Econometric Modeler Analysis

Summary of results from the Econometric Modeler App

Econometrics Toolbox Version 6.2 (R2023a)

09-May-2023

Table of Contents

1. Time Series: UI_WLE

1.1. Time Series Plot

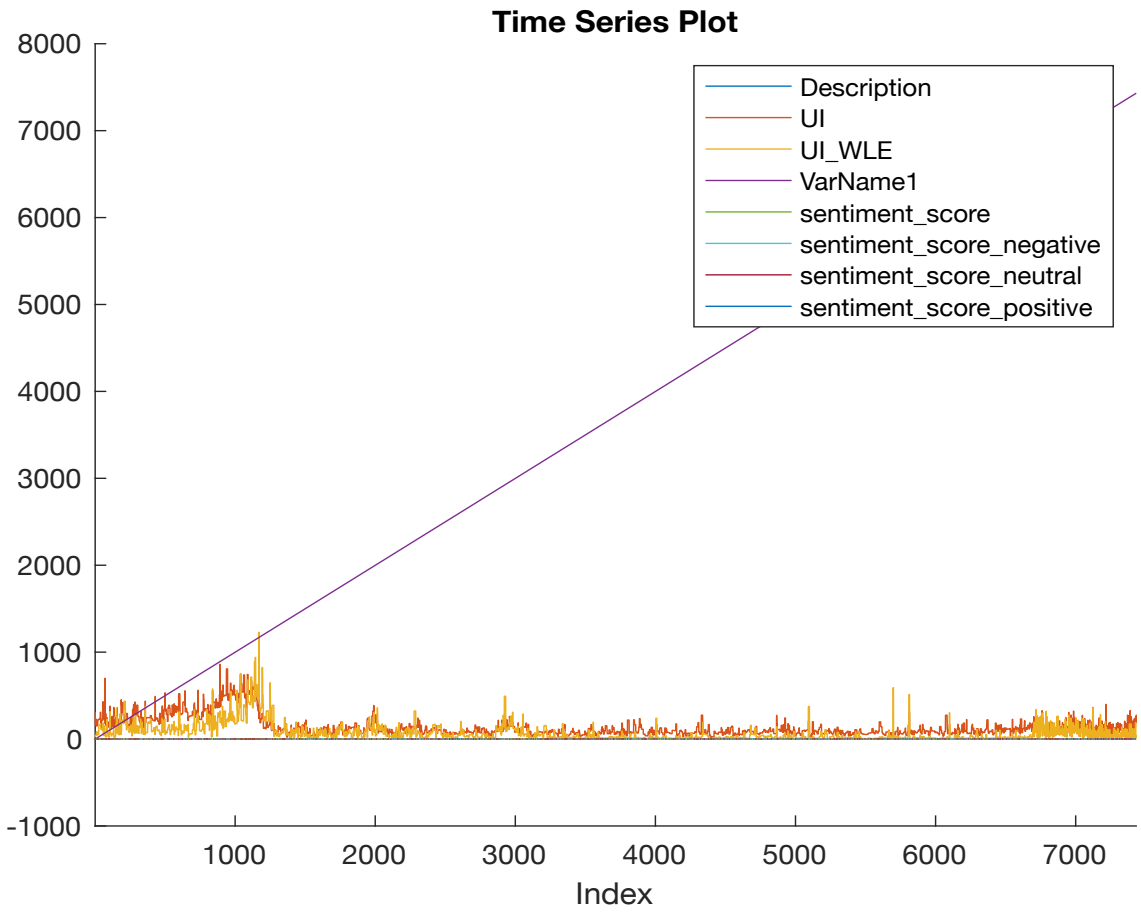

Figure 1.1. Time Series Plot of Description, UI, UI_WLE, VarName1, sentiment_score, sentiment_score_negative, sentiment_score_neutral, sentiment_score_positive

1.2. Time Series Plot

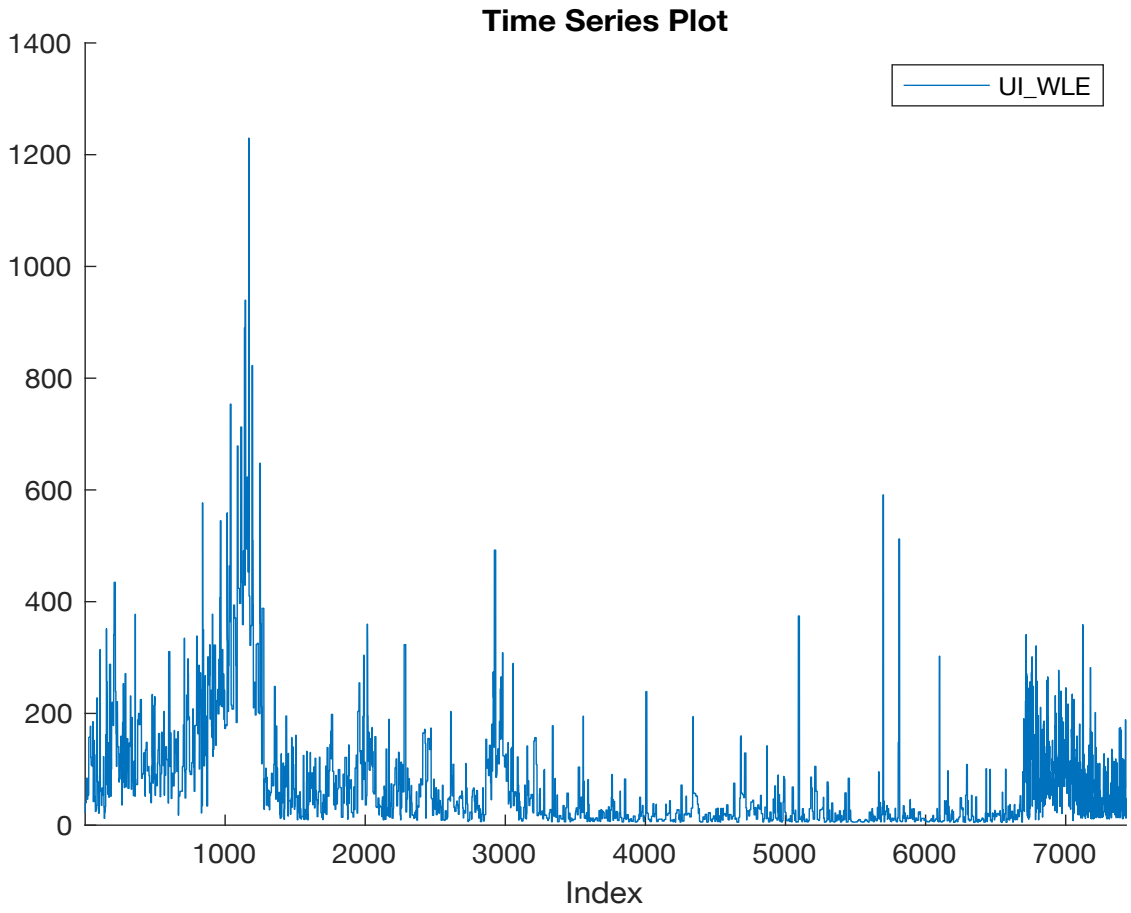

Figure 1.2. Time Series Plot of UI_WLE

1.3. Sample Autocorrelation Function

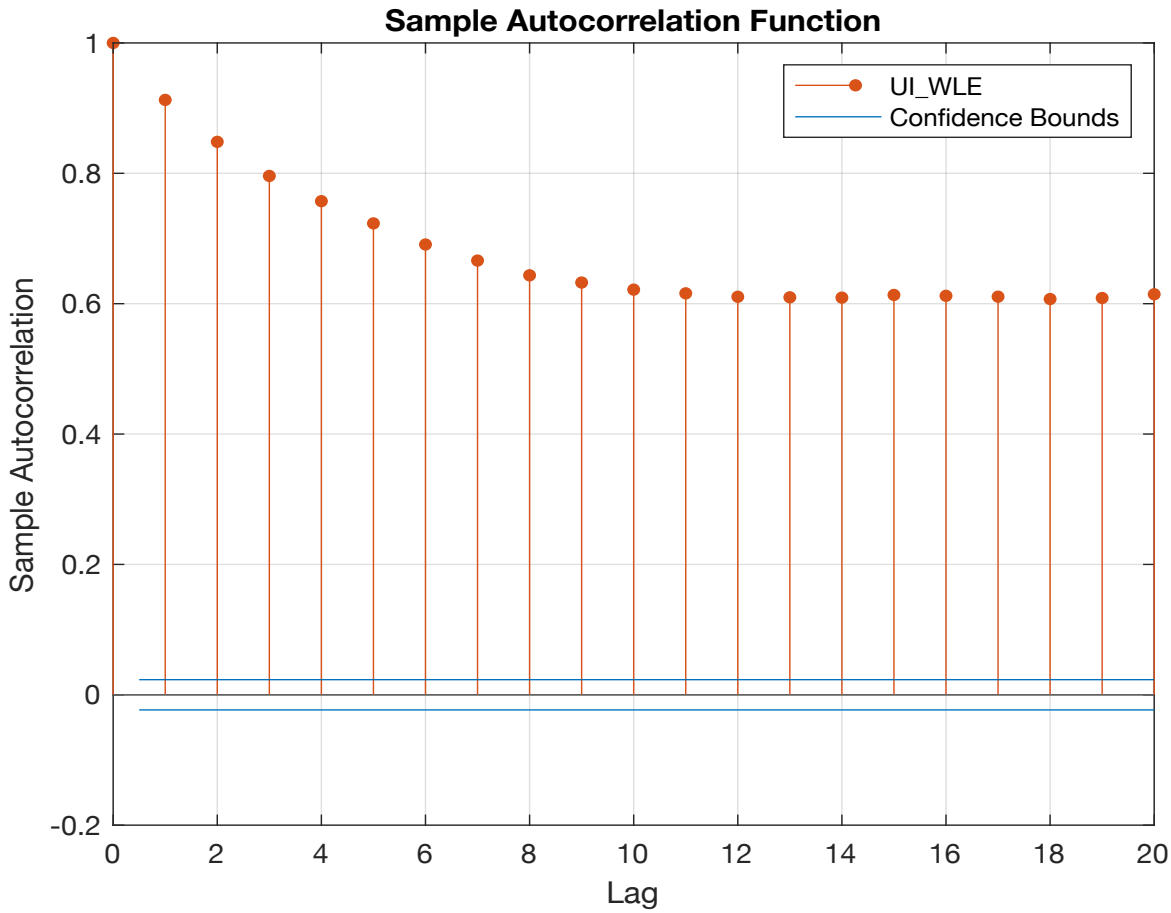

Figure 1.3. Sample autocorrelation function of UI_WLE

1.4. Sample Partial Autocorrelation Function

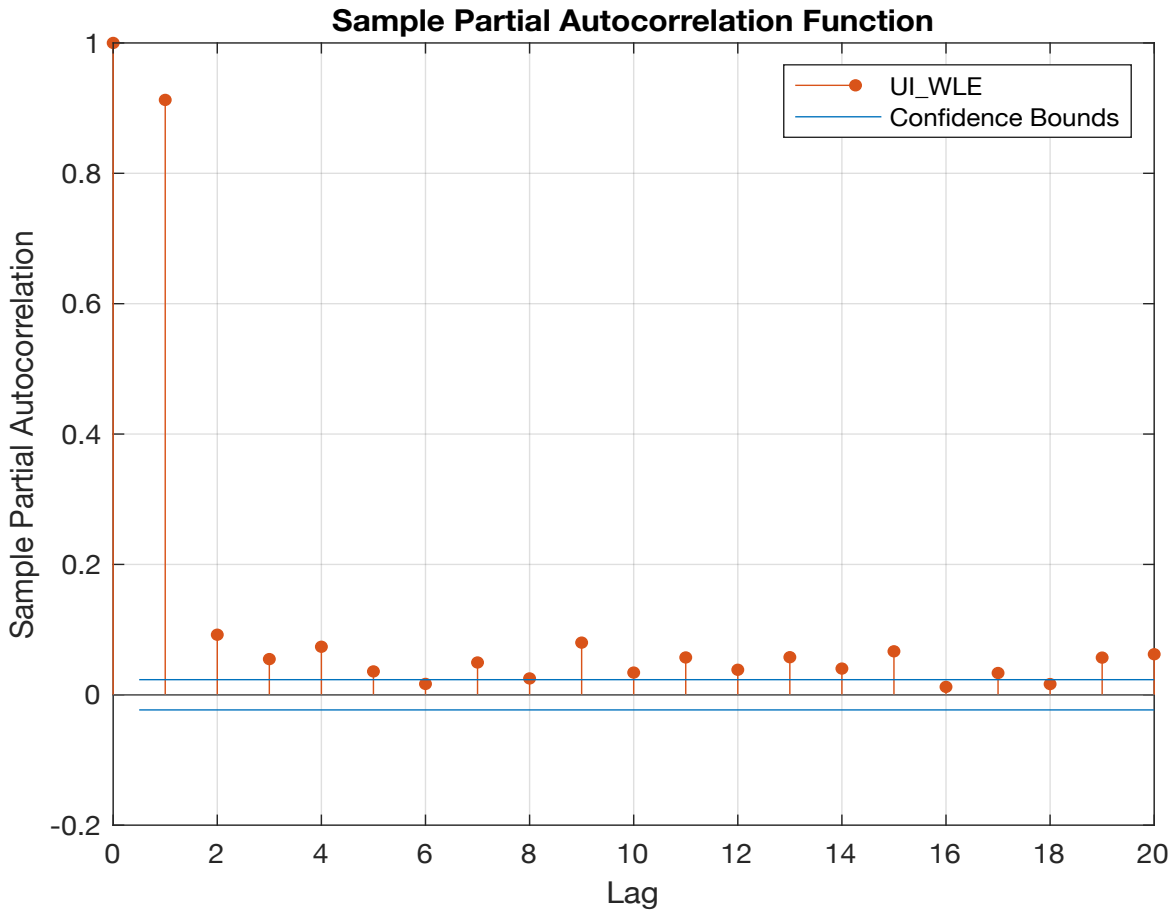

Figure 1.4. Sample partial autocorrelation function of UI_WLE

2. Time Series: sentiment_score

2.1. Time Series Plot

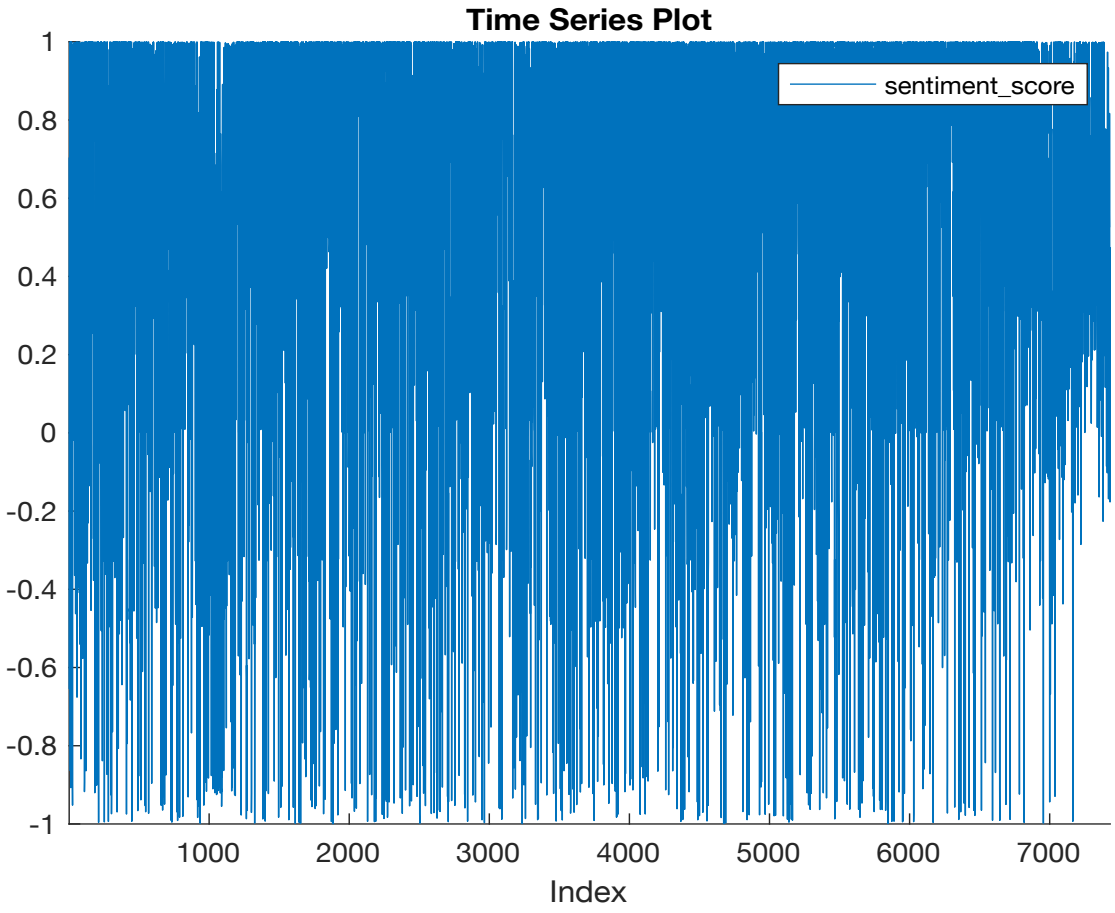

Figure 2.1. Time Series Plot of sentiment_score

3. Time Series: UI_WLEDiff

Time series UI_WLEDiff is the first-order difference of time series UI_WLE.

3.1. Time Series Plot

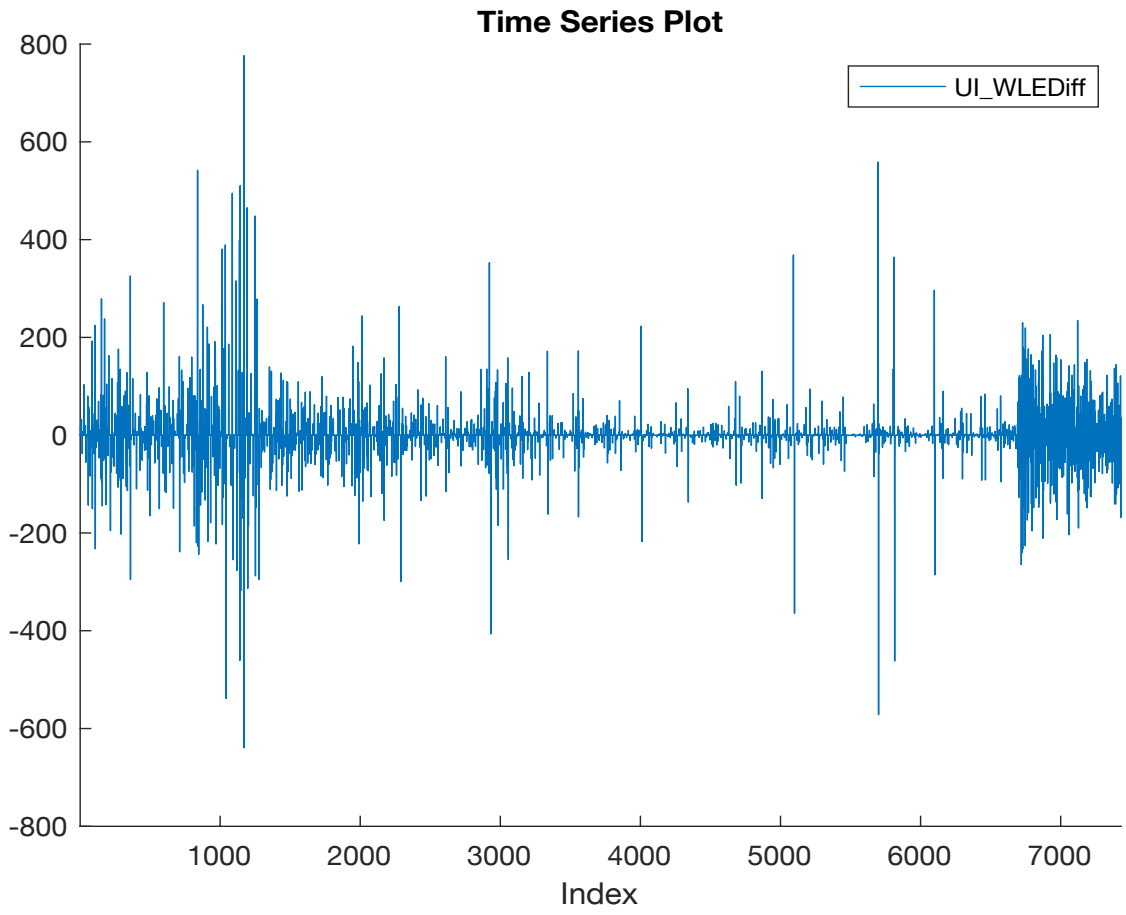

Figure 3.1. Time Series Plot of UI_WLEDiff

3.2. Sample Autocorrelation Function

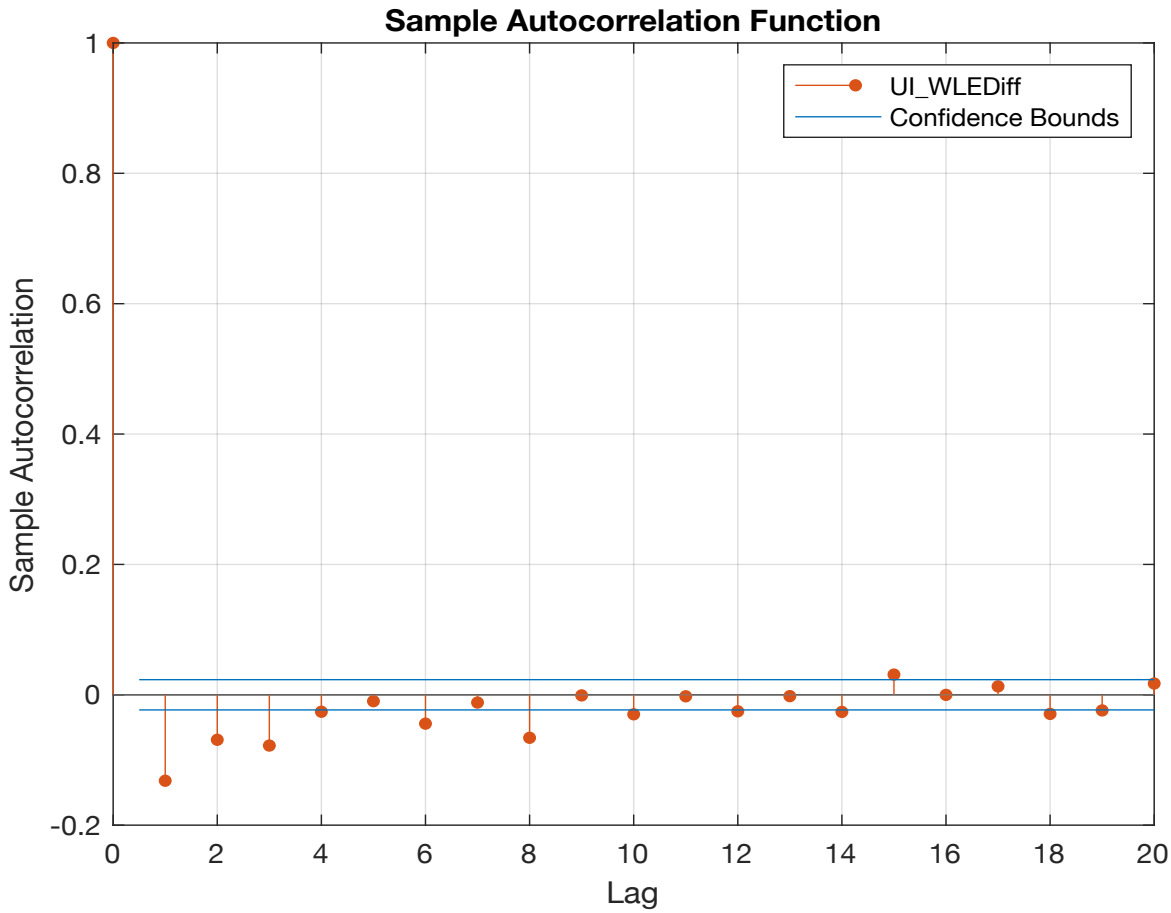

Figure 3.2. Sample autocorrelation function of UI_WLEDiff

3.3. Sample Partial Autocorrelation Function

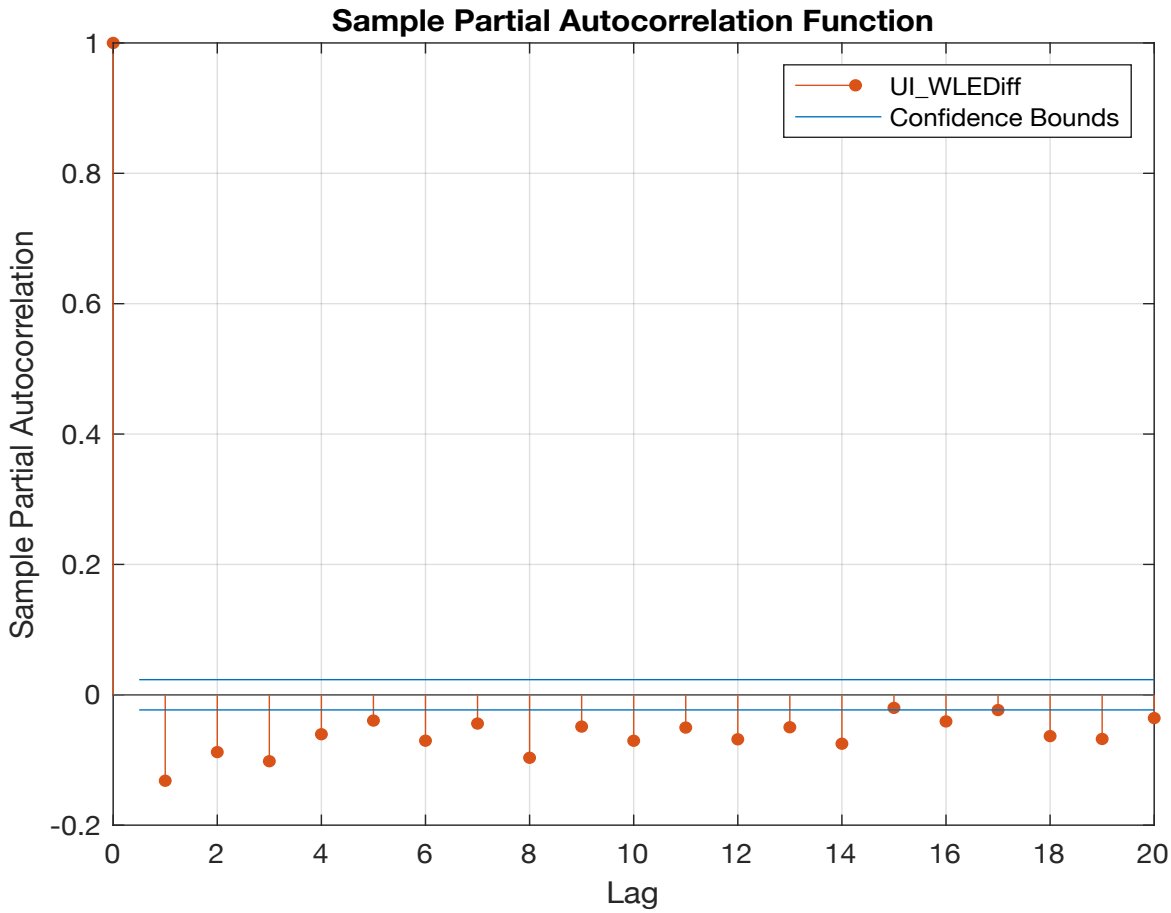

Figure 3.3. Sample partial autocorrelation function of UI_WLEDiff

4. Time Series: sentiment_scoreDiff

Time series sentiment_scoreDiff is the first-order difference of time series sentiment_score.

4.1. Time Series Plot

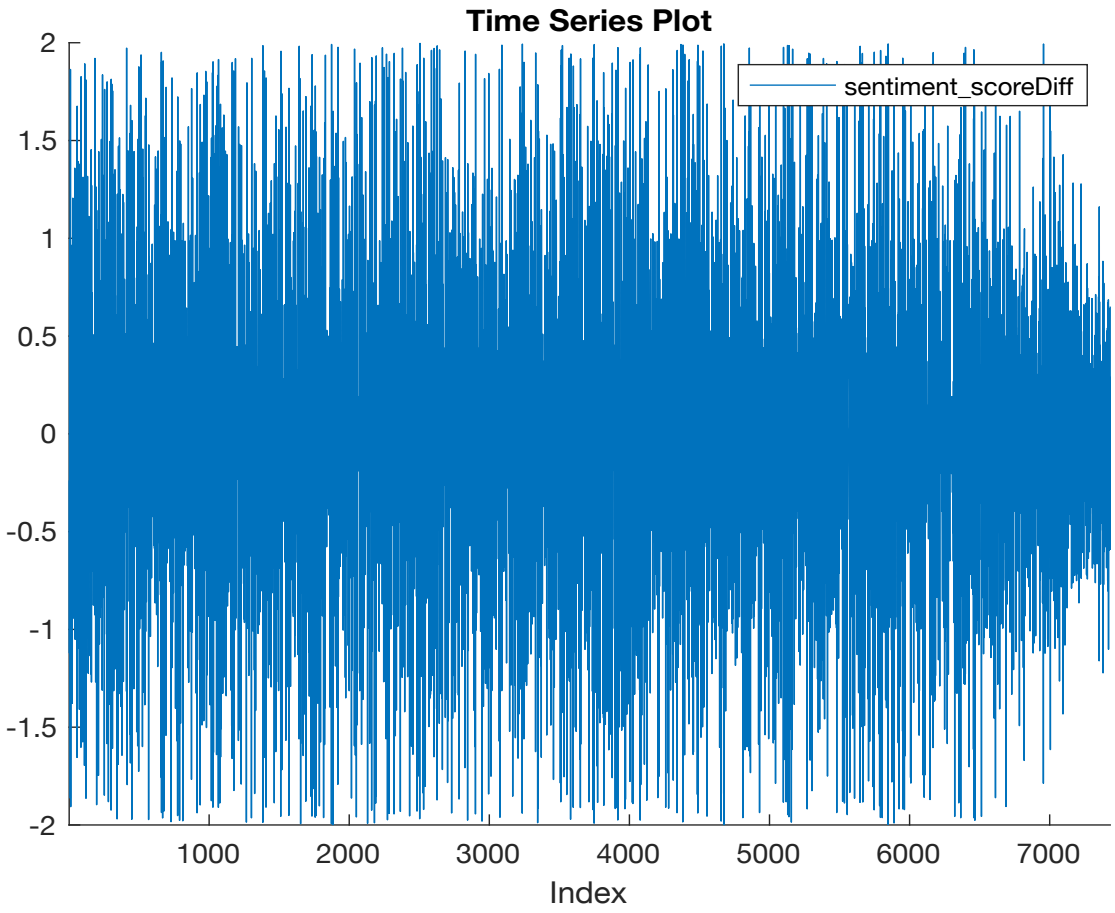

Figure 4.1. Time Series Plot of sentiment_scoreDiff

5. Multiple Linear Regression Model (MLR_UI_WLE)

Multiple linear regression model of time series UI_WLE using the following equation:

$$y_t = c + X_1\beta_1 + X_2\beta_2 + \varepsilon_t$$

5.1. Model Estimation

Table 5.1. Estimation Results

Parameter	Value	Standard Error	t Statistic	P-Value
Intercept	71.0537	11.7185	6.0634	1.4172e-09
Beta{sentiment_score}	-6.6177	2.5544	-2.5907	0.0096031
Beta{sentiment_score_negative}	3.3711	12.803	0.2633	0.79233

Table 5.2. Goodness of Fit

AIC	69265.692
BIC	69285.6821

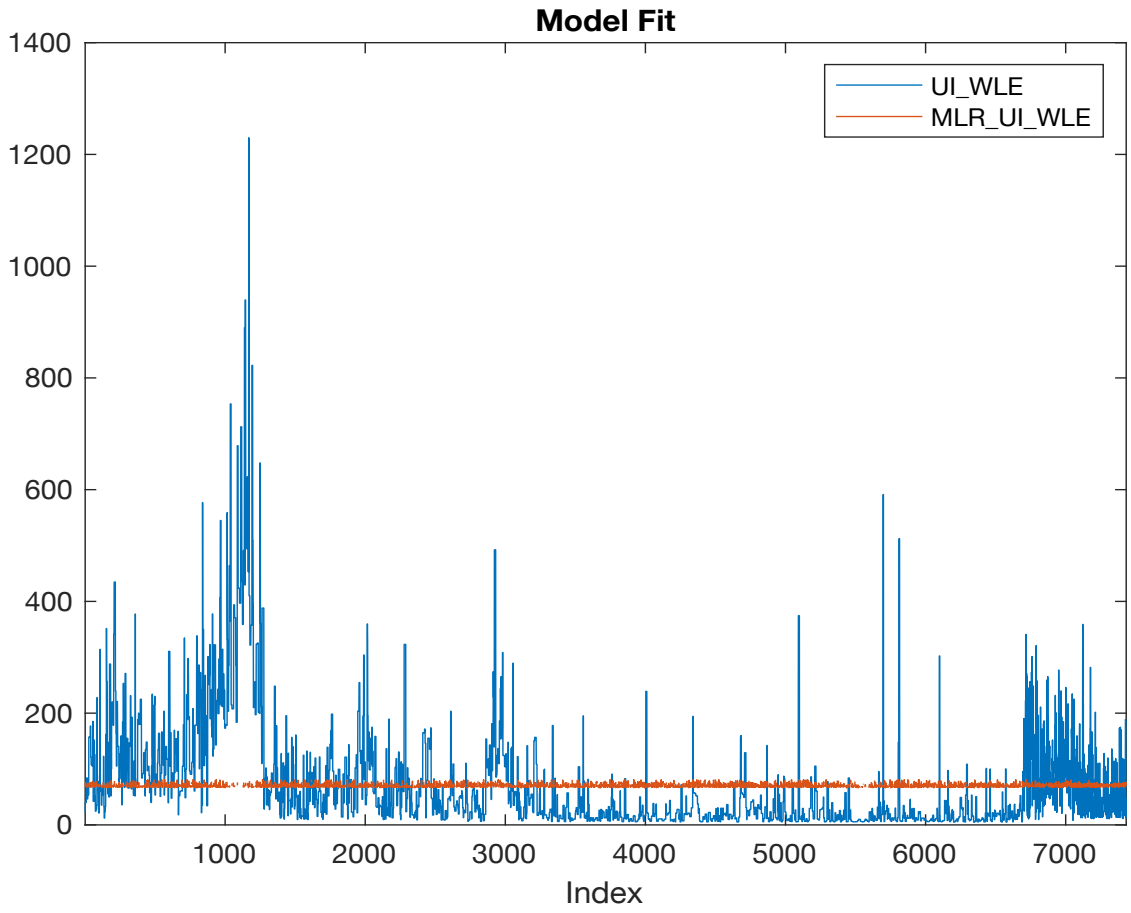

Figure 5.1. Plot the fit of model MLR_UI_WLE time series UI_WLE

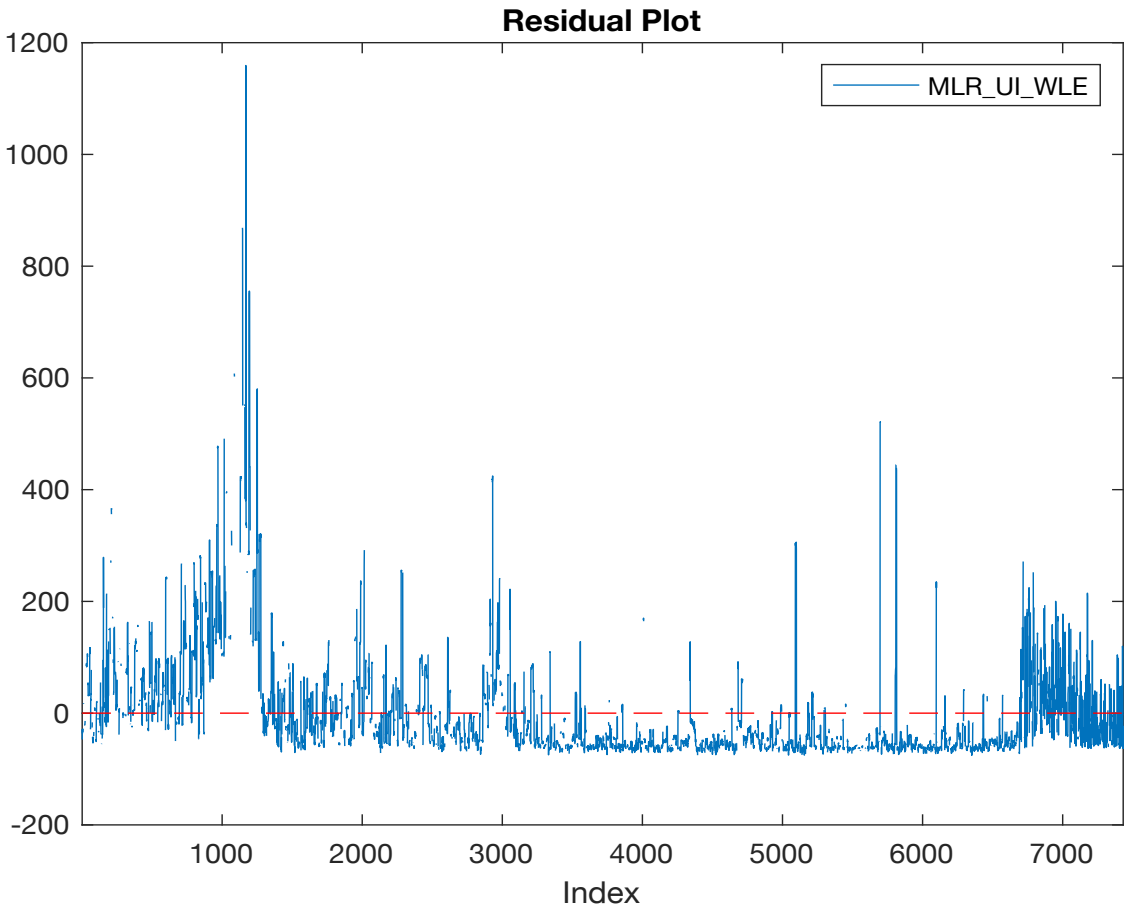

Figure 5.2. Plot of the residuals of model MLR_UI_WLE

6. ARMA(1,0) Error Model (Gaussian Distribution) (RegARMA_UI_WLE)

Regression model with ARMA time series errors of time series UI_WLE with the following equation:

$$X_1\beta_1 + ... + X_4\beta_4 + \mu_t$$

$$(1 - \phi_1 L)\mu_t \ = \ \varepsilon_t$$

6.1. Model Estimation

Table 6.1. Estimation Results

Parameter	Value	Standard Error	t Statistic	P-Value
Intercept	-4.669	9.8262	-0.47515	0.63468
AR{1}	0.78149	0.0035441	220.5048	0
Beta(UI)	0.55098	0.0088264	62.4237	0
Beta(sentiment_score)	-0.055241	1.4774	-0.03739	0.97017
Beta(sentiment_score_negative)	-4.2514	7.2602	-0.58558	0.55816
Beta(sentiment_score_neutral)	7.7086	4.8578	1.5868	0.11255
Variance	2248.2593	14.9811	150.0733	0

Table 6.2. Goodness of Fit

AIC	41688.2617
BIC	41732.2266

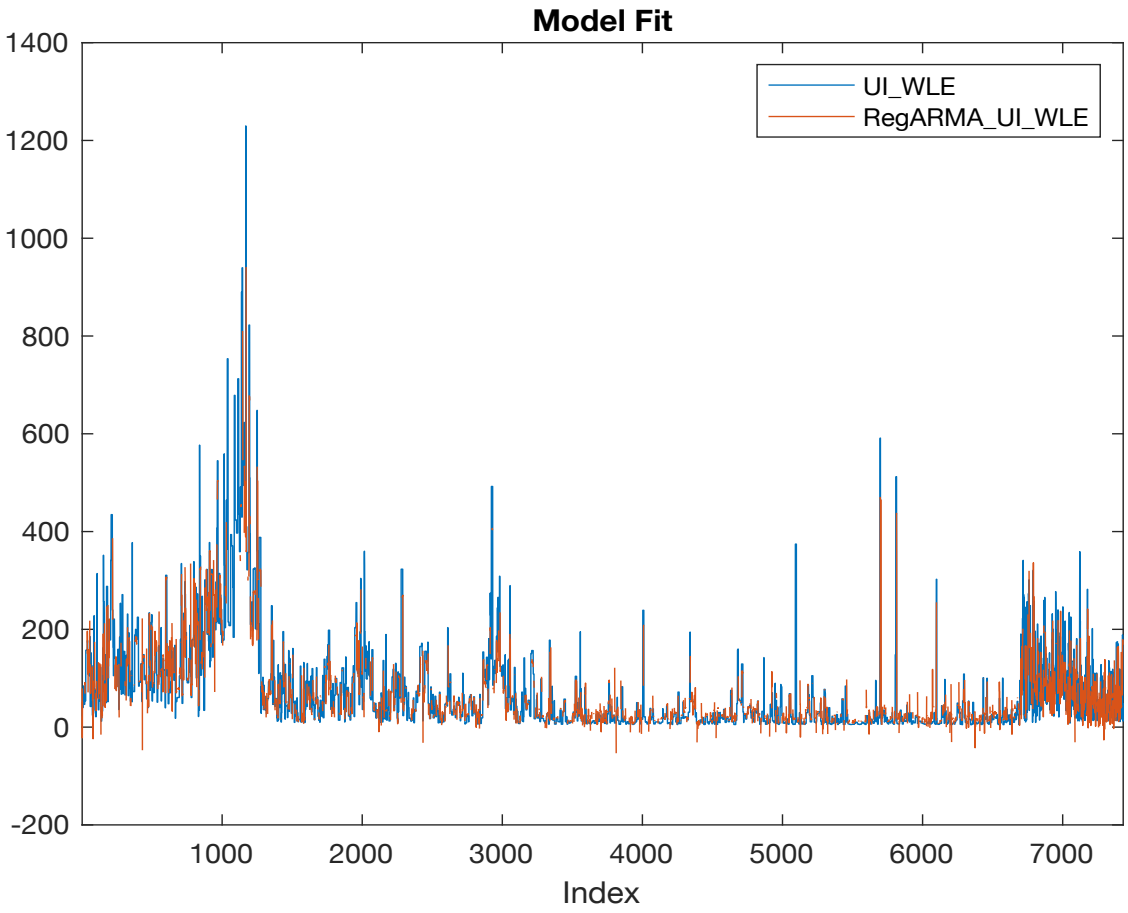

Figure 6.1. Plot the fit of model RegARMA_UI_WLE time series UI_WLE

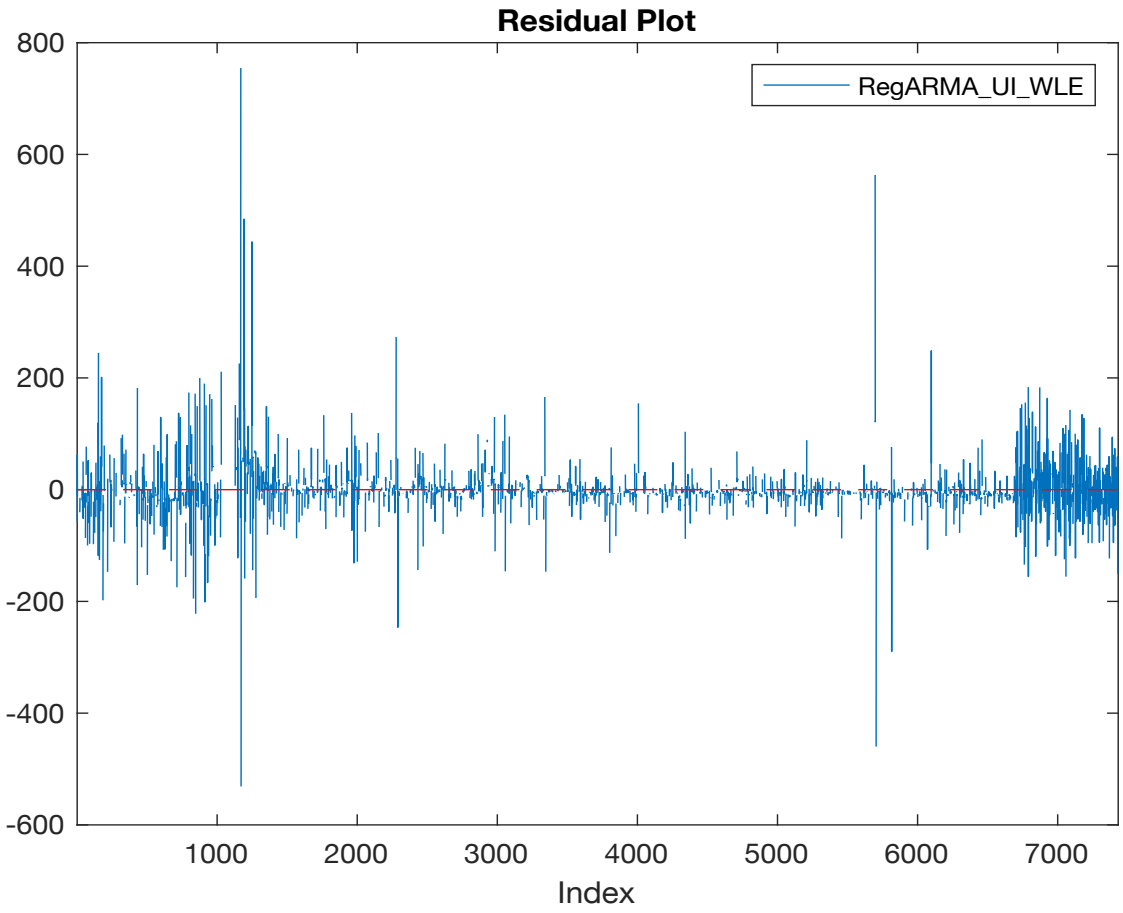

Figure 6.2. Plot of the residuals of model RegARMA_UI_WLE

6.2. Residual Quantile-Quantile plot

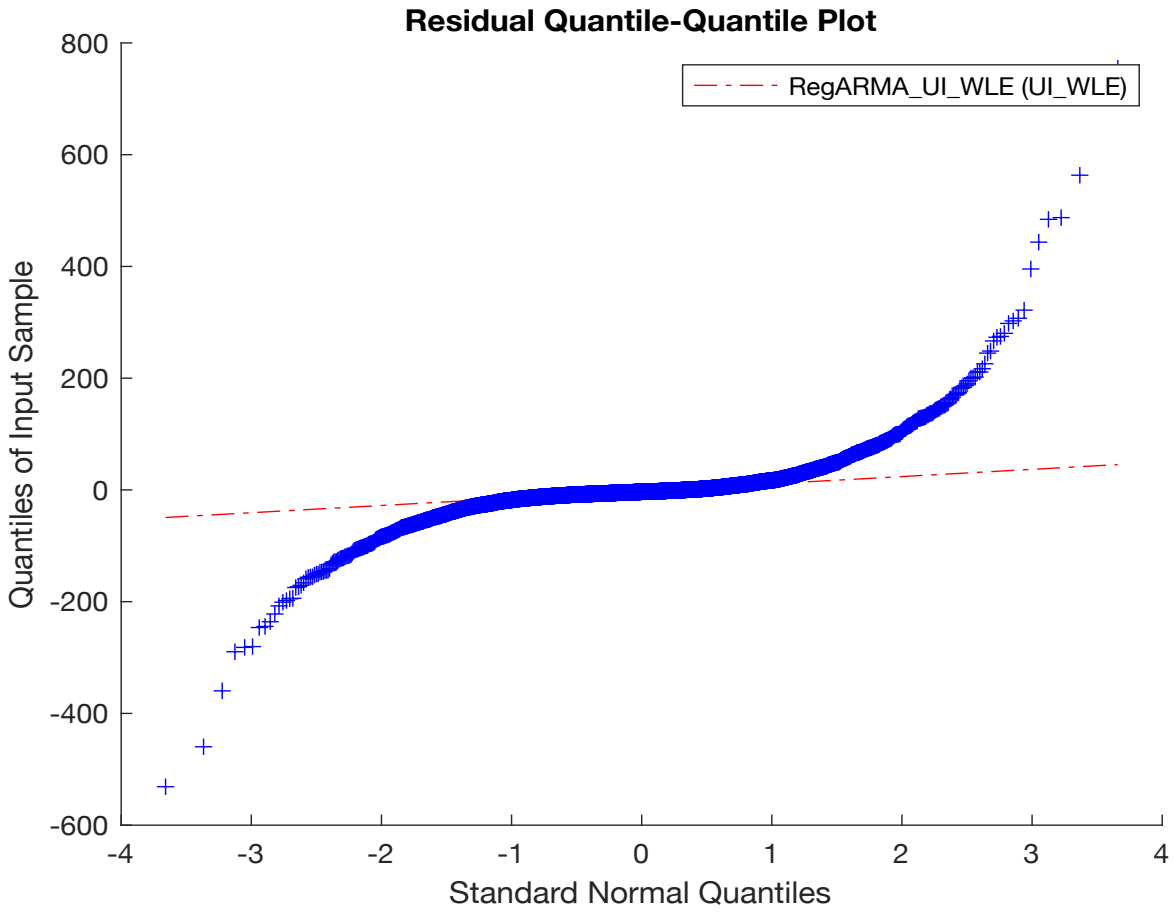

Figure 6.3. Quantile-quantile plot of the residuals of model RegARMA_UI_WLE.

6.3. Ljung-Box Q-Test

Null Hypothesis: The first m autocorrelations of the residuals of RegARMA_UI_WLE are jointly 0

$$H_0 : \rho_1 = \rho_2 = ... = \rho_m = 0$$
$$H_a : \rho_j \neq 0, \ j \in 1, ..., m$$

Table 6.3. Test Parameters

	Lags	DOF	Significance Level
1	20	20	0.05

Table 6.4. Test Results

	Null Rejected	P-Value	Test Statistic	Critical Value
1	true	2.1264e-12	98.7275	31.4104

7. ARMA(1,0) Error Model (Gaussian Distribution) (RegARMA_UI_WLEDiff)

Regression model with ARMA time series errors of time series UI_WLEDiff with the following equation:

$$y_t = c + X_1\beta_1 + \mu_t$$
$$(1 - \phi_1 L)\mu_t = \varepsilon_t$$

7.1. Model Estimation

Table 7.1. Estimation Results

Parameter	Value	Standard Error	t Statistic	P-Value
Intercept	0.0021193	0.44637	0.0047479	0.99621
AR{1}	-0.13203	0.0036248	-36.4245	1.7455e-290
Beta(sentiment_scoreDiff)	-0.96751	0.76729	-1.2609	0.20733
Variance	1785.4203	5.3858	331.5057	0

Table 7.2. Goodness of Fit

AIC	76735.124
BIC	76762.7771

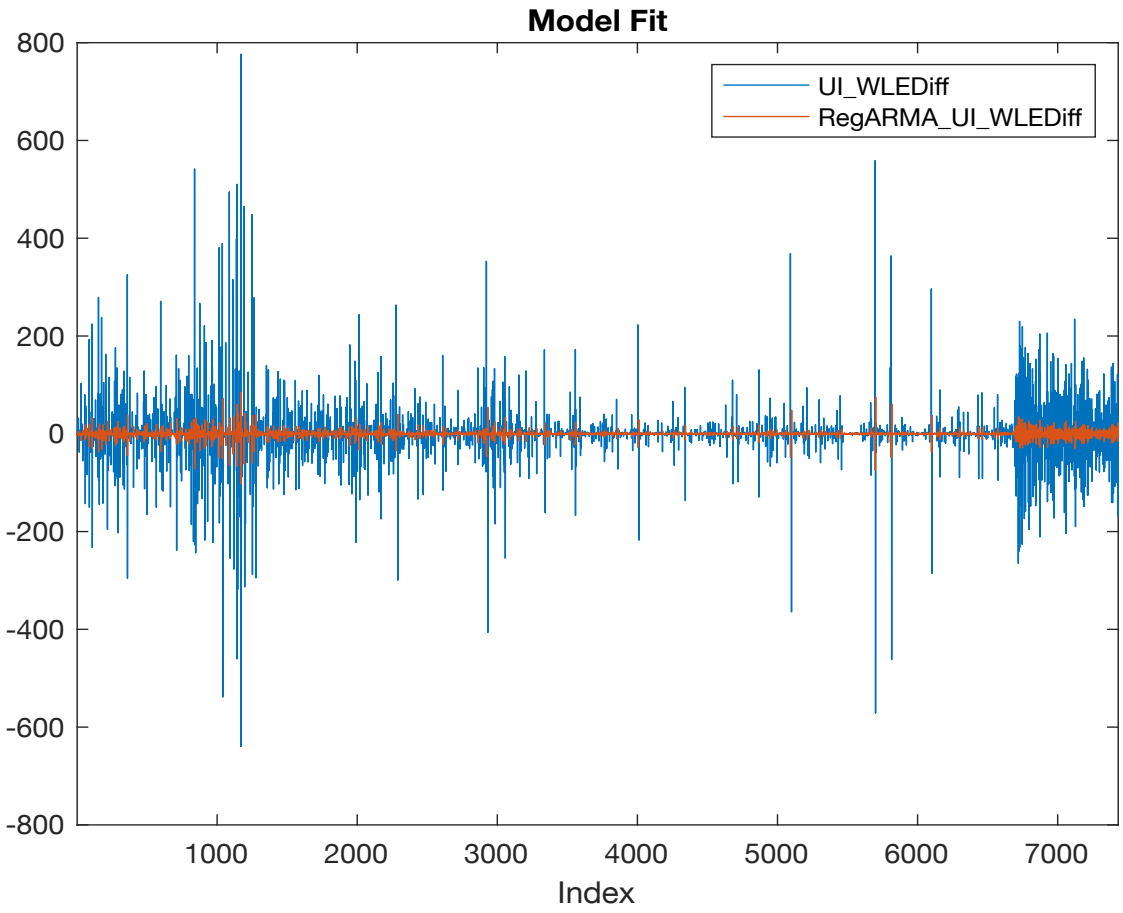

Figure 7.1. Plot the fit of model RegARMA_UI_WLEDiff time series UI_WLEDiff

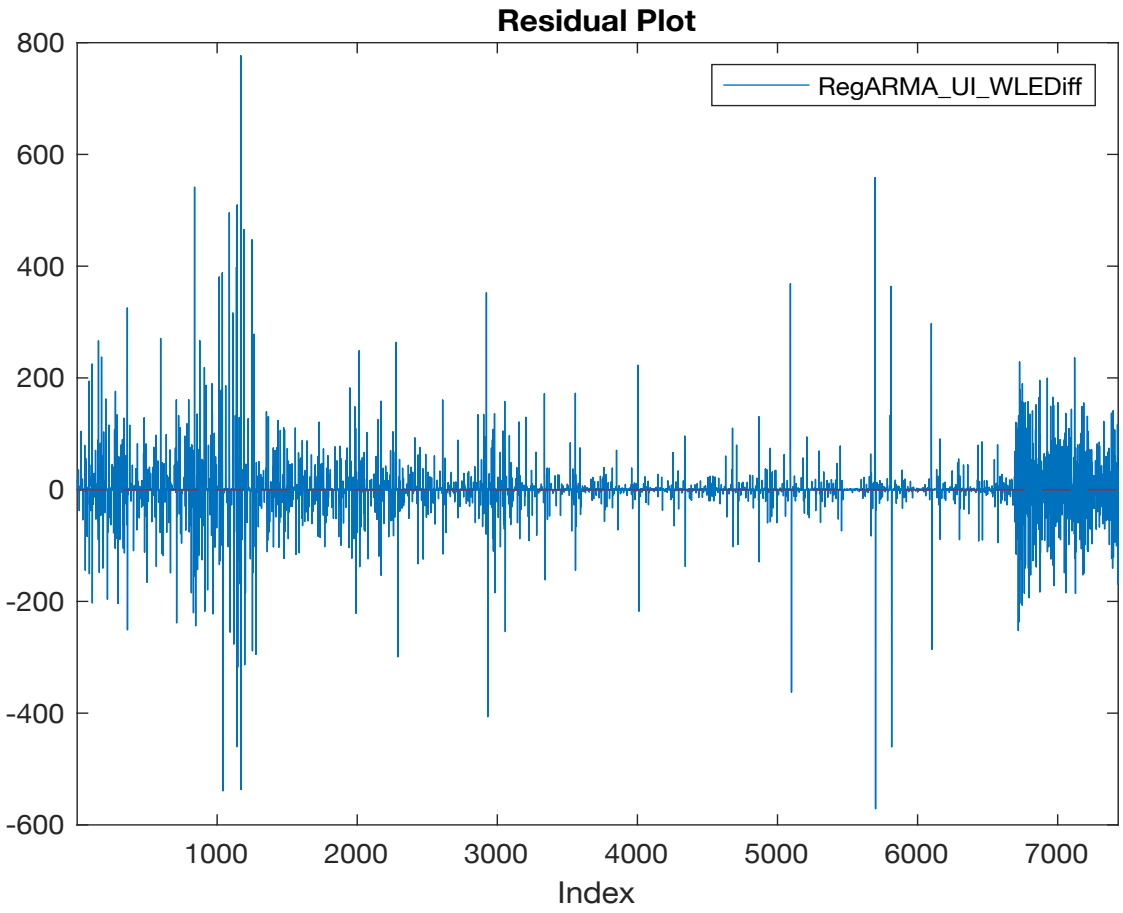

Figure 7.2. Plot of the residuals of model RegARMA_UI_WLEDiff

7.2. Residual Quantile-Quantile plot

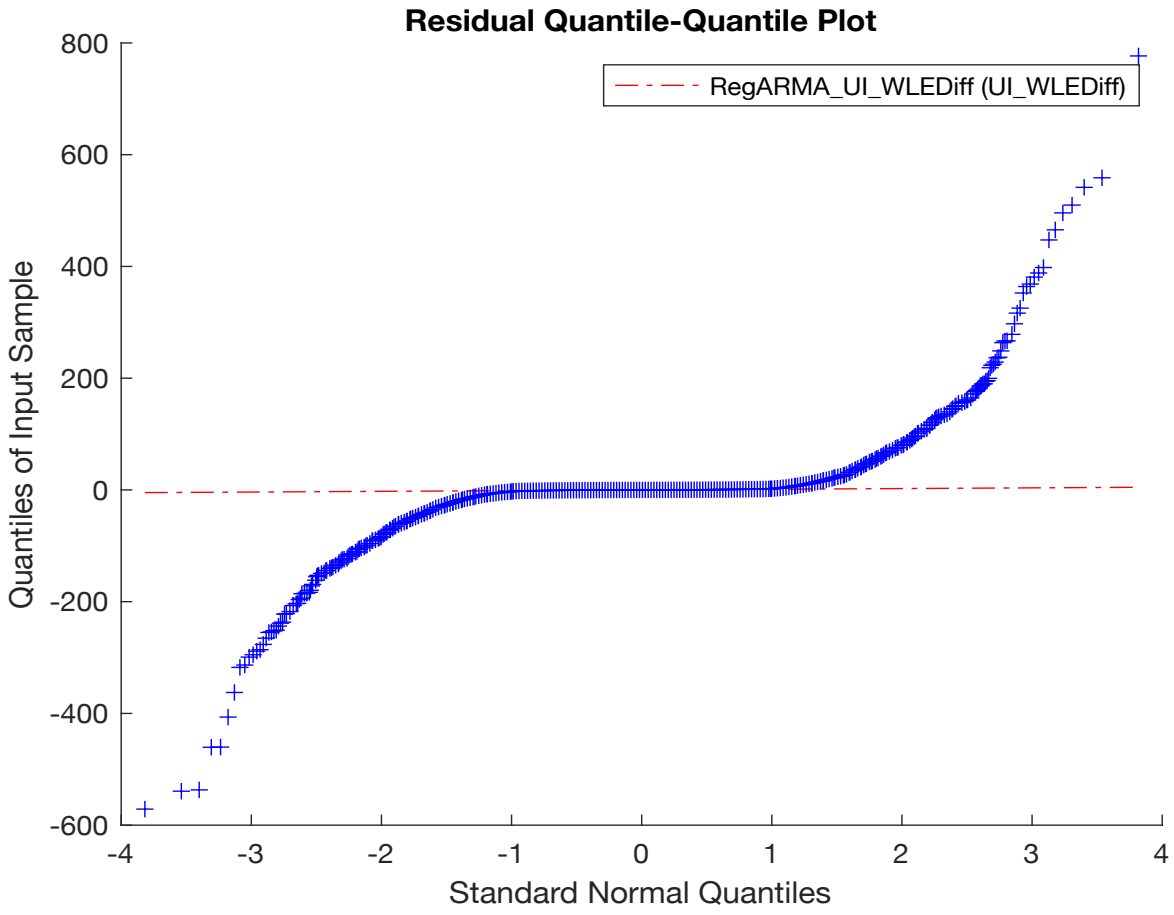

Figure 7.3. Quantile-quantile plot of the residuals of model RegARMA_UI_WLEDiff.