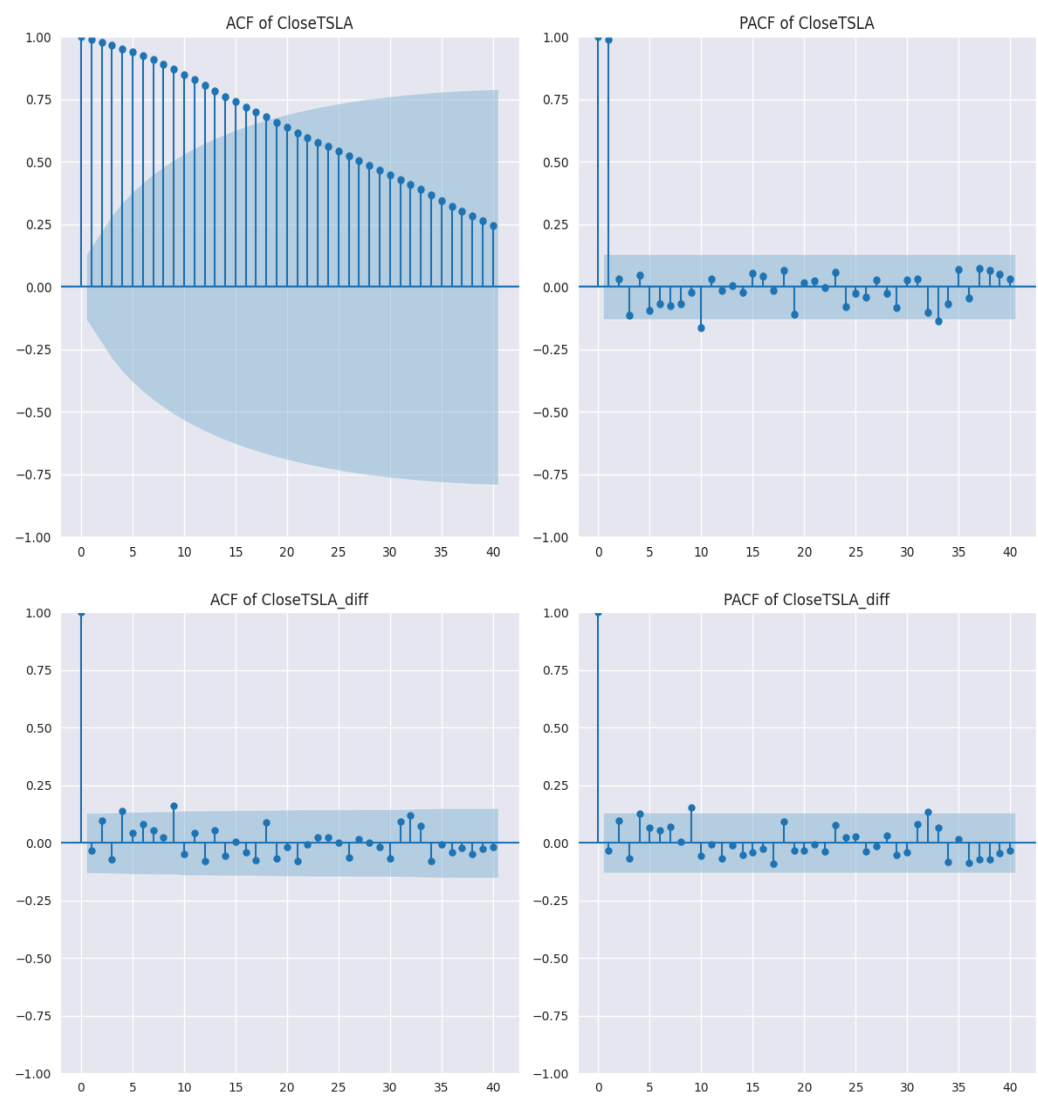
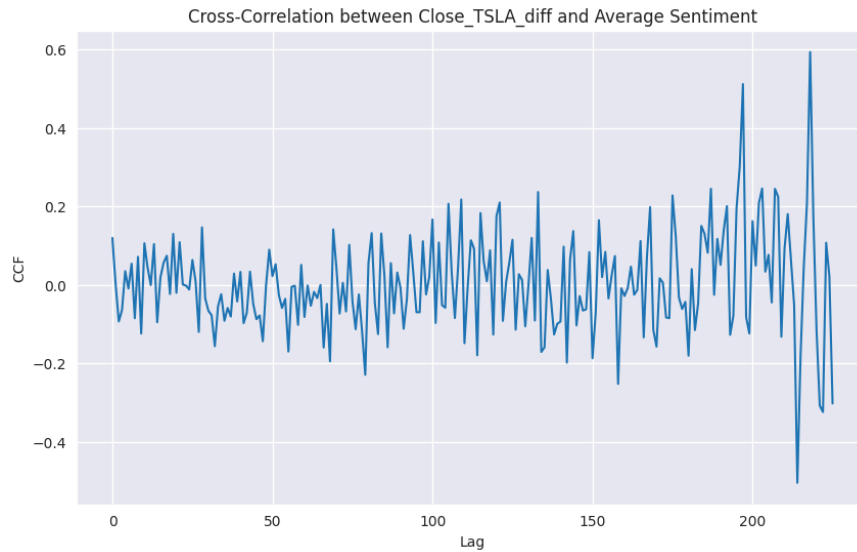


Model Assumptions: visualization of undifferenced (top) and differenced (bottom) data



Results



```
Granger Causality
number of lags (no zero) 1
ssr based F test:      F=0.0098 , p=0.9213 , df_denom=222, df_num=1
ssr based chi2 test:   chi2=0.0099 , p=0.9207 , df=1
likelihood ratio test: chi2=0.0099 , p=0.9207 , df=1
parameter F test:      F=0.0098 , p=0.9213 , df_denom=222, df_num=1
```

```
Granger Causality
number of lags (no zero) 2
ssr based F test:      F=1.2397 , p=0.2915 , df_denom=219, df_num=2
ssr based chi2 test:   chi2=2.5360 , p=0.2814 , df=2
likelihood ratio test: chi2=2.5218 , p=0.2834 , df=2
parameter F test:      F=1.2397 , p=0.2915 , df_denom=219, df_num=2
```

```
Granger Causality
number of lags (no zero) 3
ssr based F test:      F=1.0848 , p=0.3564 , df_denom=216, df_num=3
ssr based chi2 test:   chi2=3.3598 , p=0.3394 , df=3
likelihood ratio test: chi2=3.3347 , p=0.3428 , df=3
parameter F test:      F=1.0848 , p=0.3564 , df_denom=216, df_num=3
```

```
Granger Causality
number of lags (no zero) 4
ssr based F test:      F=0.6647 , p=0.6172 , df_denom=213, df_num=4
ssr based chi2 test:   chi2=2.7711 , p=0.5968 , df=4
likelihood ratio test: chi2=2.7539 , p=0.5998 , df=4
parameter F test:      F=0.6647 , p=0.6172 , df_denom=213, df_num=4
```

```
Granger Causality
number of lags (no zero) 5
ssr based F test:      F=0.4671 , p=0.8005 , df_denom=210, df_num=5
ssr based chi2 test:   chi2=2.4578 , p=0.7828 , df=5
likelihood ratio test: chi2=2.4443 , p=0.7849 , df=5
parameter F test:      F=0.4671 , p=0.8005 , df_denom=210, df_num=5
```

SARIMAX Results

```
=====
Dep. Variable:    CloseTSLA_diff  No. Observations:      226
Model:            ARIMA           Log Likelihood           -780.346
Date:            Mon, 17 Feb 2025  AIC                      1566.692
Time:            07:19:48         BIC                      1576.954
```

Sample: 0 HQIC 1570.834
- 226

Covariance Type: opg

```
=====
              coef      std err          z      P>|z|      [0.025      0.975]
-----
const          -0.9592      0.758      -1.265      0.206      -2.445      0.527
average_sentiment  7.3922      5.136       1.439      0.150      -2.674     17.458
sigma2          58.4306      5.050     11.570      0.000      48.532     68.329
=====
```

```
=====
Ljung-Box (L1) (Q):          0.30  Jarque-Bera (JB):          1.84
Prob(Q):          0.59  Prob(JB):          0.40
Heteroskedasticity (H):          0.48  Skew:          -0.11
Prob(H) (two-sided):          0.00  Kurtosis:          3.39
=====
```