Volume Estimation

Yakunina Kseniia

Methodology:

01

Stocks:
Apple inc., Nike,
Johnson & Johnson
for 5 years

02

Adding an
additional
time-based features

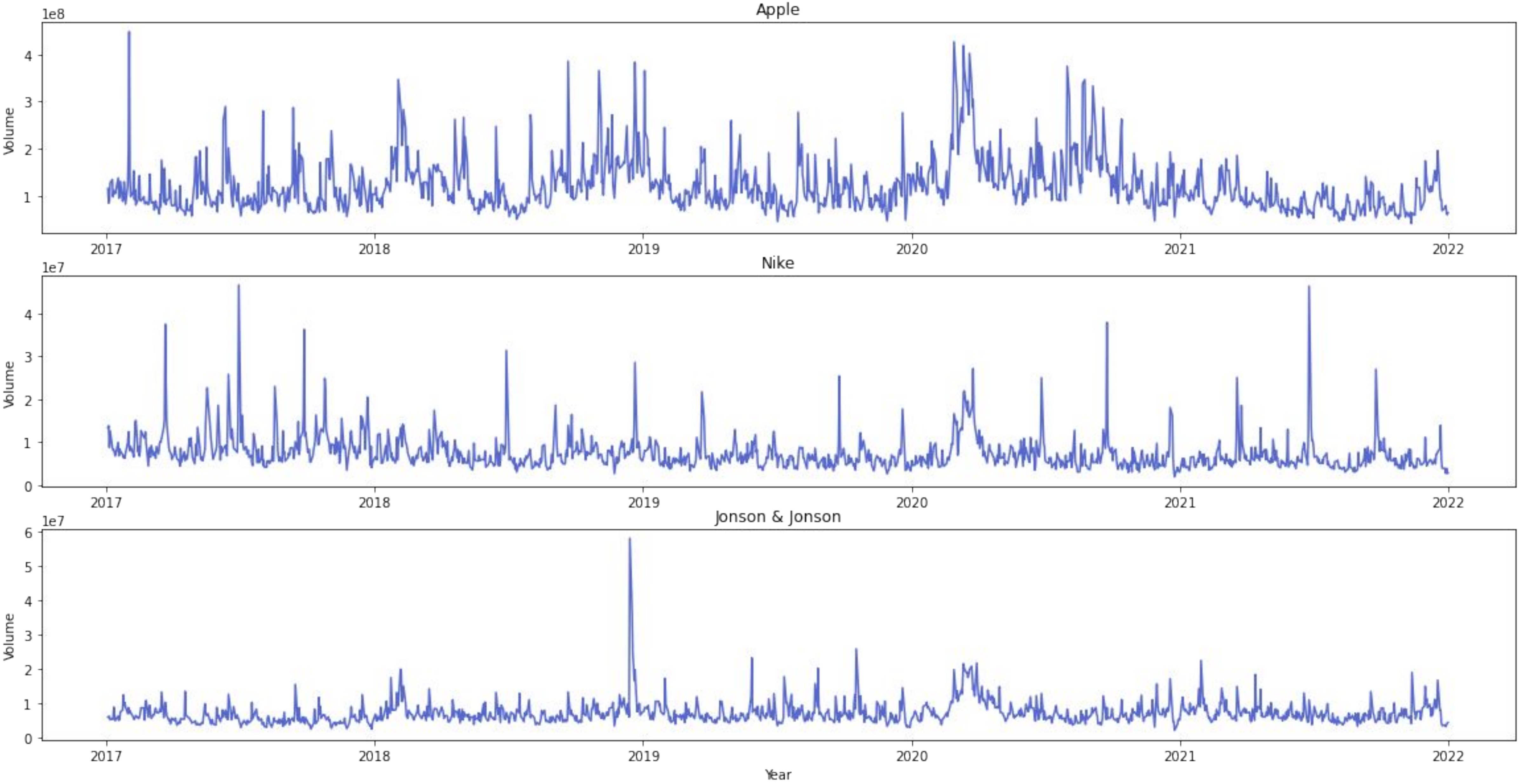
03

Prediction with SMA with
different windows

04

Results Evaluation

Data



Apple
1e8
4
3
2
1
Volume
2017
2018
2019
2020
2021
2022
Nike
1e7
4
3
2
1
0
Volume
2017
2018
2019
2020
2021
2022
Jonson & Jonson
1e7
6
5
4
3
2
1
0
Volume
2017
2018
2019
2020
2021
2022
Year

New Features

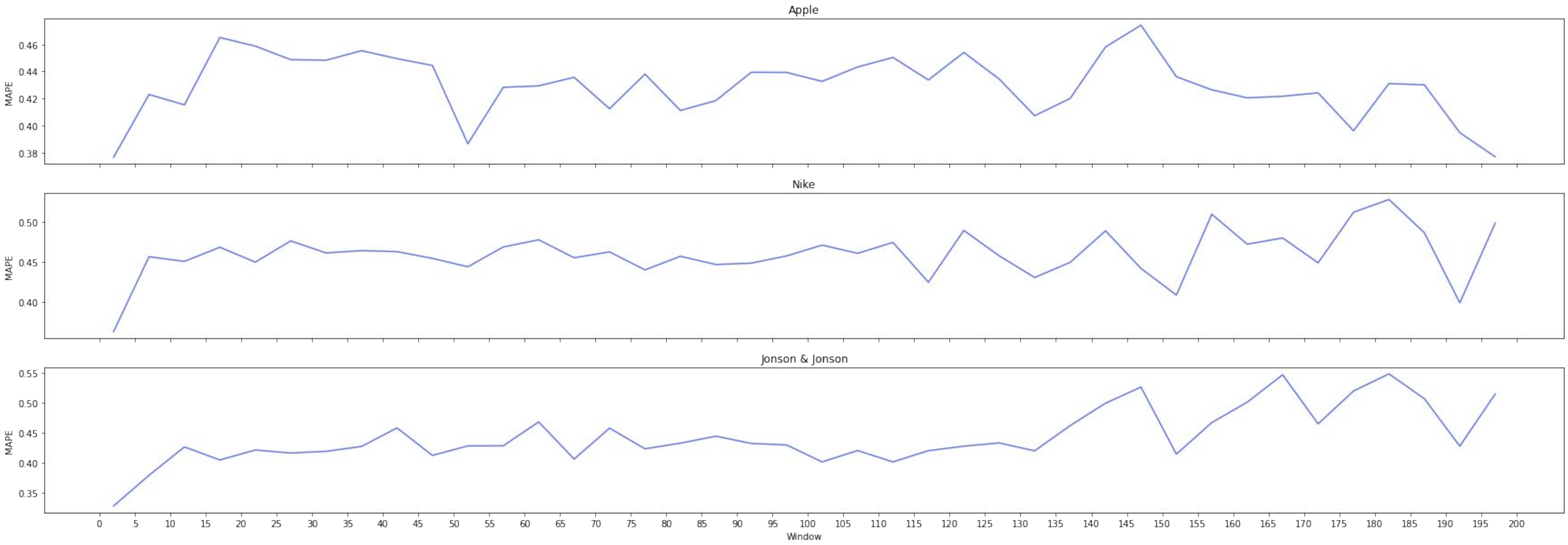
Worked :

Day of the week
Quarter
Day of the month
Simple Moving average with different windows

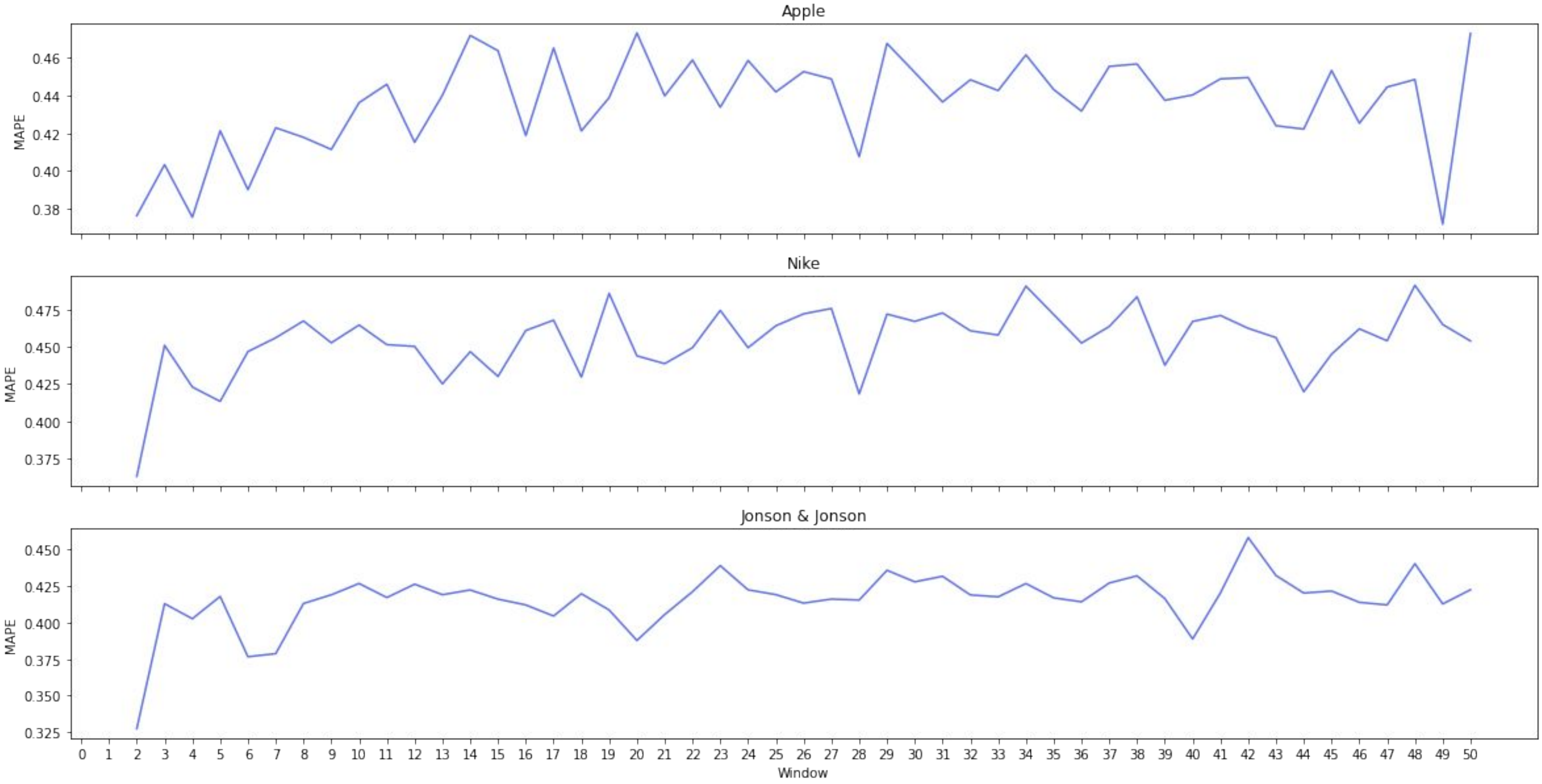
Not worked :

VWAP - Volume-weighted average price
Day of the Year
Friday marker

MAPE on In-sample data



MAPE on In-sample data



Results

OLS model without modification

Stock : Apple, R2 : 0.45

Stock : Nike, R2 : 0.81

Stock : J&J, R2 : 0.89

OLS model with modification

Stock : Apple, R2 : 0.47

Stock : Nike, R2 : 0.84

Stock : J&J, R2 : 0.91

Apple

Window	R^2	F-test	MAPE test data
2	0.85	602.0	0.11
6	0.66	203.7	0.18
12	0.6	141.9	0.2
18	0.56	128.1	0.24
25	0.54	119.9	0.23
28	0.54	117.1	0.25
50	0.5	104.3	0.25
100	0.5	96.0	0.26

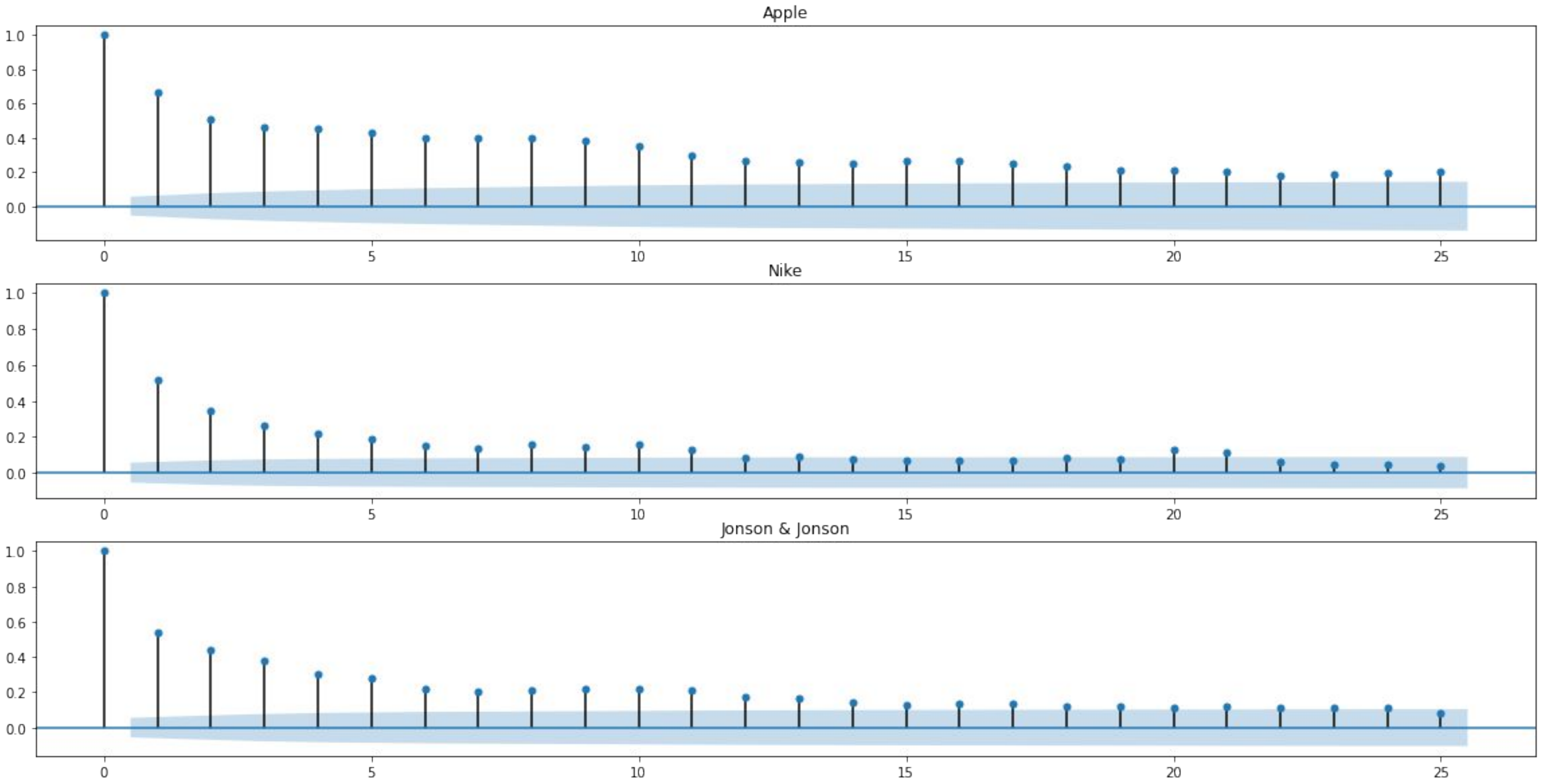
Nike

Window	R^2	F-test	MAPE test data
2	0.78	358.8	0.14
6	0.48	94.8	0.22
12	0.41	71.7	0.25
18	0.38	63.5	0.29
25	0.37	60.4	0.28
28	0.37	59.4	0.28
50	0.36	58.0	0.27
100	0.37	56.4	0.27

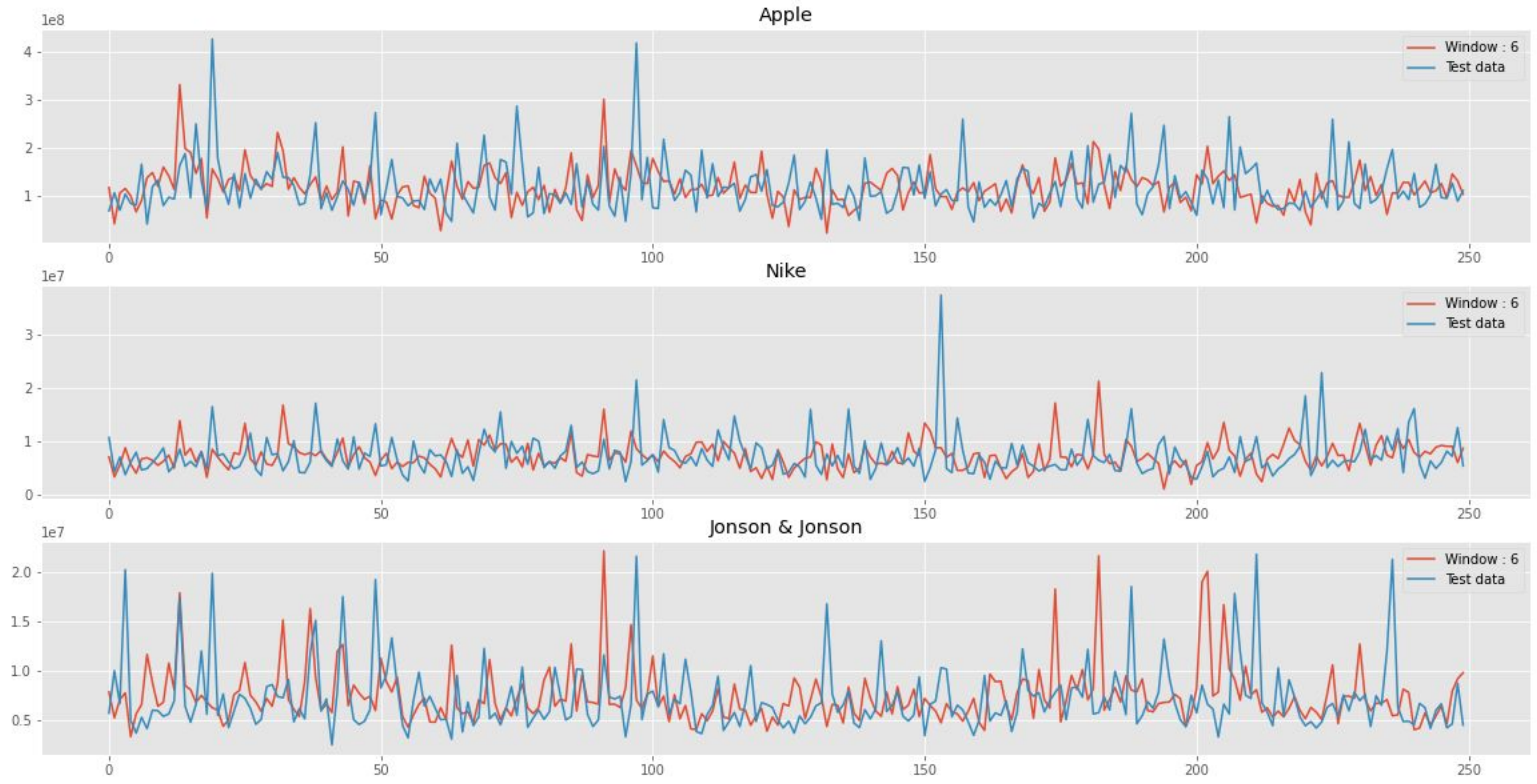
Jhonson & Jhonson

Window	R^2	F-test	MAPE test data
2	0.82	458.3	0.13
6	0.63	176.4	0.17
12	0.57	138.8	0.2
18	0.56	130.6	0.23
25	0.56	127.2	0.17
28	0.55	125.7	0.18
50	0.54	119.3	0.21
100	0.54	110.0	0.23

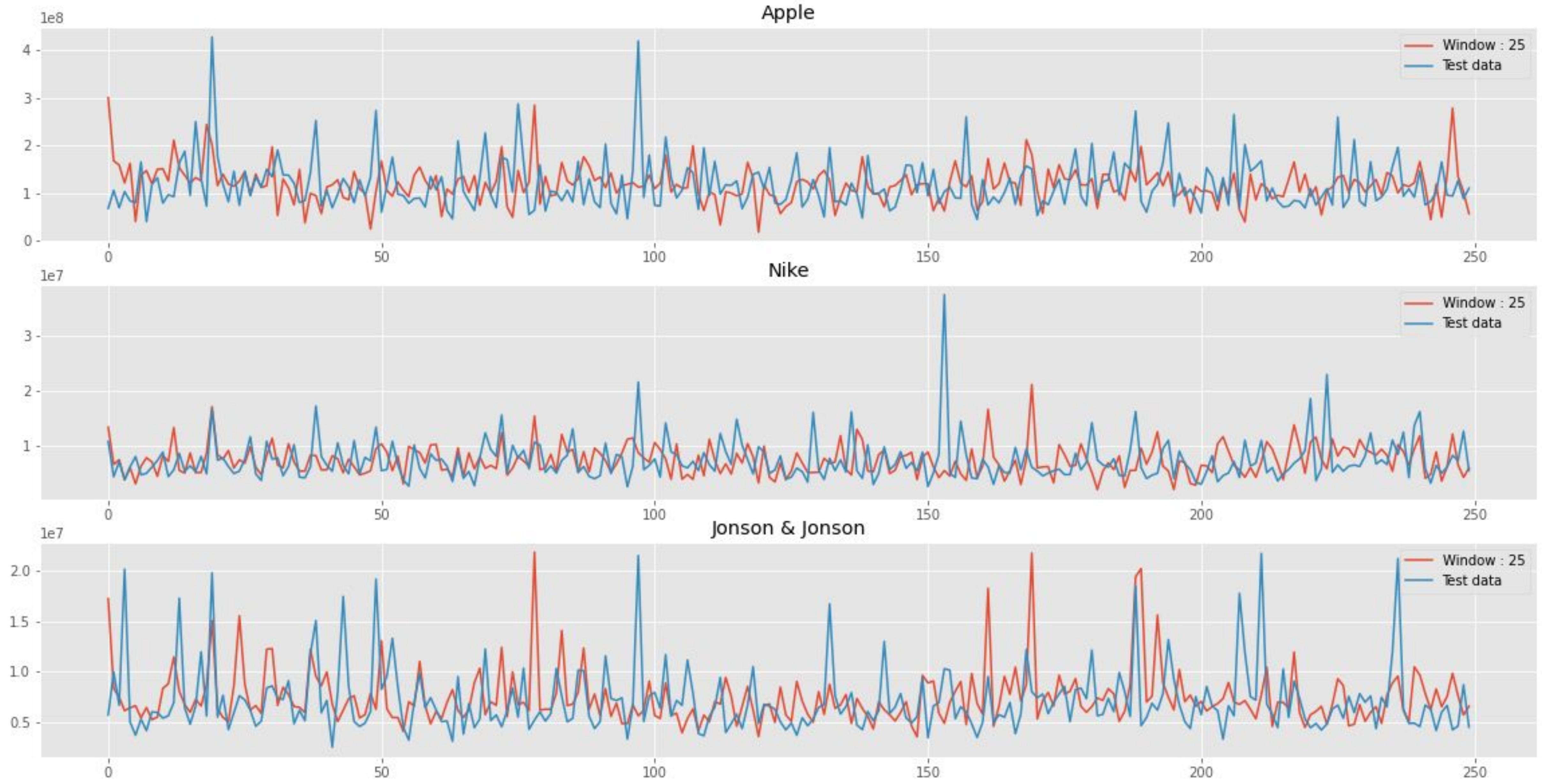
Autocorrelation plot



Prediction on test data



Prediction on test data



Conclusion

It is beneficial to use timestamp markers like “day of the week” and “day of the month” for volume estimation.

The good window day of volume estimation is 2,6 and 25.

The moving average of window 2 don’t removes noise from data and don’t reveal the trend.

The 6 and 25 window have very similar results, but 25 prediction on out-sample data better follows the tops.

References

https://flextrade.com/wp-content/uploads/2015/01/Predicting-Intraday-Trading-Volume-and-Percentages.pdf

https://towardsdatascience.com/an-algorithm-to-find-the-best-moving-average-for-stock-trading-1b024672299c