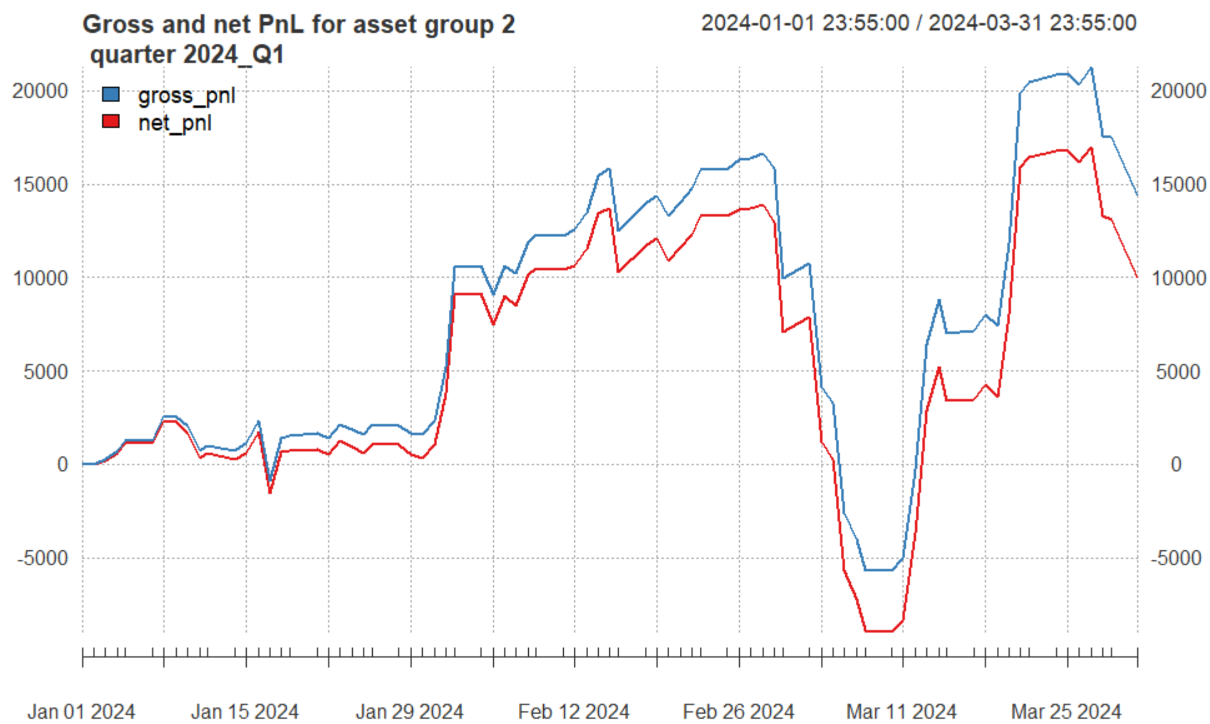
PnL mostly increased, but with a setback in the middle of the quarter. High volatility.

PnL of results for group 2 – quarter 2023Q4



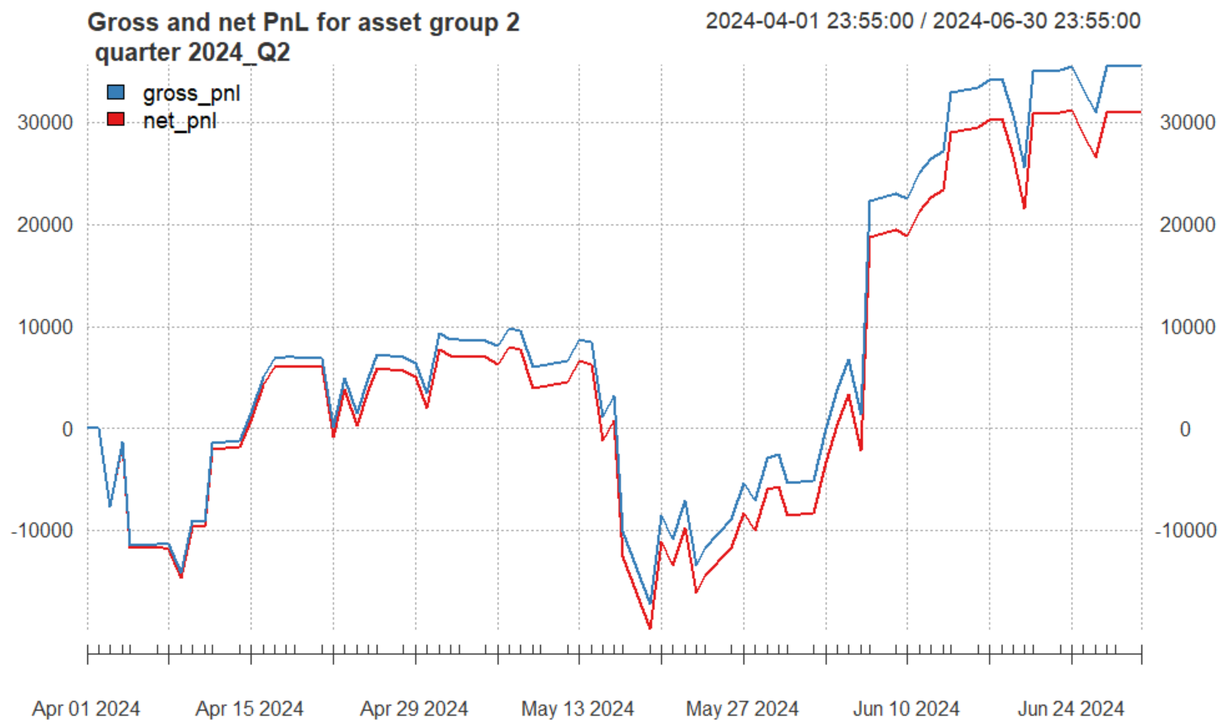
Mostly flat and high volatile PnL, with gains at the end of the quarter only.

PnL of results for group 2 – quarter 2024Q1



Volatility is less pronounced, but a huge drawdown in march is present.

PnL of results for group 2 – quarter 2024Q2



Again, volatility is less pronounced, and again a drawdown, now in the middle of the quarter.

Summary and conclusions

For group 2, the volatility-breakout strategy showed decent results on in-sample data. The main features are: rather high values of signal EMA and slow EMA; rather high volatility; large drawdowns are possible.