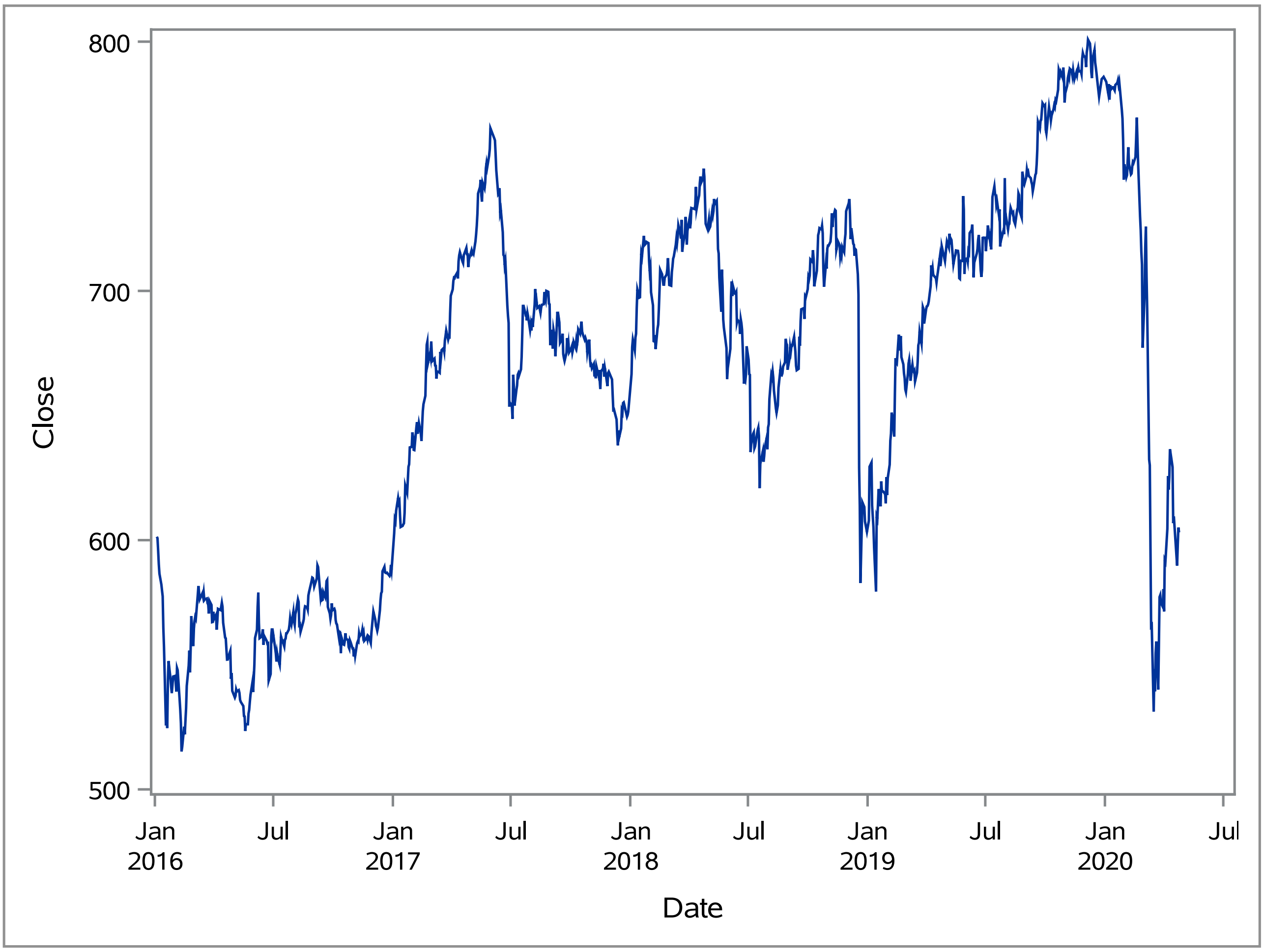
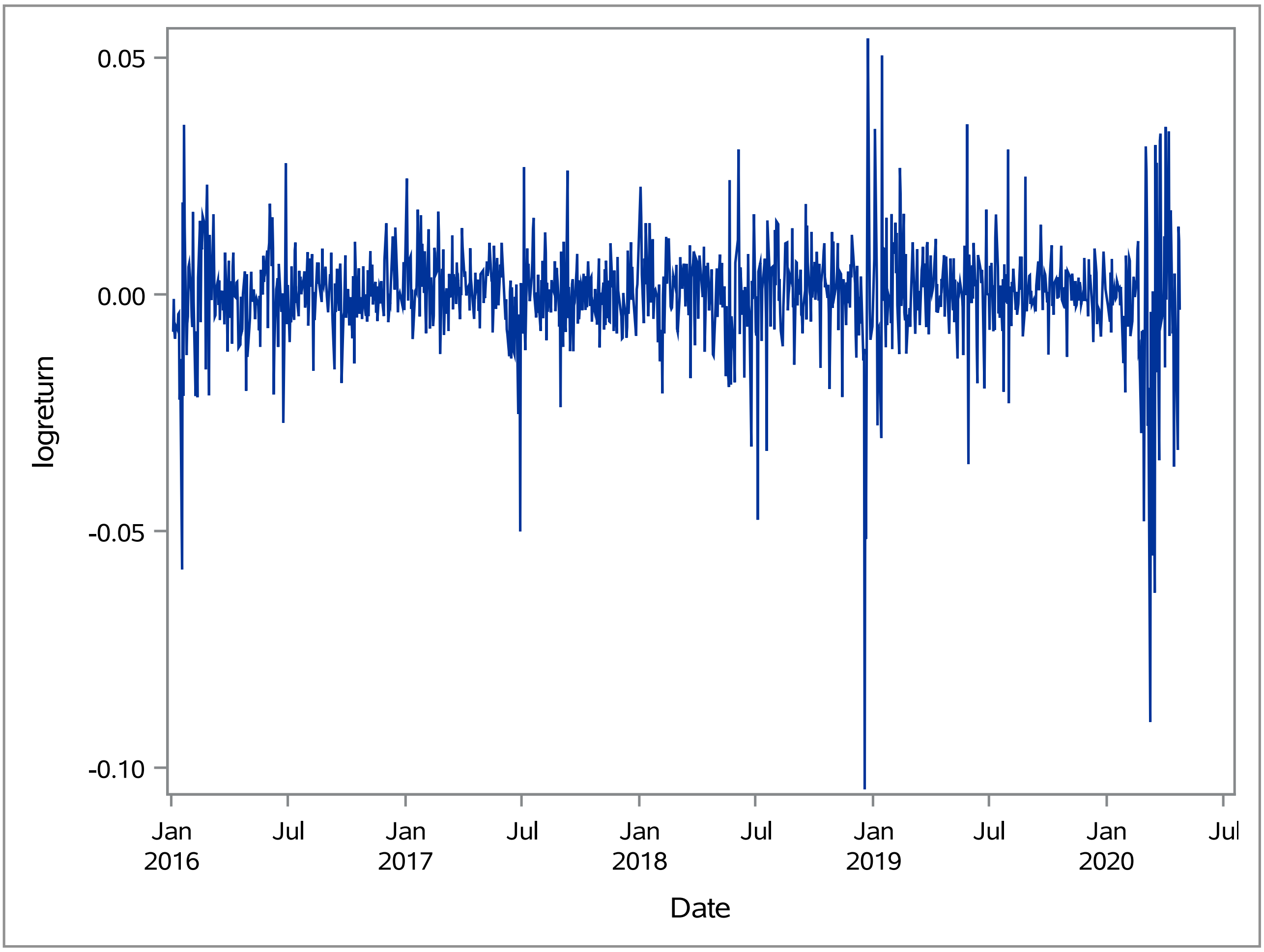

Close
800
700
600
500
Jan 2016
Jul
Jan 2017
Jul
Jan 2018
Jul
Jan 2019
Jul
Jan 2020
Jul
Date


0.05
0.00
-0.05
-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	0.13566374	**DFE**	1077
MSE	0.0001260	**Root MSE**	0.01122
SBC	-6614.6986	**AIC**	-6619.6814
MAE	0.00707001	**AICC**	-6619.6777
MAPE	99.9429528	**HQC**	-6617.7945
Durbin-Watson	1.9328	**Total R-Square**	0.0000

Parameter Estimates

Variable	DF	Estimate	Standard Error	t Value	Approx Pr > |t|
Intercept	1	-4.633E-6	0.000342	-0.01	0.9892

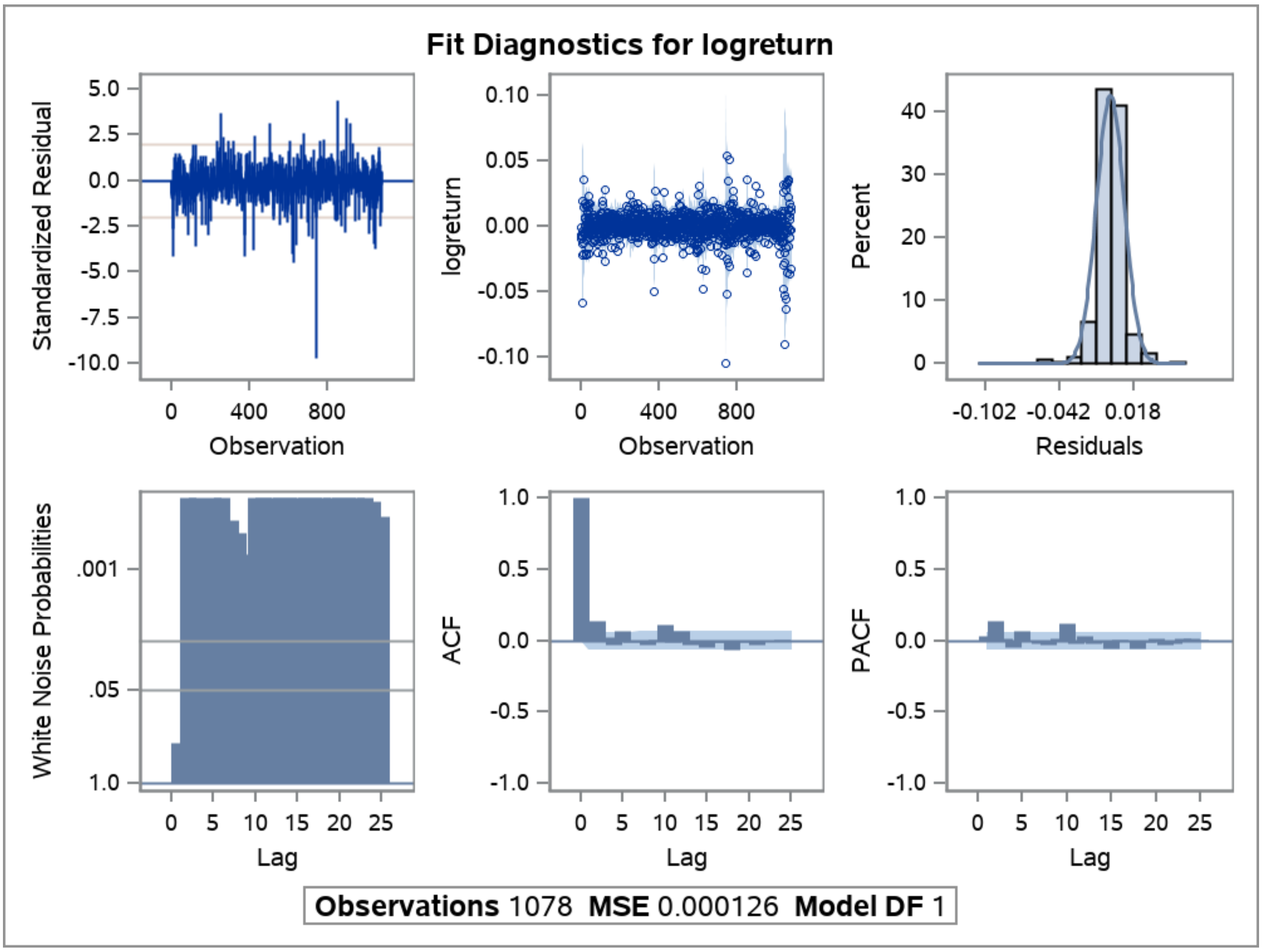
Algorithm converged.

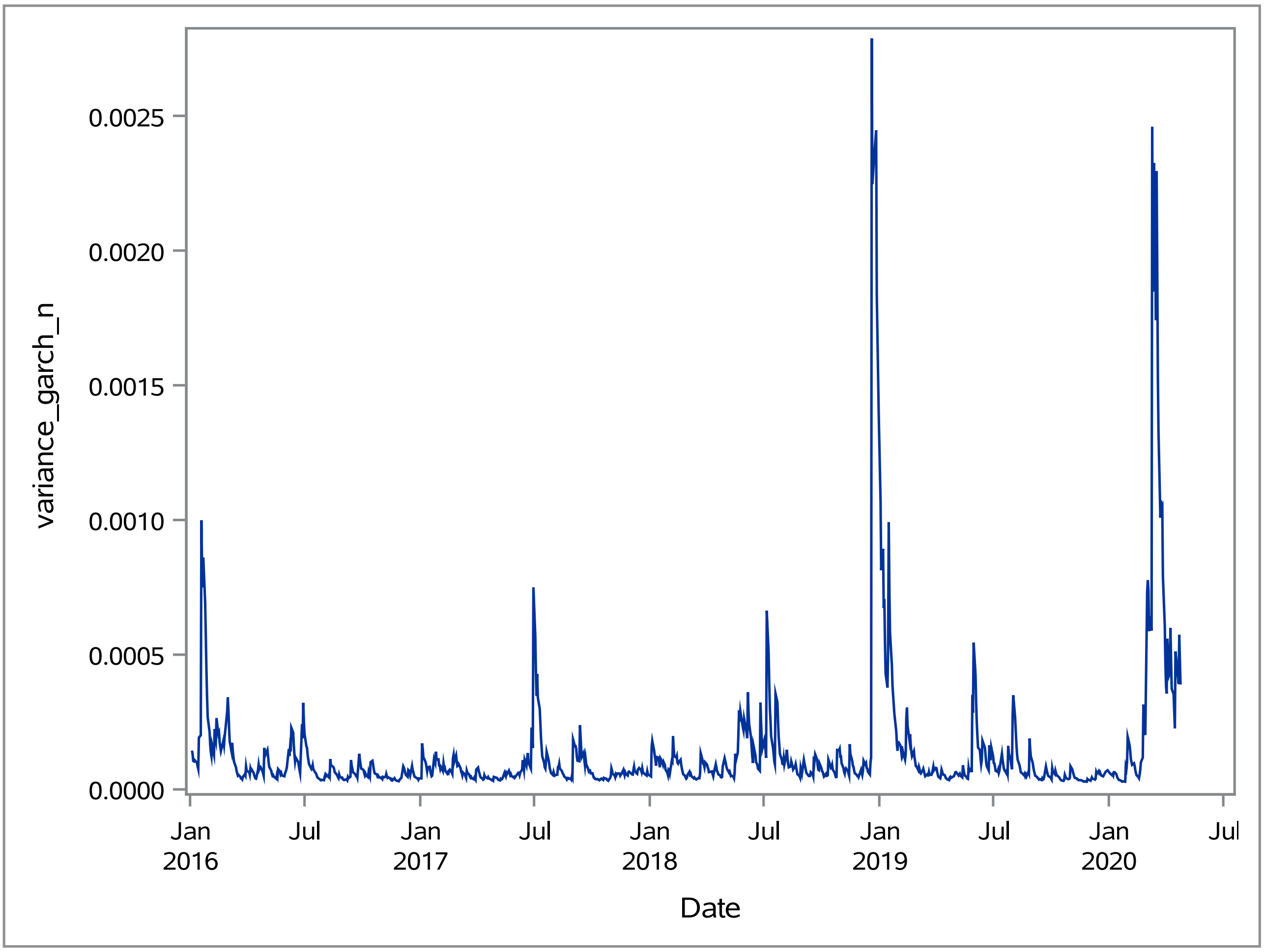
The AUTOREG Procedure

GARCH Estimates			
SSE	0.13657787	**Observations**	1078
MSE	0.0001267	**Uncond Var**	0.00051825
Log Likelihood	3507.86142	**Total R-Square**	.
SBC	-6987.7914	**AIC**	-7007.7228
MAE	0.00707234	**AICC**	-7007.6856
MAPE	147.61589	**HQC**	-7000.1752
		Normality Test	4902.3054
		Pr > ChiSq	<.0001

Parameter Estimates					
Variable	**DF**	**Estimate**	**Standard Error**	**t Value**	**Approx Pr > |t|**
Intercept	1	0.000916	0.000259	3.54	0.0004
ARCH0	1	6.0023E-6	1.0088E-6	5.95	<.0001
ARCH1	1	0.2420	0.0164	14.73	<.0001
GARCH1	1	0.7465	0.0174	42.91	<.0001

The AUTOREG Procedure




variance_garch_n
0.0025
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

The AUTOREG Procedure

Dependent Variable	logreturn

The AUTOREG Procedure

Ordinary Least Squares Estimates			
SSE	0.13566374	**DFE**	1077
MSE	0.0001260	**Root MSE**	0.01122
SBC	-6614.6986	**AIC**	-6619.6814
MAE	0.00707001	**AICC**	-6619.6777
MAPE	99.9429528	**HQC**	-6617.7945
Durbin-Watson	1.9328	**Total R-Square**	0.0000

Parameter Estimates

Variable	DF	Estimate	Standard Error	t Value	Approx Pr > |t|
Intercept	1	-4.633E-6	0.000342	-0.01	0.9892

Algorithm converged.

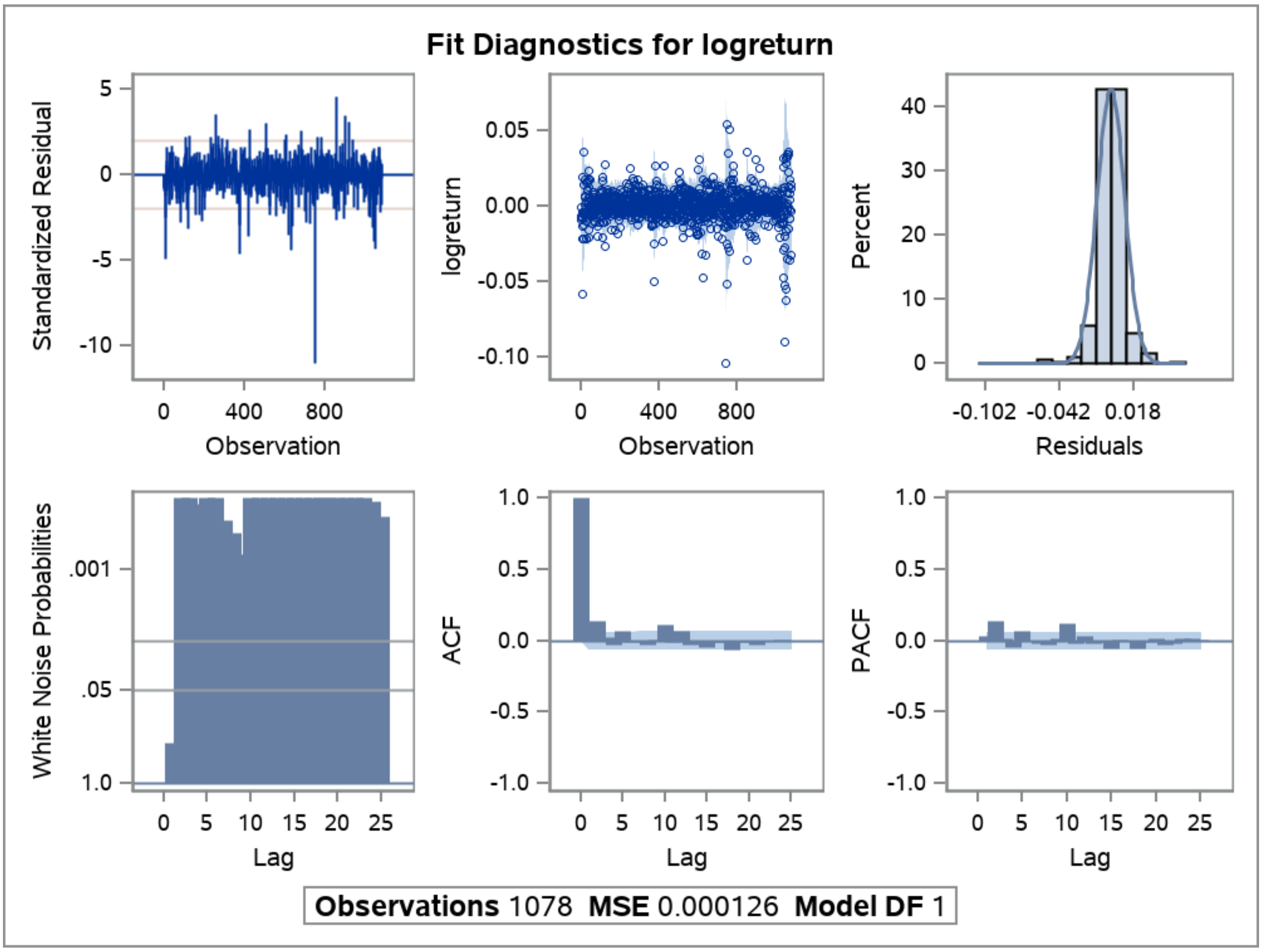
The AUTOREG Procedure

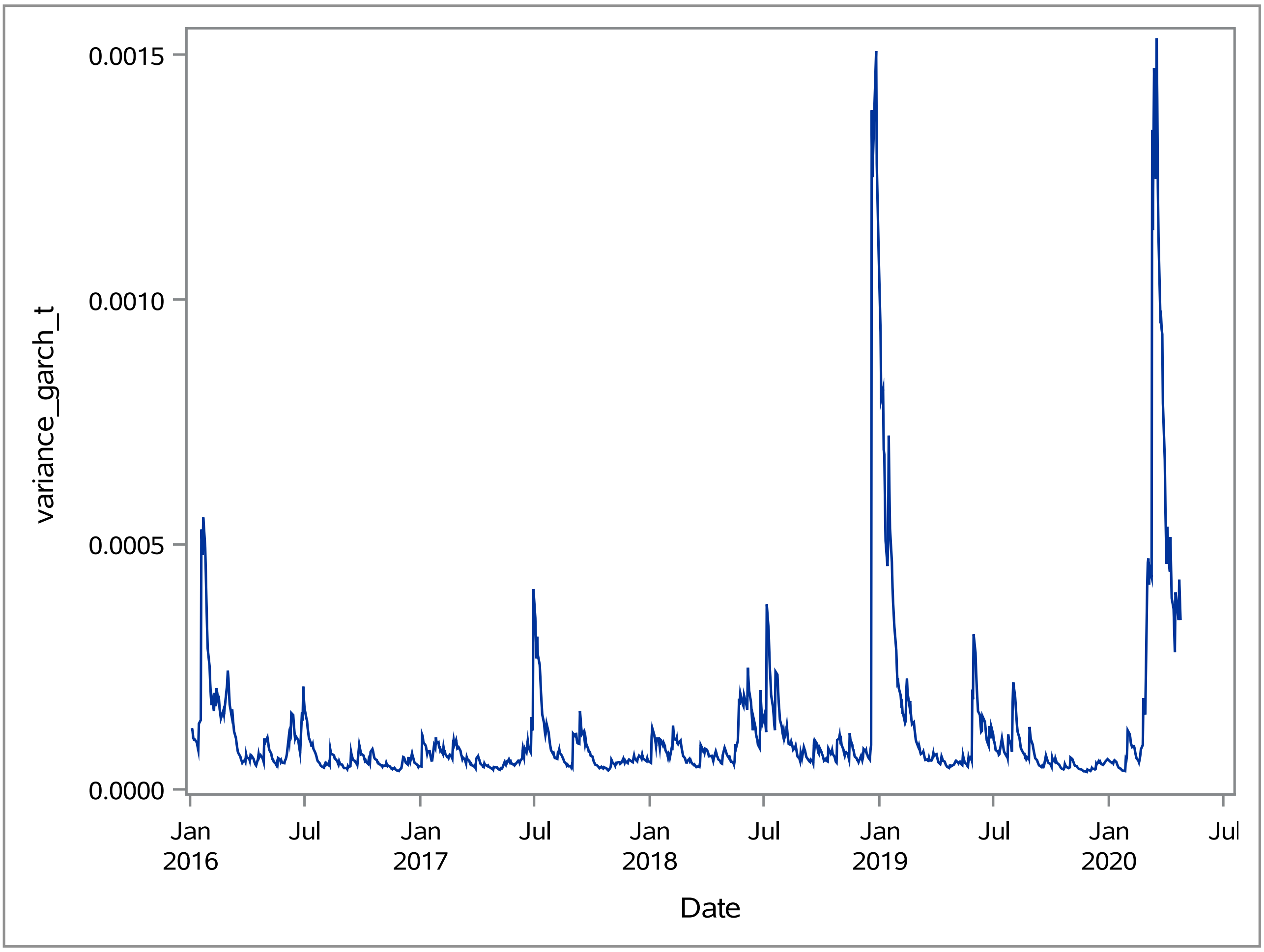
GARCH Estimates			
SSE	0.13601633	**Observations**	1078
MSE	0.0001262	**Uncond Var**	0.00012272
Log Likelihood	3612.2152	**Total R-Square**	.
SBC	-7189.5161	**AIC**	-7214.4304
MAE	0.00706173	**AICC**	-7214.3744
MAPE	127.022122	**HQC**	-7204.9958
		Normality Test	10809.3398
		Pr > ChiSq	<.0001

Parameter Estimates

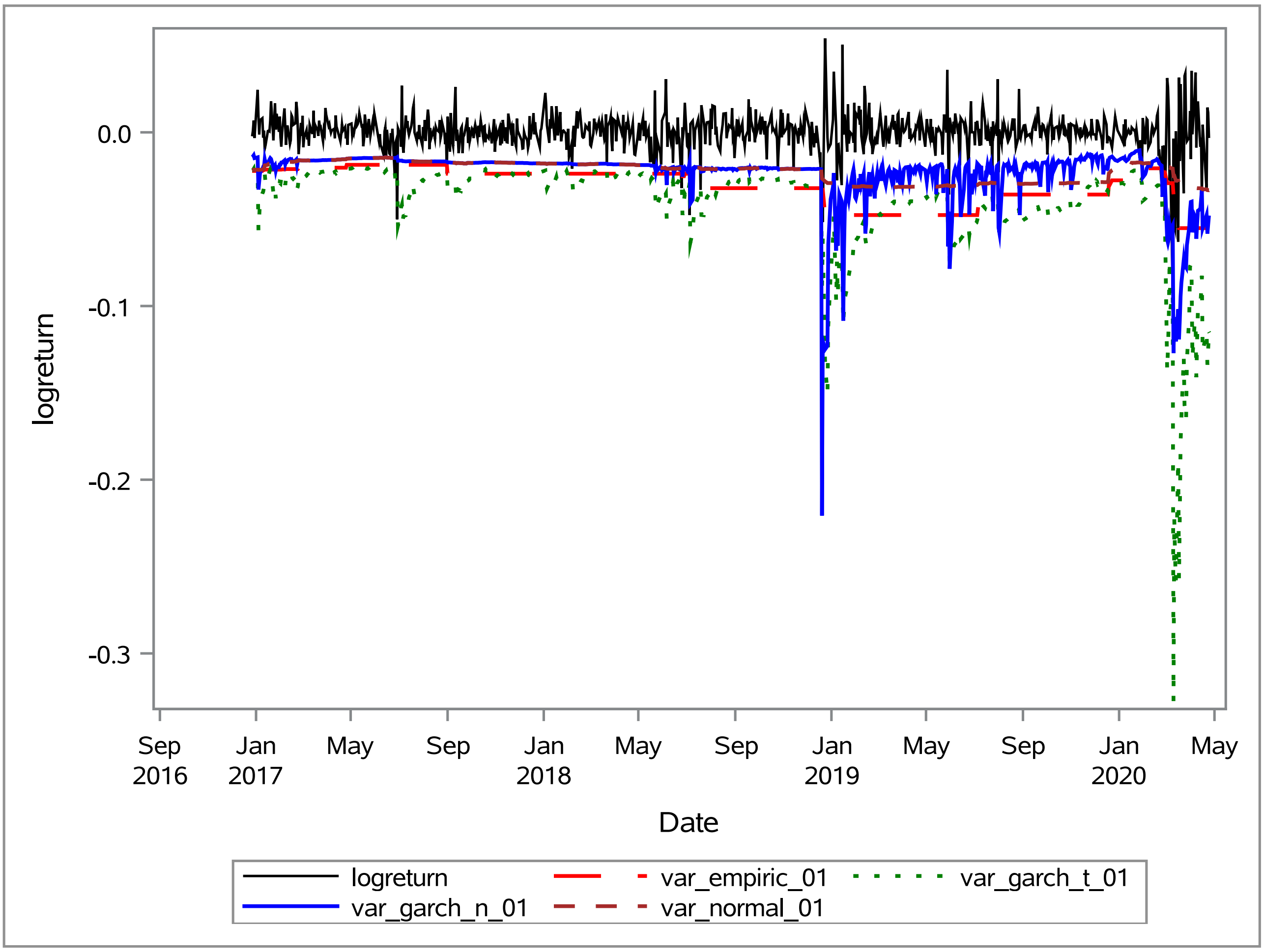
Variable	DF	Estimate	Standard Error	t Value	Approx Pr > |t|	Variable Label
Intercept	1	0.000567	0.000216	2.63	0.0085	
ARCH0	1	4.7614E-6	1.6208E-6	2.94	0.0033	
ARCH1	1	0.1181	0.0294	4.02	<.0001	
GARCH1	1	0.8431	0.0338	24.96	<.0001	
TDFI	1	0.2586	0.0303	8.53	<.0001	Inverse of t DF

The AUTOREG Procedure





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



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

Obs	p	n	s	z	p_value
1	0.028986	828	24	5.49060	2.0029E-8

Obs	p	n	s	z	p_value
1	0.018116	828	15	2.34713	.009459414

Obs	p	n	s	z	p_value
1	0.021739	828	18	3.39495	.000343205

Obs	p	n	s	z	p_value
1	.009661836	828	8	-0.097797	0.53895