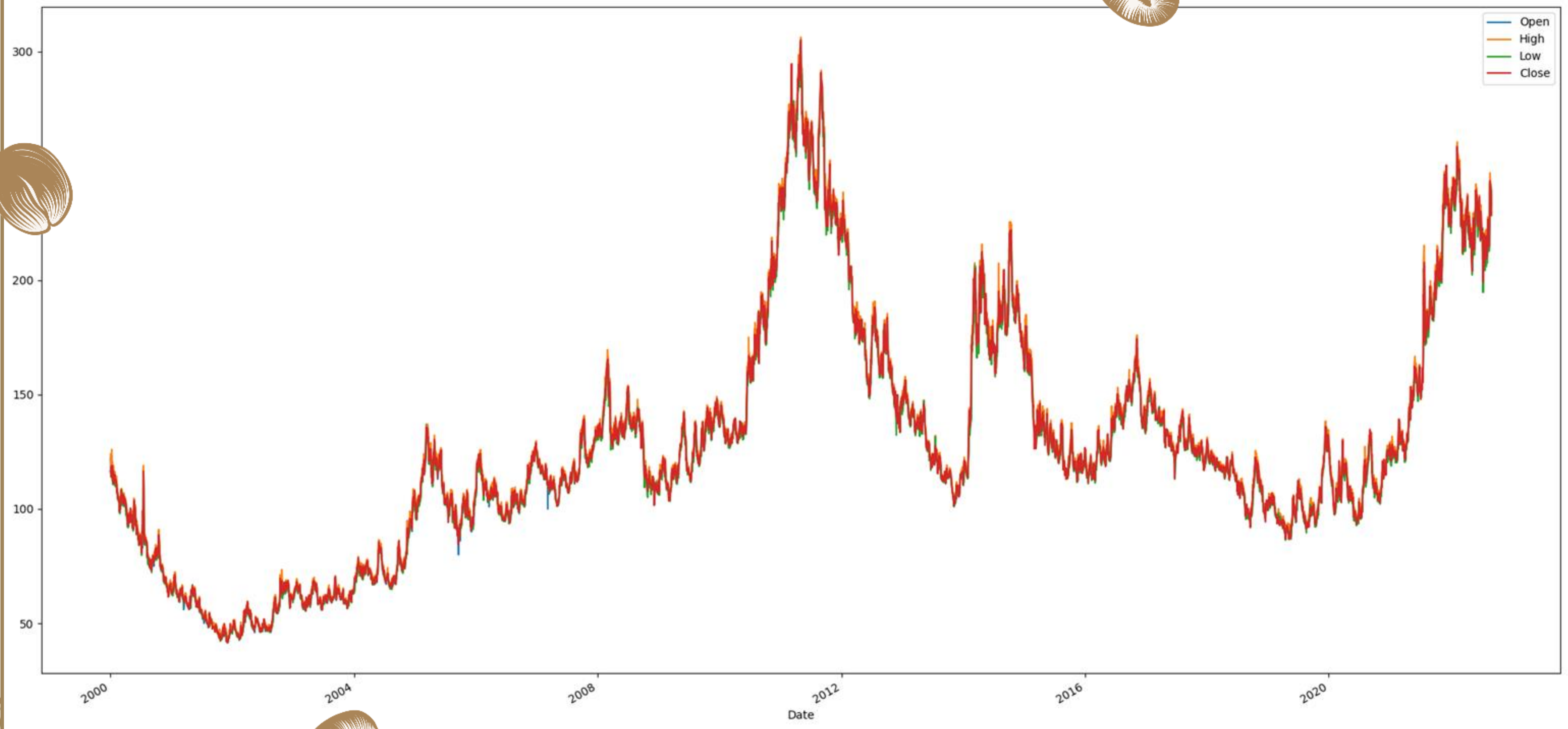
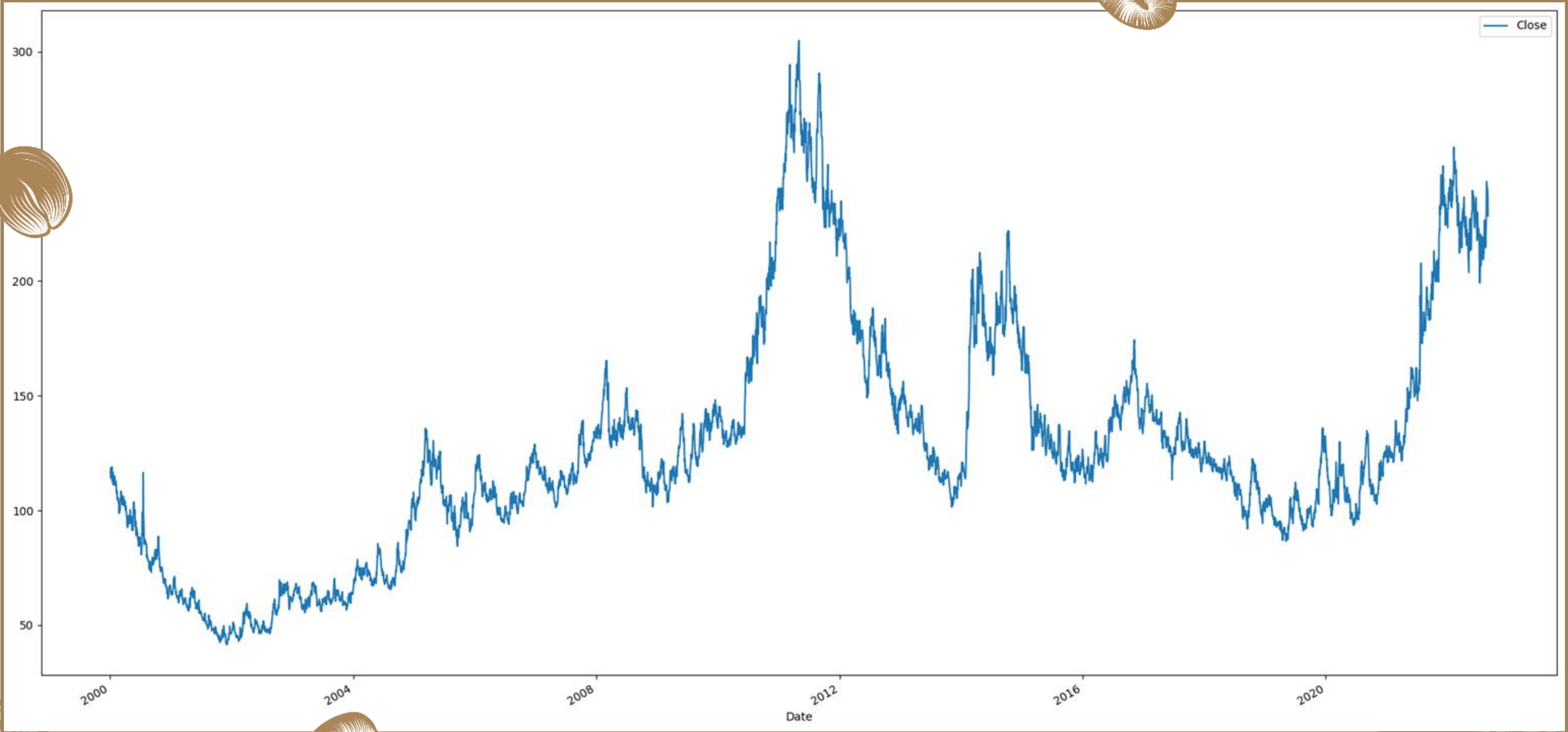
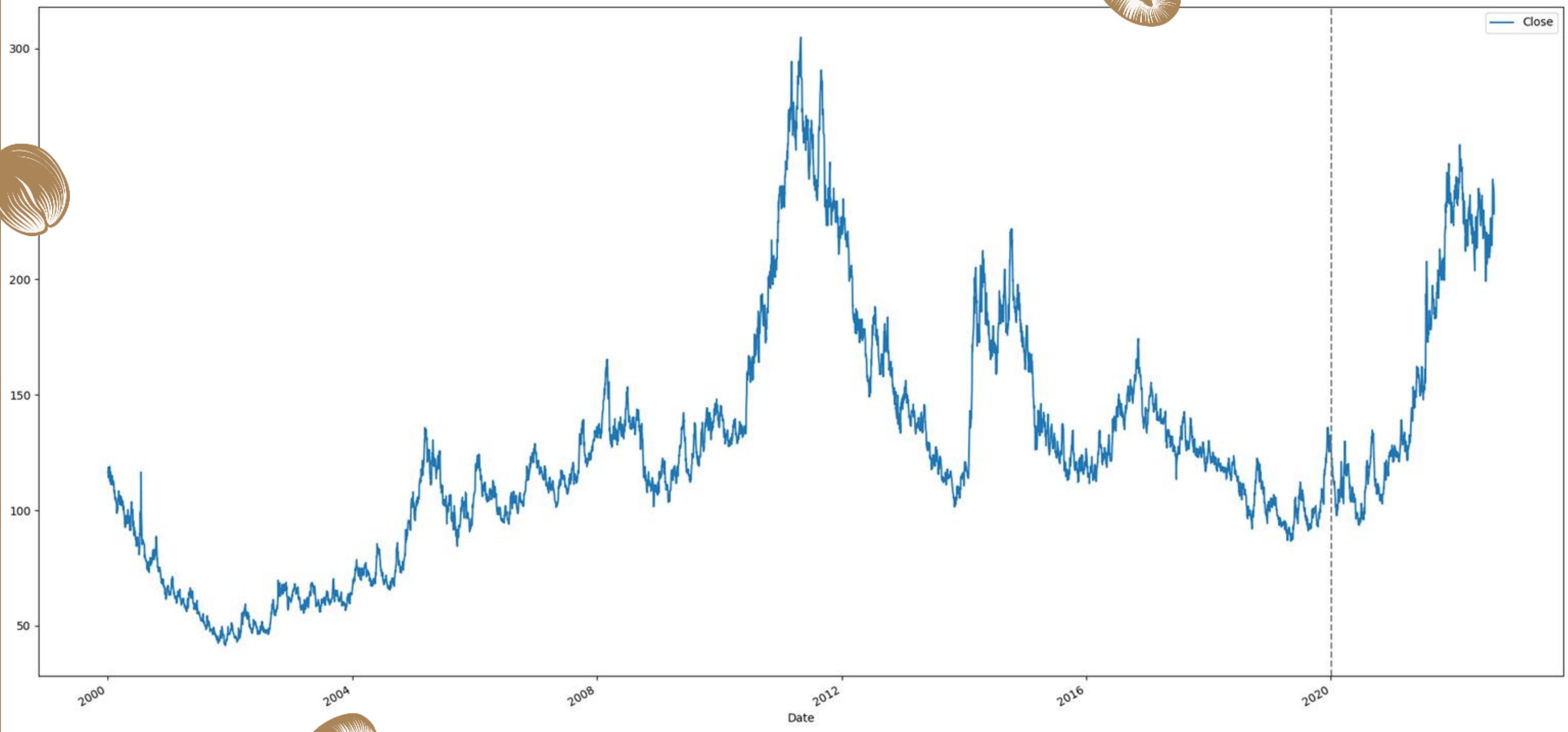
Time Series of Coffee Price

Group 7
110024516 邱繼賢 110024521 邱婉如



Open
High
Low
Close
300
200
150
100
50
2000
2004
2008
2012
2016
2020
Date


Close
300
200
150
100
50
2000
2004
2008
2012
2016
2020
Date



Close
300
200
150
100
50
2000
2004
2008
2012
2016
2020
Date

Outline

01 ARIMA

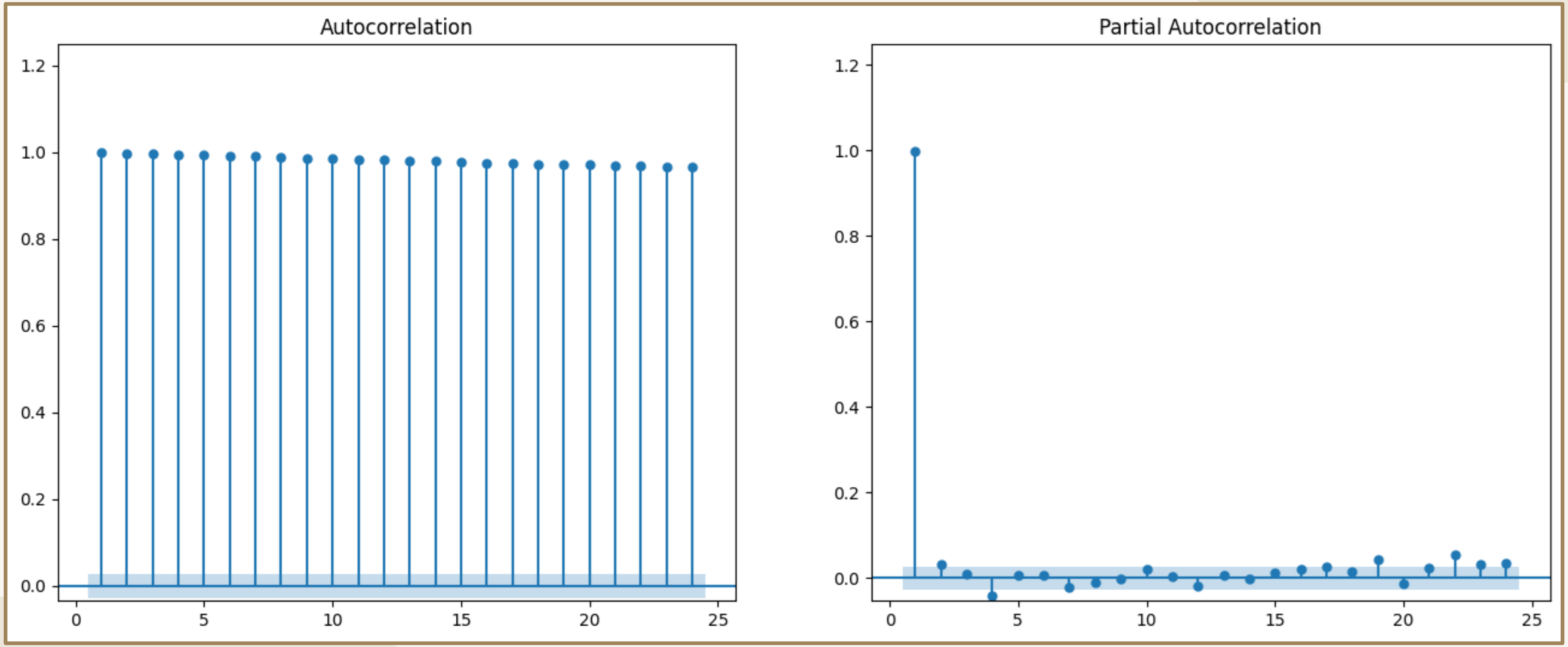
02 LSTM

03 monthly

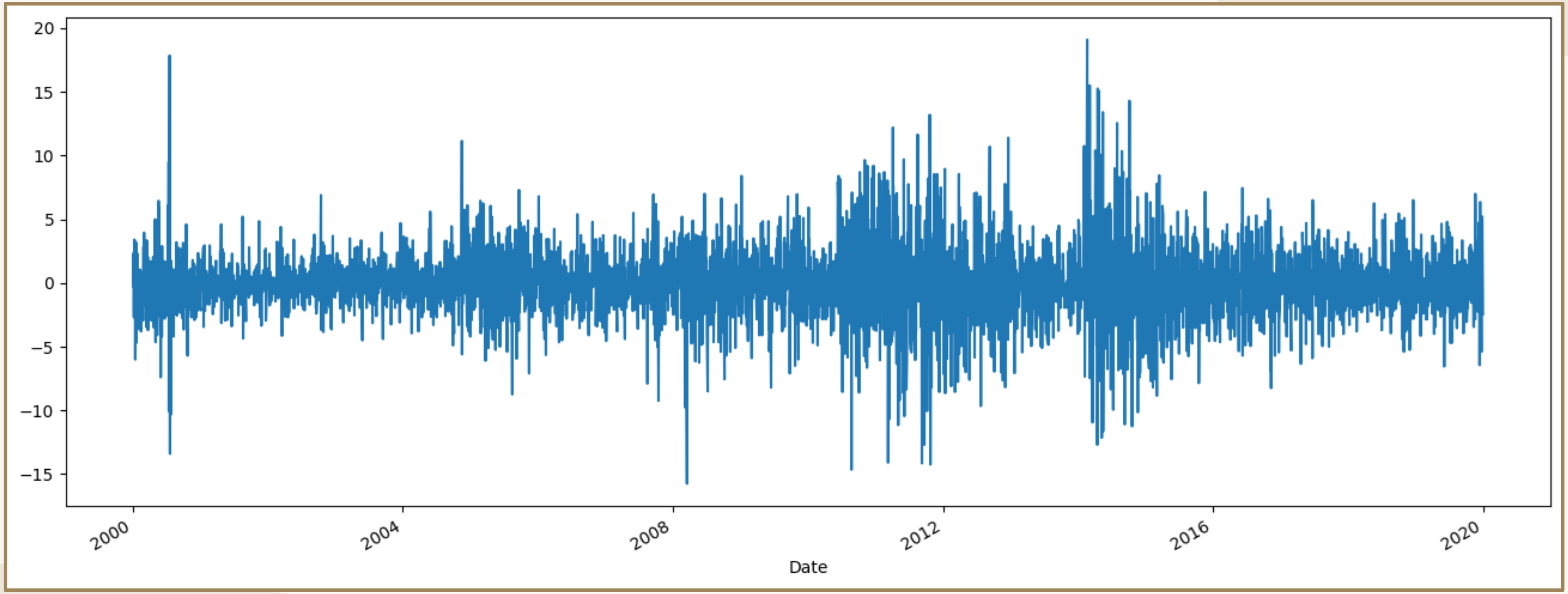
04 conclusion

01
ARIMA

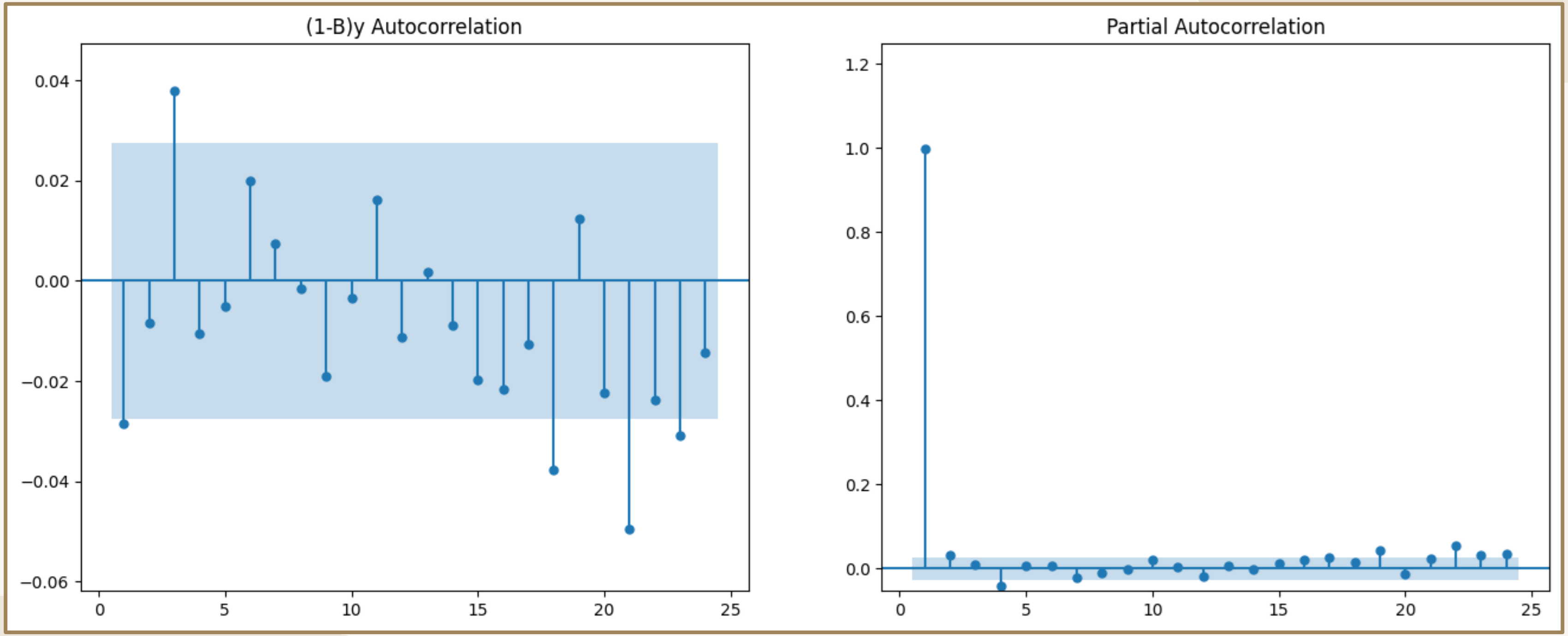
ACF & PACF of close



Differencing with order 1



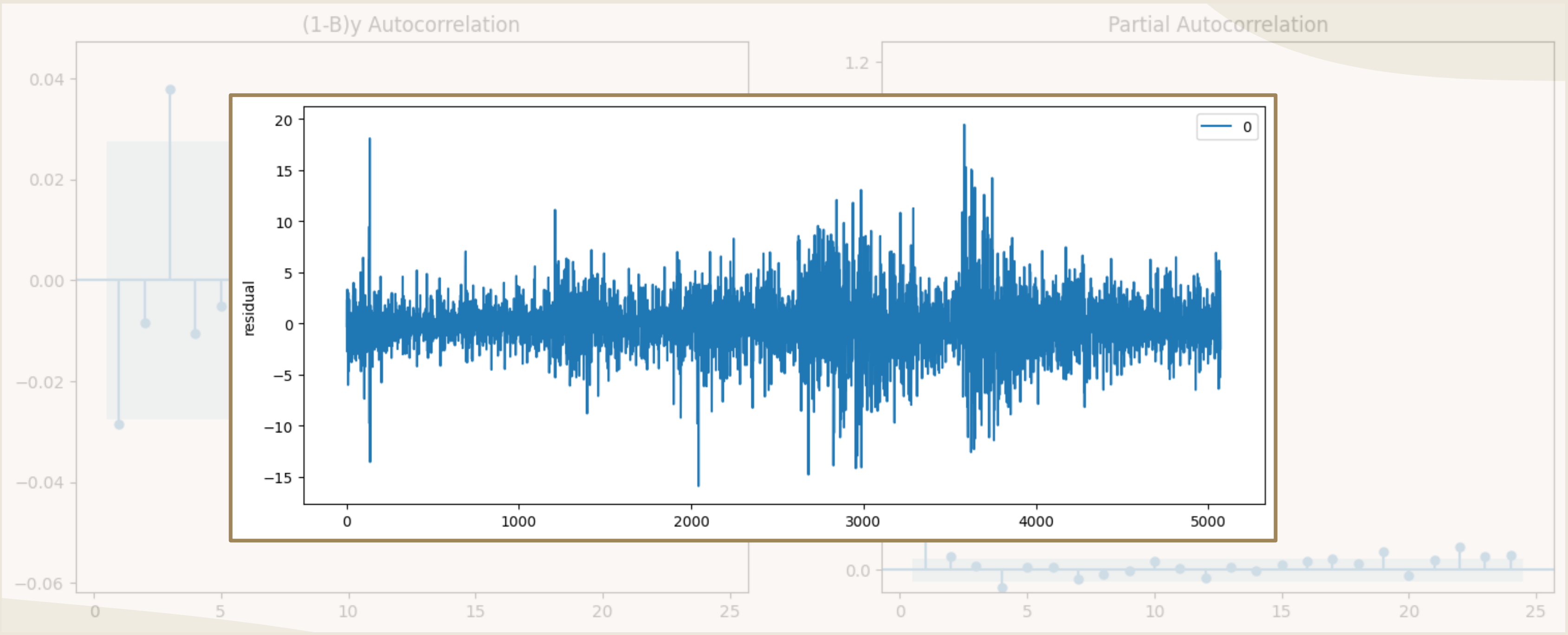
ARIMA (p,d,q) = (1, 1, 0)



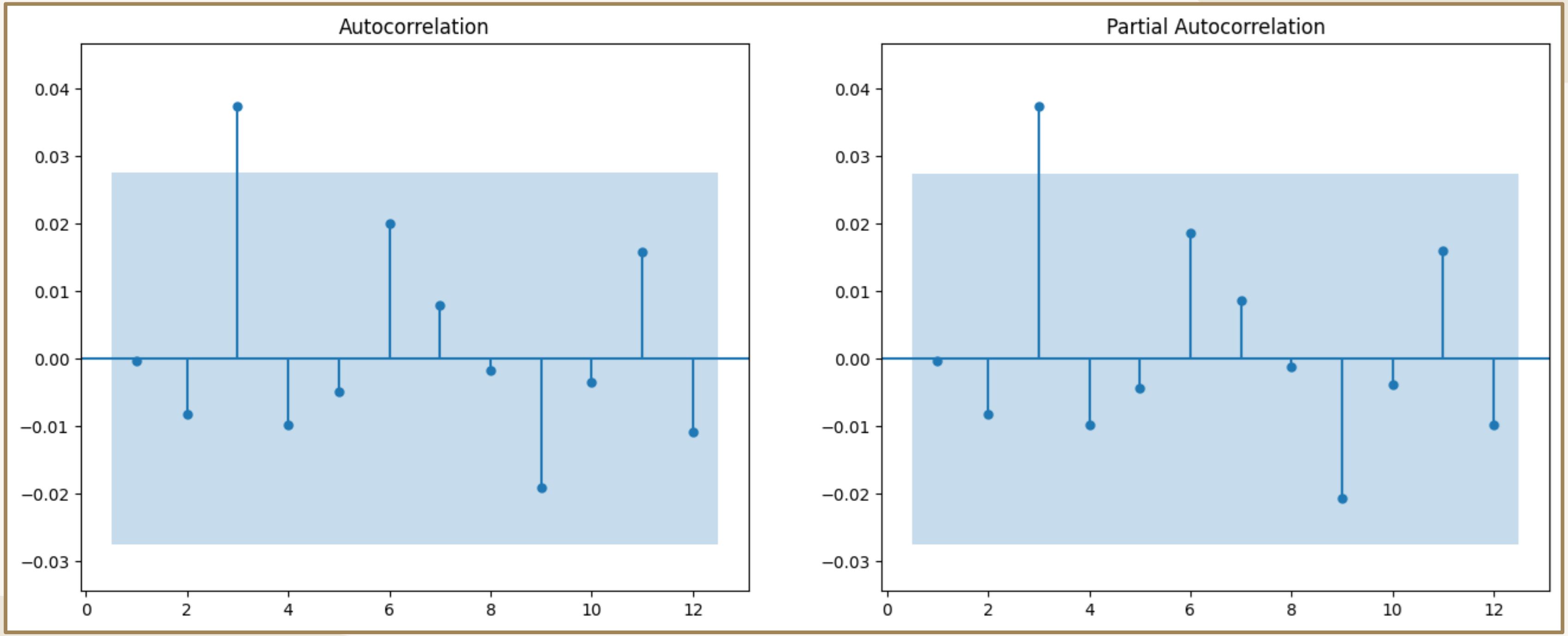
ARIMA (p,d,q) = (1, 1, 0)

	coef	std err	z	P>|z|
intercept	0.0027	0.038	0.071	0.943
ar.L1	-0.0285	0.009	-3.063	0.002
sigma2	7.3727	0.081	90.903	0.000

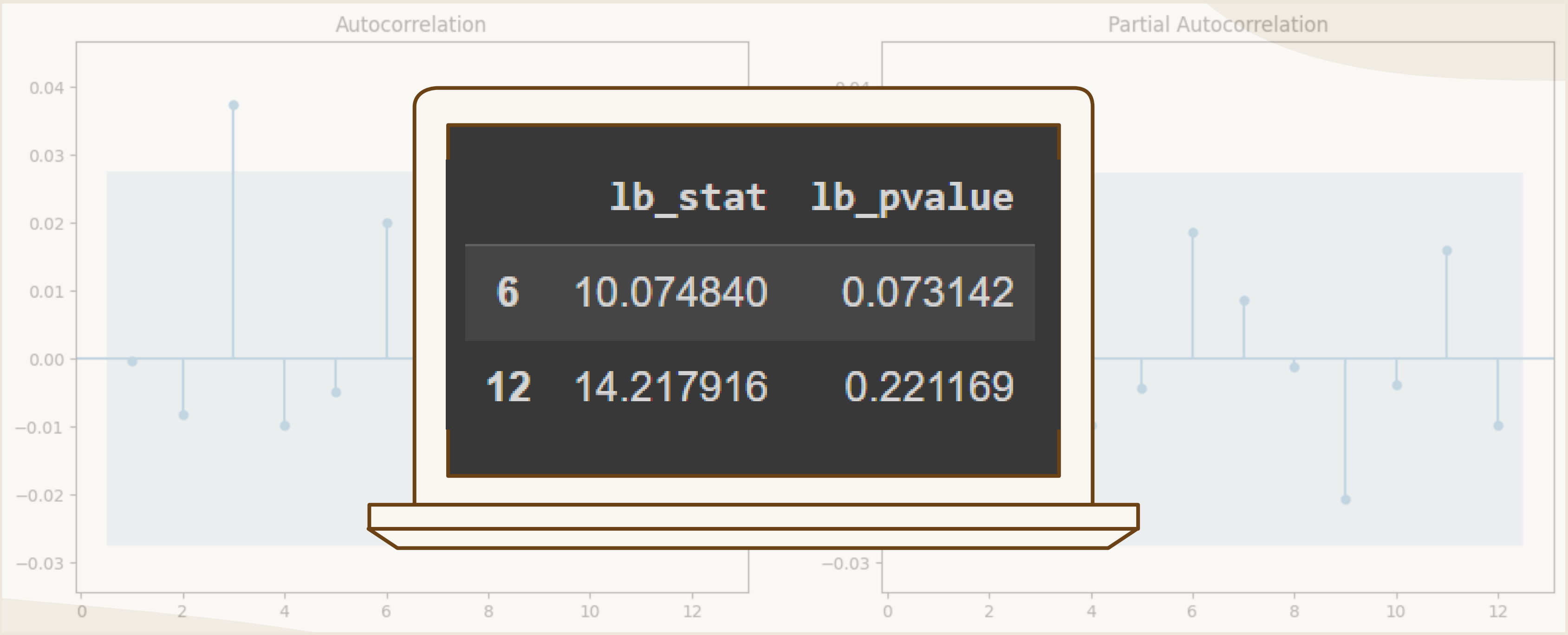
ARIMA (p,d,q) = (1, 1, 0)



ACF & PACF of residual

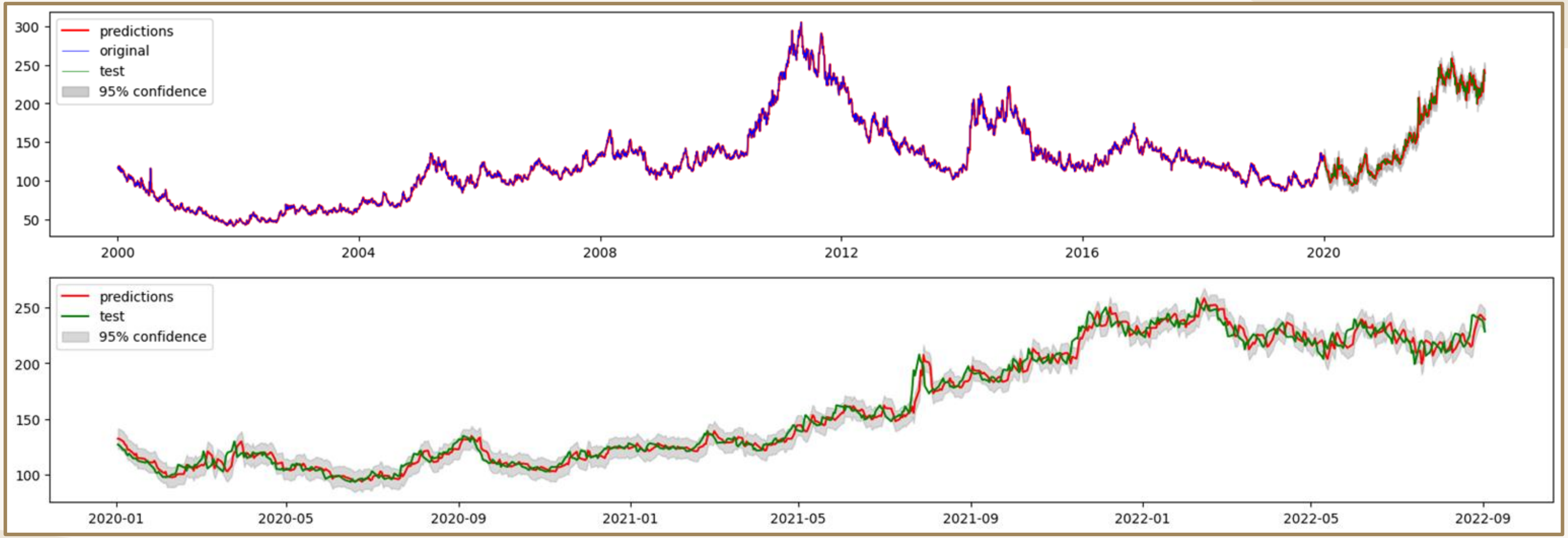


Ljung-Box test of **residual**



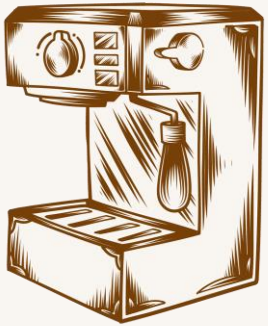
	lb_stat	lb_pvalue
6	10.074840	0.073142
12	14.217916	0.221169

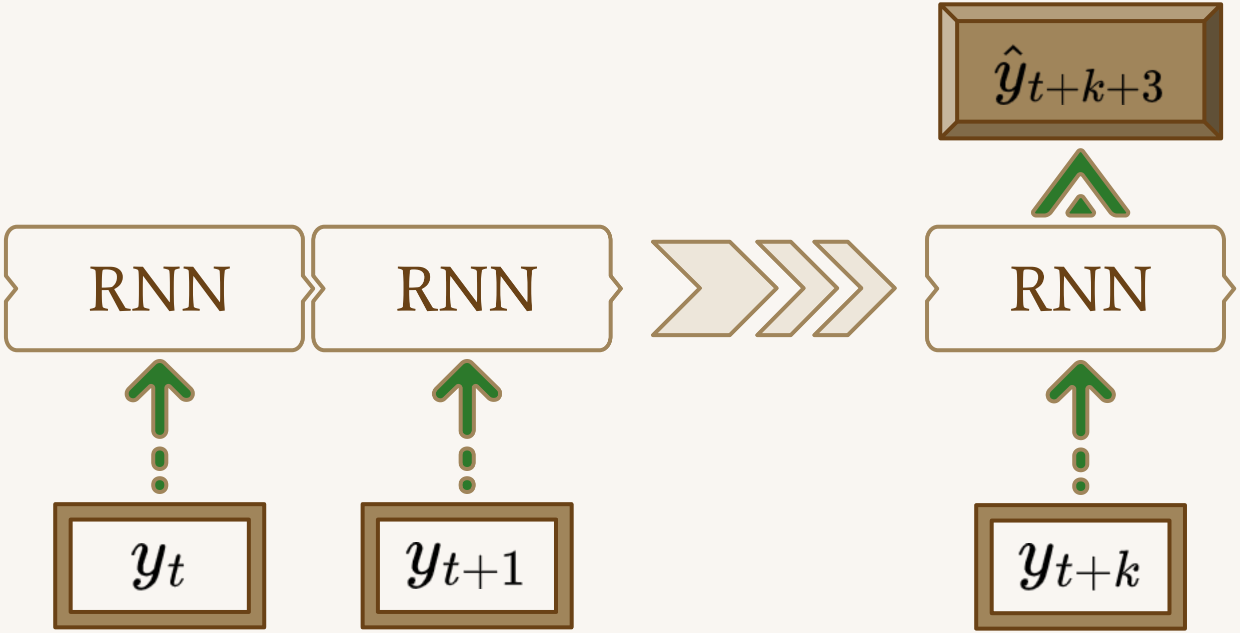
Prediction performance



02
LSTM

LSTM(RNN) model structure



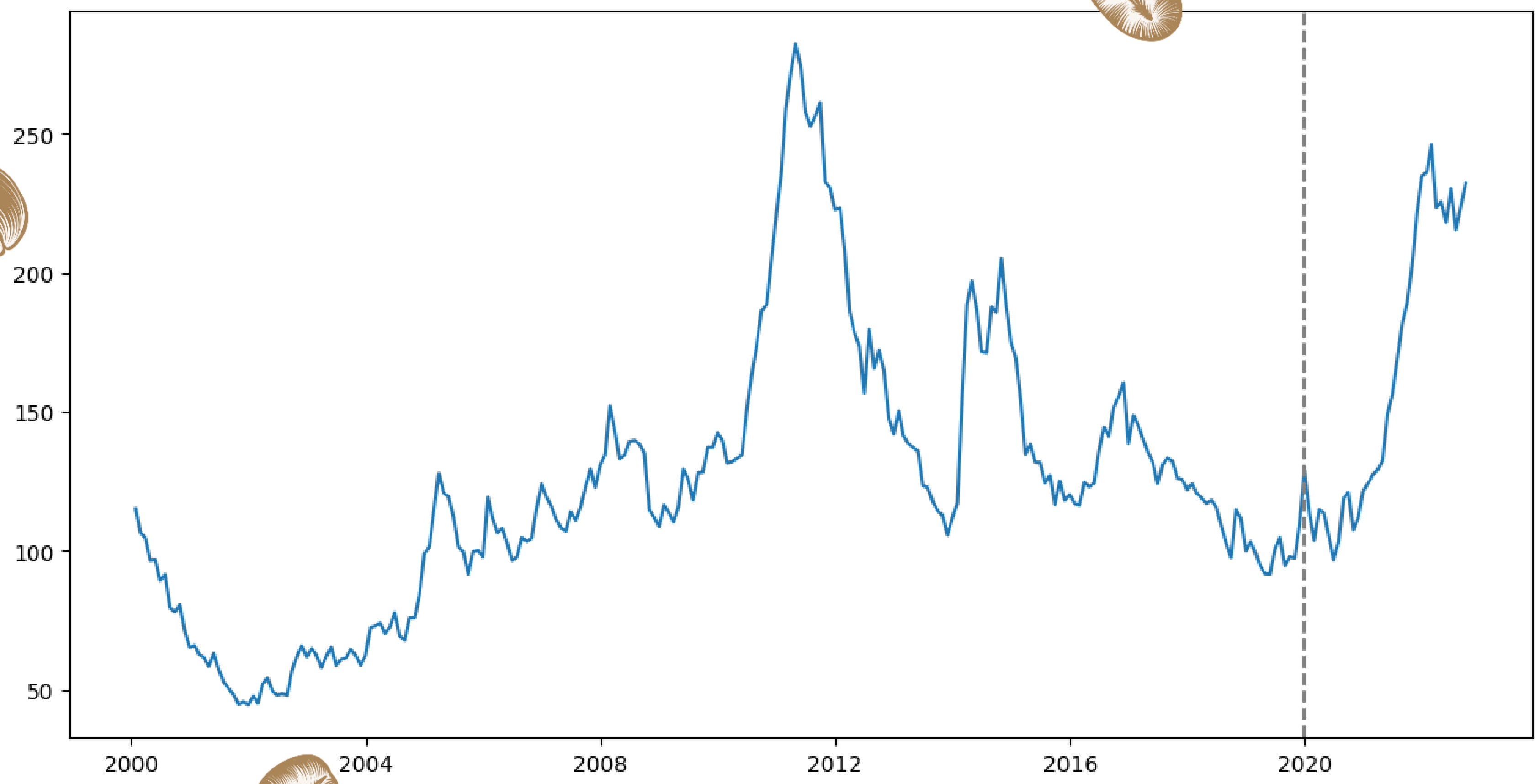


Prediction performance

Comparison

	ARIMA	LSTM	Ensemble	Baseline
MSE	46.33	47.34	46.75	46.33
MAE	5.05	5.12	5.08	5.05

03
monthly



250
200
150
100
50
2000
2004
2008
2012
2016
2020

1-step forecasting

3-step forecasting

Comparison

1-step	ARIMA	LSTM	Ensemble	Baseline
MSE	116.24	117.25	115.60	116.30
MAE	9.13	9.17	9.15	9.32

3-step	ARIMA	LSTM	Ensemble	Baseline
MSE	431.74	436.13	422.20	450.82
MAE	17.55	17.62	17.17	17.19

04
conclusion

- ARIMA 及 LSTM 皆可預測 2020 後咖啡價錢整體上升趨勢
- 在月平均資料上 ensemble 兩模型可提升預測表現
- 模型與 baseline 預測表現差異不大
- 未來可加入與咖啡豆生長相關或交易市場的變數