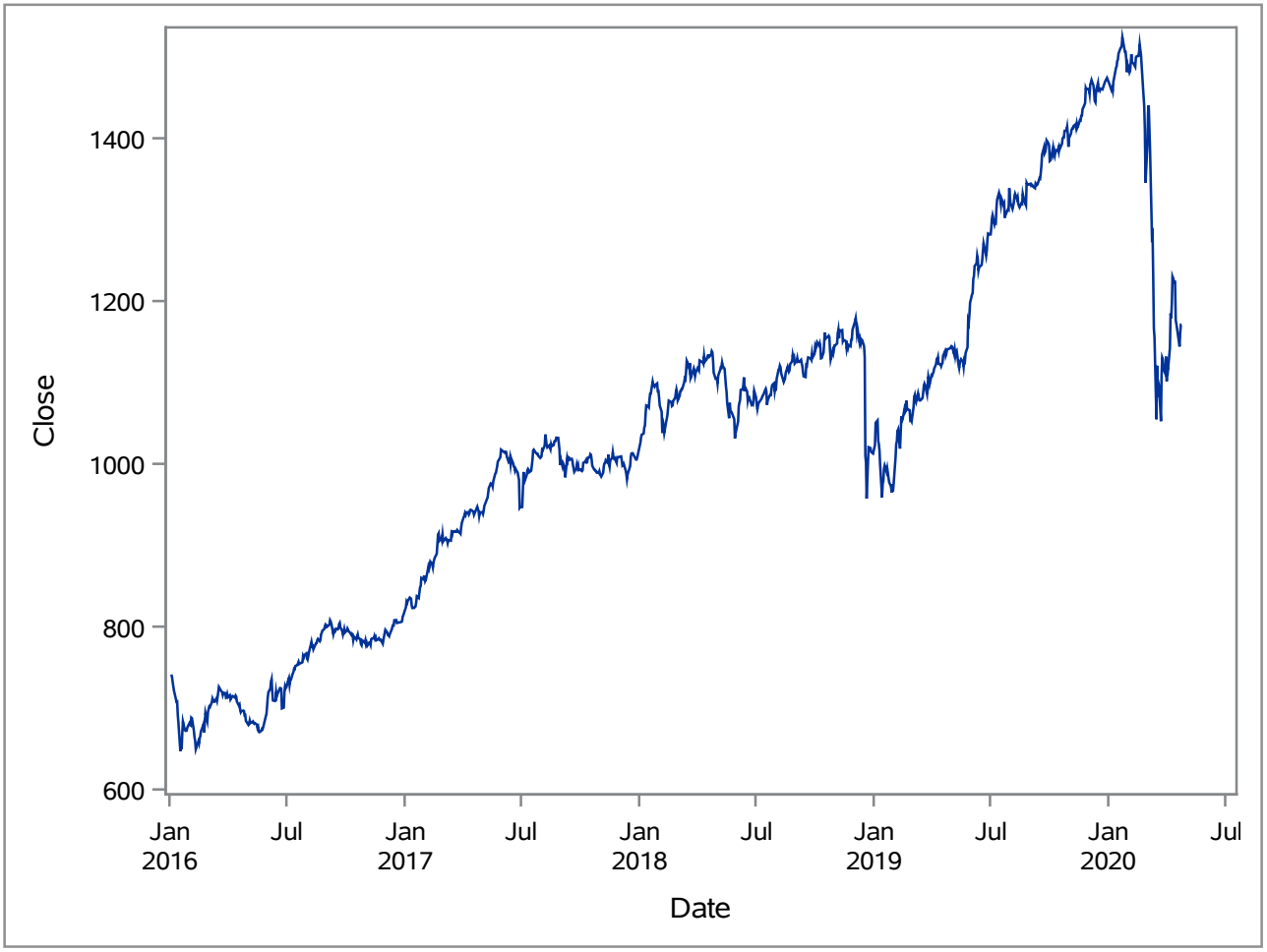
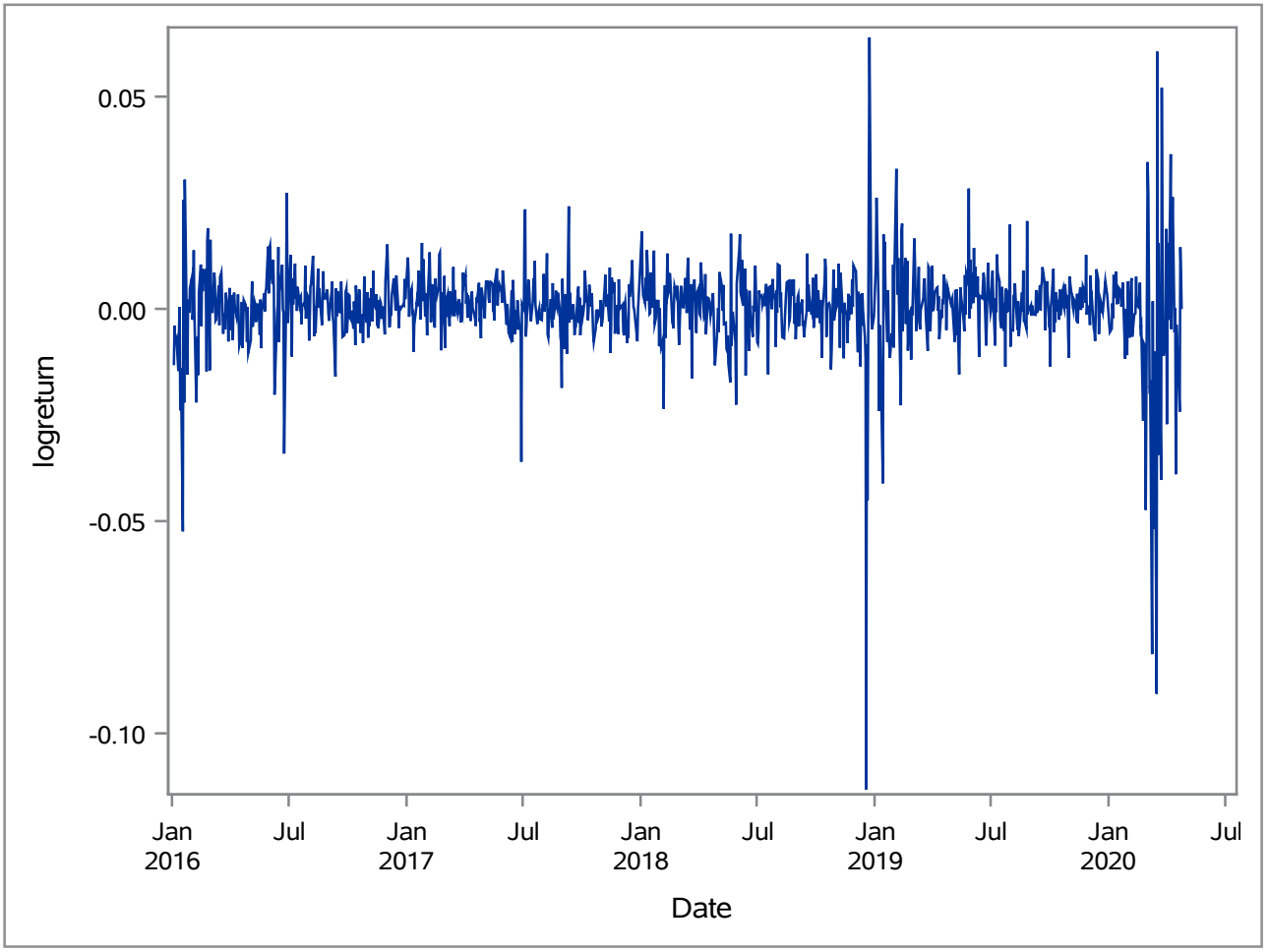

1400
1200
1000
800
600
Close
Jan
2016
Jul
Jan
2017
Jul
Jan
2018
Jul
Jan
2019
Jul
Jan
2020
Jul
Date


0.05
0.00
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-0.10
logreturn
Jan
2016
Jul
Jan
2017
Jul
Jan
2018
Jul
Jan
2019
Jul
Jan
2020
Jul
Date

The AUTOREG Procedure

Dependent Variable	logreturn

The AUTOREG Procedure

Ordinary Least Squares Estimates			
SSE	0.11690707	**DFE**	1078
MSE	0.0001084	**Root MSE**	0.01041
SBC	-6782.3958	**AIC**	-6787.3796
MAE	0.00607609	**AICC**	-6787.3759
MAPE	113.457606	**HQC**	-6785.4924
Durbin-Watson	1.9742	**Total R-Square**	0.0000

Parameter Estimates					
Variable	**DF**	**Estimate**	**Standard Error**	**t Value**	**Approx Pr > |t|**
Intercept	1	0.000412	0.000317	1.30	0.1945

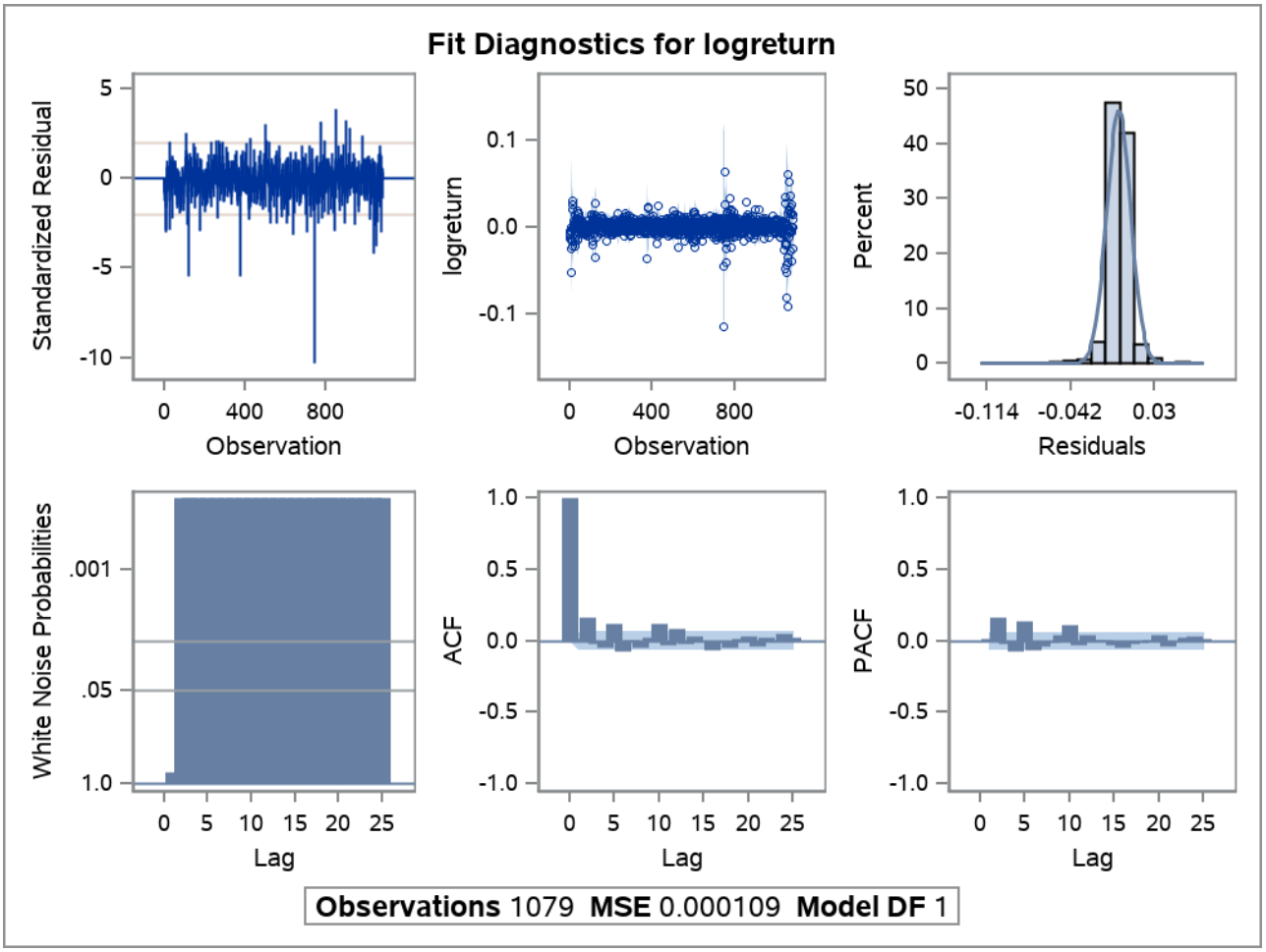
Algorithm converged.

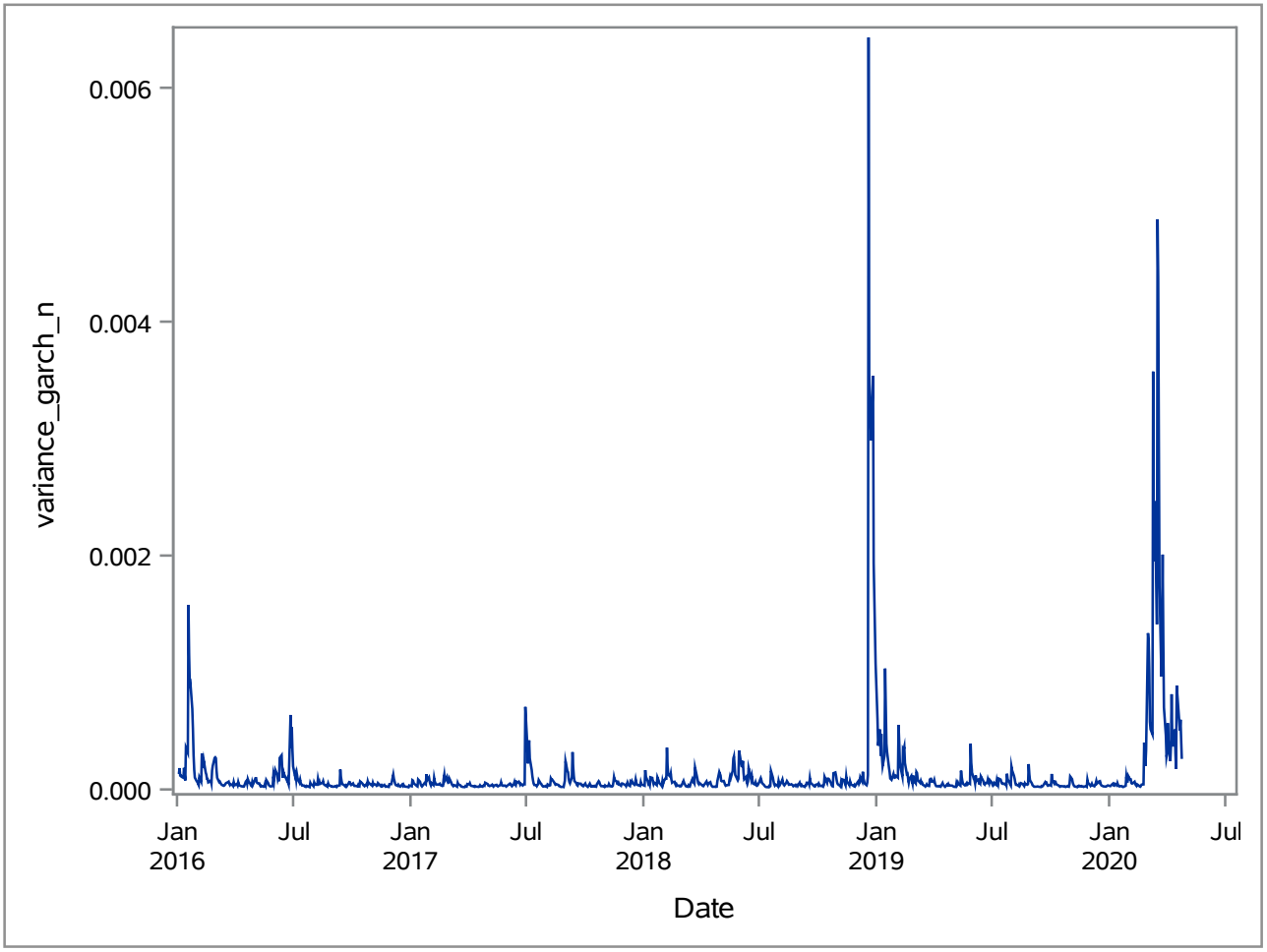
The AUTOREG Procedure

GARCH Estimates			
SSE	0.11767363	**Observations**	1079
MSE	0.0001091	**Uncond Var**	.
Log Likelihood	3711.28876	**Total R-Square**	.
SBC	-7394.6424	**AIC**	-7414.5775
MAE	0.00608232	**AICC**	-7414.5403
MAPE	160.846559	**HQC**	-7407.0288
		Normality Test	7527.1990
		Pr > ChiSq	<.0001

Parameter Estimates					
Variable	**DF**	**Estimate**	**Standard Error**	**t Value**	**Approx Pr > |t|**
Intercept	1	0.001254	0.000189	6.63	<.0001
ARCH0	1	7.7806E-6	1.1944E-6	6.51	<.0001
ARCH1	1	0.4851	0.0223	21.76	<.0001
GARCH1	1	0.5443	0.0233	23.37	<.0001

The AUTOREG Procedure




0.006
0.004
0.002
0.000
variance_garch_n
Jan
2016
Jul
Jan
2017
Jul
Jan
2018
Jul
Jan
2019
Jul
Jan
2020
Jul
Date

The AUTOREG Procedure

Dependent Variable	logreturn

The AUTOREG Procedure

Ordinary Least Squares Estimates			
SSE	0.11690707	**DFE**	1078
MSE	0.0001084	**Root MSE**	0.01041
SBC	-6782.3958	**AIC**	-6787.3796
MAE	0.00607609	**AICC**	-6787.3759
MAPE	113.457606	**HQC**	-6785.4924
Durbin-Watson	1.9742	**Total R-Square**	0.0000

Parameter Estimates					
Variable	**DF**	**Estimate**	**Standard Error**	**t Value**	**Approx Pr > |t|**
Intercept	1	0.000412	0.000317	1.30	0.1945

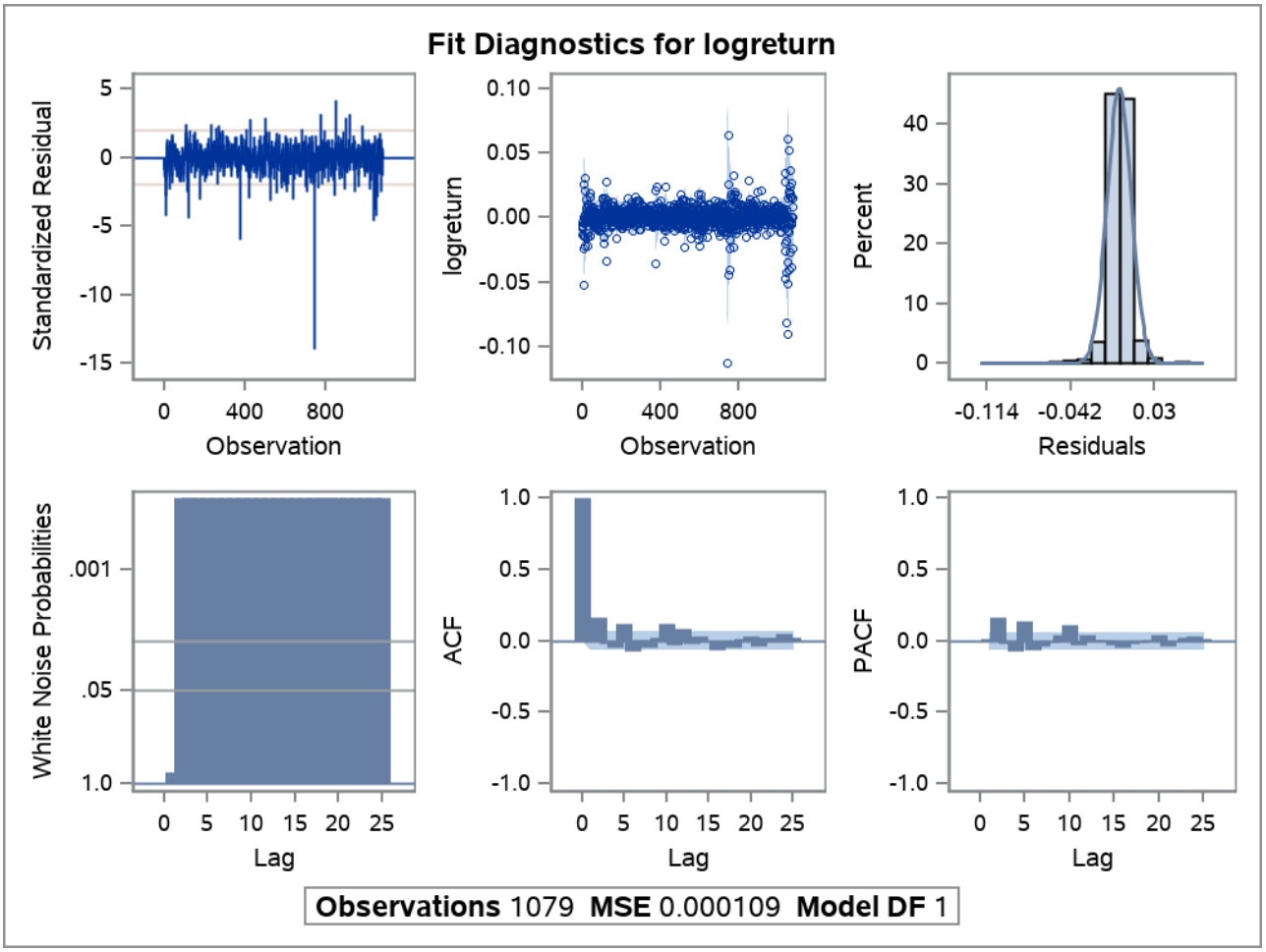
Algorithm converged.

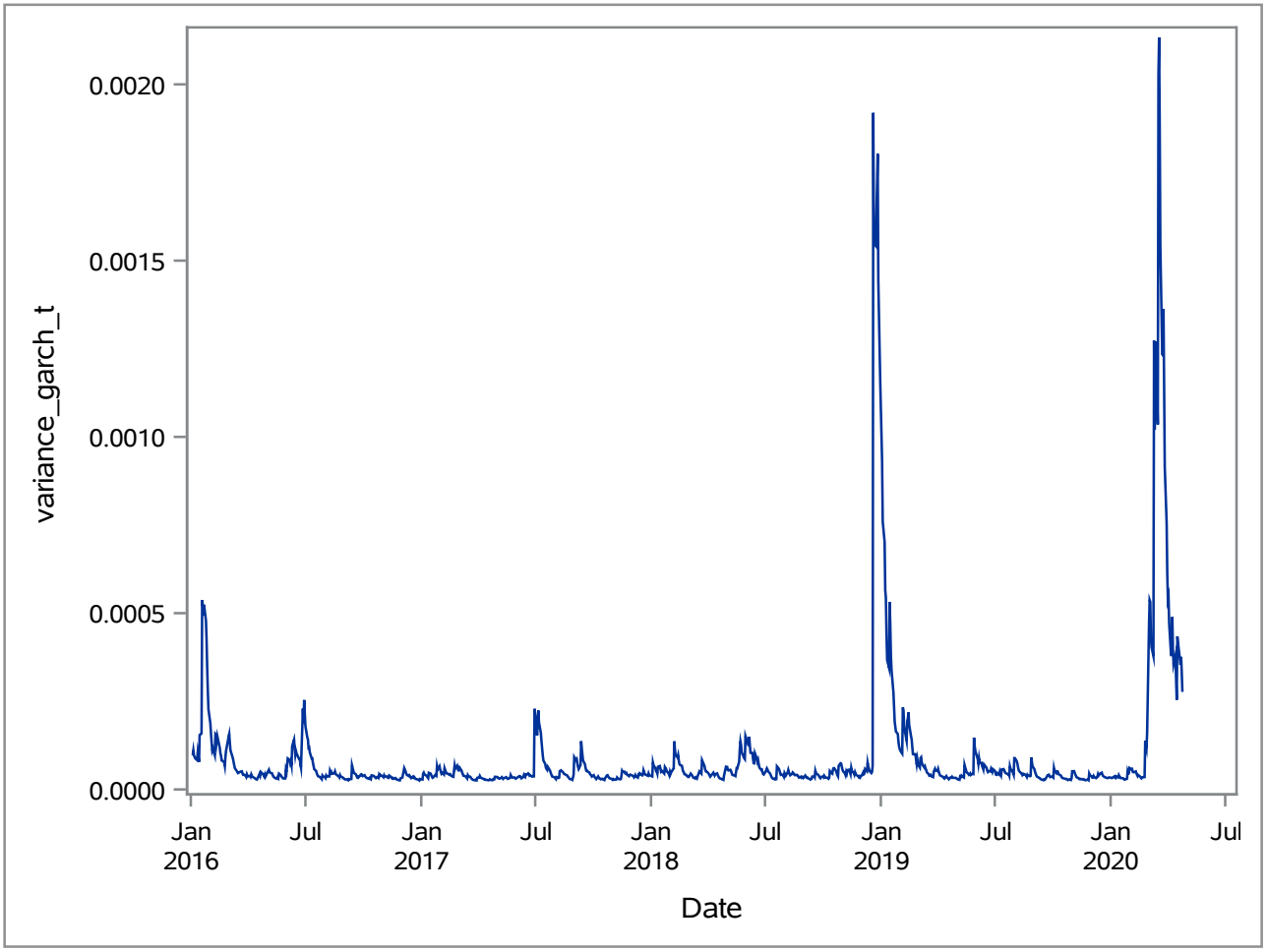
The AUTOREG Procedure

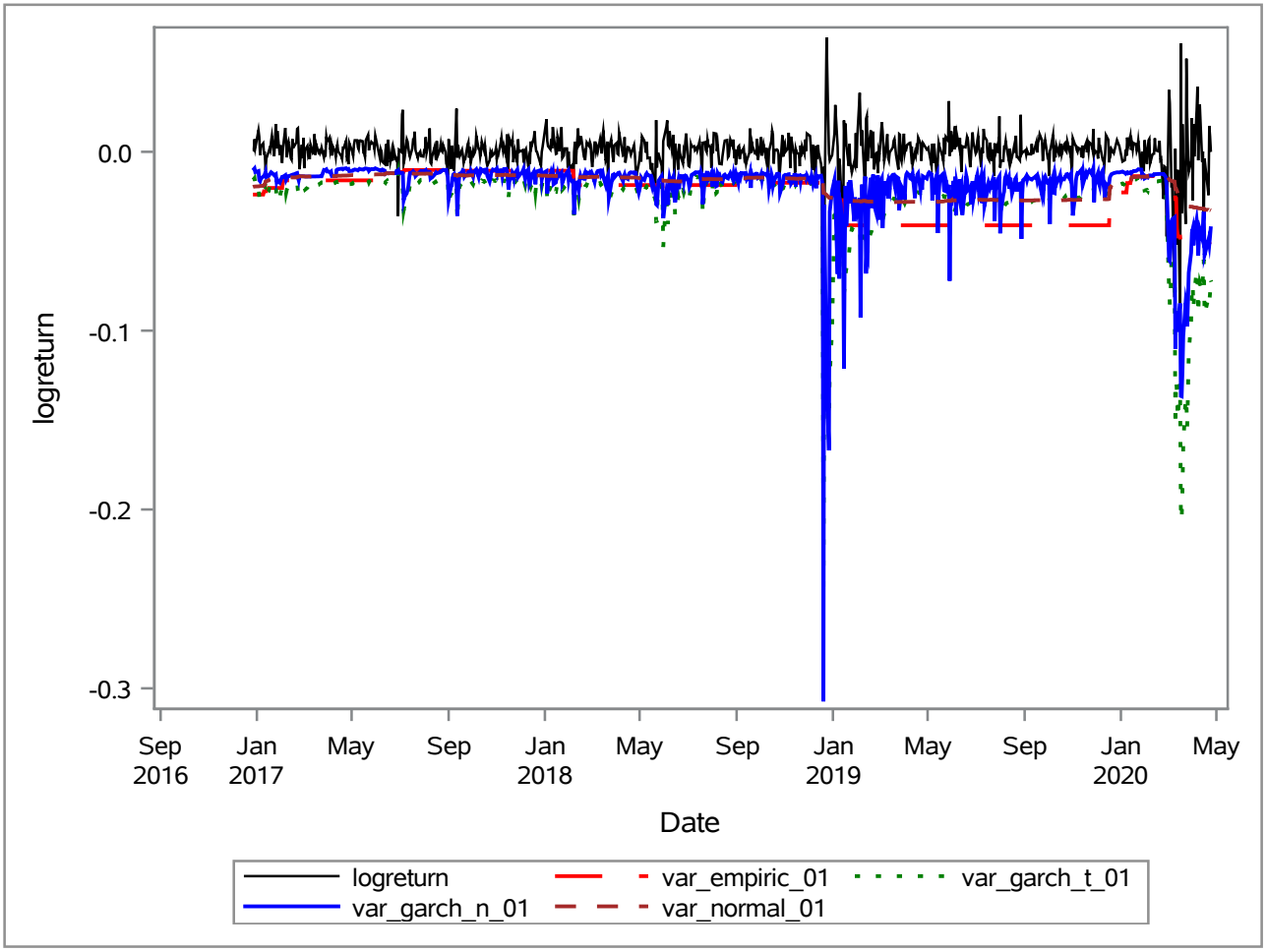
GARCH Estimates			
SSE	0.11715073	**Observations**	1079
MSE	0.0001086	**Uncond Var**	0.00006987
Log Likelihood	3819.34815	**Total R-Square**	.
SBC	-7603.7774	**AIC**	-7628.6963
MAE	0.00606678	**AICC**	-7628.6404
MAPE	138.614656	**HQC**	-7619.2604
		Normality Test	39799.4028
		Pr > ChiSq	<.0001

Parameter Estimates						
Variable	**DF**	**Estimate**	**Standard Error**	**t Value**	**Approx Pr > |t|**	**Variable Label**
Intercept	1	0.000887	0.000180	4.94	<.0001	
ARCH0	1	4.1249E-6	1.1857E-6	3.48	0.0005	
ARCH1	1	0.1430	0.0332	4.31	<.0001	
GARCH1	1	0.7979	0.0390	20.48	<.0001	
TDFI	1	0.2221	0.0245	9.05	<.0001	Inverse of t DF

The AUTOREG Procedure




variance_garch_t
0.0020
0.0015
0.0010
0.0005
0.0000
Jan 2016
Jul
Jan 2017
Jul
Jan 2018
Jul
Jan 2019
Jul
Jan 2020
Jul
Date


0.0
-0.1
-0.2
-0.3
logreturn
Sep 2016
Jan 2017
May
Sep
Jan 2018
May
Sep
Jan 2019
May
Sep
Jan 2020
May
Date
logreturn
var_garch_n_01
var_empiric_01
var_normal_01
var_garch_t_01

Obs	p	n	s	z	p_value
1	0.026538	829	22	4.78567	.000000852

Obs	p	n	s	z	p_value
1	0.018094	829	15	2.34222	.009584710

Obs	p	n	s	z	p_value
1	0.022919	829	19	3.73848	.000092570

Obs	p	n	s	z	p_value
1	.008443908	829	7	-0.45029	0.67375