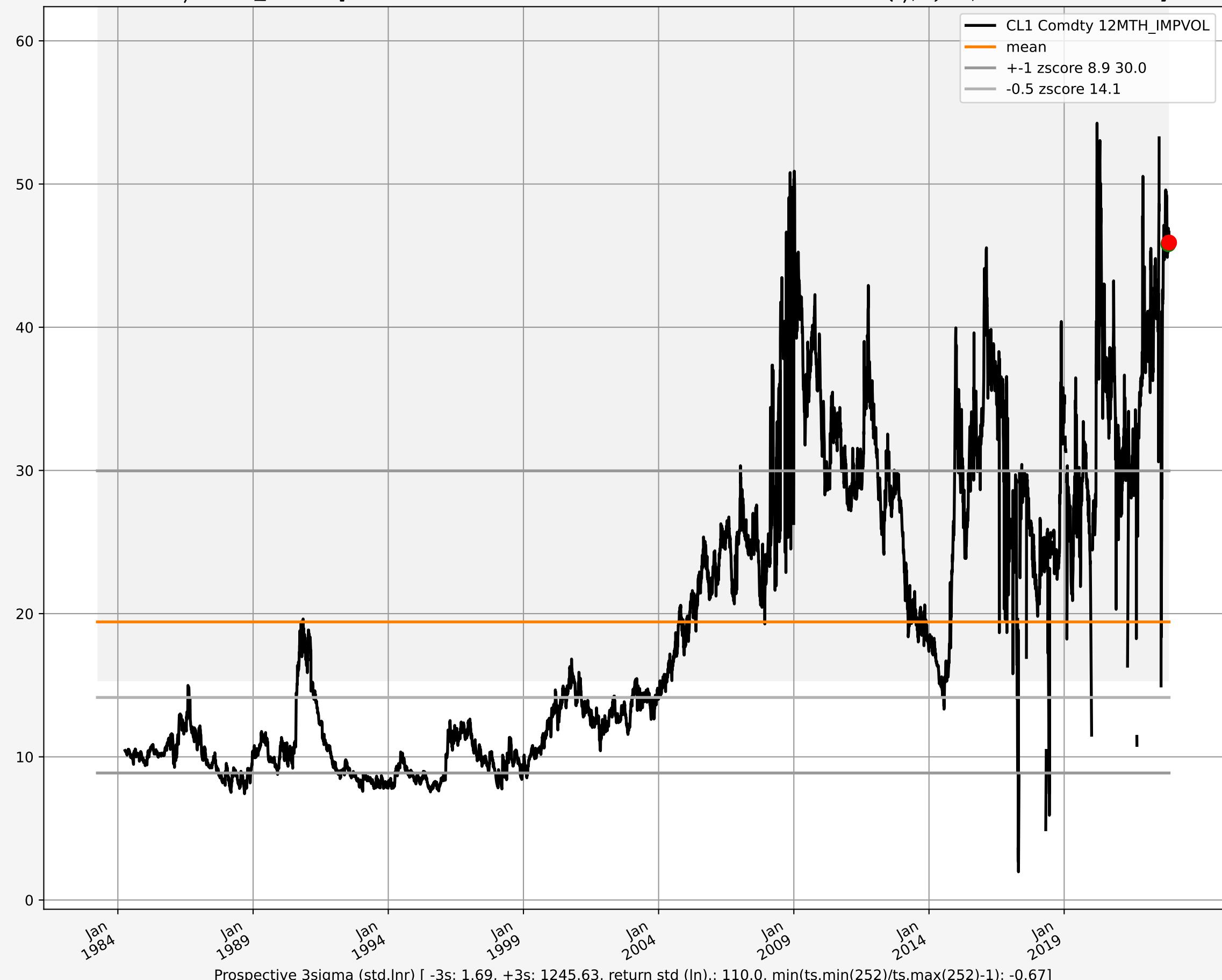


CL1 Comdty 12MTH_IMP VOL [Retro. Stats -- last:45.91 max:54.25 min:1.97 mean:19.42 lvl std (1y,all):5.2,10.6 %-ile:95.5 Z:2.51]



CL1 Comdty original & cleaned data



CL1 Comdty		12MTH_IMPVOl	
count	9916.000	count	9689.000
mean	44.972	mean	18.686
std	28.889	std	9.861
min	-37.630	min	7.424
25%	20.290	25%	10.246
50%	31.580	50%	15.323
75%	64.400	75%	25.352
max	145.290	max	83.358

OLS Regression Results

Dep. Variable: y R-squared (uncentered): 0.882
 Model: OLS Adj. R-squared (uncentered): 0.882
 Method: Least Squares F-statistic: 5956.
 Date: Sun, 20 Nov 2022 Prob (F-statistic): 0.00
 Time: 14:55:09 Log-Likelihood: -15086.
 No. Observations: 3987 AIC: 3.018e+04
 Df Residuals: 3982 BIC: 3.021e+04
 Df Model: 5
 Covariance Type: nonrobust

	coef	std err	t	P> t	[0.025	0.975]
x1	0.3045	0.003	119.146	0.000	0.299	0.309
x2	0.0350	0.003	13.562	0.000	0.030	0.040
x3	0.0229	0.003	7.784	0.000	0.017	0.029
x4	0.0306	0.002	12.766	0.000	0.026	0.035
x5	0.0346	0.003	11.557	0.000	0.029	0.040

Omnibus: 6.805 Durbin-Watson: 0.045
 Prob(Omnibus): 0.033 Jarque-Bera (JB): 6.355
 Skew: -0.061 Prob(JB): 0.0417
 Kurtosis: 2.848 Cond. No. 3.75

Notes:
 [1] R² is computed without centering (uncentered) since the model does not contain a constant.
 [2] Standard Errors assume that the covariance matrix of the errors is correctly specified.

ADF Test of Resids.:		13.880 {5% -2.8623, 1% -3.4320}	0	
CL1 Comdty	Stats	Value	12MTH_IMPVOl	
start	03-30-1983		Stats	Value
end	11-18-2022		start	04-06-1984
rf	0.000		end	11-18-2022
total_return	1.724		rf	0.000
cagr	0.026		total_return	1.861
max_drawdown	-1.259		cagr	0.028
calmar	0.020		max_drawdown	-0.727
mtd	-0.075		calmar	0.038
three_month	-0.115		mtd	-0.065
six_month	-0.269		three_month	-0.114
ytd	0.065		six_month	-0.242
one_year	0.014		ytd	0.094
three_year	0.120		one_year	0.078
five_year	0.074		three_year	0.112
ten_year	-0.011		five_year	0.082
incep	0.026		ten_year	-0.003
daily_sharpe	0.023		incep	0.028
daily_sortino	0.028		daily_sharpe	0.204
daily_mean	0.016		daily_sortino	0.667
daily_vol	0.685		daily_mean	0.110
daily_skew	-35.448		daily_vol	0.537
daily_kurt	2721.404		daily_skew	55.916
best_day	1.353		daily_kurt	4535.500
worst_day	-3.060		best_day	2.752
monthly_sharpe	0.230		worst_day	-0.248
monthly_sortino	0.570		monthly_sharpe	0.177
monthly_mean	0.123		monthly_sortino	0.816
monthly_vol	0.535		monthly_mean	0.126
monthly_skew	9.231		monthly_vol	0.710
monthly_kurt	153.317		monthly_skew	17.345
best_month	2.545		monthly_kurt	346.982
worst_month	-0.542		best_month	4.108
yearly_sharpe	0.230		worst_month	-0.302
yearly_sortino	0.535		yearly_sharpe	0.239
yearly_mean	0.082		yearly_sortino	0.492
yearly_vol	0.357		yearly_mean	0.058
yearly_skew	0.667		yearly_vol	0.244
yearly_kurt	0.621		yearly_skew	0.313
best_year	1.124		yearly_kurt	0.722
worst_year	-0.535		best_year	0.725
avg_drawdown	-0.088		worst_year	-0.449
avg_drawdown_days	213.164		avg_drawdown	-0.071
avg_up_month	0.082		avg_drawdown_days	167.373
avg_down_month	-0.076		avg_up_month	0.075
win_year_perc	0.615		avg_down_month	-0.056
twelve_month_win_perc	0.549		win_year_perc	0.605
			twelve_month_win_perc	0.552

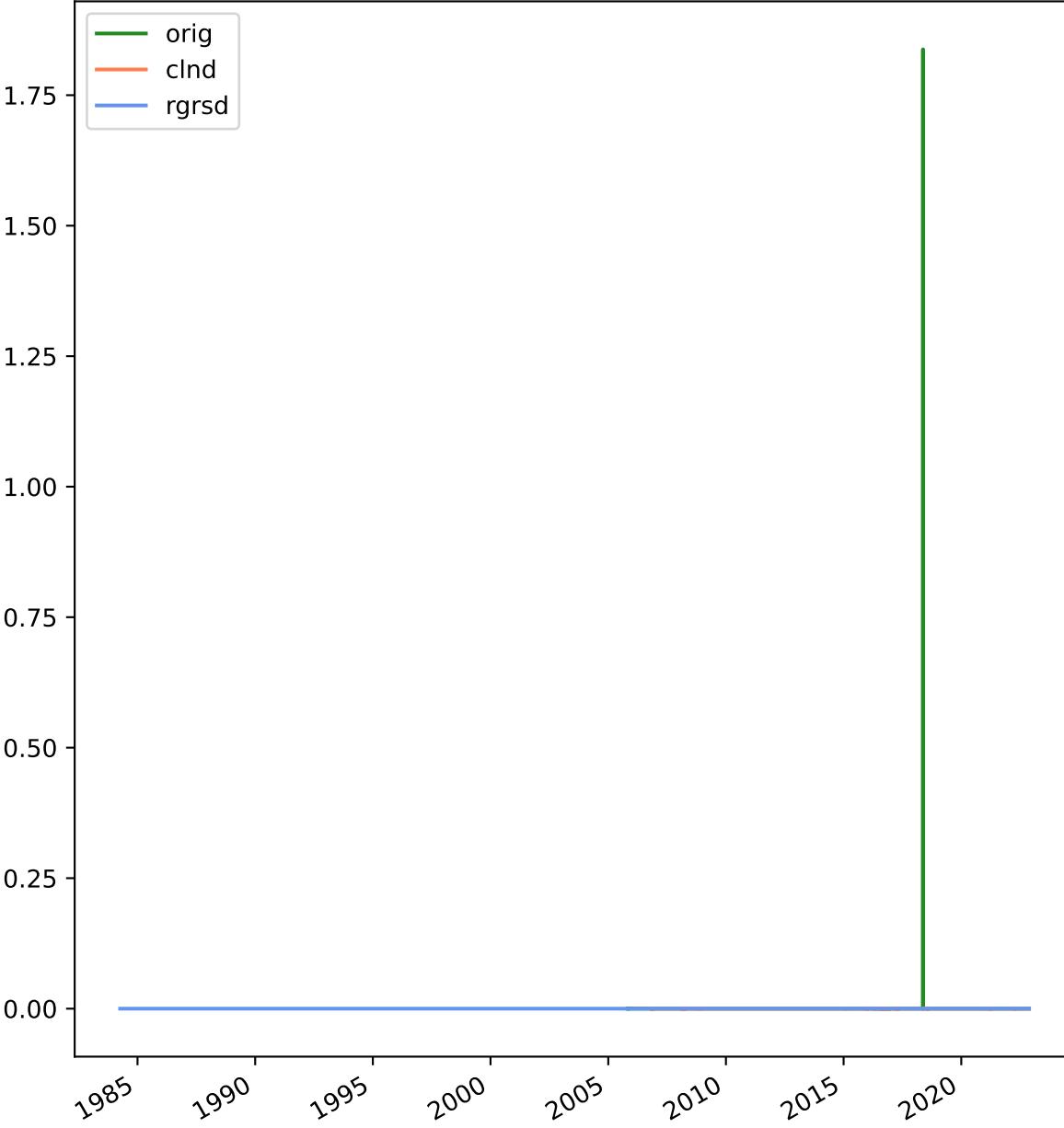
CL1 Comdty 24MTH_IMP VOL [Retro. Stats -- last:38.50 max:43.47 min:6.32 mean:16.74 lvl std (1y,all):4.3,8.9 %-ile:96.4 Z:2.45]



CL1 Comdty original & cleaned data



24MTH_IMP VOL original, cleaned & regressed backfill



	CL1 Comdty		24MTH_IMP VOL
count	9916.000	count	9689.000
mean	44.972	mean	16.098
std	28.889	std	8.543
min	-37.630	min	6.321
25%	20.290	25%	8.795
50%	31.580	50%	13.112
75%	64.400	75%	22.057
max	145.290	max	62.549

OLS Regression Results

Dep. Variable: y R-squared (uncentered): 0.905
 Model: OLS Adj. R-squared (uncentered): 0.904
 Method: Least Squares F-statistic: 7557.
 Date: Sun, 20 Nov 2022 Prob (F-statistic): 0.00
 Time: 14:55:11 Log-Likelihood: -14044.
 No. Observations: 3989 AIC: 2.810e+04
 Df Residuals: 3984 BIC: 2.813e+04
 Df Model: 5
 Covariance Type: nonrobust

	coef	std err	t	P> t	[0.025	0.975]
x1	0.2695	0.002	137.686	0.000	0.266	0.273
x2	0.0232	0.002	11.676	0.000	0.019	0.027
x3	0.0187	0.002	8.255	0.000	0.014	0.023
x4	0.0256	0.002	13.890	0.000	0.022	0.029
x5	0.0299	0.002	12.997	0.000	0.025	0.034

Omnibus: 62.397 Durbin-Watson: 0.028
 Prob(Omnibus): 0.000 Jarque-Bera (JB): 55.774
 Skew: -0.239 Prob(JB): 7.74e-13
 Kurtosis: 2.672 Cond. No. 3.75

Notes:
 [1] R² is computed without centering (uncentered) since the model does not contain a constant.
 [2] Standard Errors assume that the covariance matrix of the errors is correctly specified.

ADF Test of Resids.: -3.635 {5% -2.8623, 1% -3.4320} 0

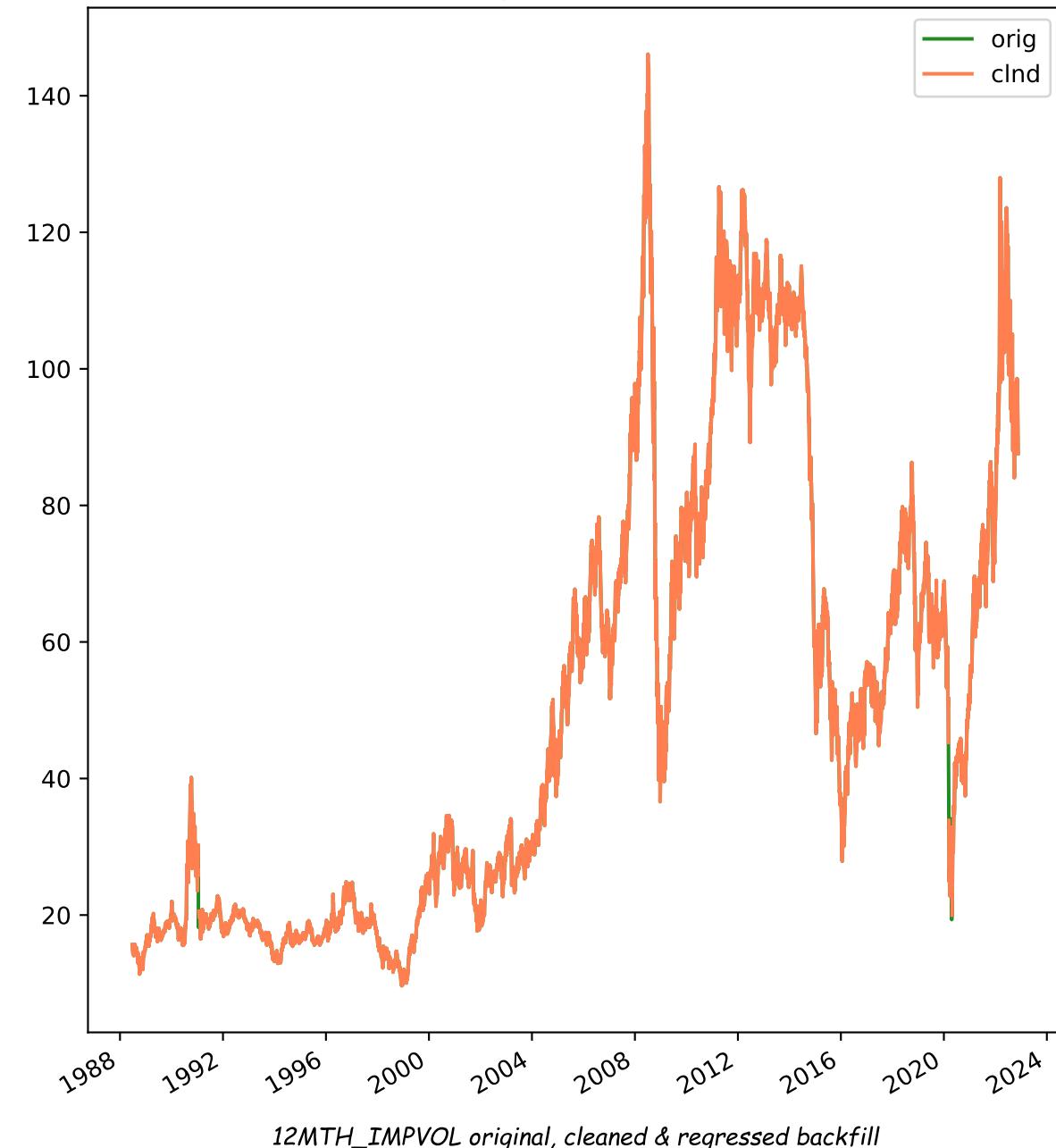
CL1 Comdty Stats	Value	24MTH_IMP VOL Stats	Value
start	03-30-1983	start	04-06-1984
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	1.724	total_return	1.834
cagr	0.026	cagr	0.027
max_drawdown	-1.259	max_drawdown	-0.741
calmar	0.020	calmar	0.037
mtd	-0.075	mtd	-0.065
three_month	-0.115	three_month	-0.114
six_month	-0.269	six_month	-0.243
ytd	0.065	ytd	0.093
one_year	0.014	one_year	0.073
three_year	0.120	three_year	0.112
five_year	0.074	five_year	0.081
ten_year	-0.011	ten_year	-0.004
incep	0.026	incep	0.027
daily_sharpe	0.023	daily_sharpe	0.212
daily_sortino	0.028	daily_sortino	0.609
daily_mean	0.016	daily_mean	0.100
daily_vol	0.685	daily_vol	0.470
daily_skew	-35.448	daily_skew	44.738
daily_kurt	2721.404	daily_kurt	3341.215
best_day	1.353	best_day	2.234
worst_day	-3.060	worst_day	-0.217
monthly_sharpe	0.230	monthly_sharpe	0.180
monthly_sortino	0.570	monthly_sortino	0.756
monthly_mean	0.123	monthly_mean	0.115
monthly_vol	0.535	monthly_vol	0.639
monthly_skew	9.231	monthly_skew	16.585
monthly_kurt	153.317	monthly_kurt	326.947
best_month	2.545	best_month	3.642
worst_month	-0.542	worst_month	-0.299
yearly_sharpe	0.230	yearly_sharpe	0.240
yearly_sortino	0.535	yearly_sortino	0.488
yearly_mean	0.082	yearly_mean	0.059
yearly_vol	0.357	yearly_vol	0.246
yearly_skew	0.667	yearly_skew	0.208
yearly_kurt	0.621	yearly_kurt	0.362
best_year	1.124	best_year	0.695
worst_year	-0.535	worst_year	-0.439
avg_drawdown	-0.088	avg_drawdown	-0.071
avg_drawdown_days	213.164	avg_drawdown_days	175.747
avg_up_month	0.082	avg_up_month	0.072
avg_down_month	-0.076	avg_down_month	-0.056
win_year_perc	0.615	win_year_perc	0.605
twelve_month_win_perc	0.549	twelve_month_win_perc	0.554

CO1 Comdty 12MTH_IMP VOL [Retro. Stats -- last:46.05 max:60.72 min:12.16 mean:27.03 lvl std (1y,all):3.5,8.1 %-ile:94.7 Z:2.35]

- CO1 Comdty 12MTH_IMP VOL
- mean
- +1 zscore 18.9 35.1
- 0.5 zscore 23.0



CO1 Comdty original & cleaned data



CO1 Comdty		12MTH_IMPVOL	
count	8773.000	count	8537.000
mean	50.104	mean	26.860
std	33.056	std	7.787
min	9.640	min	12.157
25%	19.470	25%	22.923
50%	43.340	50%	25.933
75%	72.130	75%	30.157
max	146.080	max	61.250

OLS Regression Results

Dep. Variable: y R-squared (uncentered): 0.973
 Model: OLS Adj. R-squared (uncentered): 0.973
 Method: Least Squares F-statistic: 2.405e+04
 Date: Sun, 20 Nov 2022 Prob (F-statistic): 0.00
 Time: 14:55:17 Log-Likelihood: -10006.
 No. Observations: 3296 AIC: 2.002e+04
 Df Residuals: 3291 BIC: 2.005e+04
 Df Model: 5
 Covariance Type: nonrobust

coef std err t P>|t| [0.025] 0.975]

x1 0.1179 0.002 63.019 0.000 0.114 0.122
 x2 0.1604 0.008 20.381 0.000 0.145 0.176
 x3 0.0740 0.010 7.296 0.000 0.054 0.094
 x4 0.1230 0.008 16.057 0.000 0.108 0.138
 x5 0.2722 0.011 24.384 0.000 0.250 0.294

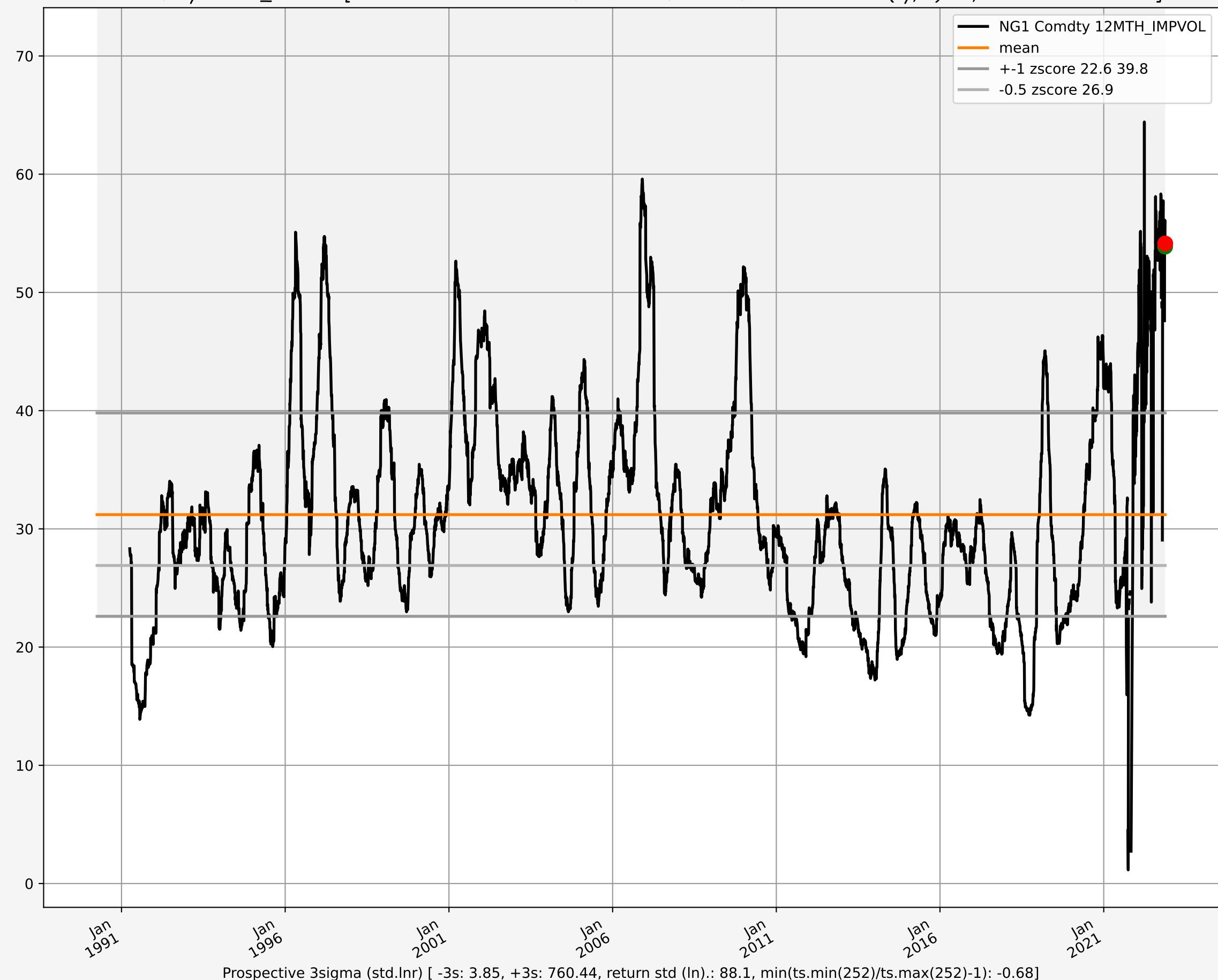
Omnibus: 35.978 Durbin-Watson: 0.043
 Prob(Omnibus): 0.000 Jarque-Bera (JB): 37.715
 Skew: -0.235 Prob(JB): 6.46e-09
 Kurtosis: 3.232 Cond. No. 16.0

Notes:
 [1] R² is computed without centering (uncentered) since the model does not contain a constant.
 [2] Standard Errors assume that the covariance matrix of the errors is correctly specified.

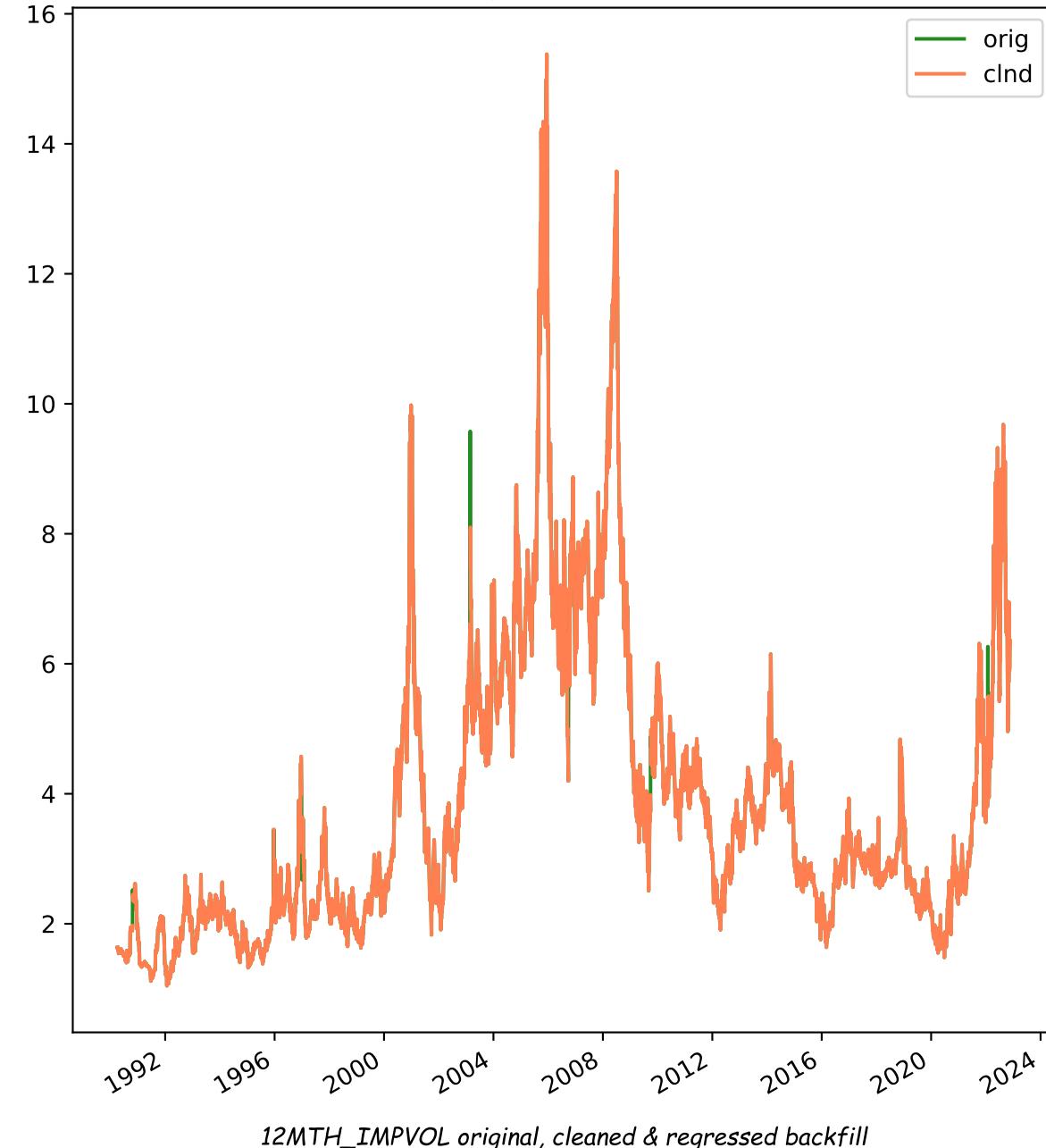
ADF Test of Resids.: 4.043 {5% -2.8624, 1% -3.4323} 0

CO1 Comdty Stats	Value	12MTH_IMPVOL Stats	Value
start	06-23-1988	start	06-22-1989
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	4.599	total_return	0.653
cagr	0.051	cagr	0.015
max_drawdown	-0.863	max_drawdown	-0.800
calmar	0.059	calmar	0.019
mtd	-0.076	mtd	-0.031
three_month	-0.093	three_month	-0.137
six_month	-0.197	six_month	-0.111
ytd	0.127	ytd	0.232
one_year	0.079	one_year	0.366
three_year	0.120	three_year	0.100
five_year	0.071	five_year	0.095
ten_year	-0.024	ten_year	0.022
incep	0.051	incep	0.015
daily_sharpe	0.319	daily_sharpe	0.188
daily_sortino	0.512	daily_sortino	0.367
daily_mean	0.116	daily_mean	0.053
daily_vol	0.363	daily_vol	0.282
daily_skew	-0.184	daily_skew	4.064
daily_kurt	15.344	daily_kurt	71.613
best_day	0.327	best_day	0.394
worst_day	-0.319	worst_day	-0.193
monthly_sharpe	0.327	monthly_sharpe	0.207
monthly_sortino	0.572	monthly_sortino	0.529
monthly_mean	0.112	monthly_mean	0.079
monthly_vol	0.342	monthly_vol	0.385
monthly_skew	0.008	monthly_skew	2.642
monthly_kurt	4.430	monthly_kurt	14.714
best_month	0.462	best_month	0.935
worst_month	-0.550	worst_month	-0.240
yearly_sharpe	0.301	yearly_sharpe	0.218
yearly_sortino	0.729	yearly_sortino	0.759
yearly_mean	0.118	yearly_mean	0.104
yearly_vol	0.391	yearly_vol	0.478
yearly_skew	0.815	yearly_skew	2.125
yearly_kurt	1.887	yearly_kurt	6.531
best_year	1.382	best_year	1.983
worst_year	-0.514	worst_year	-0.462
avg_drawdown	-0.080	avg_drawdown	-0.121
avg_drawdown_days	169.014	avg_drawdown_days	714.529
avg_up_month	0.075	avg_up_month	0.092
avg_down_month	-0.070	avg_down_month	-0.055
win_year_perc	0.647	win_year_perc	0.455
twelve_month_win_perc	0.581	twelve_month_win_perc	0.509

NG1 Comdty 12MTH_IMP VOL [Retro. Stats -- last:54.13 max:64.42 min:1.15 mean:31.20 lvl std (1y,all):8.2,8.6 %-ile:95.3 Z:2.67]



NG1 Comdty original & cleaned data



NG1 Comdty		12MTH_IMPVOL	
count	8181.000	count	7947.000
mean	3.799	mean	31.246
std	2.219	std	8.486
min	1.046	min	13.888
25%	2.230	25%	25.431
50%	2.991	50%	30.023
75%	4.700	75%	35.194
max	15.378	max	59.593

OLS Regression Results

Dep. Variable: y R-squared (uncentered): 0.955
 Model: OLS Adj. R-squared (uncentered): 0.955
 Method: Least Squares F-statistic: 1497.
 Date: Sun, 20 Nov 2022 Prob (F-statistic): 3.29e-234
 Time: 14:55:22 Log-Likelihood: -1276.1
 No. Observations: 356 AIC: 2562.
 Df Residuals: 351 BIC: 2582.
 Df Model: 5 Covariance Type: nonrobust

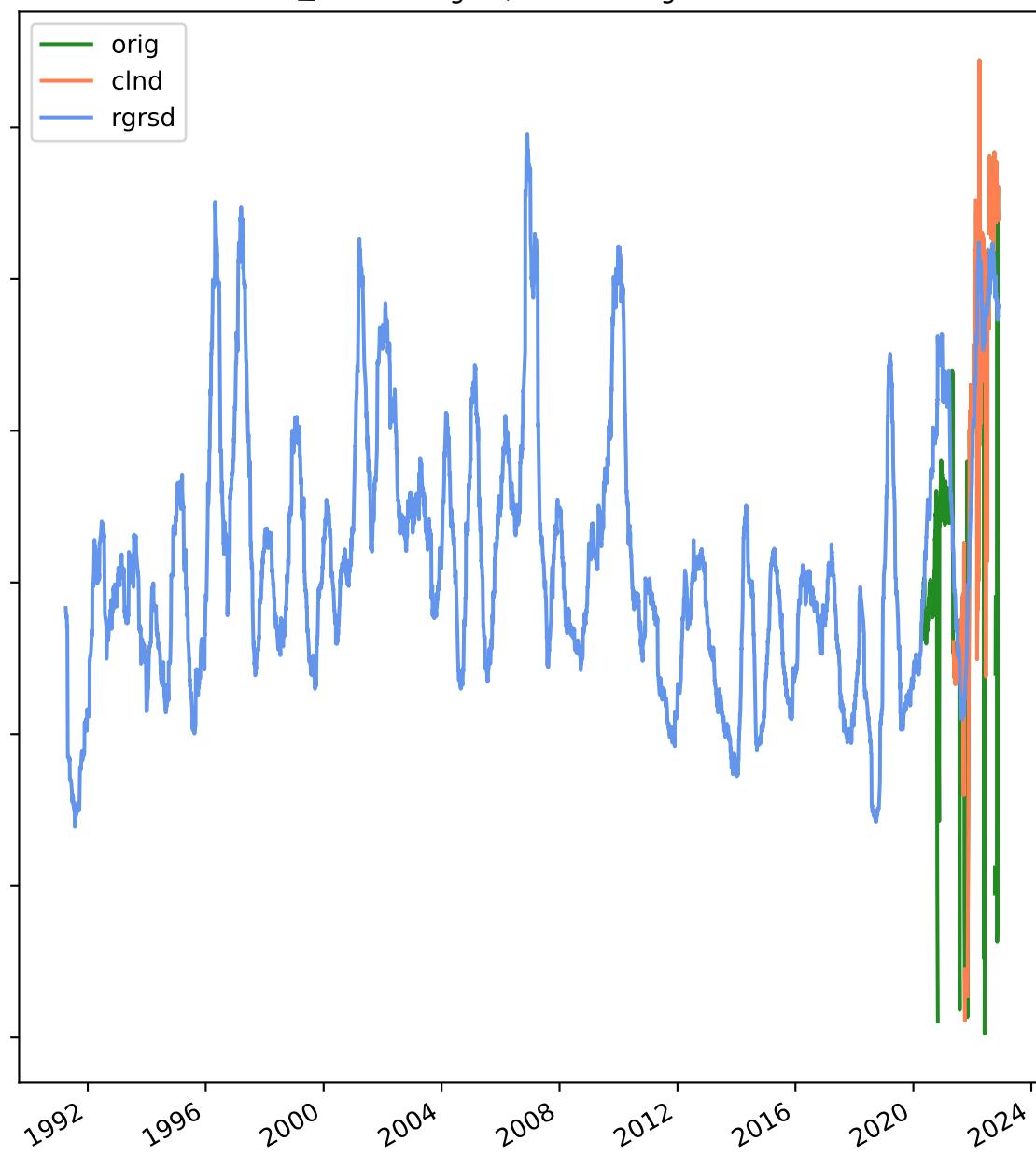
coef std err t P>|t| [0.025] 0.975]
 x1 0.3455 0.356 0.972 0.332 -0.354 1.045
 x2 -0.1229 0.028 -4.354 0.000 -0.178 -0.067
 x3 0.3382 0.036 9.282 0.000 0.267 0.410
 x4 0.2372 0.028 8.442 0.000 0.182 0.292
 x5 0.1179 0.035 3.326 0.001 0.048 0.188

Omnibus: 57.388 Durbin-Watson: 0.246
 Prob(Omnibus): 0.000 Jarque-Bera (JB): 80.777
 Skew: -1.128 Prob(JB): 2.88e-18
 Kurtosis: 3.600 Cond. No. 105.

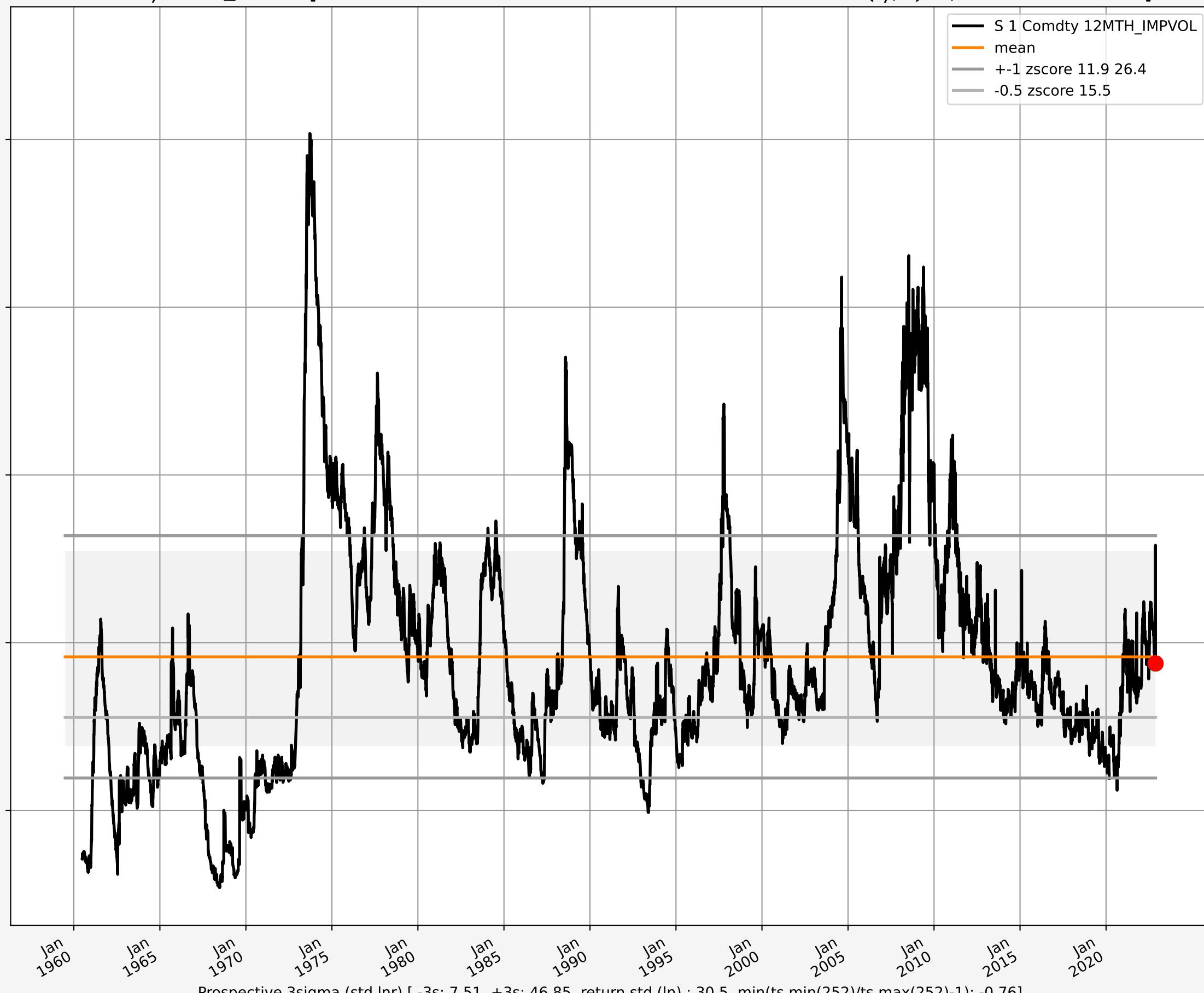
Notes:
 [1] R² is computed without centering (uncentered) since the model does not contain a constant.
 [2] Standard Errors assume that the covariance matrix of the errors is correctly specified.

ADF Test of Resids.: 3.545 {5% -2.8698, 1% -3.4490} 0

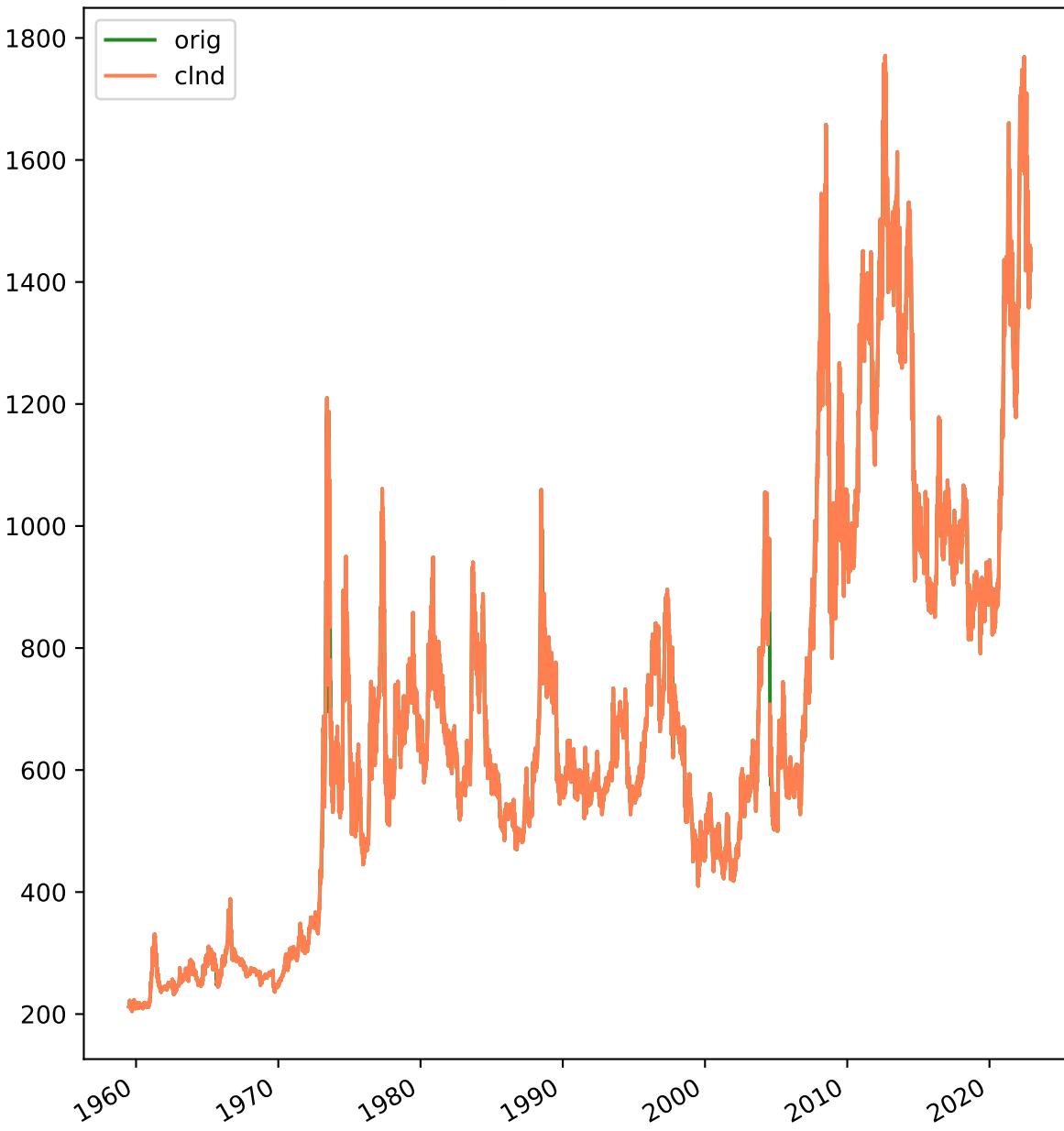
NG1 Comdty Stats	Value	12MTH_IMPVOL Stats	Value
start	04-03-1990	start	04-03-1991
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	2.855	total_return	0.701
cagr	0.042	cagr	0.017
max_drawdown	-0.904	max_drawdown	-0.761
calmar	0.047	calmar	0.022
mtd	-0.008	mtd	-0.010
three_month	-0.314	three_month	-0.049
six_month	-0.247	six_month	0.045
ytd	0.690	ytd	0.256
one_year	0.286	one_year	0.596
three_year	0.349	three_year	0.300
five_year	0.157	five_year	0.200
ten_year	0.054	ten_year	0.046
incep	0.042	incep	0.017
daily_sharpe	0.349	daily_sharpe	0.188
daily_sortino	0.612	daily_sortino	0.310
daily_mean	0.193	daily_mean	0.043
daily_vol	0.552	daily_vol	0.229
daily_skew	0.619	daily_skew	0.641
daily_kurt	6.754	daily_kurt	37.940
best_day	0.427	best_day	0.234
worst_day	-0.223	worst_day	-0.224
monthly_sharpe	0.345	monthly_sharpe	0.259
monthly_sortino	0.675	monthly_sortino	0.504
monthly_mean	0.191	monthly_mean	0.093
monthly_vol	0.554	monthly_vol	0.360
monthly_skew	0.604	monthly_skew	0.501
monthly_kurt	1.860	monthly_kurt	1.183
best_month	0.793	best_month	0.442
worst_month	-0.416	worst_month	-0.309
yearly_sharpe	0.248	yearly_sharpe	0.228
yearly_sortino	0.925	yearly_sortino	0.574
yearly_mean	0.168	yearly_mean	0.076
yearly_vol	0.677	yearly_vol	0.334
yearly_skew	2.974	yearly_skew	0.352
yearly_kurt	12.687	yearly_kurt	-1.105
best_year	3.197	best_year	0.724
worst_year	-0.737	worst_year	-0.419
avg_drawdown	-0.172	avg_drawdown	-0.105
avg_drawdown_days	311.263	avg_drawdown_days	408.714
avg_up_month	0.127	avg_up_month	0.089
avg_down_month	-0.108	avg_down_month	-0.070
win_year_perc	0.500	win_year_perc	0.516
twelve_month_win_perc	0.575	twelve_month_win_perc	0.523



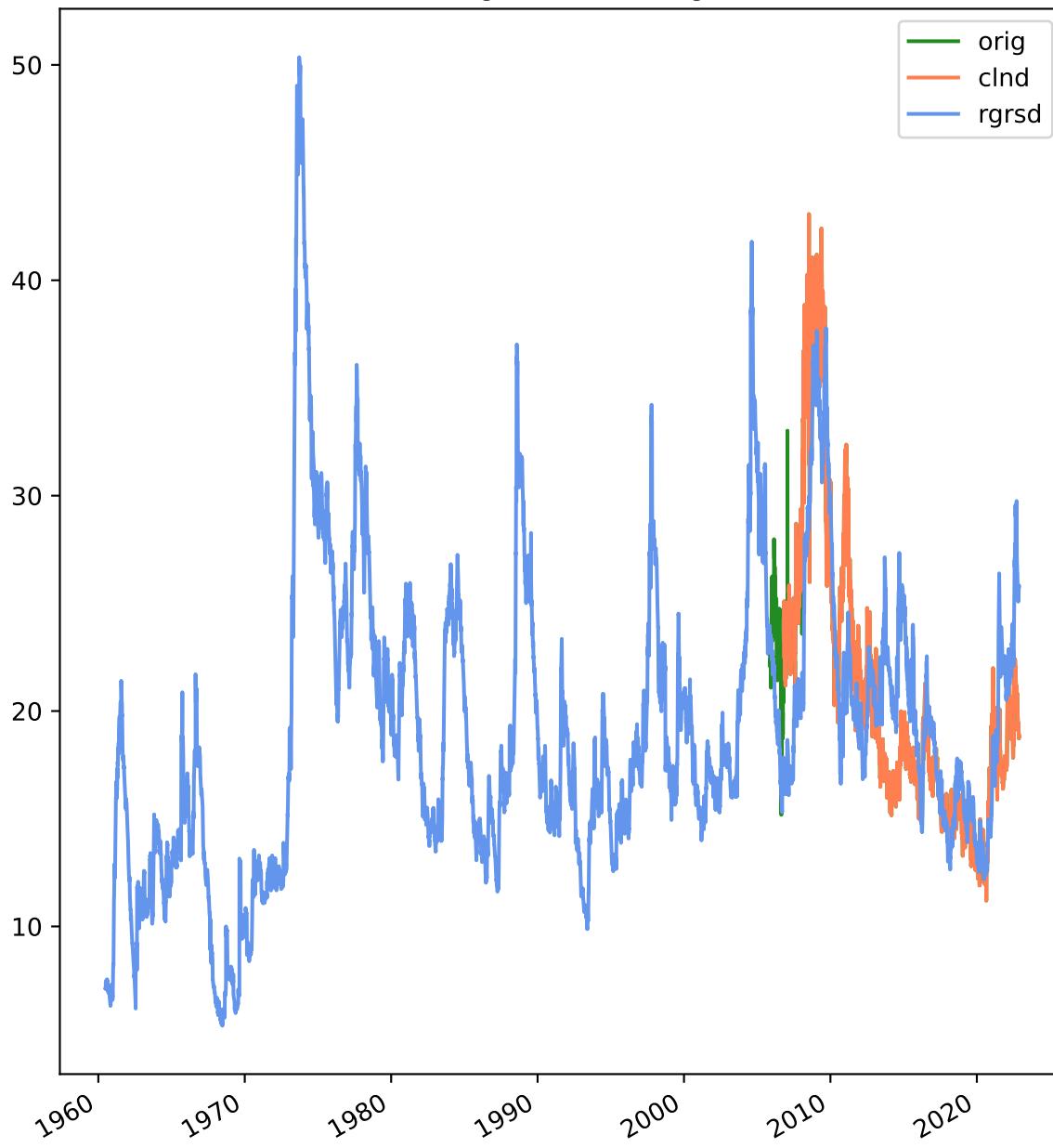
S 1 Comdty 12MTH_IMPVOL [Retro. Stats -- last:18.76 max:50.36 min:5.39 mean:19.15 lvl std (1y,all):1.5,7.2 %ile:56.9 Z:-0.05]



S 1 Comdty original & cleaned data



12MTH_IMP VOL original, cleaned & regressed backfill



S 1 Comdty		12MTH_IMP VOL	
count	15942.000	count	15721.000
mean	679.673	mean	19.132
std	335.023	std	6.944
min	204.500	min	5.392
25%	477.062	25%	14.611
50%	612.500	50%	17.977
75%	863.938	75%	22.557
max	1771.000	max	50.356

OLS Regression Results

```

Dep. Variable: y R-squared (uncentered): 0.964
Model: OLS Adj. R-squared (uncentered): 0.964
Method: Least Squares F-statistic: 2.135e+04
Date: Sun, 20 Nov 2022 Prob (F-statistic): 0.00
Time: 14:55:28 Log-Likelihood: -11507.
No. Observations: 4038 AIC: 2.302e+04
Df Residuals: 4033 BIC: 2.305e+04
Df Model: 5
Covariance Type: nonrobust

```

	coef	std err	t	P> t	[0.025	0.975]
x1	0.0013	0.000	6.893	0.000	0.001	0.002
x2	0.1324	0.012	10.646	0.000	0.108	0.157
x3	0.0930	0.016	5.768	0.000	0.061	0.125
x4	0.1263	0.013	9.952	0.000	0.101	0.151
x5	0.4833	0.019	25.866	0.000	0.447	0.520

```

Omnibus: 108.365 Durbin-Watson: 0.018
Prob(Omnibus): 0.000 Jarque-Bera (JB): 116.561
Skew: 0.410 Prob(JB): 4.89e-26
Kurtosis: 3.146 Cond. No. 382.

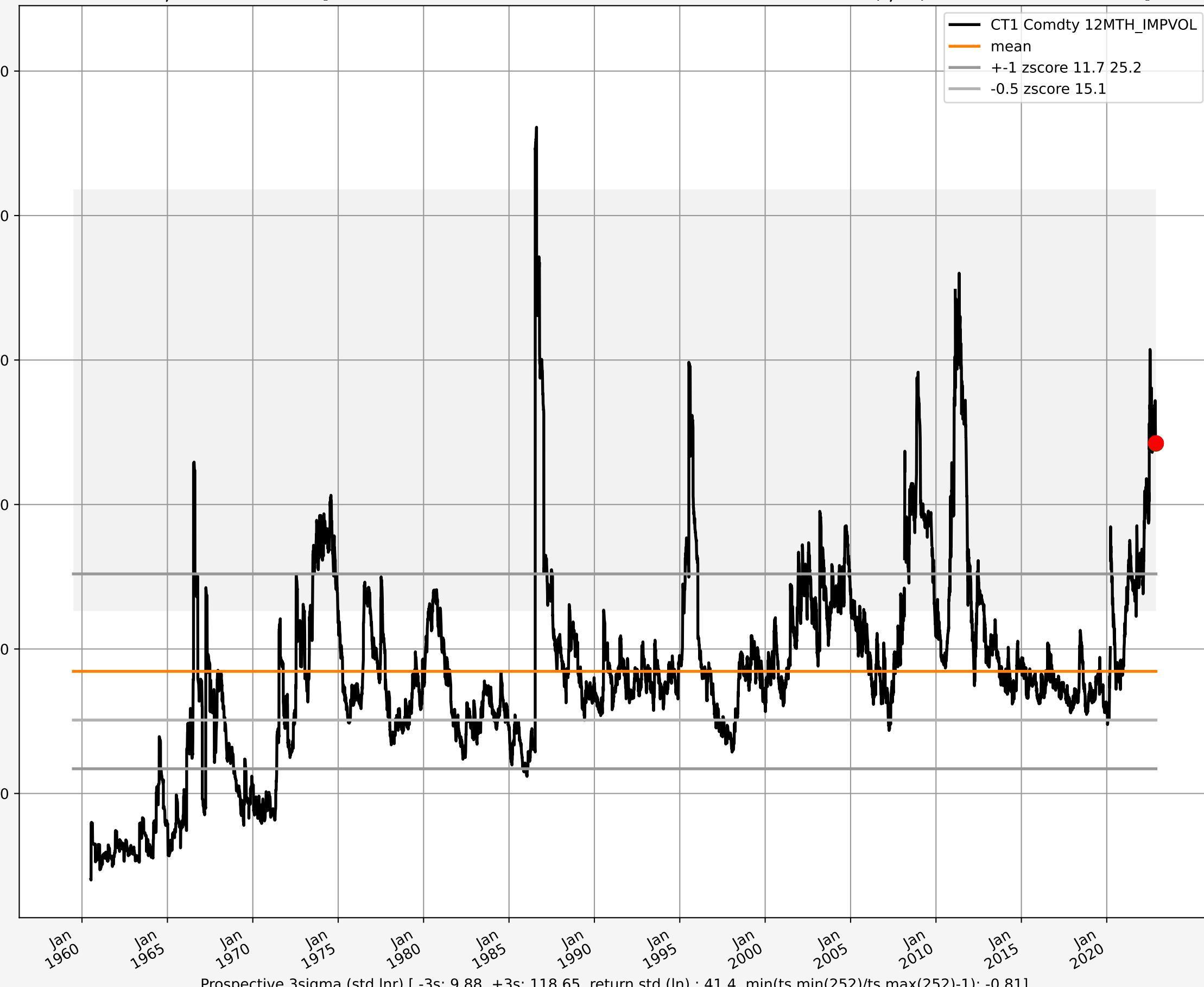
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Notes:
[1] R^2 is computed without centering (uncentered) since the model does not contain a constant.
[2] Standard Errors assume that the covariance matrix of the errors is correctly specified.

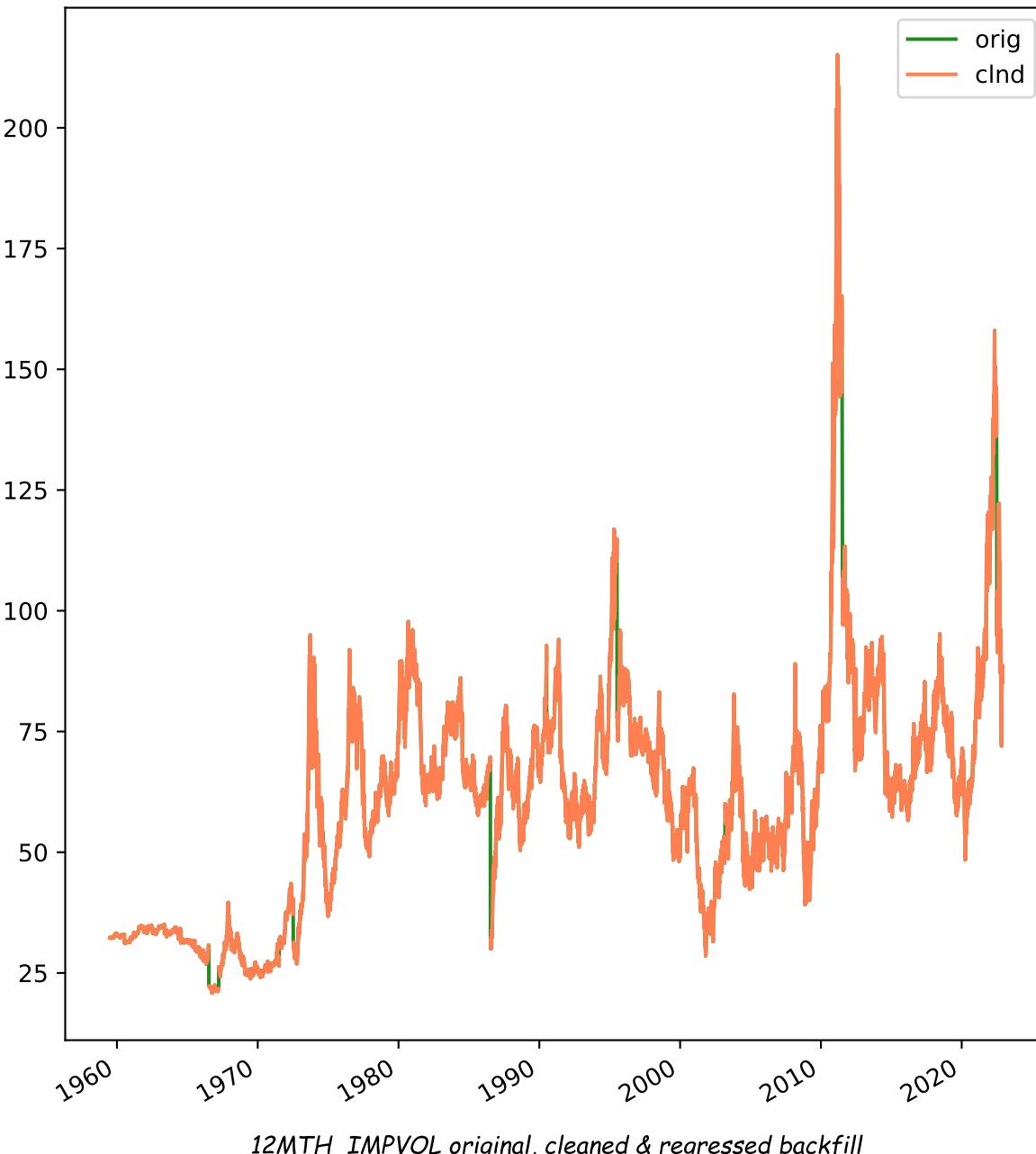
ADF Test of Resids.: 3.232 {5% -2.8623, 1% -3.4320} 0

S 1 Comdty Stats	Value	12MTH_IMP VOL Stats	Value
start	07-01-1959	start	06-29-1960
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	5.733	total_return	2.638
cagr	0.031	cagr	0.021
max_drawdown	-0.661	max_drawdown	-0.804
calmar	0.046	calmar	0.026
mtd	0.015	mtd	0.029
three_month	-0.144	three_month	0.010
six_month	-0.141	six_month	0.118
ytd	0.075	ytd	0.233
one_year	0.129	one_year	0.154
three_year	0.162	three_year	0.218
five_year	0.076	five_year	0.115
ten_year	0.002	ten_year	0.018
incep	0.031	incep	0.021
daily_sharpe	0.246	daily_sharpe	0.199
daily_sortino	0.384	daily_sortino	0.439
daily_mean	0.059	daily_mean	0.056
daily_vol	0.238	daily_vol	0.282
daily_skew	-0.578	daily_skew	13.711
daily_kurt	7.504	daily_kurt	570.767
best_day	0.106	best_day	0.929
worst_day	-0.180	worst_day	-0.195
monthly_sharpe	0.241	monthly_sharpe	0.214
monthly_sortino	0.435	monthly_sortino	0.523
monthly_mean	0.063	monthly_mean	0.074
monthly_vol	0.262	monthly_vol	0.346
monthly_skew	0.802	monthly_skew	2.269
monthly_kurt	7.293	monthly_kurt	12.472
best_month	0.577	best_month	0.907
worst_month	-0.329	worst_month	-0.257
yearly_sharpe	0.238	yearly_sharpe	0.211
yearly_sortino	0.570	yearly_sortino	0.559
yearly_mean	0.053	yearly_mean	0.082
yearly_vol	0.225	yearly_vol	0.389
yearly_skew	0.650	yearly_skew	1.330
yearly_kurt	0.475	yearly_kurt	3.217
best_year	0.754	best_year	1.632
worst_year	-0.357	worst_year	-0.611
avg_drawdown	-0.085	avg_drawdown	-0.062
avg_drawdown_days	477.875	avg_drawdown_days	452.700
avg_up_month	0.055	avg_up_month	0.085
avg_down_month	-0.048	avg_down_month	-0.054
win_year_perc	0.540	win_year_perc	0.548
twelve_month_win_perc	0.521	twelve_month_win_perc	0.526

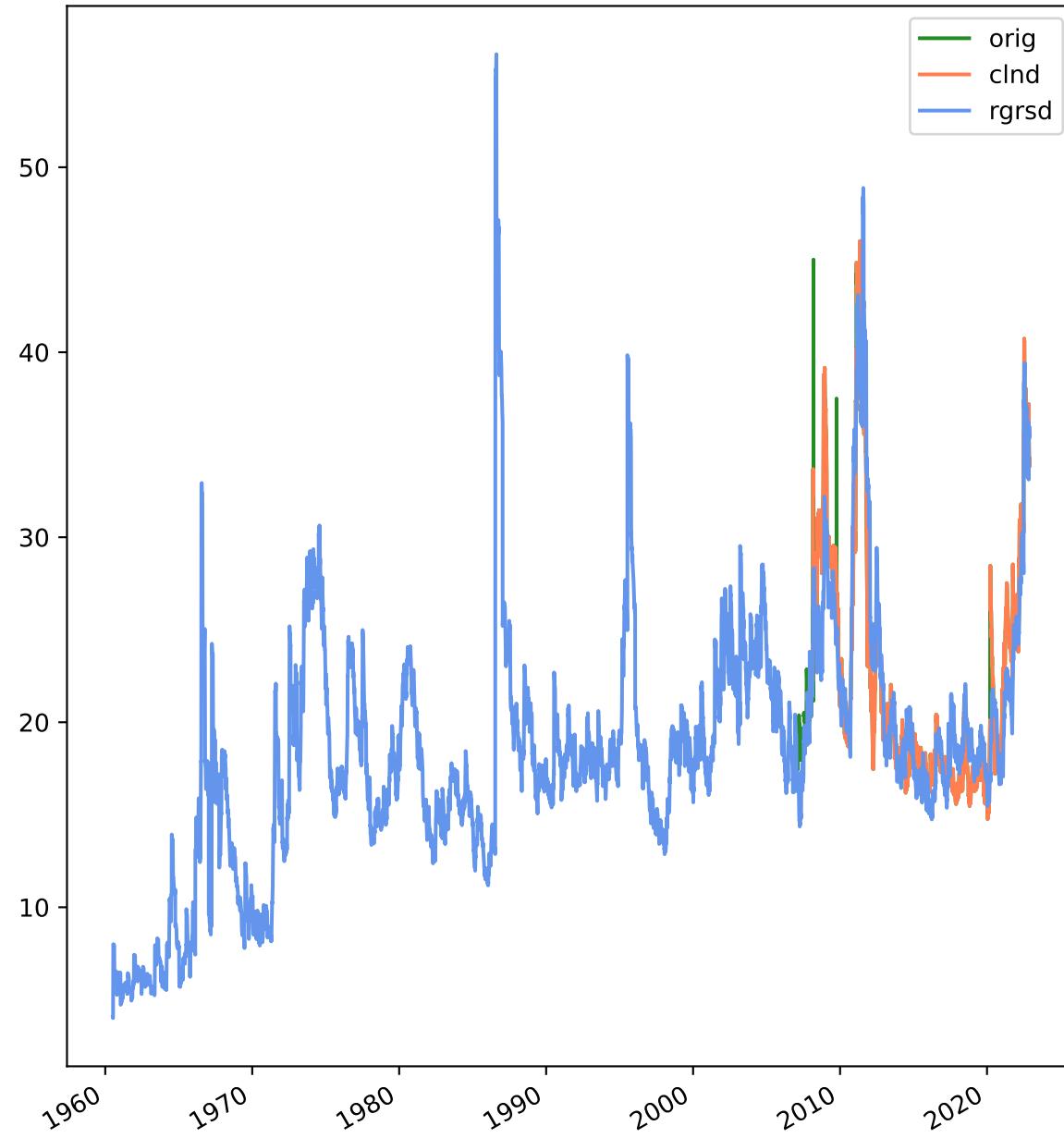
CT1 Comdty 12MTH_IMP VOL [Retro. Stats -- last:34.24 max:56.11 min:4.01 mean:18.45 lvl std (1y,all):4.3,6.7 %-ile:95.3 Z:2.34]



CT1 Comdty original & cleaned data



12MTH_IMPVOl original, cleaned & regressed backfill



	CT1 Comdty		12MTH_IMPVOl
count	15866.000	count	15656.000
mean	60.928	mean	18.437
std	23.576	std	6.694
min	20.800	min	4.009
25%	43.900	25%	15.270
50%	62.250	50%	18.076
75%	74.058	75%	21.384
max	215.150	max	56.112

OLS Regression Results

```

Dep. Variable: y R-squared (uncentered): 0.986
Model: OLS Adj. R-squared (uncentered): 0.986
Method: Least Squares F-statistic: 5.303e+04
Date: Sun, 20 Nov 2022 Prob (F-statistic): 0.00
Time: 14:55:34 Log-Likelihood: -9056.0
No. Observations: 3725 AIC: 1.812e+04
Df Residuals: 3720 BIC: 1.815e+04
Df Model: 5
Covariance Type: nonrobust

```

	coef	std err	t	P> t	[0.025	0.975]
x1	0.0781	0.002	51.952	0.000	0.075	0.081
x2	0.0797	0.006	14.421	0.000	0.069	0.090
x3	0.2693	0.008	34.862	0.000	0.254	0.284
x4	0.1442	0.007	21.810	0.000	0.131	0.157
x5	0.0782	0.010	8.131	0.000	0.059	0.097

```

Omnibus: 205.712 Durbin-Watson: 0.047
Prob(Omnibus): 0.000 Jarque-Bera (JB): 796.129
Skew: -0.092 Prob(JB): 1.33e-173
Kurtosis: 5.257 Cond. No. 26.2

```

Notes:
[1] R² is computed without centering (uncentered) since the model does not contain a constant.
[2] Standard Errors assume that the covariance matrix of the errors is correctly specified.

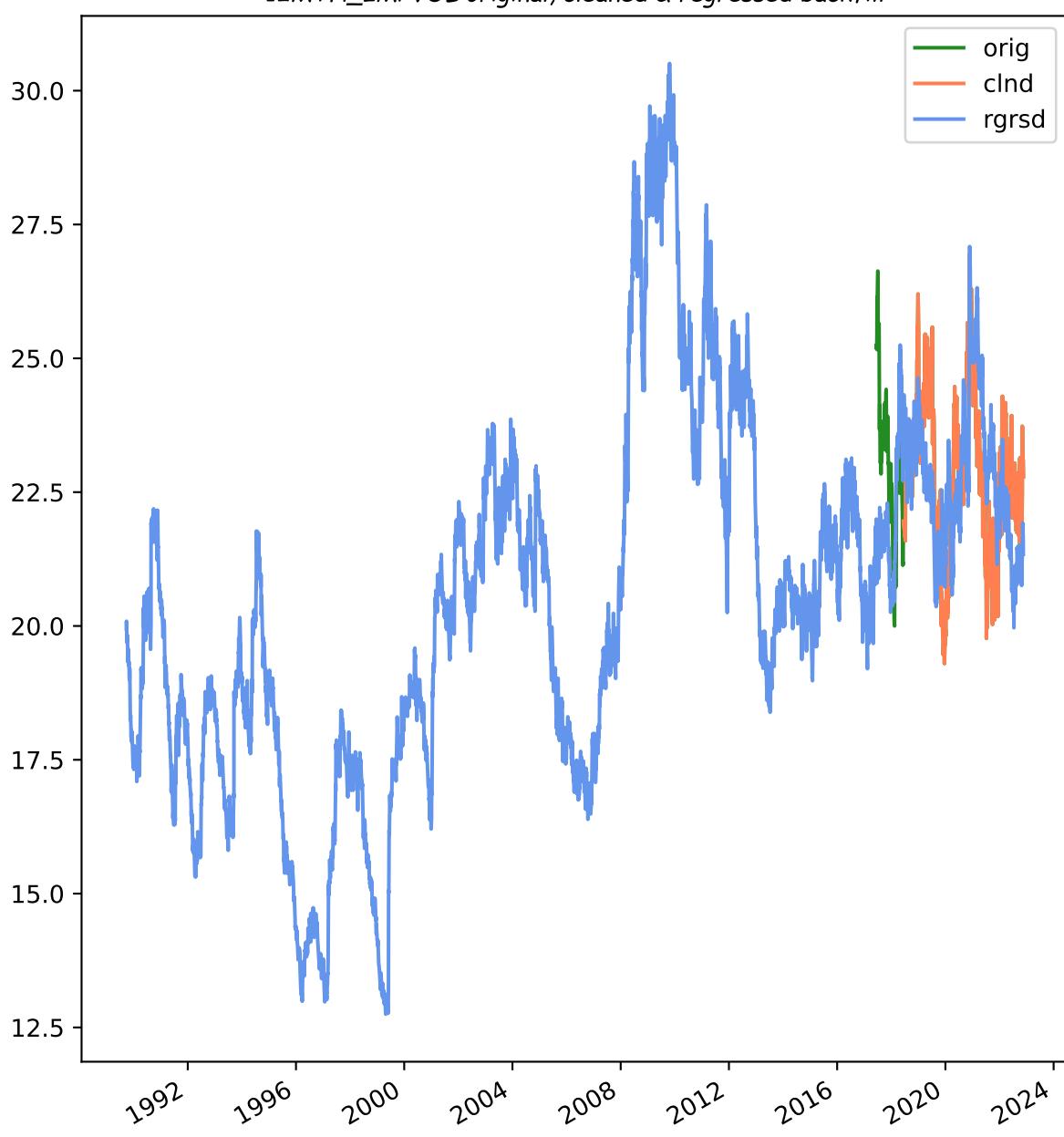
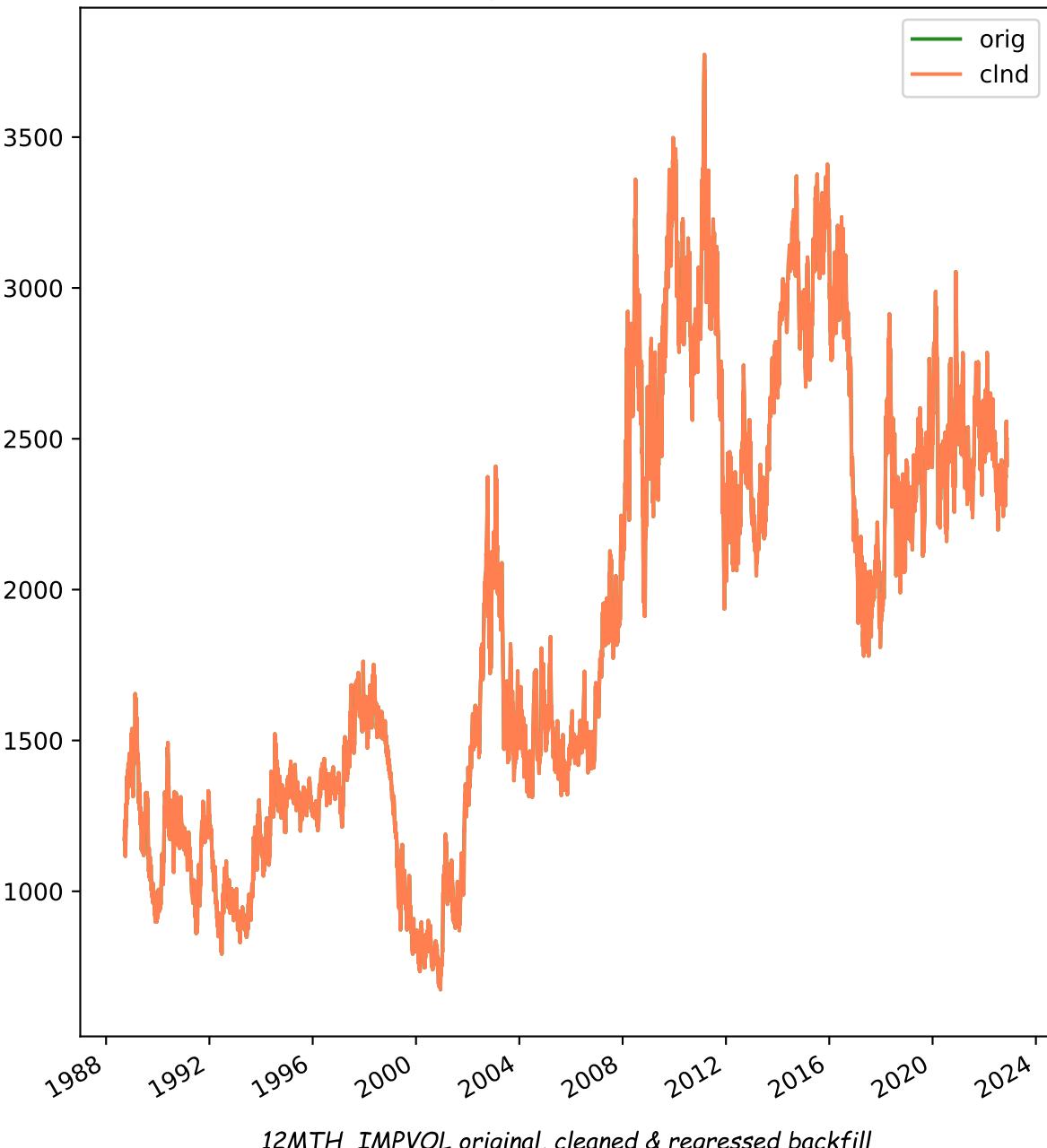
```
ADF Test of Resids.: 5.063 {5% -2.8623, 1% -3.4321} 0
```

CT1 Comdty Stats	Value	12MTH_IMPVOl Stats	Value
start	07-01-1959	start	07-07-1960
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	1.640	total_return	7.712
cagr	0.015	cagr	0.035
max_drawdown	-0.775	max_drawdown	-0.771
calmar	0.020	calmar	0.046
mtd	0.183	mtd	0.069
three_month	-0.273	three_month	-0.028
six_month	-0.411	six_month	0.193
ytd	-0.244	ytd	0.400
one_year	-0.276	one_year	0.457
three_year	0.099	three_year	0.276
five_year	0.036	five_year	0.140
ten_year	0.017	ten_year	0.047
incep	0.015	incep	0.035
daily_sharpe	0.200	daily_sharpe	0.229
daily_sortino	0.298	daily_sortino	0.765
daily_mean	0.054	daily_mean	0.136
daily_vol	0.269	daily_vol	0.594
daily_skew	-3.211	daily_skew	50.311
daily_kurt	98.812	daily_kurt	3926.926
best_day	0.207	best_day	3.246
worst_day	-0.554	worst_day	-0.401
monthly_sharpe	0.200	monthly_sharpe	0.218
monthly_sortino	0.324	monthly_sortino	0.739
monthly_mean	0.055	monthly_mean	0.131
monthly_vol	0.276	monthly_vol	0.600
monthly_skew	-0.398	monthly_skew	10.197
monthly_kurt	4.859	monthly_kurt	165.876
best_month	0.400	best_month	3.188
worst_month	-0.533	worst_month	-0.456
yearly_sharpe	0.182	yearly_sharpe	0.198
yearly_sortino	0.458	yearly_sortino	0.622
yearly_mean	0.060	yearly_mean	0.073
yearly_vol	0.332	yearly_vol	0.366
yearly_skew	1.541	yearly_skew	3.150
yearly_kurt	4.908	yearly_kurt	16.447
best_year	1.493	best_year	2.153
worst_year	-0.584	worst_year	-0.458
avg_drawdown	-0.095	avg_drawdown	-0.131
avg_drawdown_days	375.738	avg_drawdown_days	873.308
avg_up_month	0.056	avg_up_month	0.100
avg_down_month	-0.055	avg_down_month	-0.060
win_year_perc	0.508	win_year_perc	0.532
twelve_month_win_perc	0.509	twelve_month_win_perc	0.493

CC1 Comdty 12MTH_IMPVOL [Retro. Stats -- last:22.79 max:30.51 min:12.75 mean:20.52 lvl std (1y,all):0.8,3.4 %-ile:74.5 Z:0.66]

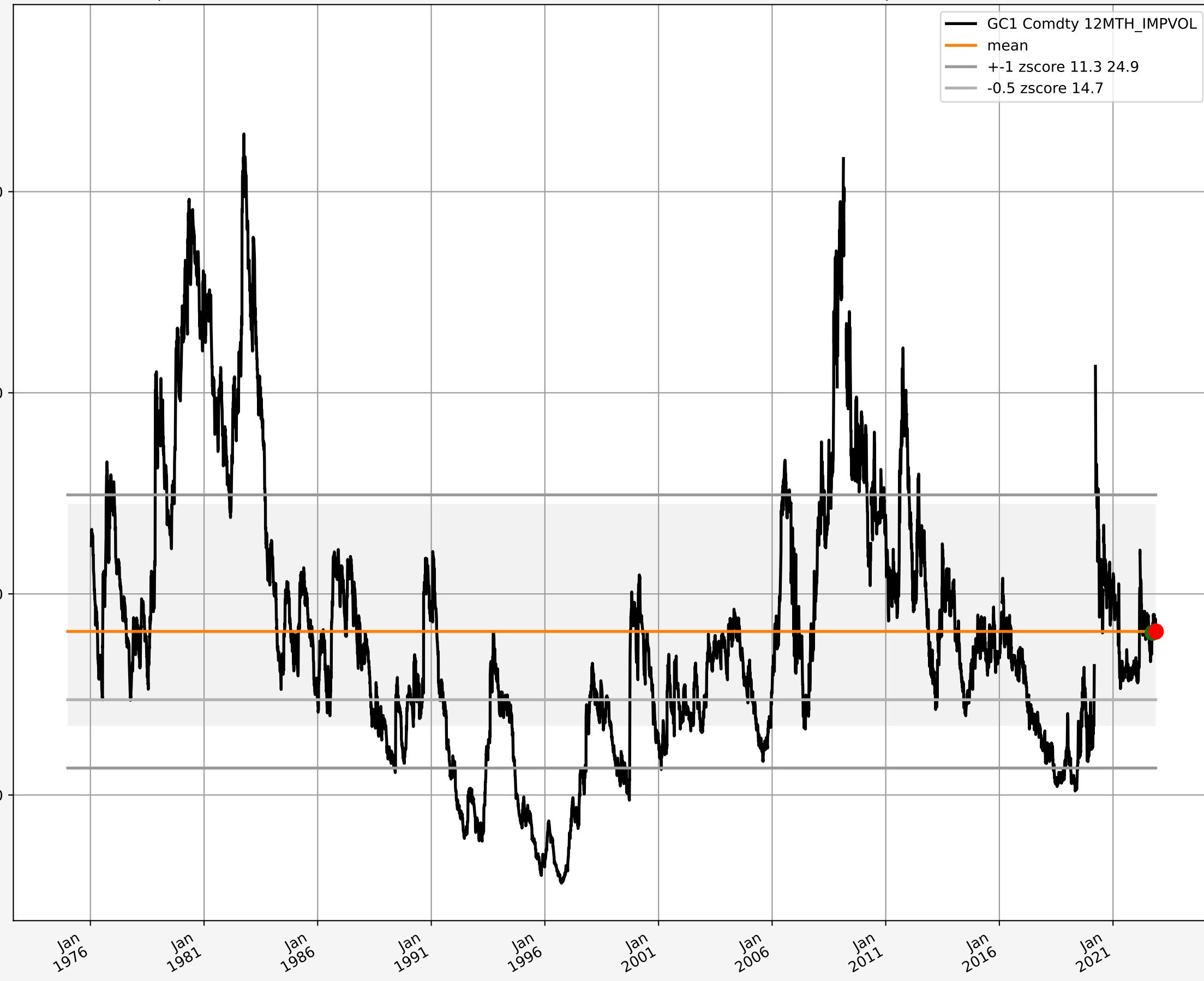


CC1 Comdty original & cleaned data



	CC1 Comdty		12MTH_IMP VOL		
count	8567.000	count	8315.000		
mean	1885.917	mean	20.508		
std	724.152	std	3.408		
min	674.000	min	12.748		
25%	1293.500	25%	18.086		
50%	1691.000	50%	20.578		
75%	2477.500	75%	22.534		
max	3774.000	max	30.508		
OLS Regression Results					
Dep. Variable:	y	R-squared (Uncentered):	0.996		
Model:	OLS	Adj. R-squared (uncentered):	0.996		
Method:	Least Squares	F-statistic:	5.445e+04		
Date:	Sun, 20 Nov 2022	Prob (F-statistic):	0.00		
Time:	14:55:38	Log-Likelihood:	-2008.5		
No. Observations:	1118	AIC:	4027.		
Df Residuals:	1113	BIC:	4052.		
Df Model:	5	Covariance Type:	nonrobust		
	coef	std err	t	P> t	
x1	0.0044	0.000	31.526	0.000	
x2	-0.0136	0.010	-1.387	0.166	
x3	0.1070	0.015	7.251	0.000	
x4	0.0567	0.015	3.706	0.000	
x5	0.2588	0.021	12.085	0.000	
			[0.025	0.975]	
			0.004	0.005	
			-0.033	0.006	
			0.078	0.136	
			0.027	0.087	
			0.217	0.301	
Omnibus:	362.321	Durbin-Watson:	0.044		
Prob(Omnibus):	0.000	Jarque-Bera (JB):	59.742		
Skew:	-0.182	Prob(JB):	1.06e-13		
Kurtosis:	1.928	Cond. No.	1.40e+03		
Notes:					
[1] R ² is computed without centering (uncentered) since the model does not contain a constant.					
[2] Standard Errors assume that the covariance matrix of the errors is correctly specified.					
[3] The condition number is large, 1.4e+03. This might indicate that there are strong multicollinearity or other numerical problems.					
ADF Test of Resids.: -3.230 {5% -2.8641, 1% -3.4362}					
CC1 Comdty Stats					
start	09-16-1988	Value		12MTH_IMP VOL Stats	
end	11-18-2022	Value		start	09-25-1989
rf	0.000		end	11-18-2022	
total_return	1.056		rf	0.000	
cagr	0.021		total_return	0.070	
max_drawdown	-0.617		cagr	0.002	
calmar	0.035		max_drawdown	-0.425	
mtd	0.033		calmar	0.005	
three_month	0.004		mtd	0.014	
six_month	-0.023		three_month	0.010	
ytd	-0.043		six_month	-0.006	
one_year	-0.055		ytd	-0.034	
three_year	-0.042		one_year	-0.033	
five_year	0.030		three_year	-0.016	
ten_year	-0.003		five_year	-0.002	
incep	0.021		ten_year	-0.011	
daily_sharpe	0.222		incep	0.002	
daily_sortino	0.381		daily_sharpe	0.083	
daily_mean	0.068		daily_sortino	0.180	
daily_vol	0.305		daily_mean	0.011	
daily_skew	0.192		daily_vol	0.138	
daily_kurt	2.592		daily_skew	2.230	
best_day	0.136		daily_kurt	18.113	
worst_day	-0.095		best_day	0.125	
monthly_sharpe	0.222		worst_day	-0.041	
monthly_sortino	0.421		monthly_sharpe	0.089	
monthly_mean	0.067		monthly_sortino	0.192	
monthly_vol	0.303		monthly_mean	0.014	
monthly_skew	0.418		monthly_vol	0.157	
monthly_kurt	0.984		monthly_skew	1.437	
best_month	0.346		monthly_kurt	5.488	
worst_month	-0.281		best_month	0.296	
yearly_sharpe	0.173		worst_month	-0.097	
yearly_sortino	0.342		yearly_sharpe	0.110	
yearly_mean	0.042		yearly_sortino	0.250	
yearly_vol	0.245		yearly_mean	0.018	
yearly_skew	0.424		yearly_vol	0.160	
yearly_kurt	0.922		yearly_skew	0.826	
best_year	0.728		yearly_kurt	0.352	
worst_year	-0.393		best_year	0.429	
avg_drawdown	-0.106		worst_year	-0.236	
avg_drawdown_days	280.545		avg_drawdown	-0.062	
avg_up_month	0.071		avg_drawdown_days	316.316	
avg_down_month	-0.064		avg_up_month	0.039	
win_year_perc	0.588		avg_down_month	-0.029	
twelve_month_win_perc	0.545		win_year_perc	0.485	
			twelve_month_win_perc	0.515	

GC1 Comdty 12MTH_IMP VOL [Retro. Stats -- last:18.13 max:42.87 min:5.62 mean:18.13 lvl std (1y,all):1.3,6.8 %ile:58.0 Z:-0.00]



GC1 Comdty original & cleaned data



GC1 Comdty		12MTH_IMP VOL	
count	11893.000	count	11726.000
mean	682.188	mean	18.160
std	508.592	std	6.667
min	102.400	min	5.616
25%	336.200	25%	13.951
50%	405.800	50%	17.134
75%	1171.300	75%	21.193
max	2051.500	max	42.874

OLS Regression Results

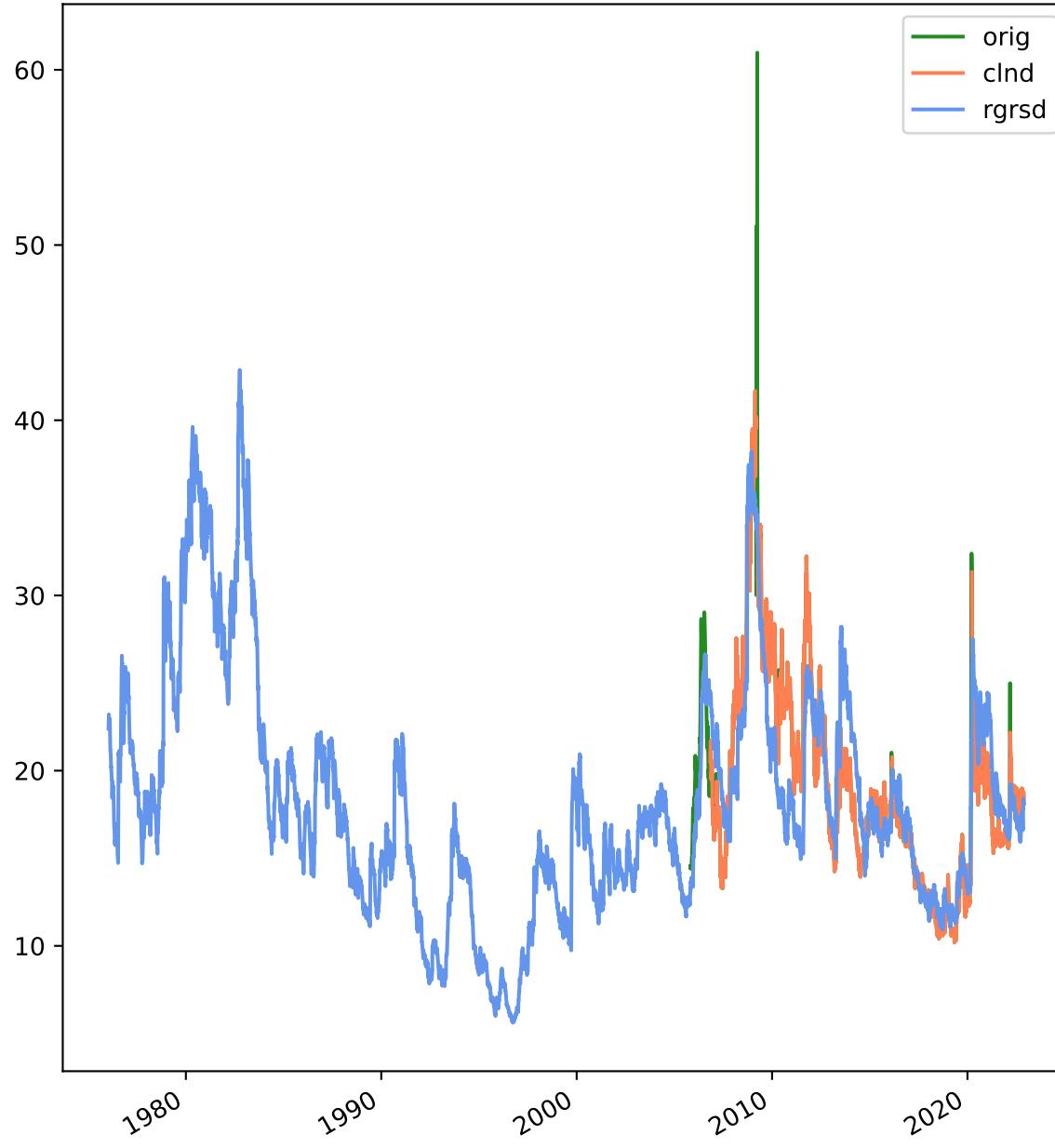
Dep. Variable:	y	R-squared (uncentered):	0.978							
Model:	OLS	Adj. R-squared (uncentered):	0.978							
Method:	Least Squares	F-statistic:	3.545e+04							
Date:	Sun, 20 Nov 2022	Prob (F-statistic):	0.00							
Time:	14:55:43	Log-Likelihood:	-10153.							
No. Observations:	4039	AIC:	2.032e+04							
Df Residuals:	4034	BIC:	2.035e+04							
Df Model:	5	Covariance Type:	nonrobust							
x1	0.0013	std err	8.42e-05	t	15.990	P> t	0.000	[0.025	0.001	0.975]
x2	0.1403	std err	0.012	t	11.458	P> t	0.000	[0.116	0.164	0.975]
x3	0.2815	std err	0.016	t	17.169	P> t	0.000	[0.249	0.314	0.975]
x4	0.0670	std err	0.013	t	5.191	P> t	0.000	[0.042	0.092	0.975]
x5	0.5315	std err	0.017	t	32.011	P> t	0.000	[0.499	0.564	0.975]

Omnibus: 151.392 Durbin-Watson: 0.032
Prob(Omnibus): 0.000 Jarque-Bera (JB): 168.065
Skew: 0.486 Prob(JB): 3.20e-37
Kurtosis: 3.233 Cond. No. 603.

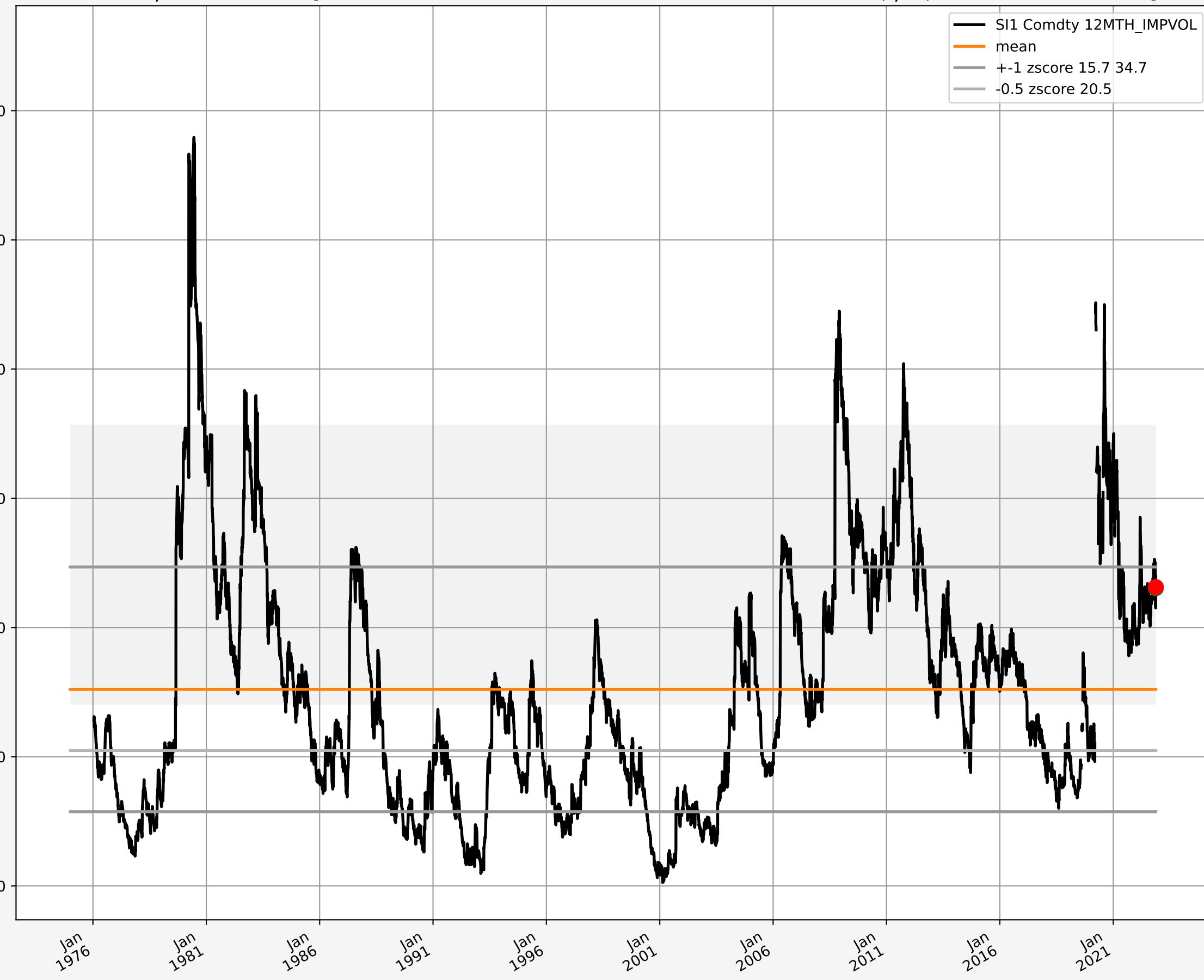
Notes:
[1] R² is computed without centering (uncentered) since the model does not contain a constant.
[2] Standard Errors assume that the covariance matrix of the errors is correctly specified.

GC1 Comdty Stats	Value	12MTH_IMP VOL Stats	Value
start	01-02-1975	start	01-16-1976
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	9.019	total_return	-0.194
cagr	0.049	cagr	-0.005
max_drawdown	-0.646	max_drawdown	-0.869
calmar	0.076	calmar	-0.005
mtd	0.069	mtd	0.056
three_month	-0.001	three_month	0.080
six_month	-0.034	six_month	-0.012
ytd	-0.041	ytd	0.104
one_year	-0.057	one_year	0.053
three_year	0.060	three_year	0.077
five_year	0.066	five_year	0.070
ten_year	0.001	ten_year	-0.002
incep	0.049	incep	-0.005
daily_sharpe	0.357	daily_sharpe	0.110
daily_sortino	0.579	daily_sortino	0.266
daily_mean	0.066	daily_mean	0.030
daily_vol	0.184	daily_vol	0.272
daily_skew	0.056	daily_skew	6.717
daily_kurt	7.798	daily_kurt	107.029
best_day	0.140	best_day	0.400
worst_day	-0.115	worst_day	-0.103
monthly_sharpe	0.349	monthly_sharpe	0.141
monthly_sortino	0.665	monthly_sortino	0.372
monthly_mean	0.066	monthly_mean	0.049
monthly_vol	0.188	monthly_vol	0.347
monthly_skew	0.558	monthly_skew	2.022
monthly_kurt	4.064	monthly_kurt	6.555
best_month	0.291	best_month	0.626
worst_month	-0.217	worst_month	-0.163
yearly_sharpe	0.311	yearly_sharpe	0.136
yearly_sortino	0.993	yearly_sortino	0.363
yearly_mean	0.077	yearly_mean	0.052
yearly_vol	0.249	yearly_vol	0.381
yearly_skew	2.929	yearly_skew	1.222
yearly_kurt	14.934	yearly_kurt	1.637
best_year	1.362	best_year	1.337
worst_year	-0.328	worst_year	-0.412
avg_drawdown	-0.051	avg_drawdown	-0.105
avg_drawdown_days	180.200	avg_drawdown_days	655.000
avg_up_month	0.044	avg_up_month	0.092
avg_down_month	-0.034	avg_down_month	-0.056
win_year_perc	0.574	win_year_perc	0.500
twelve_month_win_perc	0.578	twelve_month_win_perc	0.458

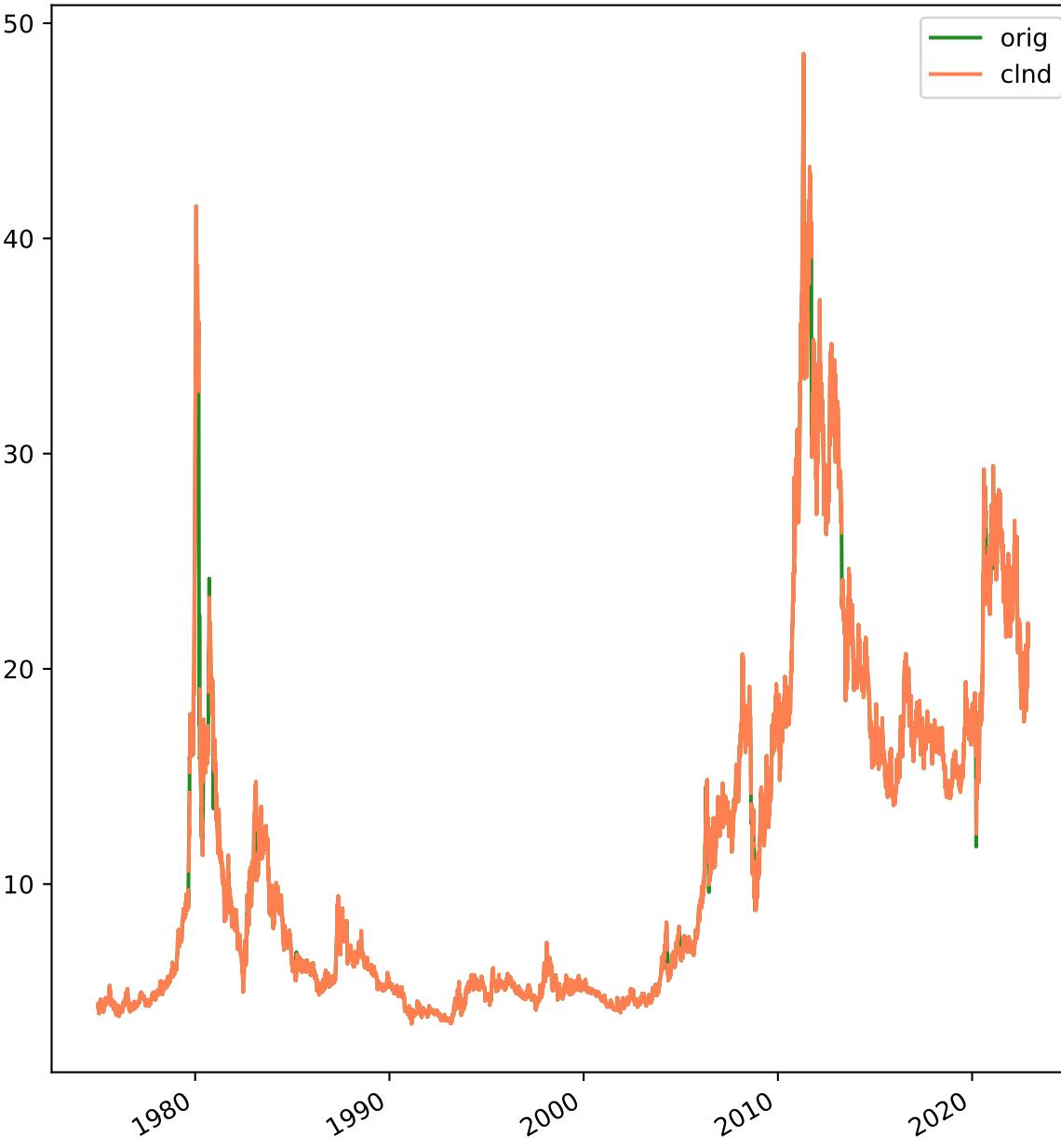
12MTH_IMP VOL original, cleaned & regressed backfill



SI1 Comdty 12MTH_IMPVOL [Retro. Stats -- last:33.12 max:67.94 min:10.27 mean:25.21 lvl std (1y,all):2.0,9.5 %-ile:78.9 Z:0.83]



SI1 Comdty original & cleaned data



SI1 Comdty		12MTH_IMPVOL	
count	11903.000	count	11745.000
mean	11.092	mean	25.098
std	8.002	std	9.652
min	3.510	min	10.266
25%	5.043	25%	17.950
50%	7.019	50%	23.211
75%	16.284	75%	30.527
max	48.584	max	67.936

OLS Regression Results

Dep. Variable: y R-squared (uncentered): 0.988
 Model: OLS Adj. R-squared (uncentered): 0.988
 Method: Least Squares F-statistic: 5.435e+04
 Date: Sun, 20 Nov 2022 Prob (F-statistic): 0.00
 Time: 14:55:47 Log-Likelihood: -9098.5
 No. Observations: 3436 AIC: 1.821e+04
 Df Residuals: 3431 BIC: 1.824e+04
 Df Model: 5 Covariance Type: nonrobust

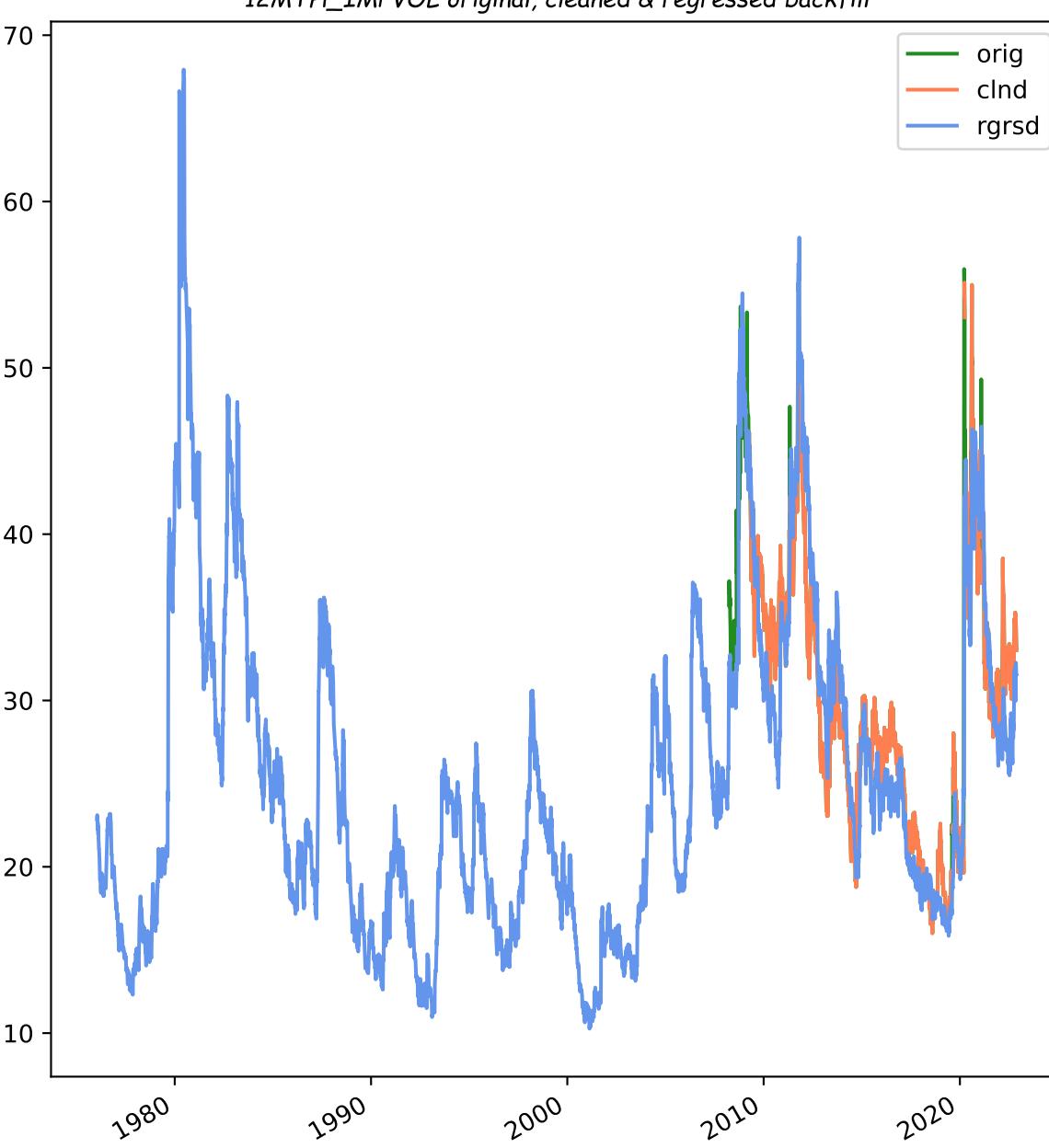
coef std err t P>|t| [0.025] 0.975]
 x1 0.2907 0.009 33.202 0.000 0.273 0.308
 x2 0.1207 0.007 16.318 0.000 0.106 0.135
 x3 0.2507 0.011 23.753 0.000 0.230 0.271
 x4 0.0796 0.009 8.750 0.000 0.062 0.097
 x5 0.3168 0.012 26.826 0.000 0.294 0.340

Omnibus: 154.583 Durbin-Watson: 0.071
 Prob(Omnibus): 0.000 Jarque-Bera (JB): 276.052
 Skew: -0.354 Prob(JB): 1.14e-60
 Kurtosis: 4.194 Cond. No. 17.2

Notes:
 [1] R² is computed without centering (uncentered) since the model does not contain a constant.
 [2] Standard Errors assume that the covariance matrix of the errors is correctly specified.

ADF Test of Resids.: -3.957 {5% -0.8614, 1% -3.4323} 0

SI1 Comdty Stats	Value	12MTH_IMPVOL Stats	Value
start	01-02-1975	start	01-16-1976
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	3.796	total_return	0.379
cagr	0.033	cagr	0.007
max_drawdown	-0.915	max_drawdown	-0.849
calmar	0.036	calmar	0.008
mtd	0.098	mtd	0.009
three_month	0.079	three_month	0.112
six_month	-0.025	six_month	0.151
ytd	-0.101	ytd	0.182
one_year	-0.157	one_year	0.126
three_year	0.073	three_year	0.132
five_year	0.045	five_year	0.098
ten_year	-0.045	ten_year	-0.000
incep	0.033	incep	0.007
daily_sharpe	0.265	daily_sharpe	0.162
daily_sortino	0.414	daily_sortino	0.405
daily_mean	0.083	daily_mean	0.051
daily_vol	0.312	daily_vol	0.312
daily_skew	-0.669	daily_skew	10.283
daily_kurt	25.280	daily_kurt	247.706
best_day	0.254	best_day	0.602
worst_day	-0.386	worst_day	-0.152
monthly_sharpe	0.264	monthly_sharpe	0.182
monthly_sortino	0.503	monthly_sortino	0.477
monthly_mean	0.086	monthly_mean	0.067
monthly_vol	0.326	monthly_vol	0.371
monthly_skew	0.757	monthly_skew	2.332
monthly_kurt	5.865	monthly_kurt	9.535
best_month	0.583	best_month	0.717
worst_month	-0.460	worst_month	-0.209
yearly_sharpe	0.186	yearly_sharpe	0.190
yearly_sortino	0.928	yearly_sortino	0.613
yearly_mean	0.111	yearly_mean	0.085
yearly_vol	0.598	yearly_vol	0.446
yearly_skew	5.021	yearly_skew	1.512
yearly_kurt	30.304	yearly_kurt	2.320
best_year	3.734	best_year	1.635
worst_year	-0.486	worst_year	-0.411
avg_drawdown	-0.077	avg_drawdown	-0.153
avg_drawdown_days	375.696	avg_drawdown_days	1311.615
avg_up_month	0.074	avg_up_month	0.091
avg_down_month	-0.058	avg_down_month	-0.057
win_year_perc	0.489	win_year_perc	0.457
twelve_month_win_perc	0.473	twelve_month_win_perc	0.428



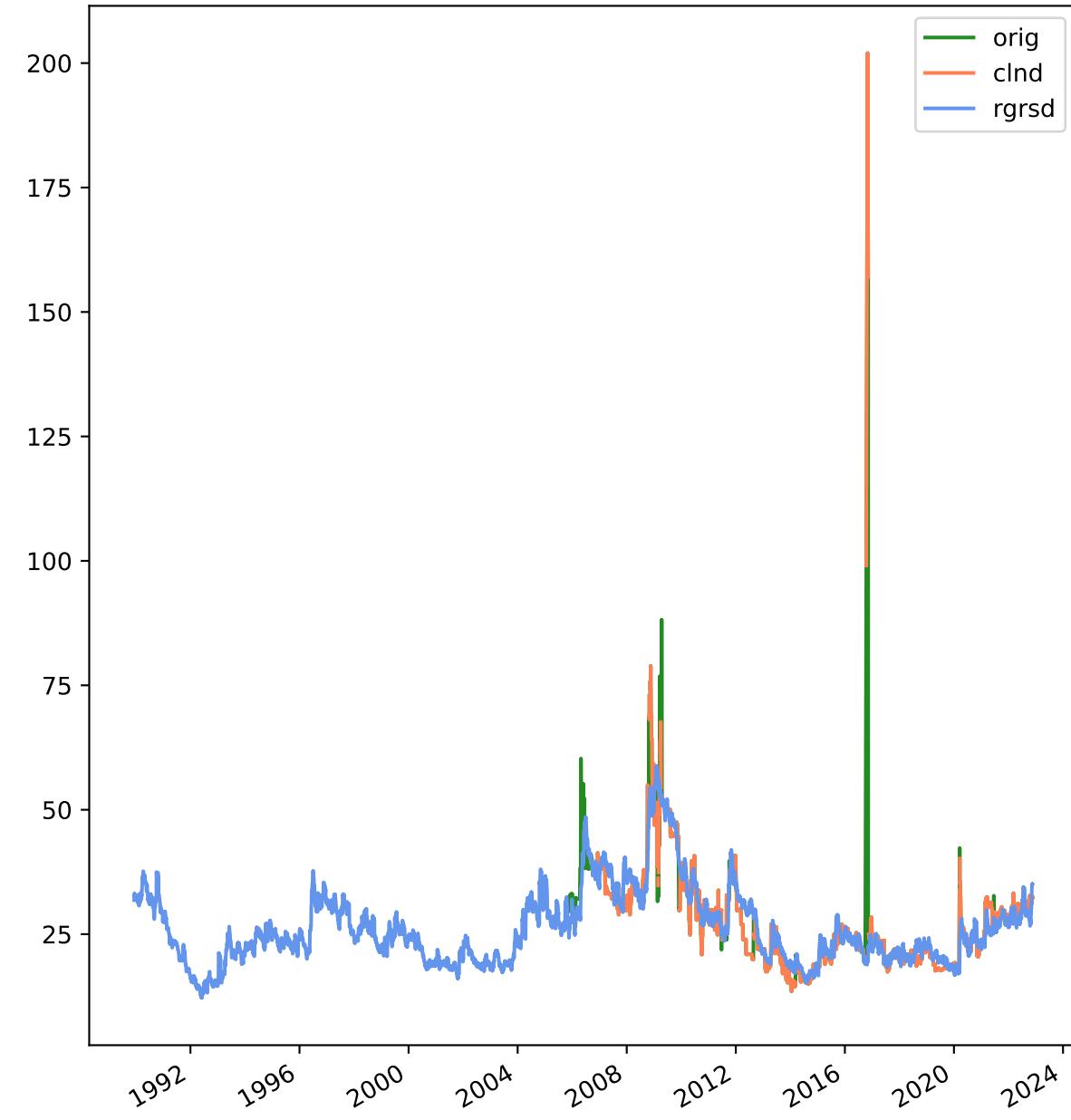
HG1 Comdty 12MTH_IMPVOL [Retro. Stats -- last:32.45 max:202.01 min:12.19 mean:26.20 lyl std (1y,all):1.3,10.0 %-ile:81.4 Z:0.62]



HG1 Comdty original & cleaned data



12MTH_IMP VOL original, cleaned & regressed backfill



HG1 Comdty		12MTH_IMP VOL	
count	8507.000	count	8283.000
mean	208.133	mean	26.242
std	118.118	std	7.566
min	60.600	min	12.194
25%	99.365	25%	20.934
50%	168.200	50%	24.451
75%	313.025	75%	30.046
max	492.900	max	58.838

OLS Regression Results

```

Dep. Variable: y R-squared (uncentered): 0.872
Model: OLS Adj. R-squared (uncentered): 0.872
Method: Least Squares F-statistic: 5512.
Date: Sun, 20 Nov 2022 Prob (F-statistic): 0.00
Time: 14:55:51 Log-Likelihood: -15477.
No. Observations: 4042 AIC: 3.096e+04
Df Residuals: 4037 BIC: 3.100e+04
Df Model: 5
Covariance Type: nonrobust

```

	coef	std err	t	P> t	[0.025	0.975]
x1	0.0043	0.001	2.992	0.003	0.001	0.007
x2	0.2569	0.036	7.235	0.000	0.187	0.327
x3	0.1870	0.049	3.802	0.000	0.091	0.283
x4	0.0080	0.038	0.207	0.836	-0.067	0.083
x5	0.5940	0.052	11.336	0.000	0.491	0.697

```

Omnibus: 6857.265 Durbin-Watson: 0.055
Prob(Omnibus): 0.000 Jarque-Bera (JB): 4236939.769
Skew: 11.761 Prob(JB): 0.00
Kurtosis: 159.857 Cond. No. 120.

```

Notes:
[1] R² is computed without centering (uncentered) since the model does not contain a constant.
[2] Standard Errors assume that the covariance matrix of the errors is correctly specified.

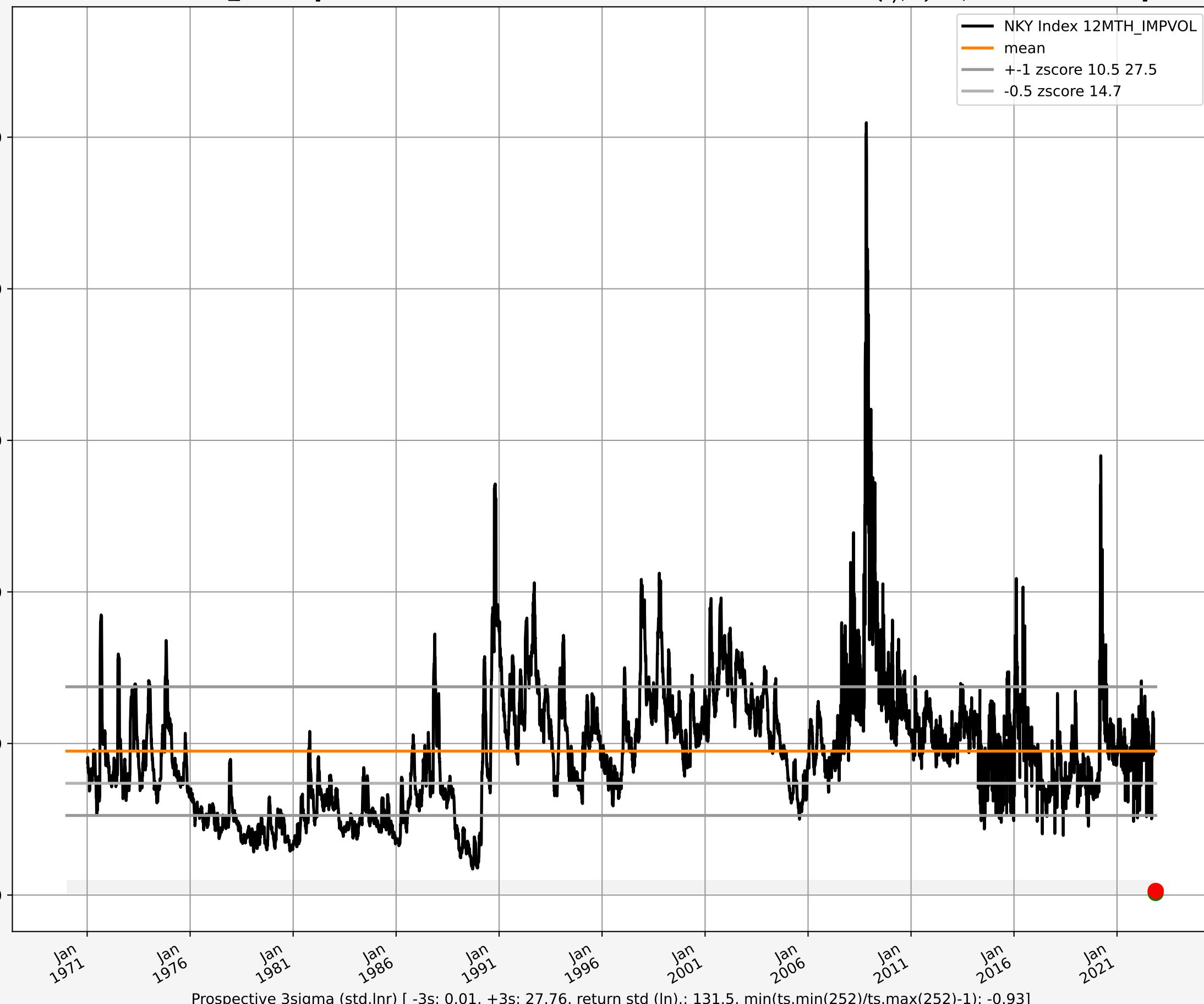
```

ADF Test of Resids.: 8.613 {5% -2.8623, 1% -3.4320} 0

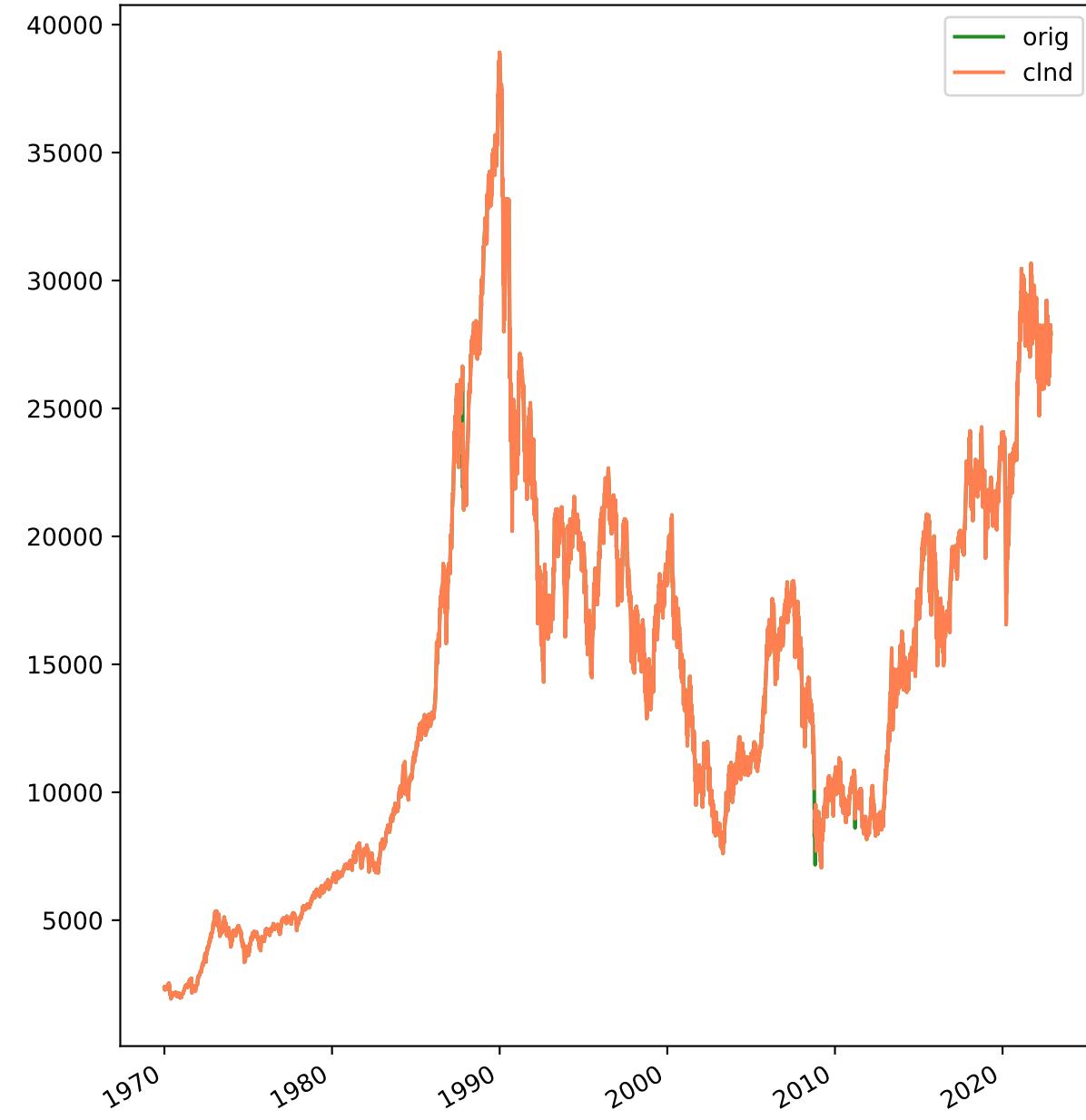
```

HG1 Comdty Stats	Value	12MTH_IMP VOL Stats	Value
start	12-06-1988	start	12-08-1989
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	1.645	total_return	0.103
cagr	0.029	cagr	0.003
max_drawdown	-0.694	max_drawdown	-0.742
calmar	0.042	calmar	0.004
mtd	0.076	mtd	0.209
three_month	0.000	three_month	0.214
six_month	-0.132	six_month	0.266
ytd	-0.186	ytd	0.328
one_year	-0.156	one_year	0.290
three_year	0.115	three_year	0.237
five_year	0.033	five_year	0.116
ten_year	0.003	ten_year	0.042
incep	0.029	incep	0.003
daily_sharpe	0.241	daily_sharpe	0.158
daily_sortino	0.396	daily_sortino	0.309
daily_mean	0.062	daily_mean	0.048
daily_vol	0.258	daily_vol	0.305
daily_skew	-0.125	daily_skew	2.448
daily_kurt	2.810	daily_kurt	27.855
best_day	0.085	best_day	0.318
worst_day	-0.104	worst_day	-0.199
monthly_sharpe	0.238	monthly_sharpe	0.180
monthly_sortino	0.432	monthly_sortino	0.414
monthly_mean	0.061	monthly_mean	0.067
monthly_vol	0.255	monthly_vol	0.373
monthly_skew	0.142	monthly_skew	1.316
monthly_kurt	2.685	monthly_kurt	3.208
best_month	0.354	best_month	0.562
worst_month	-0.365	worst_month	-0.229
yearly_sharpe	0.219	yearly_sharpe	0.133
yearly_sortino	0.627	yearly_sortino	0.275
yearly_mean	0.077	yearly_mean	0.034
yearly_vol	0.353	yearly_vol	0.254
yearly_skew	1.528	yearly_skew	0.203
yearly_kurt	4.231	yearly_kurt	-0.807
best_year	1.373	best_year	0.496
worst_year	-0.536	worst_year	-0.429
avg_drawdown	-0.094	avg_drawdown	-0.143
avg_drawdown_days	299.122	avg_drawdown_days	543.545
avg_up_month	0.058	avg_up_month	0.096
avg_down_month	-0.053	avg_down_month	-0.068
win_year_perc	0.529	win_year_perc	0.545
twelve_month_win_perc	0.496	twelve_month_win_perc	0.481

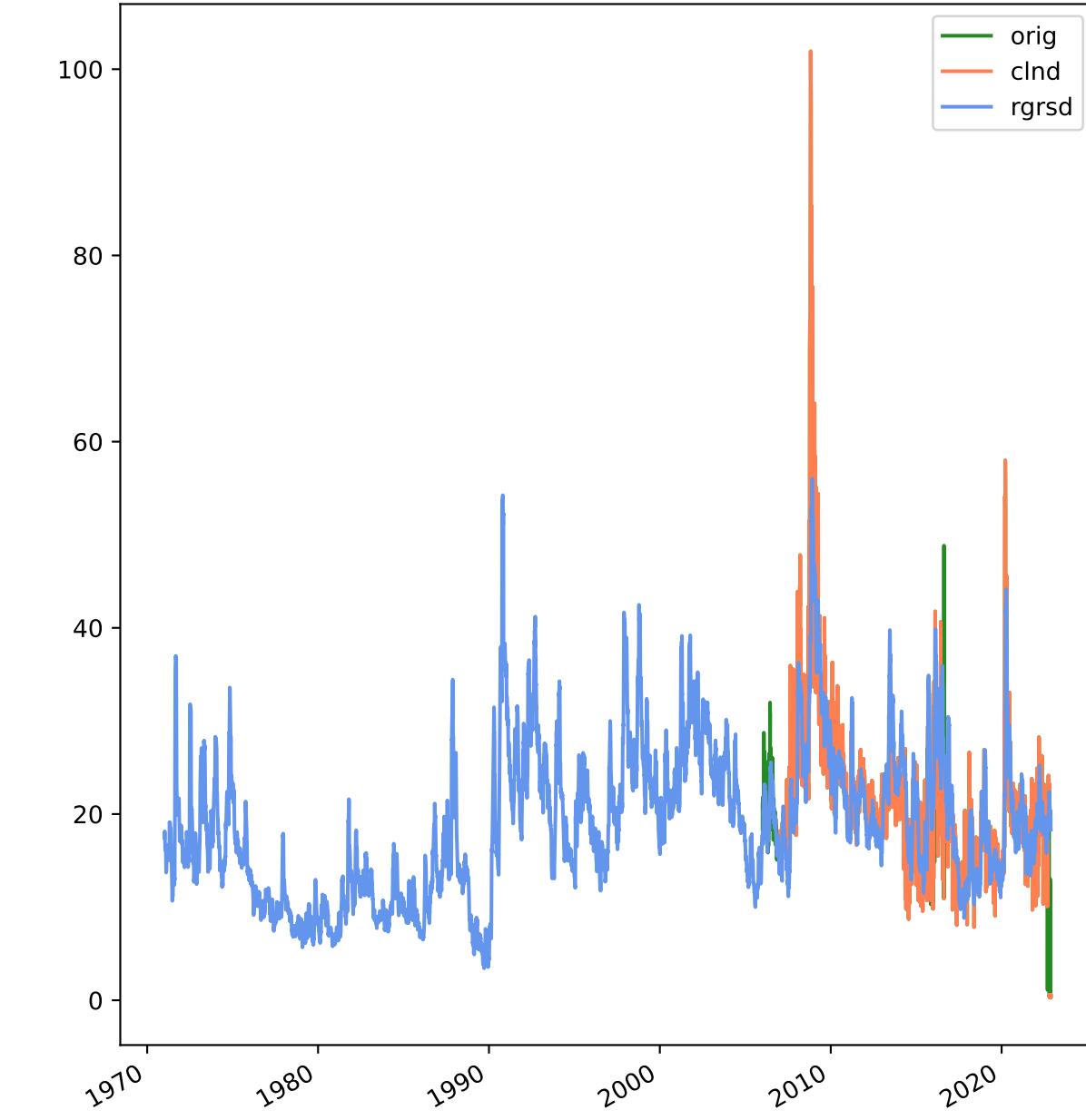
NKY Index 12MTH_IMPVOL [Retro. Stats -- last:0.54 max:101.92 min:0.27 mean:18.99 lvl std (1y,all):5.4,8.5 %-ile:0.1 Z:-2.17]



NKY Index original & cleaned data



12MTH_IMPVOL original, cleaned & regressed backfill



NKY Index		12MTH_IMPVOL	
count	13005.000	count	12770.000
mean	14314.123	mean	18.927
std	7793.341	std	8.067
min	1929.640	min	3.431
25%	7936.190	25%	12.906
50%	13860.810	50%	18.031
75%	19754.360	75%	23.796
max	38915.870	max	56.023

Dep. Variable:	y	R-squared (uncentered):	0.946
Model:	OLS	Adj. R-squared (uncentered):	0.946
Method:	Least Squares	F-statistic:	1.350e+04
Date:	Sun, 20 Nov 2022	Prob (F-statistic):	0.00
Time:	14:55:54	Log-Likelihood:	-12136.
No. Observations:	3881	AIC:	2.428e+04
Df Residuals:	3876	BIC:	2.431e+04
Df Model:	5	Covariance Type:	nonrobust

	coef	std err	t	P> t	[0.025	0.975]
x1	-0.0001	1.01e-05	-12.834	0.000	-0.000	-0.000
x2	0.4563	0.016	27.836	0.000	0.424	0.488
x3	0.1849	0.022	8.316	0.000	0.141	0.229
x4	-0.0333	0.017	-1.974	0.048	-0.066	-0.000
x5	0.5263	0.025	21.322	0.000	0.478	0.575

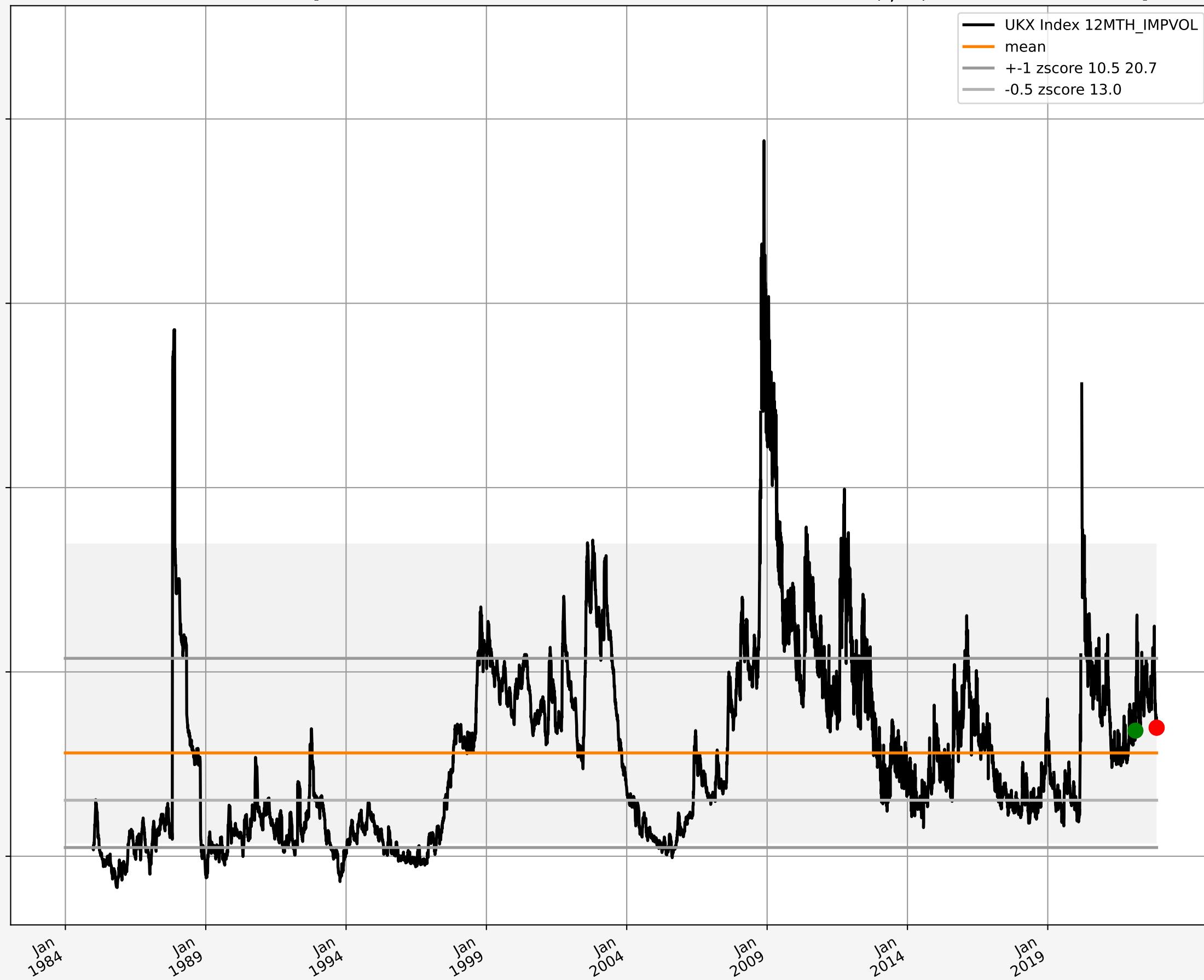
Omnibus:	2329.250	Durbin-Watson:	0.293
Prob(Omnibus):	0.000	Jarque-Bera (JB):	82938.595
Skew:	2.278	Prob(JB):	0.00
Kurtosis:	25.184	Cond. No.	6.21e+03

Notes:
[1] R^2 is computed without centering (uncentered) since the model does not contain a constant.
[2] Standard Errors assume that the covariance matrix of the errors is correctly specified.
[3] The condition number is large, 6.21e+03. This might indicate that there are strong multicollinearity or other numerical problems.

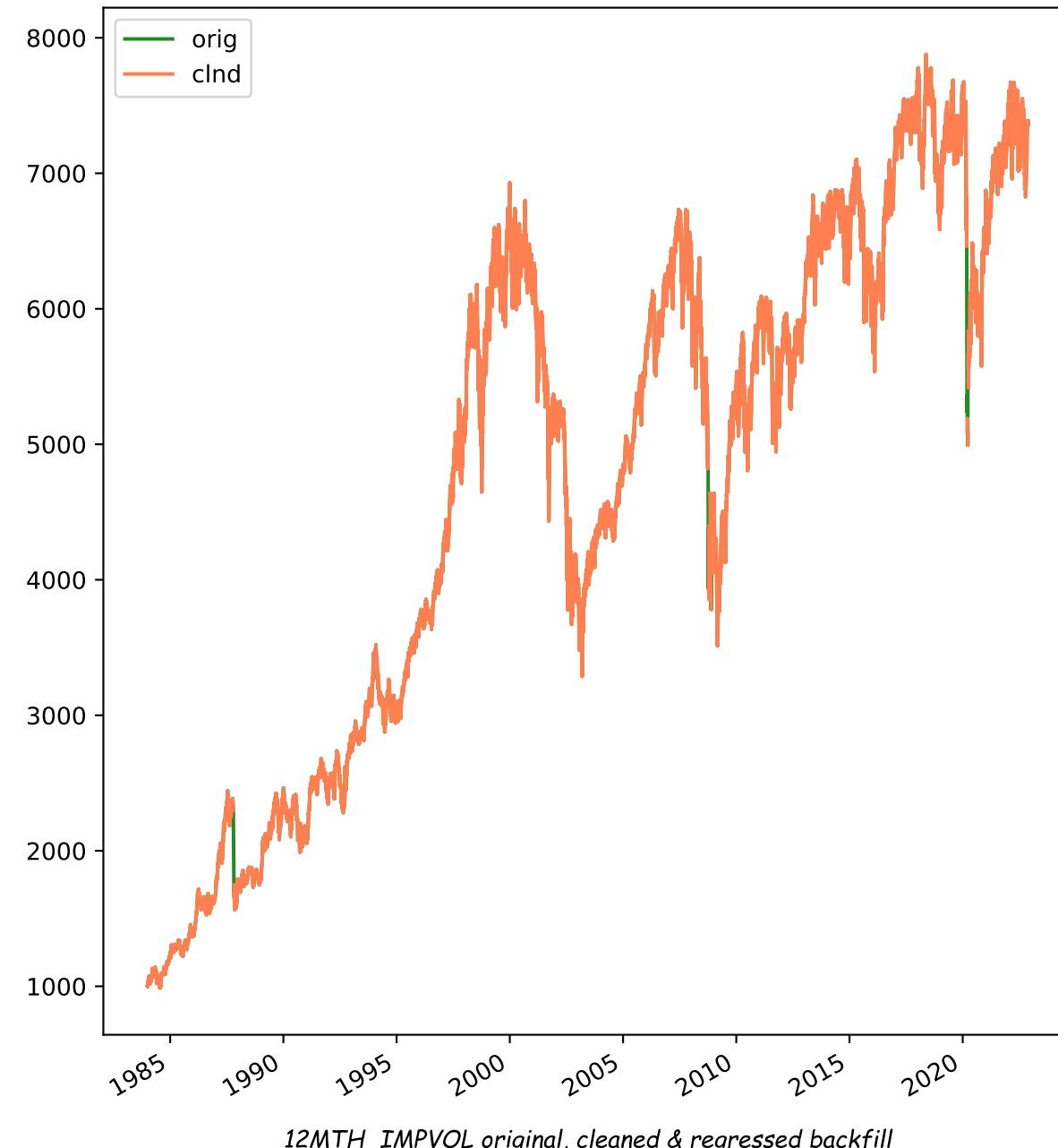
ADF Test of Resids.: -6.406 {5% -2.8623, 1% -3.4320} 0

NKY Index Stats	Value	12MTH_IMPVOL Stats	Value
start	01-05-1970	start	01-08-1971
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	10.611	total_return	0.050
cagr	0.047	cagr	0.001
max_drawdown	-0.819	max_drawdown	-0.907
calmar	0.058	calmar	0.001
mtd	0.011	mtd	-0.120
three_month	-0.036	three_month	0.088
six_month	0.037	six_month	-0.105
ytd	-0.031	ytd	0.038
one_year	-0.057	one_year	0.179
three_year	0.060	three_year	0.162
five_year	0.046	five_year	0.094
ten_year	0.118	ten_year	0.005
incep	0.047	incep	0.001
daily_sharpe	0.337	daily_sharpe	0.266
daily_sortino	0.542	daily_sortino	0.527
daily_mean	0.068	daily_mean	0.150
daily_vol	0.201	daily_vol	0.566
daily_skew	0.006	daily_skew	4.069
daily_kurt	6.393	daily_kurt	62.092
best_day	0.169	best_day	0.770
worst_day	-0.082	worst_day	-0.302
monthly_sharpe	0.347	monthly_sharpe	0.352
monthly_sortino	0.573	monthly_sortino	0.954
monthly_mean	0.065	monthly_mean	0.303
monthly_vol	0.188	monthly_vol	0.861
monthly_skew	-0.371	monthly_skew	1.895
monthly_kurt	1.116	monthly_kurt	5.612
best_month	0.201	best_month	1.426
worst_month	-0.238	worst_month	-0.467
yearly_sharpe	0.325	yearly_sharpe	0.174
yearly_sortino	0.749	yearly_sortino	1.041
yearly_mean	0.078	yearly_mean	0.192
yearly_vol	0.241	yearly_vol	1.107
yearly_skew	0.667	yearly_skew	5.277
yearly_kurt	1.969	yearly_kurt	32.968
best_year	0.919	best_year	7.194
worst_year	-0.421	worst_year	-0.639
avg_drawdown	-0.022	avg_drawdown	-0.287
avg_drawdown_days	72.734	avg_drawdown_days	1575.583
avg_up_month	0.042	avg_up_month	0.219
avg_down_month	-0.041	avg_down_month	-0.130
win_year_perc	0.654	win_year_perc	0.471
twelve_month_win_perc	0.633	twelve_month_win_perc	0.495

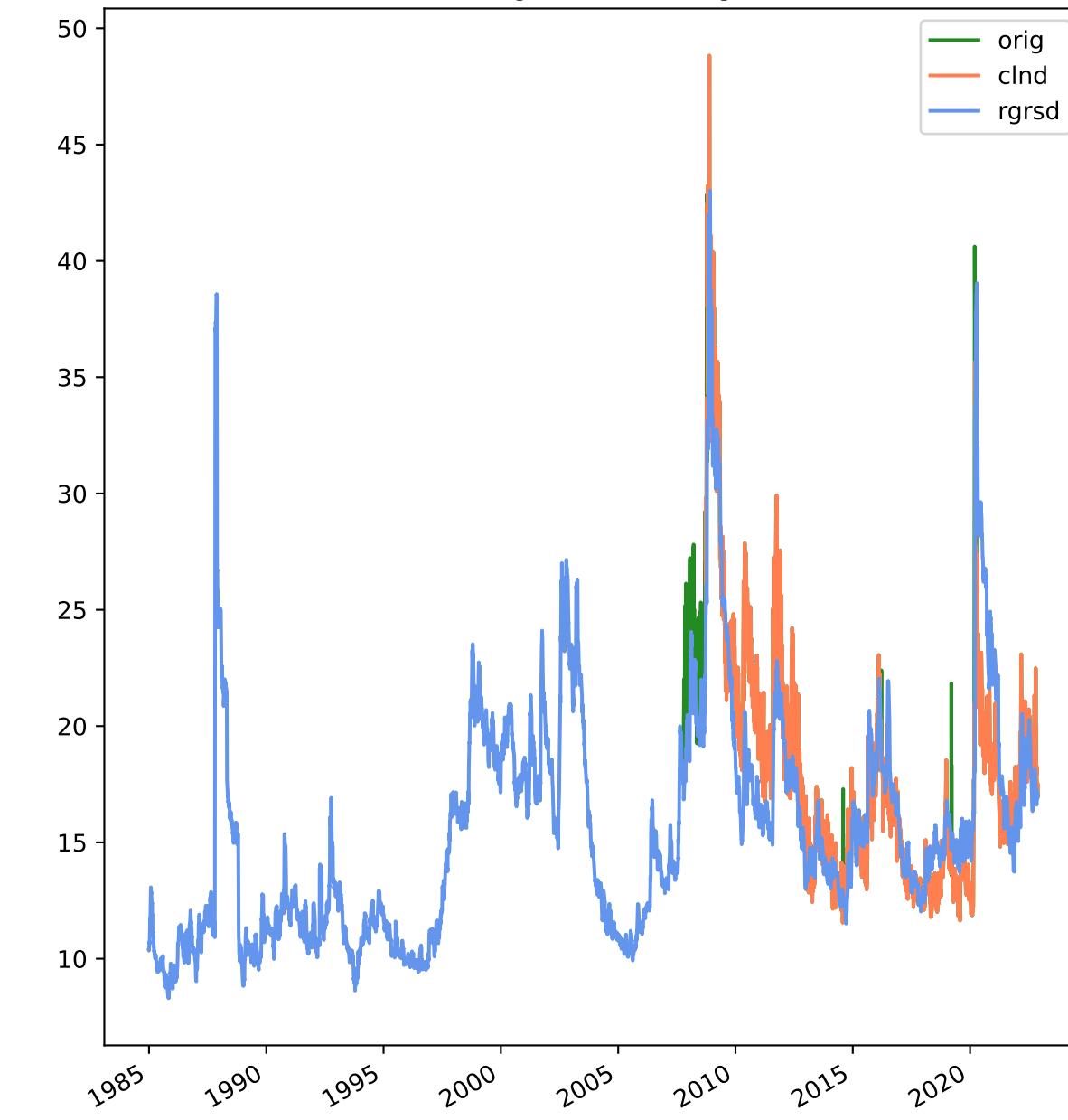
UKX Index 12MTH_IMP VOL [Retro. Stats -- last:16.97 max:48.82 min:8.30 mean:15.60 lvl std (1y,all):1.5,5.1 %-ile:63.6 Z:0.27]



UKX Index original & cleaned data



12MTH_IMP VOL original, cleaned & regressed backfill



UKX Index		12MTH_IMP VOL	
count	9812.000	count	9591.000
mean	4741.628	mean	15.561
std	1945.568	std	5.020
min	986.900	min	8.300
25%	2963.525	25%	11.514
50%	5242.400	50%	14.760
75%	6356.023	75%	18.075
max	7877.450	max	43.023

OLS Regression Results

Dep. Variable: y R-squared (Uncentered): 0.977
 Model: OLS Adj. R-squared (uncentered): 0.977
 Method: Least Squares F-statistic: 3.063e+04
 Date: Sun, 20 Nov 2022 Prob (F-statistic): 0.00
 Time: 14:55:56 Log-Likelihood: -8787.5
 No. Observations: 3576 AIC: 1.759e+04
 Df Residuals: 3571 BIC: 1.762e+04
 Df Model: 5 Covariance Type: nonrobust

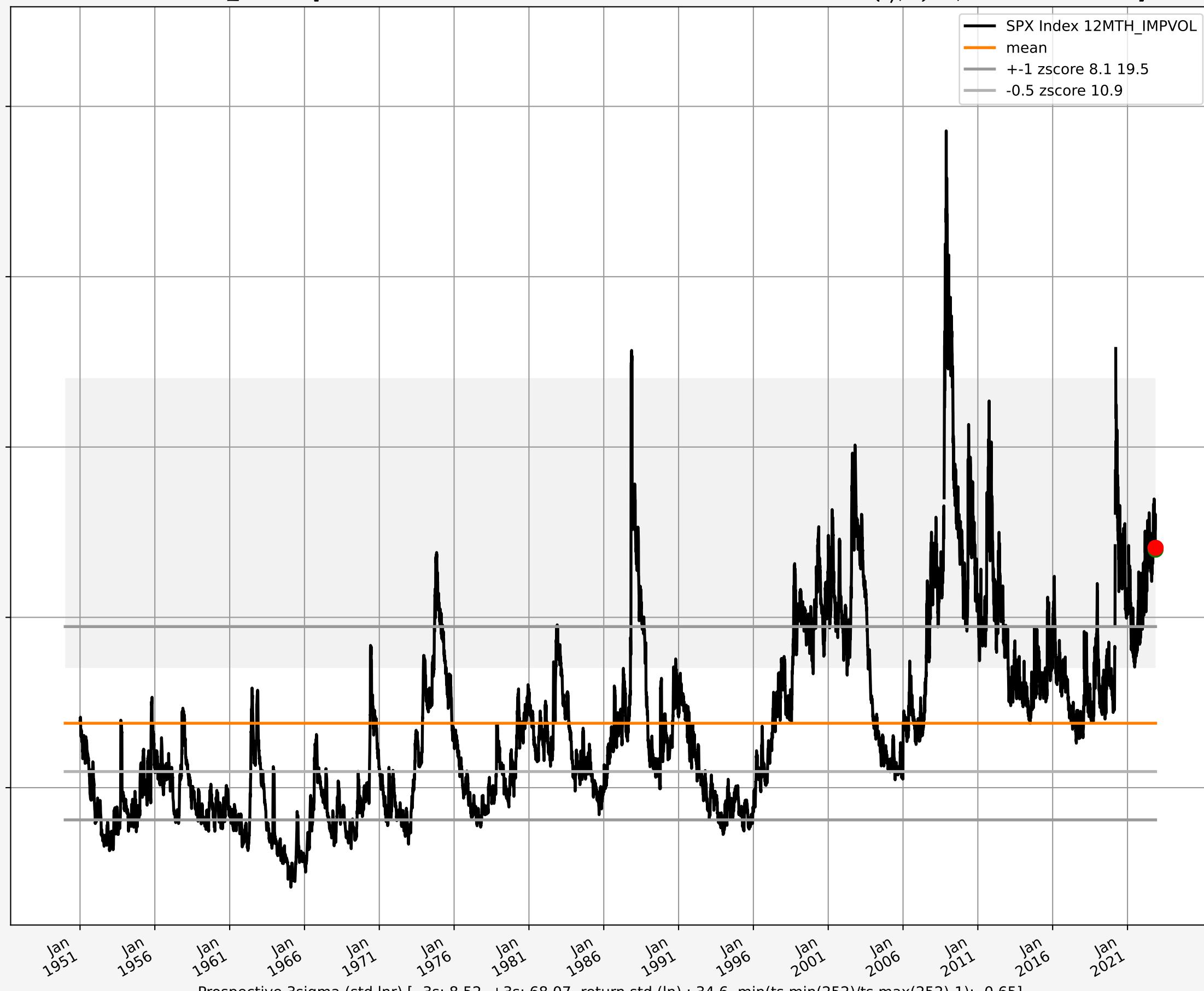
	coef	std err	t	P> t	[0.025	0.975]
x1	0.0009	1.42e-05	64.337	0.000	0.001	0.001
x2	0.1885	0.008	24.766	0.000	0.174	0.203
x3	0.1389	0.010	14.372	0.000	0.120	0.158
x4	0.0955	0.007	13.092	0.000	0.081	0.110
x5	0.2736	0.010	26.350	0.000	0.253	0.294

Omnibus: 296.885 Durbin-Watson: 0.106
 Prob(Omnibus): 0.000 Jarque-Bera (JB): 1135.918
 Skew: -0.345 Prob(JB): 2.18e-247
 Kurtosis: 5.673 Cond. No. 1.75e+03

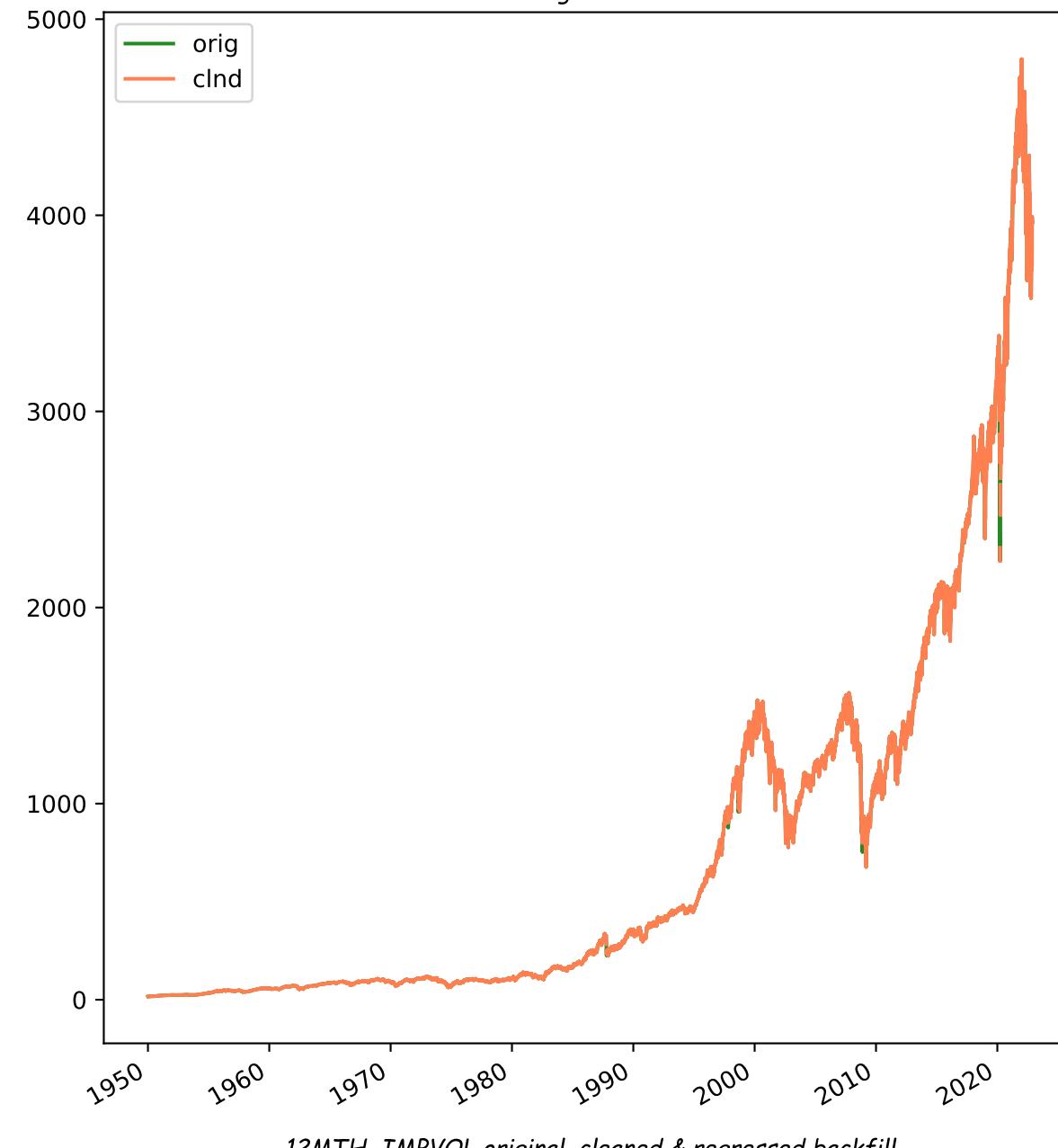
Notes:
 [1] R² is computed without centering (uncentered) since the model does not contain a constant.
 [2] Standard Errors assume that the covariance matrix of the errors is correctly specified.
 [3] The condition number is large, 1.75e+03. This might indicate that there are strong multicollinearity or other numerical problems.

ADF Test of Resids.: 3.102 {5% -2.8624, 1% -3.4322} 0

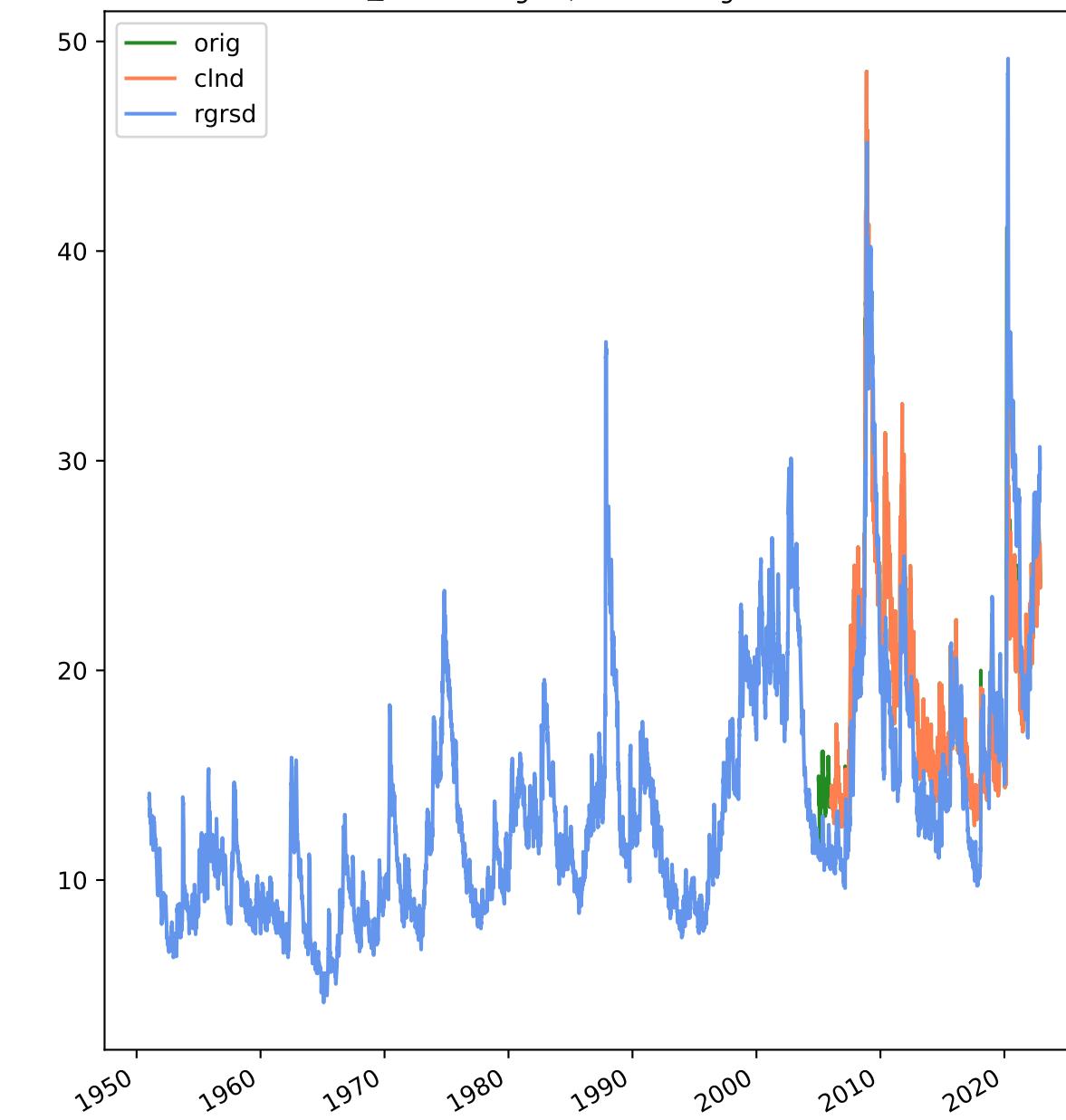
UKX Index Stats	Value	12MTH_IMP VOL Stats	Value
start	12-30-1983	start	12-28-1984
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	6.386	total_return	0.635
cagr	0.053	cagr	0.013
max_drawdown	-0.526	max_drawdown	-0.776
calmar	0.100	calmar	0.017
mtd	0.041	mtd	-0.001
three_month	-0.021	three_month	0.018
six_month	-0.007	six_month	-0.099
ytd	0.000	ytd	0.095
one_year	0.018	one_year	0.231
three_year	0.004	three_year	0.054
five_year	-0.000	five_year	0.067
ten_year	0.026	ten_year	0.008
incep	0.053	incep	0.013
daily_sharpe	0.378	daily_sharpe	0.164
daily_sortino	0.581	daily_sortino	0.555
daily_mean	0.068	daily_mean	0.076
daily_vol	0.179	daily_vol	0.466
daily_skew	-1.607	daily_skew	54.760
daily_kurt	58.405	daily_kurt	4212.002
best_day	0.182	best_day	2.328
worst_day	-0.268	worst_day	-0.302
monthly_sharpe	0.415	monthly_sharpe	0.193
monthly_sortino	0.657	monthly_sortino	0.647
monthly_mean	0.064	monthly_mean	0.100
monthly_vol	0.153	monthly_vol	0.518
monthly_skew	-0.857	monthly_skew	8.383
monthly_kurt	3.603	monthly_kurt	111.409
best_month	0.144	best_month	2.209
worst_month	-0.260	worst_month	-0.281
yearly_sharpe	0.434	yearly_sharpe	0.188
yearly_sortino	0.854	yearly_sortino	0.460
yearly_mean	0.063	yearly_mean	0.072
yearly_vol	0.146	yearly_vol	0.382
yearly_skew	-0.669	yearly_skew	1.782
yearly_kurt	0.092	yearly_kurt	6.642
best_year	0.351	best_year	1.627
worst_year	-0.313	worst_year	-0.630
avg_drawdown	-0.031	avg_drawdown	-0.155
avg_drawdown_days	73.188	avg_drawdown_days	1060.231
avg_up_month	0.033	avg_up_month	0.096
avg_down_month	-0.035	avg_down_month	-0.055
win_year_perc	0.718	win_year_perc	0.632
twelve_month_win_perc	0.698	twelve_month_win_perc	0.535



SPX Index original & cleaned data



12MTH_IMP VOL original, cleaned & regressed backfill



SPX Index		12MTH_IMP VOL	
count	18305.000	count	18090.000
mean	730.472	mean	13.591
std	961.343	std	5.884
min	16.660	min	4.156
25%	87.800	25%	9.394
50%	235.990	50%	12.056
75%	1182.990	75%	16.154
max	4796.560	max	49.186

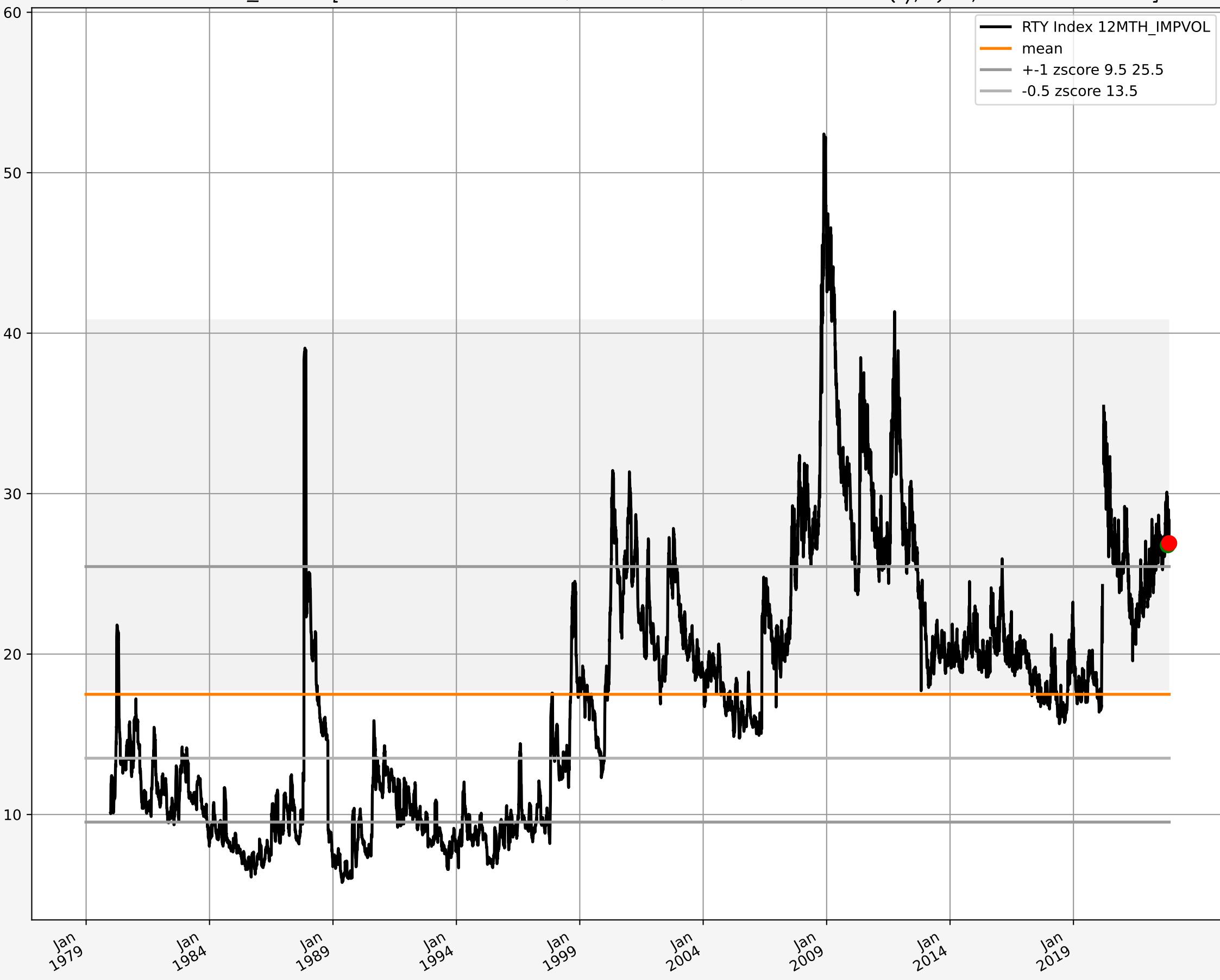
OLS Regression Results

Dep. Variable:	y	R-squared (uncentered):	0.966			
Model:	OLS	Adj. R-squared (uncentered):	0.966			
Method:	Least Squares	F-statistic:	2.401e+04			
Date:	Sun, 20 Nov 2022	Prob (F-statistic):	0.00			
Time:	14:55:59	Log-Likelihood:	-11622.			
No. Observations:	4251	AIC:	2.325e+04			
Df Residuals:	4246	BIC:	2.329e+04			
Df Model:	5	Covariance Type:	nonrobust			
	coef	std err	t	P> t	[0.025	0.975]
x1	0.0016	4.16e-05	39.452	0.000	0.002	0.002
x2	0.2557	0.010	25.952	0.000	0.236	0.275
x3	0.1309	0.013	10.434	0.000	0.106	0.155
x4	0.1079	0.009	11.509	0.000	0.089	0.126
x5	0.4108	0.013	30.952	0.000	0.385	0.437

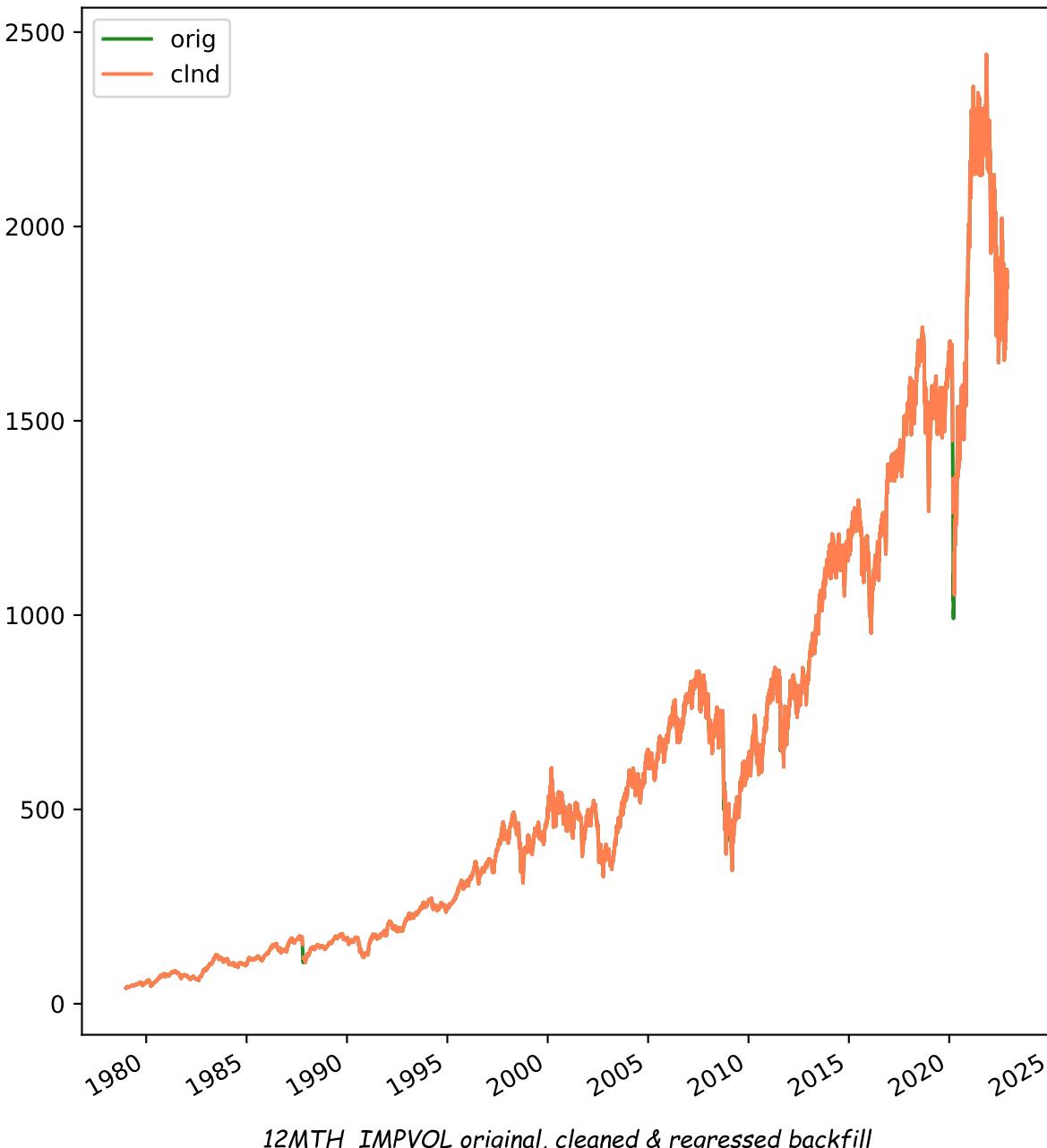
Omnibus: 1240.304 Durbin-Watson: 0.036
Prob(Omnibus): 0.000 Jarque-Bera (JB): 4731.959
Skew: -1.407 Prob(JB): 0.00
Kurtosis: 7.336 Cond. No. 666.

Notes:
[1] R² is computed without centering (uncentered) since the model does not contain a constant.
[2] Standard Errors assume that the covariance matrix of the errors is correctly specified.

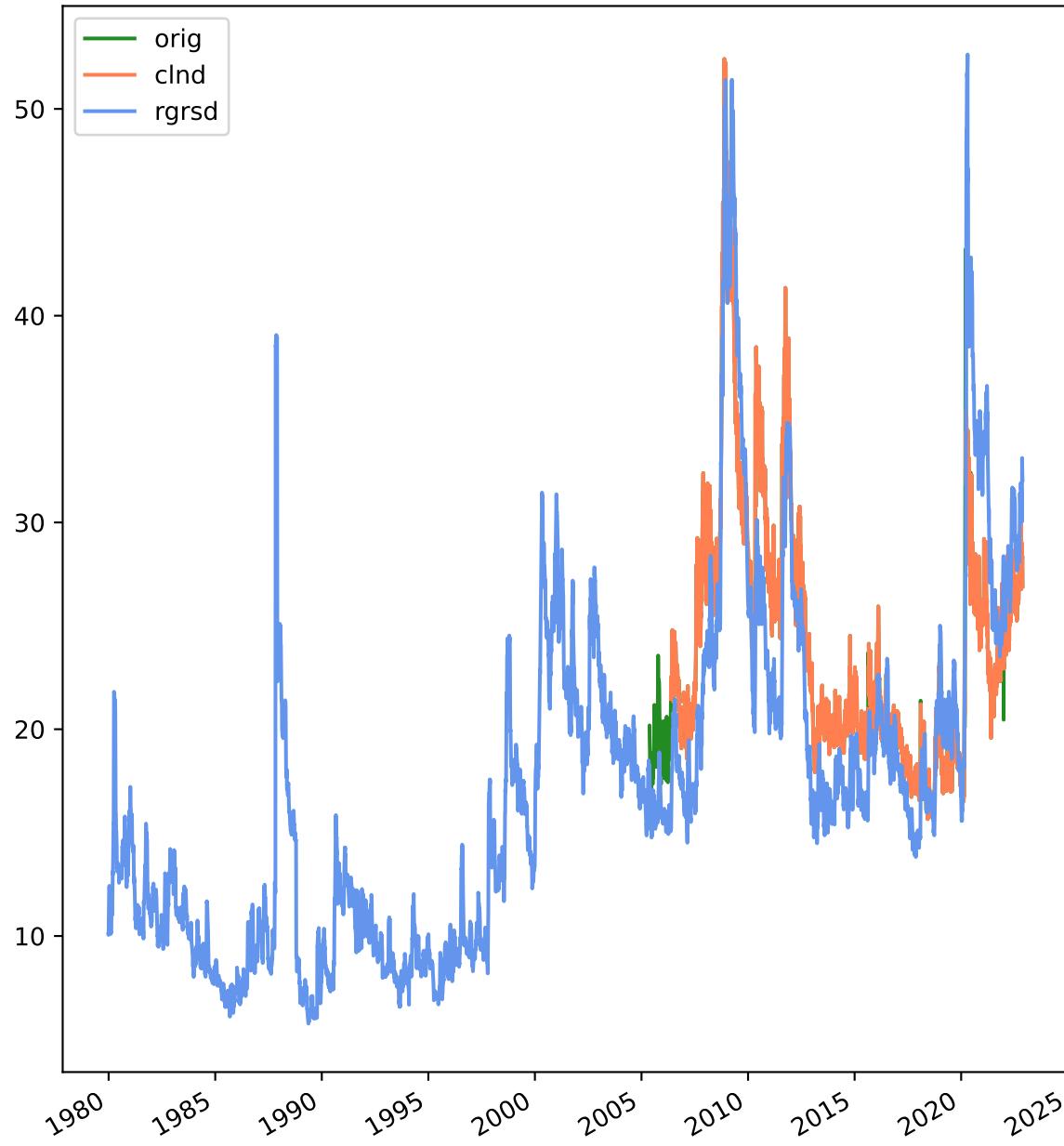
SPX Index Stats	Value	12MTH_IMP VOL Stats	Value
start	01-03-1950	start	01-05-1951
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	237.016	total_return	1.132
cagr	0.078	cagr	0.011
max_drawdown	-0.568	max_drawdown	-0.797
calmar	0.137	calmar	0.013
mtd	0.024	mtd	0.020
three_month	-0.074	three_month	0.158
six_month	0.011	six_month	0.064
ytd	-0.168	ytd	0.444
one_year	-0.157	one_year	0.761
three_year	0.083	three_year	0.231
five_year	0.090	five_year	0.243
ten_year	0.111	ten_year	0.066
incep	0.078	incep	0.011
daily_sharpe	0.570	daily_sharpe	0.189
daily_sortino	0.914	daily_sortino	0.382
daily_mean	0.087	daily_mean	0.064
daily_vol	0.153	daily_vol	0.337
daily_skew	-0.213	daily_skew	6.890
daily_kurt	21.976	daily_kurt	206.320
best_day	0.174	best_day	0.861
worst_day	-0.175	worst_day	-0.271
monthly_sharpe	0.586	monthly_sharpe	0.226
monthly_sortino	0.990	monthly_sortino	0.596
monthly_mean	0.086	monthly_mean	0.111
monthly_vol	0.147	monthly_vol	0.492
monthly_skew	-0.611	monthly_skew	3.119
monthly_kurt	3.107	monthly_kurt	21.141
best_month	0.163	best_month	1.379
worst_month	-0.272	worst_month	-0.337
yearly_sharpe	0.537	yearly_sharpe	0.212
yearly_sortino	1.201	yearly_sortino	0.591
yearly_mean	0.089	yearly_mean	0.088
yearly_vol	0.167	yearly_vol	0.416
yearly_skew	-0.437	yearly_skew	0.956
yearly_kurt	-0.011	yearly_kurt	0.558
best_year	0.450	best_year	1.332
worst_year	-0.385	worst_year	-0.532
avg_drawdown	-0.024	avg_drawdown	-0.204
avg_drawdown_days	38.981	avg_drawdown_days	934.357
avg_up_month	0.033	avg_up_month	0.116
avg_down_month	-0.032	avg_down_month	-0.073
win_year_perc	0.722	win_year_perc	0.465
twelve_month_win_perc	0.735	twelve_month_win_perc	0.508



RTY Index original & cleaned data



12MTH_IMP VOL original, cleaned & regressed backfill



RTY Index		12MTH_IMP VOL	
count	11149.000	count	10922.000
mean	603.948	mean	17.170
std	540.120	std	8.212
min	40.237	min	5.764
25%	164.941	25%	10.229
50%	450.058	50%	16.355
75%	812.893	75%	20.998
max	2442.742	max	52.633

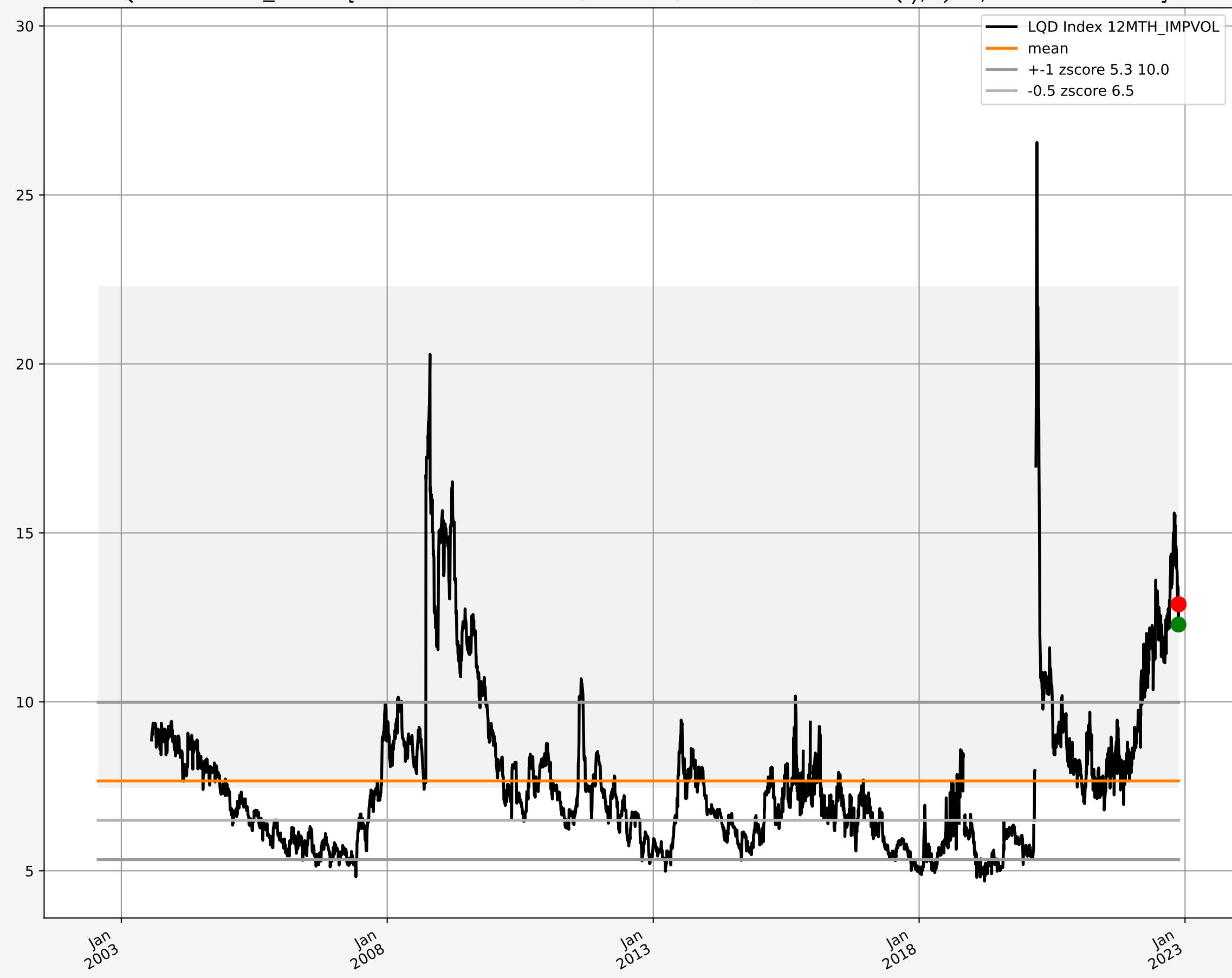
OLS Regression Results

Dep. Variable:	y	R-squared (uncentered):	0.970							
Model:	OLS	Adj. R-squared (uncentered):	0.969							
Method:	Least Squares	F-statistic:	2.640e+04							
Date:	Sun, 20 Nov 2022	Prob (F-statistic):	0.00							
Time:	14:56:01	Log-Likelihood:	-12041.							
No. Observations:	4156	AIC:	2.409e+04							
Df Residuals:	4151	BIC:	2.412e+04							
Df Model:	5	Covariance Type:	nonrobust							
x1	0.0028	std err	9.62e-05	t	29.486	P> t	0.000	[0.025	0.003	0.975]
x2	0.2751	std err	0.012	t	22.909	P> t	0.000	[0.252	0.299	0.975]
x3	0.1155	std err	0.015	t	7.721	P> t	0.000	[0.086	0.145	0.975]
x4	0.0885	std err	0.010	t	8.571	P> t	0.000	[0.068	0.109	0.975]
x5	0.4248	std err	0.014	t	30.403	P> t	0.000	[0.397	0.452	0.975]

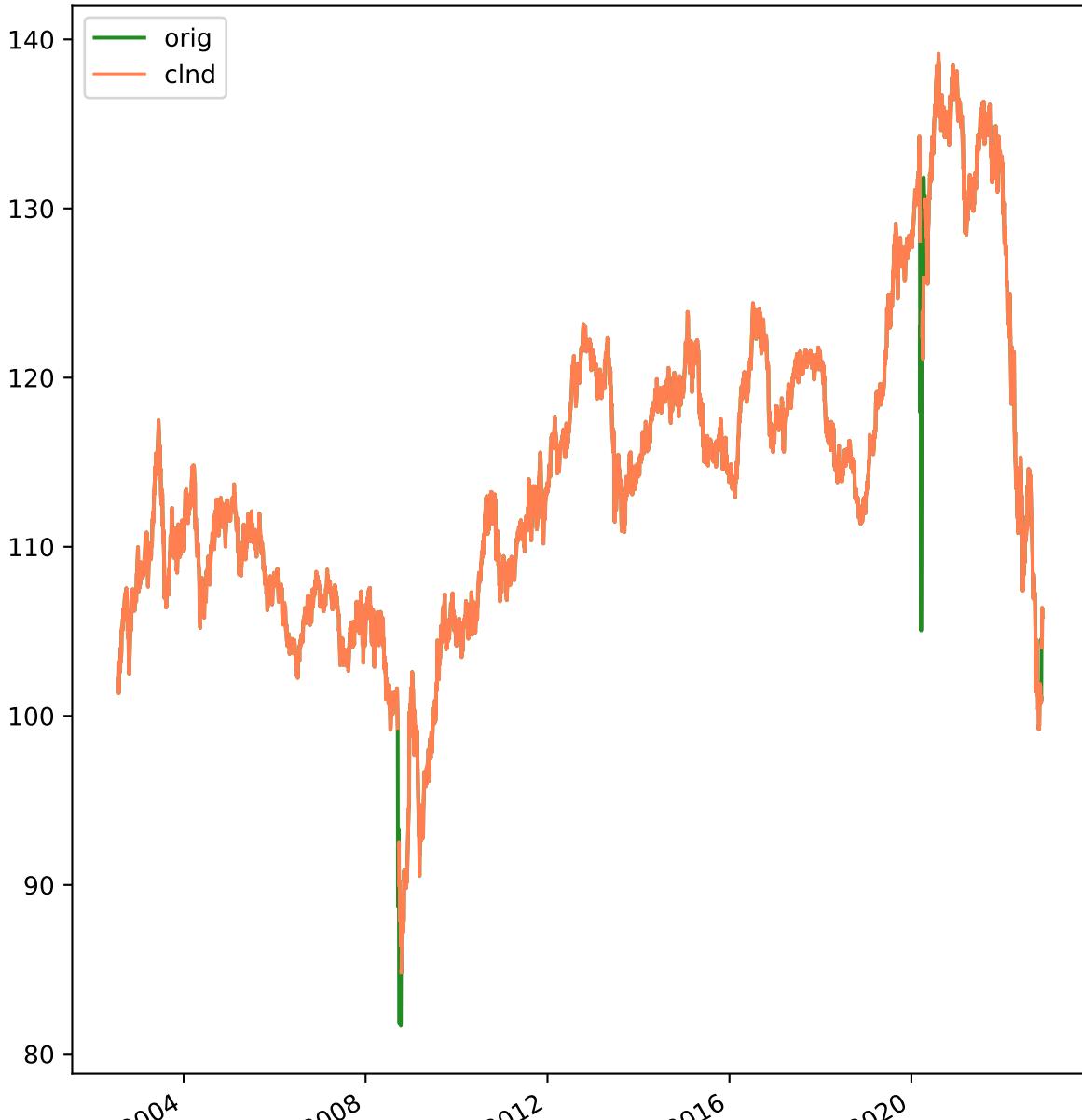
Omnibus: 740.080 Durbin-Watson: 0.029
Prob(Omnibus): 0.000 Jarque-Bera (JB): 1459.198
Skew: -1.075 Prob(JB): 0.00
Kurtosis: 4.950 Cond. No. 344.

Notes:
[1] R² is computed without centering (uncentered) since the model does not contain a constant.
[2] Standard Errors assume that the covariance matrix of the errors is correctly specified.

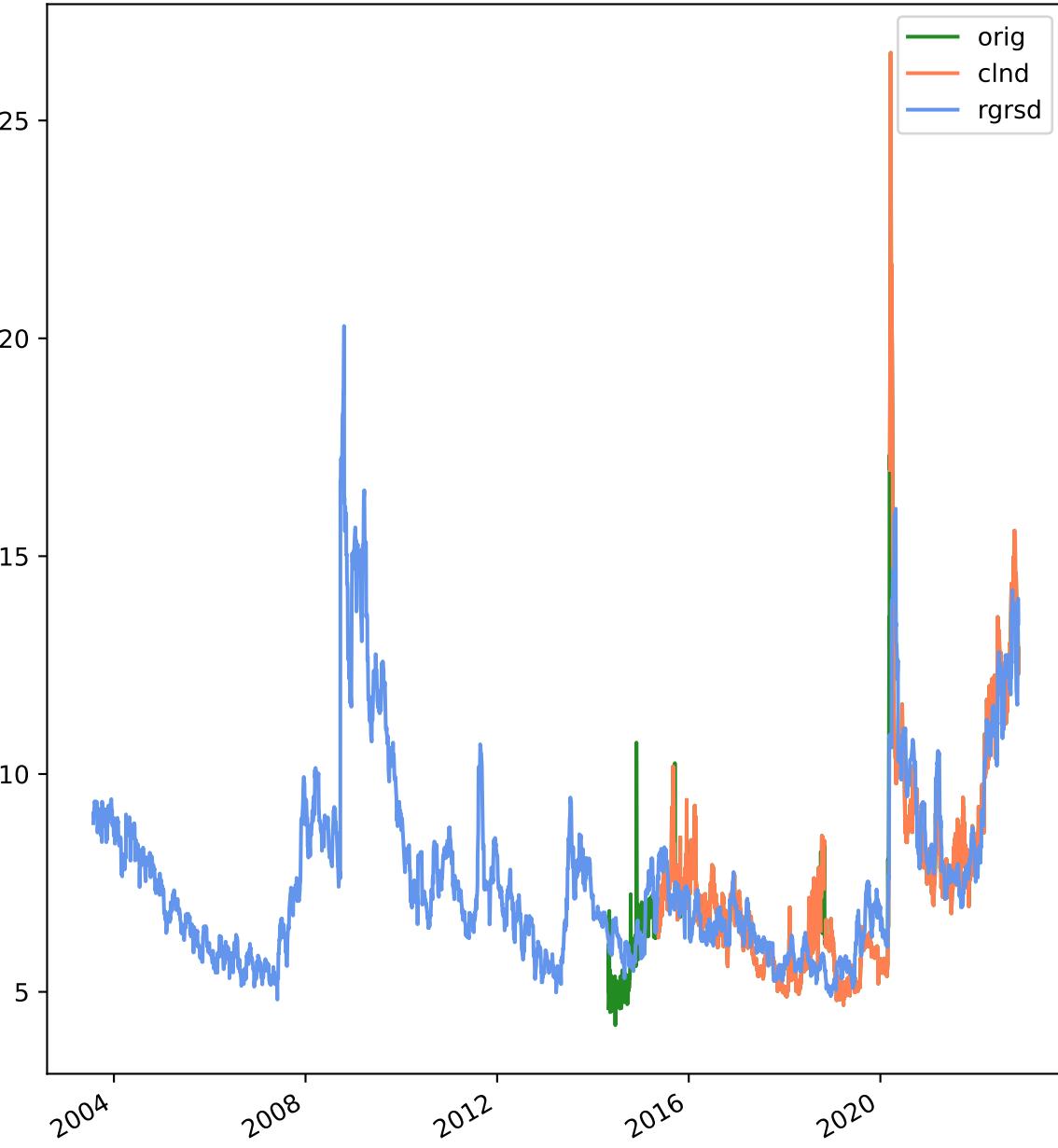
RTY Index Stats	Value	12MTH_IMP VOL Stats	Value
start	12-29-1978	start	12-28-1979
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	44.971	total_return	2.176
cagr	0.091	cagr	0.027
max_drawdown	-0.599	max_drawdown	-0.852
calmar	0.152	calmar	0.032
mtd	0.002	mtd	0.024
three_month	-0.075	three_month	0.158
six_month	0.042	six_month	0.028
ytd	-0.176	ytd	0.194
one_year	-0.217	one_year	0.318
three_year	0.051	three_year	0.208
five_year	0.042	five_year	0.172
ten_year	0.088	ten_year	0.053
incep	0.091	incep	0.027
daily_sharpe	0.541	daily_sharpe	0.228
daily_sortino	0.836	daily_sortino	0.574
daily_mean	0.106	daily_mean	0.109
daily_vol	0.195	daily_vol	0.480
daily_skew	-0.776	daily_skew	35.103
daily_kurt	19.832	daily_kurt	2467.004
best_day	0.156	best_day	2.172
worst_day	-0.225	worst_day	-0.412
monthly_sharpe	0.545	monthly_sharpe	0.265
monthly_sortino	0.891	monthly_sortino	0.823
monthly_mean	0.107	monthly_mean	0.180
monthly_vol	0.197	monthly_vol	0.680
monthly_skew	-0.743	monthly_skew	6.733
monthly_kurt	2.577	monthly_kurt	82.784
best_month	0.183	best_month	2.796
worst_month	-0.307	worst_month	-0.409
yearly_sharpe	0.582	yearly_sharpe	0.242
yearly_sortino	1.440	yearly_sortino	0.666
yearly_mean	0.107	yearly_mean	0.110
yearly_vol	0.183	yearly_vol	0.457
yearly_skew	-0.319	yearly_skew	1.255
yearly_kurt	-0.297	yearly_kurt	2.228
best_year	0.454	best_year	1.636
worst_year	-0.348	worst_year	-0.699
avg_drawdown	-0.031	avg_drawdown	-0.152
avg_drawdown_days	44.450	avg_drawdown_days	708.409
avg_up_month	0.043	avg_up_month	0.131
avg_down_month	-0.046	avg_down_month	-0.082
win_year_perc	0.682	win_year_perc	0.535
twelve_month_win_perc	0.689	twelve_month_win_perc	0.509



LQD Index original & cleaned data



12MTH_IMPVOL original, cleaned & regressed backfill



LQD Index		12MTH_IMPVOL	
count	5090.000	count	4865.000
mean	114.305	mean	7.654
std	9.313	std	2.206
min	84.850	min	4.822
25%	107.490	25%	6.125
50%	113.490	50%	7.100
75%	119.730	75%	8.329
max	139.150	max	20.284

OLS Regression Results

```

Dep. Variable: y R-squared (uncentered): 0.974
Model: OLS Adj. R-squared (uncentered): 0.974
Method: Least Squares F-statistic: 1.414e+04
Date: Sun, 20 Nov 2022 Prob (F-statistic): 0.00
Time: 14:56:03 Log-Likelihood: -3191.3
No. Observations: 1907 AIC: 6393.
Df Residuals: 1902 BIC: 6420.
Df Model: 5
Covariance Type: nonrobust

```

	coef	std err	t	P> t	[0.025	0.975]
x1	0.0154	0.001	18.647	0.000	0.014	0.017
x2	0.4065	0.019	21.946	0.000	0.370	0.443
x3	0.0822	0.025	3.352	0.001	0.034	0.130
x4	0.1741	0.018	9.644	0.000	0.139	0.210
x5	0.2696	0.032	8.480	0.000	0.207	0.332

```

Omnibus: 1819.856 Durbin-Watson: 0.130
Prob(Omnibus): 0.000 Jarque-Bera (JB): 166623.182
Skew: 4.226 Prob(JB): 0.00
Kurtosis: 48.006 Cond. No. 150.

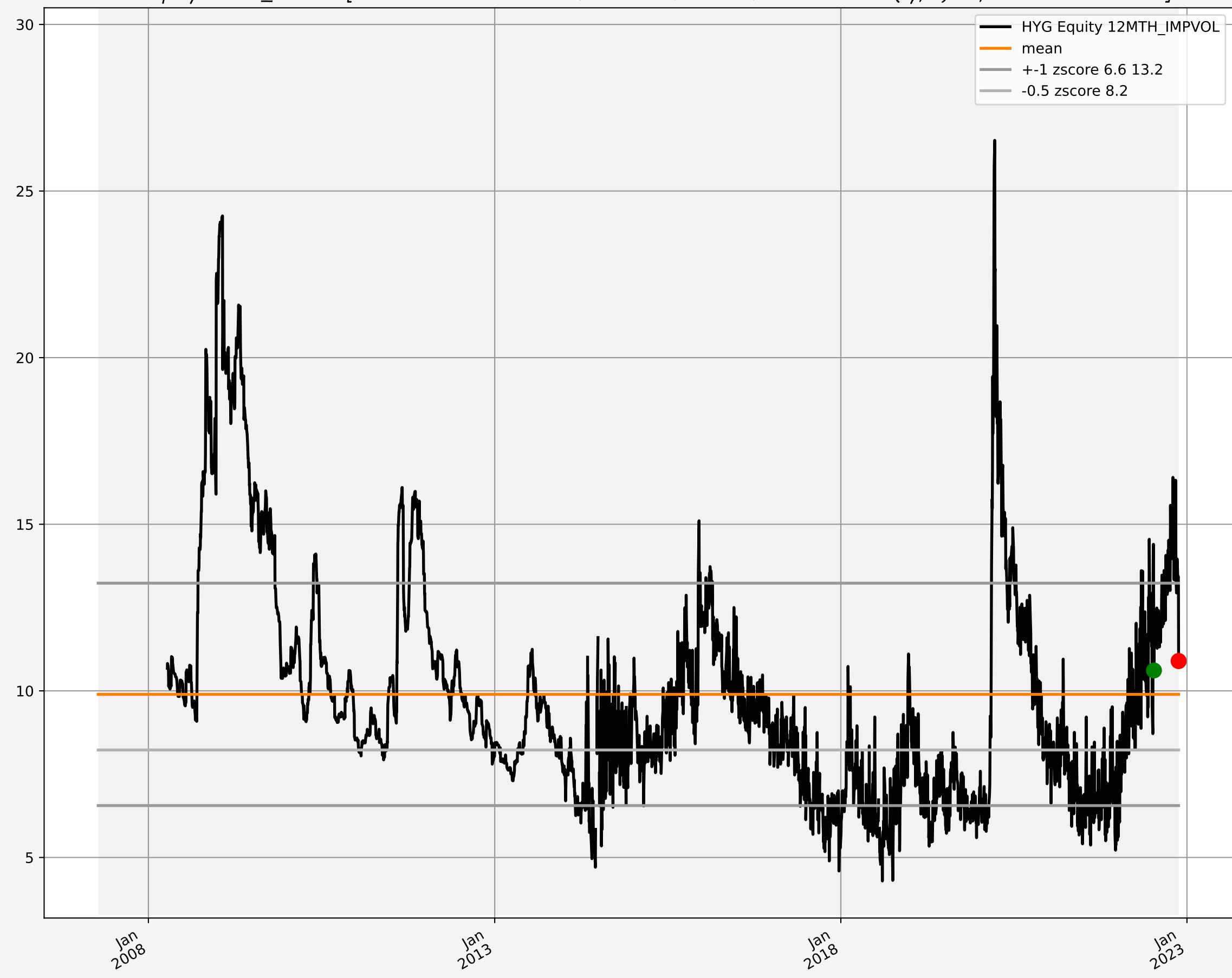
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Notes:
[1] R² is computed without centering (uncentered) since the model does not contain a constant.
[2] Standard Errors assume that the covariance matrix of the errors is correctly specified.

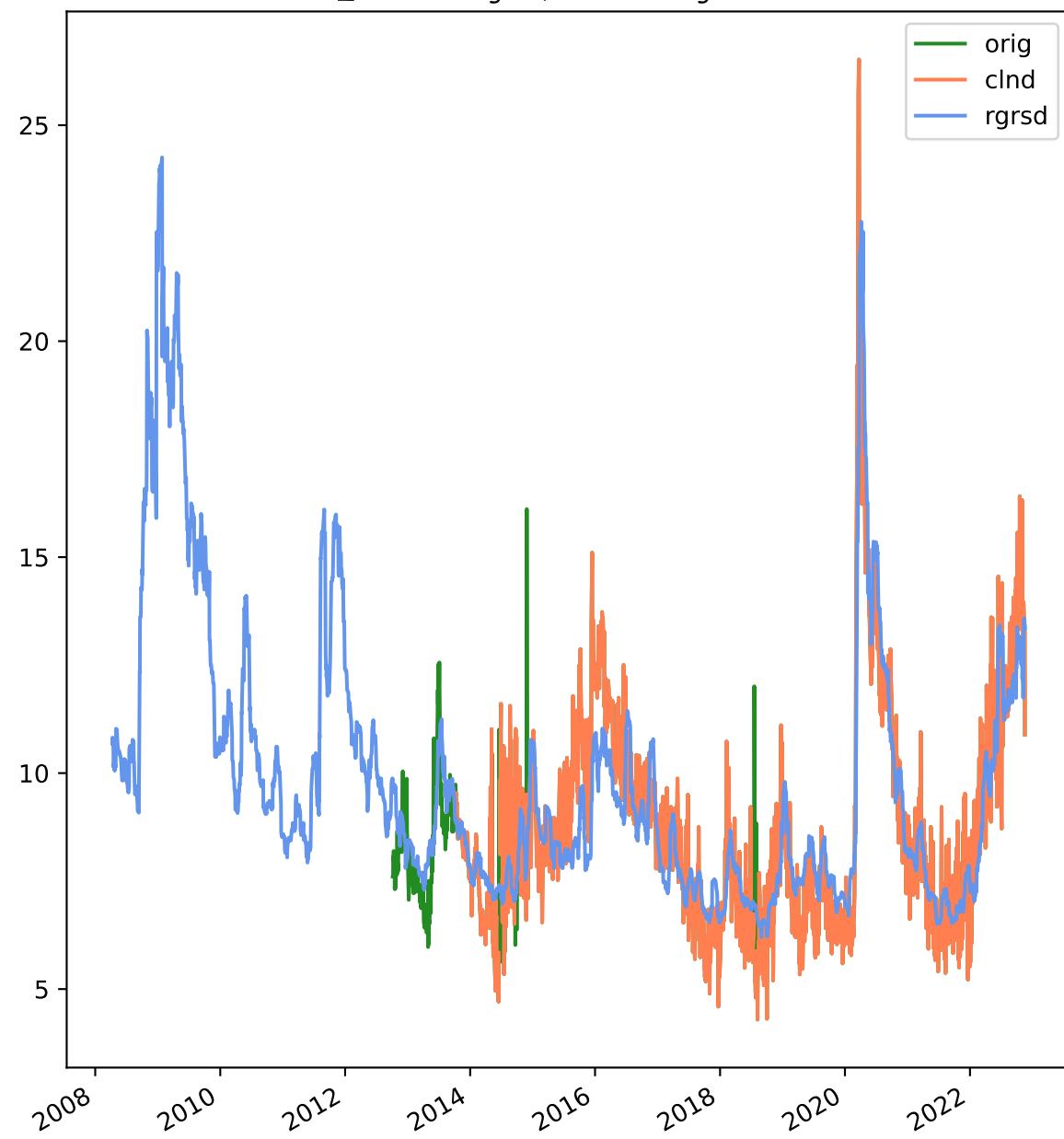
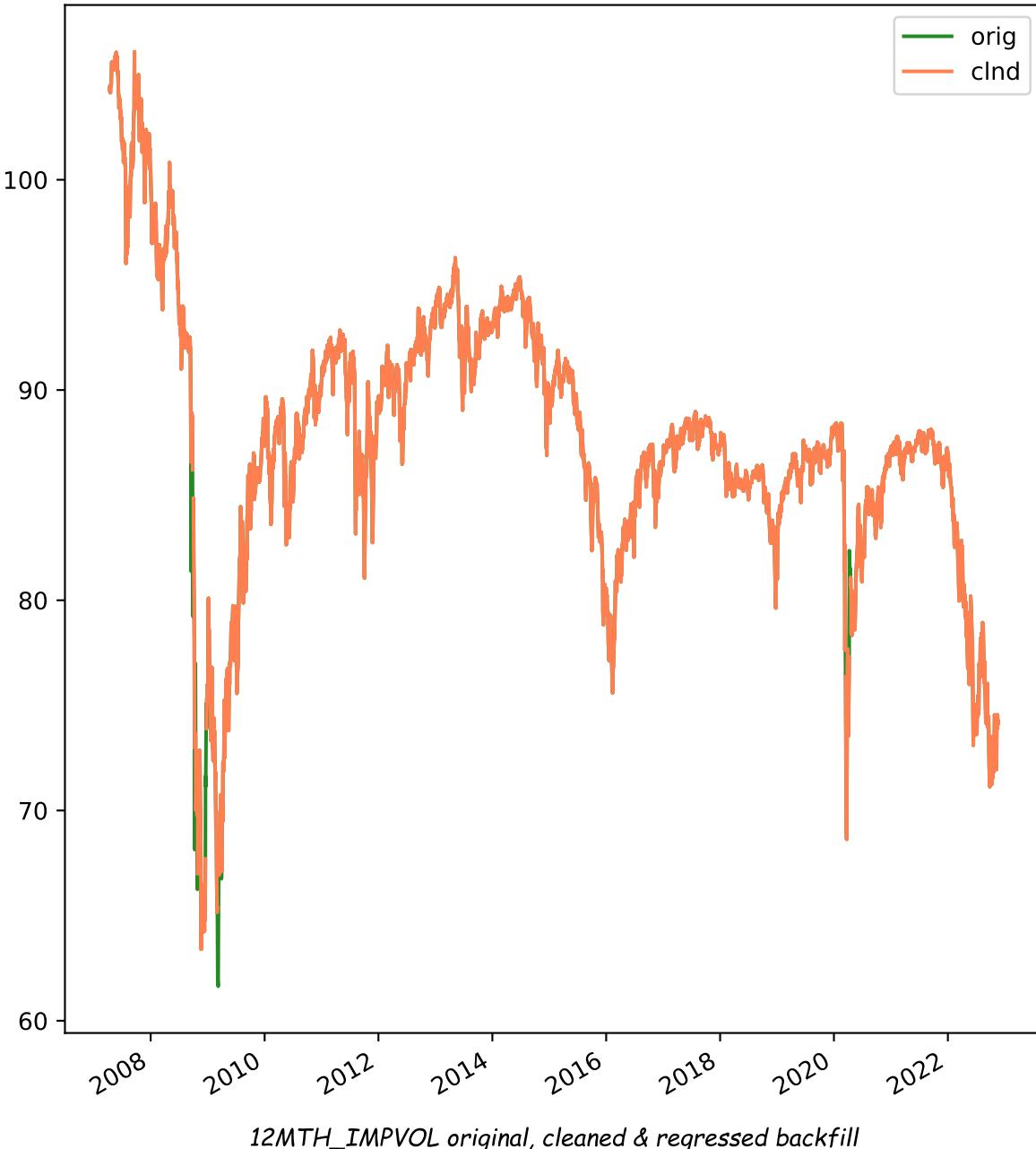
ADF Test of Resids.: 9.481 {5% -2.861, 1% -3.4338} 0

LQD Index Stats	Value	12MTH_IMPVOL Stats	Value
start	07-26-2002	start	07-28-2003
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	0.036	total_return	0.516
cagr	0.002	cagr	0.022
max_drawdown	-0.287	max_drawdown	-0.758
calmar	0.006	calmar	0.029
mtd	0.044	mtd	0.068
three_month	-0.063	three_month	0.057
six_month	-0.052	six_month	0.195
ytd	-0.202	ytd	0.742
one_year	-0.202	one_year	0.676
three_year	-0.059	three_year	0.245
five_year	-0.026	five_year	0.198
ten_year	-0.014	ten_year	0.084
incep	0.002	incep	0.022
daily_sharpe	0.060	daily_sharpe	0.227
daily_sortino	0.091	daily_sortino	0.506
daily_mean	0.004	daily_mean	0.098
daily_vol	0.071	daily_vol	0.432
daily_skew	-1.053	daily_skew	18.243
daily_kurt	17.651	daily_kurt	779.658
best_day	0.034	best_day	1.197
worst_day	-0.070	worst_day	-0.200
monthly_sharpe	0.062	monthly_sharpe	0.232
monthly_sortino	0.097	monthly_sortino	0.608
monthly_mean	0.005	monthly_mean	0.110
monthly_vol	0.076	monthly_vol	0.476
monthly_skew	-0.109	monthly_skew	3.750
monthly_kurt	6.873	monthly_kurt	25.647
best_month	0.128	best_month	1.078
worst_month	-0.109	worst_month	-0.289
yearly_sharpe	0.009	yearly_sharpe	0.206
yearly_sortino	0.013	yearly_sortino	0.562
yearly_mean	0.001	yearly_mean	0.066
yearly_vol	0.070	yearly_vol	0.322
yearly_skew	-0.962	yearly_skew	0.856
yearly_kurt	2.867	yearly_kurt	-0.039
best_year	0.134	best_year	0.742
worst_year	-0.202	worst_year	-0.408
avg_drawdown	-0.024	avg_drawdown	-0.133
avg_drawdown_days	136.170	avg_drawdown_days	501.286
avg_up_month	0.015	avg_up_month	0.098
avg_down_month	-0.016	avg_down_month	-0.072
win_year_perc	0.550	win_year_perc	0.421
twelve_month_win_perc	0.534	twelve_month_win_perc	0.450

HYG Equity 12MTH_IMP VOL [Retro. Stats -- last:10.90 max:26.52 min:4.29 mean:9.89 lvl std (1y,all):2.5,3.3 %-ile:68.8 Z:0.30]



HYG Equity original & cleaned data



HYG Equity		12MTH_IMPVOl	
count	3910.000	count	3681.000
mean	87.707	mean	9.877
std	6.503	std	3.208
min	63.400	min	6.201
25%	85.310	25%	7.708
50%	87.380	50%	8.907
75%	91.520	75%	10.699
max	106.090	max	24.254

OLS Regression Results

Dep. Variable:	y	R-squared (uncentered):	0.980			
Model:	OLS	Adj. R-squared (uncentered):	0.980			
Method:	Least Squares	F-statistic:	2.270e+04			
Date:	Sun, 20 Nov 2022	Prob (F-statistic):	0.00			
Time:	14:56:04	Log-Likelihood:	-3836.0			
No. Observations:	2296	AIC:	7682.			
Df Residuals:	2291	BIC:	7711.			
Df Model:	5	Covariance Type:	nonrobust			
	coef	std err	t	P> t	[0.025	0.975]
x1	0.0528	0.001	76.083	0.000	0.051	0.054
x2	0.3048	0.009	33.256	0.000	0.287	0.323
x3	0.1324	0.011	11.928	0.000	0.111	0.154
x4	0.1372	0.008	17.858	0.000	0.122	0.152
x5	0.0550	0.012	4.702	0.000	0.032	0.078

Omnibus: 354.500 Durbin-Watson: 0.417
 Prob(Omnibus): 0.000 Jarque-Bera (JB): 1193.265
 Skew: 0.760 Prob(JB): 7.69e-260
 Kurtosis: 6.188 Cond. No. 46.6

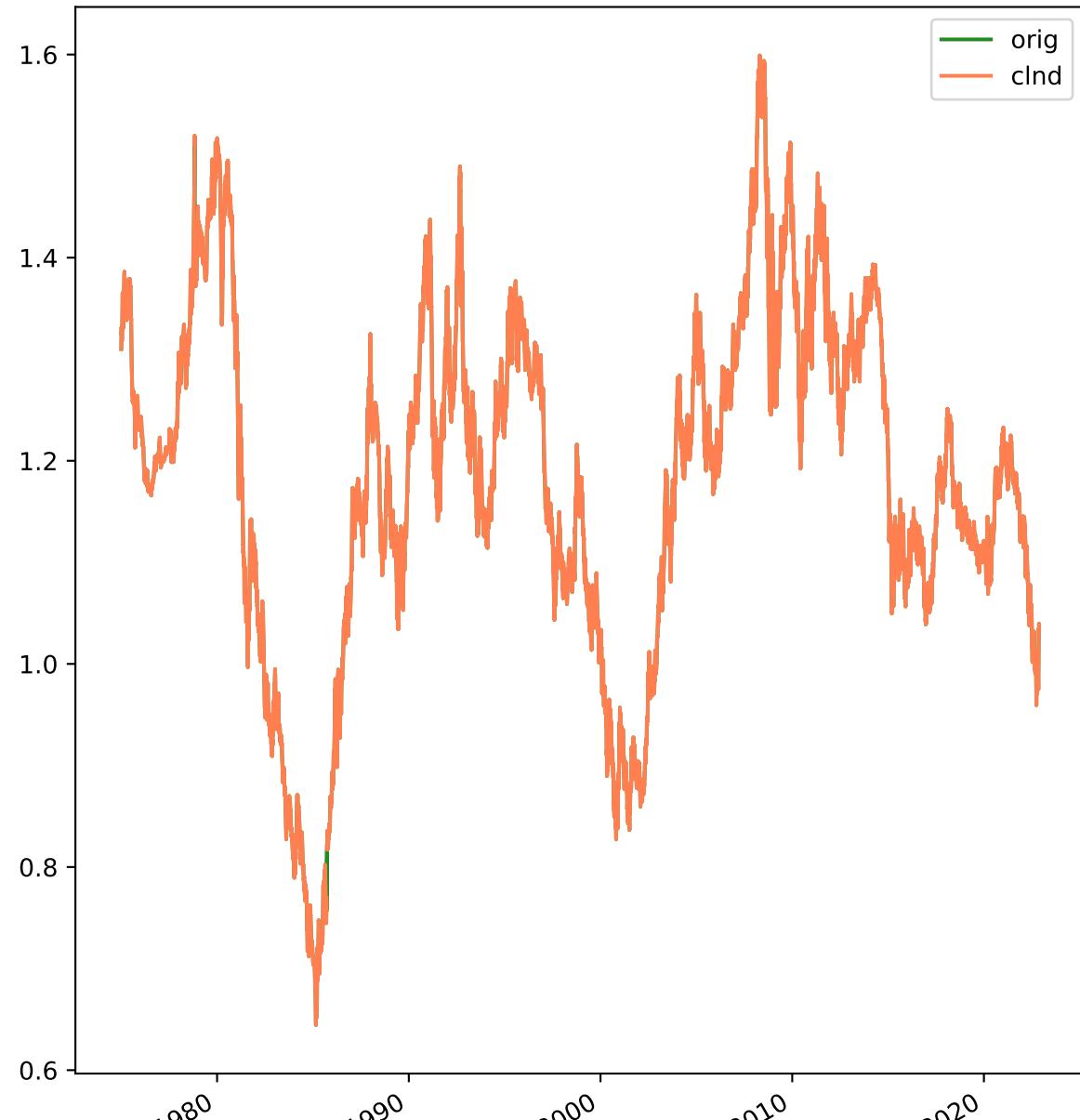
Notes:
 [1] R² is computed without centering (uncentered) since the model does not contain a constant.
 [2] Standard Errors assume that the covariance matrix of the errors is correctly specified.

ADF Test of Resids.:	8.674 {5% -2.8628, 1% -3.4332}	0	
HYG Equity Stats	Value	12MTH_IMPVOl Stats	Value
start	04-11-2007	start	04-10-2008
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	-0.289	total_return	0.250
cagr	-0.022	cagr	0.015
max_drawdown	-0.402	max_drawdown	-0.744
calmar	-0.054	calmar	0.021
mtd	0.011	mtd	0.041
three_month	-0.045	three_month	0.150
six_month	-0.023	six_month	0.323
ytd	-0.147	ytd	0.798
one_year	-0.143	one_year	0.957
three_year	-0.051	three_year	0.249
five_year	-0.032	five_year	0.124
ten_year	-0.021	ten_year	0.039
incep	-0.022	incep	0.015
daily_sharpe	-0.156	daily_sharpe	0.203
daily_sortino	-0.238	daily_sortino	0.393
daily_mean	-0.016	daily_mean	0.067
daily_vol	0.105	daily_vol	0.329
daily_skew	0.282	daily_skew	4.409
daily_kurt	18.977	daily_kurt	73.284
best_day	0.092	best_day	0.405
worst_day	-0.046	worst_day	-0.190
monthly_sharpe	-0.152	monthly_sharpe	0.259
monthly_sortino	-0.227	monthly_sortino	0.797
monthly_mean	-0.017	monthly_mean	0.166
monthly_vol	0.109	monthly_vol	0.640
monthly_skew	-0.264	monthly_skew	4.554
monthly_kurt	7.827	monthly_kurt	35.005
best_month	0.147	best_month	1.638
worst_month	-0.165	worst_month	-0.258
yearly_sharpe	-0.156	yearly_sharpe	0.059
yearly_sortino	-0.213	yearly_sortino	0.129
yearly_mean	-0.015	yearly_mean	0.021
yearly_vol	0.098	yearly_vol	0.353
yearly_skew	-0.722	yearly_skew	0.715
yearly_kurt	1.233	yearly_kurt	0.300
best_year	0.156	best_year	0.798
worst_year	-0.245	worst_year	-0.509
avg_drawdown	-0.063	avg_drawdown	-0.078
avg_drawdown_days	709.375	avg_drawdown_days	311.235
avg_up_month	0.018	avg_up_month	0.132
avg_down_month	-0.021	avg_down_month	-0.083
win_year_perc	0.400	win_year_perc	0.429
twelve_month_win_perc	0.475	twelve_month_win_perc	0.448

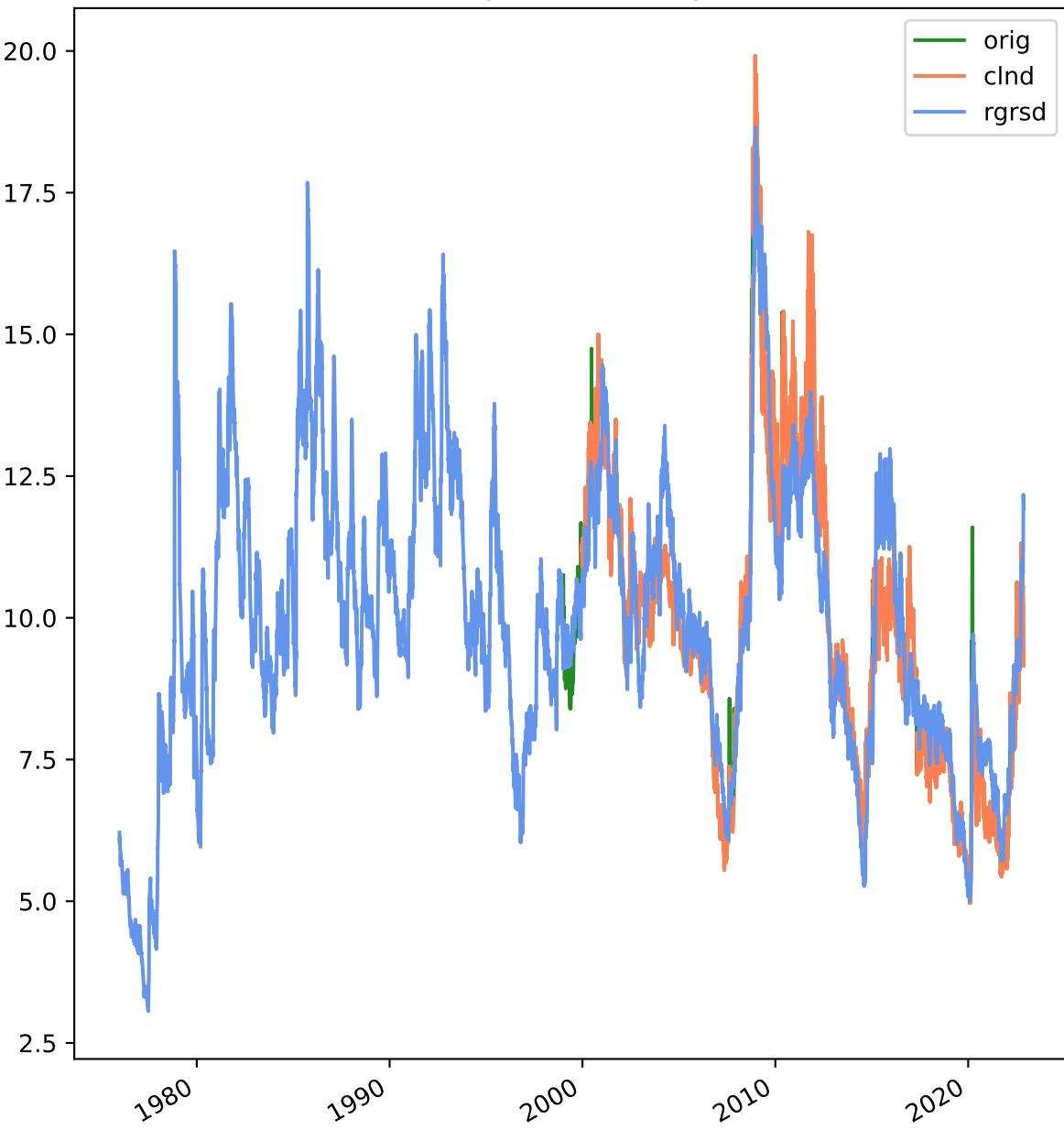
EURUSD Curncy EURUSDV1Y Cu [Retro. Stats -- last:9.30 max:19.91 min:3.06 mean:9.97 lvl std (1y,all):1.6,2.7 %-ile:37.4 Z:-0.25]



EURUSD Curncy original & cleaned data



EURUSDV1Y Cu original, cleaned & regressed backfill



EURUSD Curncy		EURUSDV1Y Cu	
count	12294.000	count	12050.000
mean	1.183	mean	9.967
std	0.172	std	2.541
min	0.644	min	3.060
25%	1.092	25%	8.259
50%	1.196	50%	9.870
75%	1.304	75%	11.743
max	1.599	max	18.652

OLS Regression Results

Dep. Variable: y R-squared (uncentered): 0.989
 Model: OLS Adj. R-squared (uncentered): 0.989
 Method: Least Squares F-statistic: 1.123e+05
 Date: Sun, 20 Nov 2022 Prob (F-statistic): 0.00
 Time: 14:56:07 Log-Likelihood: -8744.6
 No. Observations: 5978 AIC: 1.750e+04
 Df Residuals: 5973 BIC: 1.753e+04
 Df Model: 5 Covariance Type: nonrobust

	coef	std err	t	P> t	[0.025	0.975]
x1	0.8406	0.038	21.996	0.000	0.766	0.915
x2	0.1539	0.009	16.624	0.000	0.136	0.172
x3	0.2671	0.013	21.316	0.000	0.242	0.292
x4	-0.0129	0.010	-1.263	0.207	-0.033	0.007
x5	0.5739	0.013	42.843	0.000	0.548	0.600

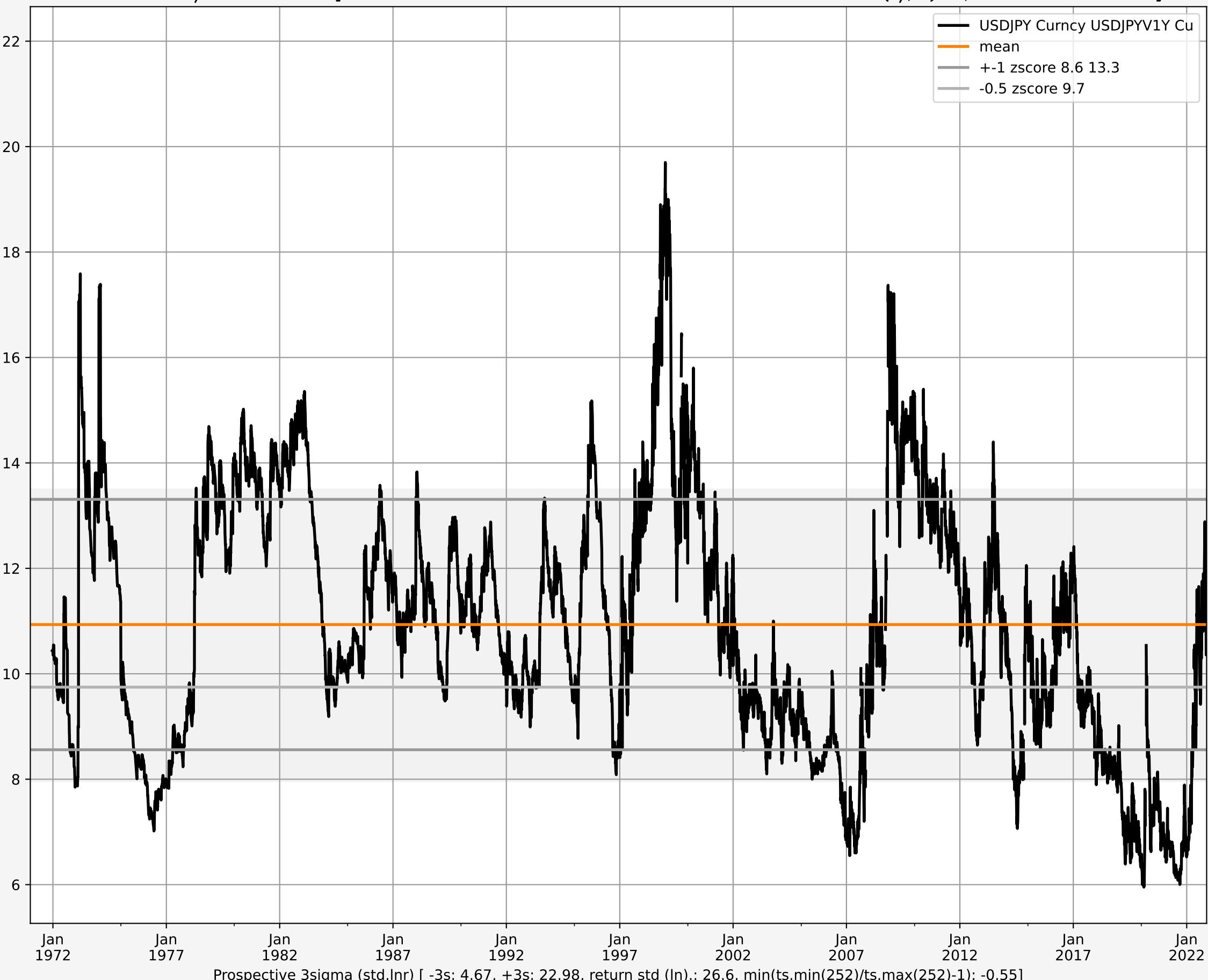
Omnibus:	141.091	Durbin-Watson:	0.036
Prob(Omnibus):	0.000	Jarque-Bera (JB):	179.106
Skew:	0.300	Prob(JB):	1.28e-39
Kurtosis:	3.599	Cond. No.	53.4

Notes:
 [1] R² is computed without centering (uncentered) since the model does not contain a constant.
 [2] Standard Errors assume that the covariance matrix of the errors is correctly specified.

ADF Test of Resids.:	5.360 {5% -2.8620, 1% -3.4314}	0
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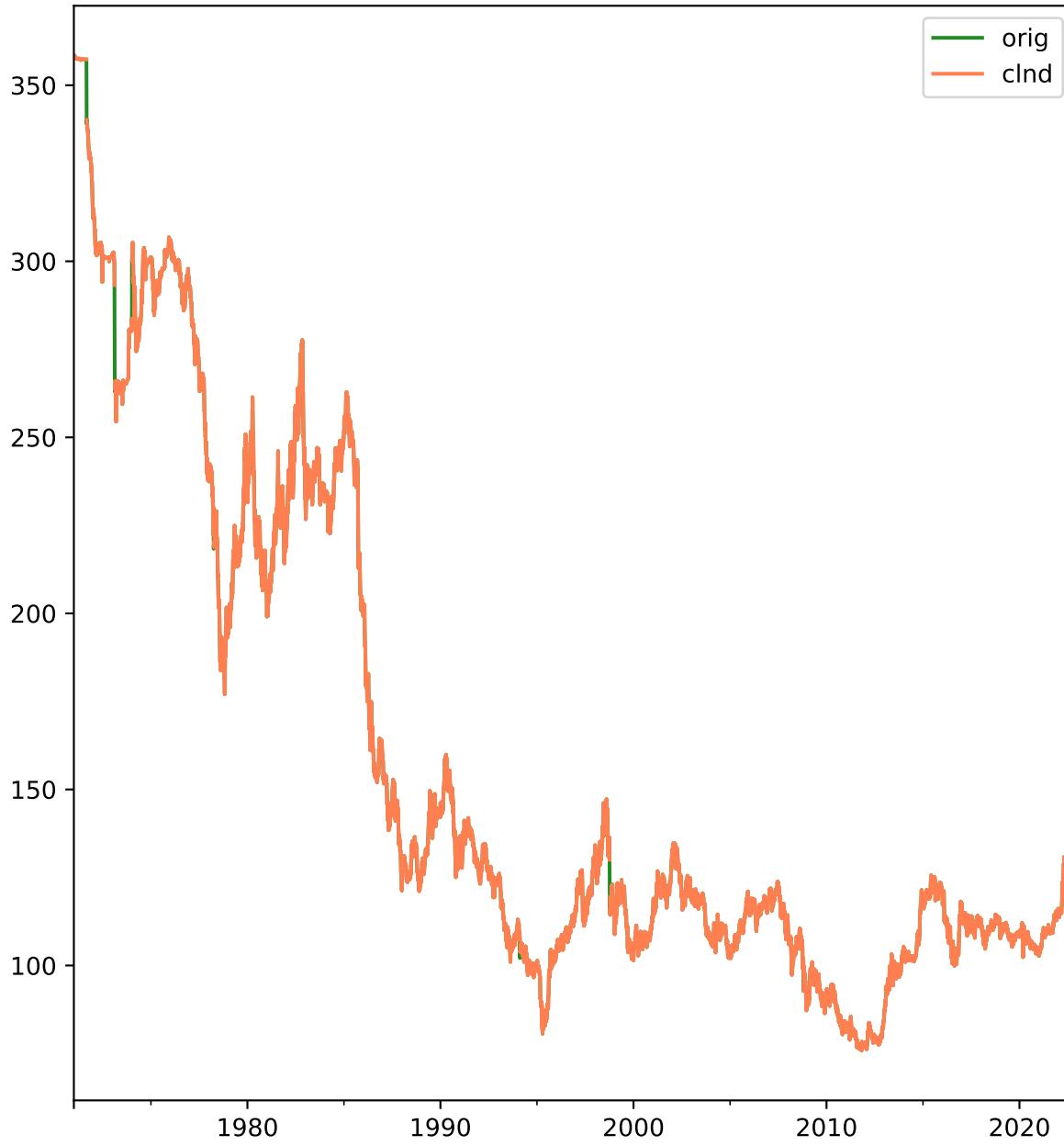
EURUSD Curncy Stats	Value	EURUSDV1Y Cu Stats	Value
start	01-02-1975	start	12-30-1975
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	-0.212	total_return	0.924
cagr	-0.005	cagr	0.014
max_drawdown	-0.576	max_drawdown	-0.732
calmar	-0.009	calmar	0.019
mtd	0.045	mtd	0.083
three_month	0.024	three_month	0.290
six_month	-0.013	six_month	0.391
ytd	-0.092	ytd	0.818
one_year	-0.092	one_year	0.835
three_year	-0.023	three_year	0.288
five_year	-0.025	five_year	0.074
ten_year	-0.021	ten_year	0.035
incep	-0.005	incep	0.014
daily_sharpe	-0.003	daily_sharpe	0.174
daily_sortino	-0.005	daily_sortino	0.392
daily_mean	-0.000	daily_mean	0.046
daily_vol	0.096	daily_vol	0.263
daily_skew	-0.004	daily_skew	9.865
daily_kurt	4.851	daily_kurt	346.566
best_day	0.063	best_day	0.716
worst_day	-0.074	worst_day	-0.244
monthly_sharpe	-0.004	monthly_sharpe	0.194
monthly_sortino	-0.007	monthly_sortino	0.496
monthly_mean	-0.000	monthly_mean	0.067
monthly_vol	0.101	monthly_vol	0.344
monthly_skew	-0.058	monthly_skew	2.431
monthly_kurt	0.921	monthly_kurt	11.333
best_month	0.101	best_month	0.677
worst_month	-0.106	worst_month	-0.236
yearly_sharpe	0.021	yearly_sharpe	0.178
yearly_sortino	0.044	yearly_sortino	0.505
yearly_mean	0.002	yearly_mean	0.063
yearly_vol	0.114	yearly_vol	0.357
yearly_skew	0.461	yearly_skew	1.551
yearly_kurt	-0.780	yearly_kurt	2.946
best_year	0.251	best_year	1.198
worst_year	-0.168	worst_year	-0.448
avg_drawdown	-0.079	avg_drawdown	-0.191
avg_drawdown_days	1089.438	avg_drawdown_days	1139.200
avg_up_month	0.022	avg_up_month	0.083
avg_down_month	-0.022	avg_down_month	-0.054
win_year_perc	0.447	win_year_perc	0.511
twelve_month_win_perc	0.482	twelve_month_win_perc	0.461

USDJPY Curncy USDJPYV1Y Cu [Retro. Stats -- last:10.36 max:19.70 min:5.95 mean:10.93 lvl std (1y,all):1.8,2.4 %-ile:42.9 Z:-0.24]



Prospective 3sigma (std.lnr) [-3s: 4.67, +3s: 22.98, return std (ln): 26.6, min(ts.min(252)/ts.max(252)-1): -0.55]

USDJPY Curncy original & cleaned data



	USDJPY Curncy		USDJPYV1Y Cu
count	13509.000	count	13283.000
mean	156.887	mean	10.889
std	71.398	std	2.318
min	75.820	min	6.259
25%	108.050	25%	9.323
50%	121.280	50%	10.660
75%	217.200	75%	12.374
max	358.440	max	19.617

OLS Regression Results

Dep. Variable: y R-squared (uncentered): 0.981
 Model: OLS Adj. R-squared (uncentered): 0.981
 Method: Least Squares F-statistic: 7.089e+04
 Date: Sun, 20 Nov 2022 Prob (F-statistic): 0.00
 Time: 14:56:10 Log-Likelihood: -12173.
 No. Observations: 6740 AIC: 2.436e+04
 Df Residuals: 6735 BIC: 2.439e+04
 Df Model: 5
 Covariance Type: nonrobust

	coef	std err	t	P> t	[0.025	0.975]
x1	0.0173	0.001	32.858	0.000	0.016	0.018
x2	0.0837	0.007	11.194	0.000	0.069	0.098
x3	0.1450	0.011	13.715	0.000	0.124	0.166
x4	0.0545	0.009	6.122	0.000	0.037	0.072
x5	0.5913	0.013	45.189	0.000	0.566	0.617

Omnibus: 169.901 Durbin-Watson: 0.024
 Prob(Omnibus): 0.000 Jarque-Bera (JB): 173.735
 Skew: 0.372 Prob(JB): 1.88e-38
 Kurtosis: 2.745 Cond. No. 98.1

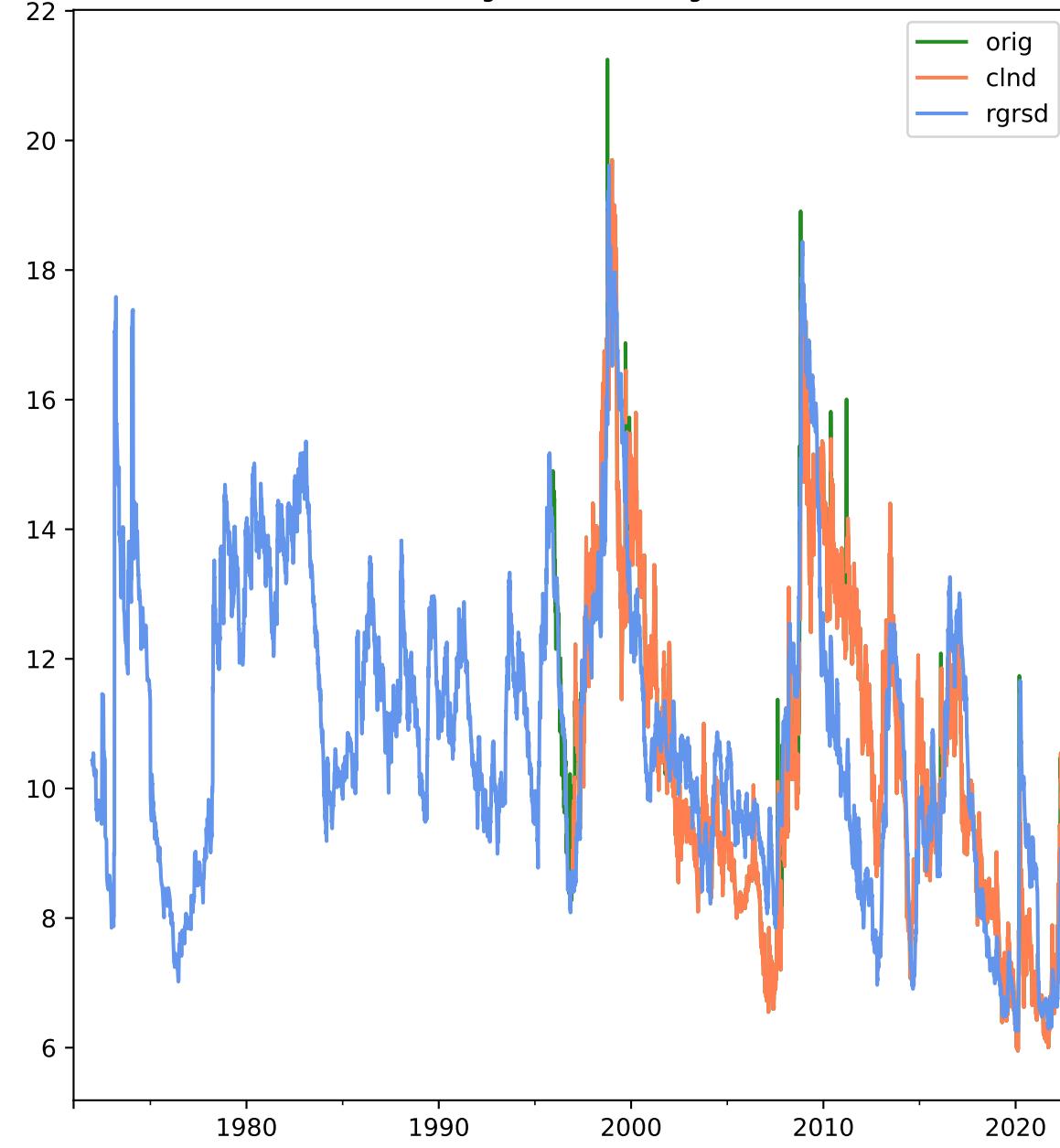
Notes:

- [1] R² is computed without centering (uncentered) since the model does not contain a constant.
- [2] Standard Errors assume that the covariance matrix of the errors is correctly specified.

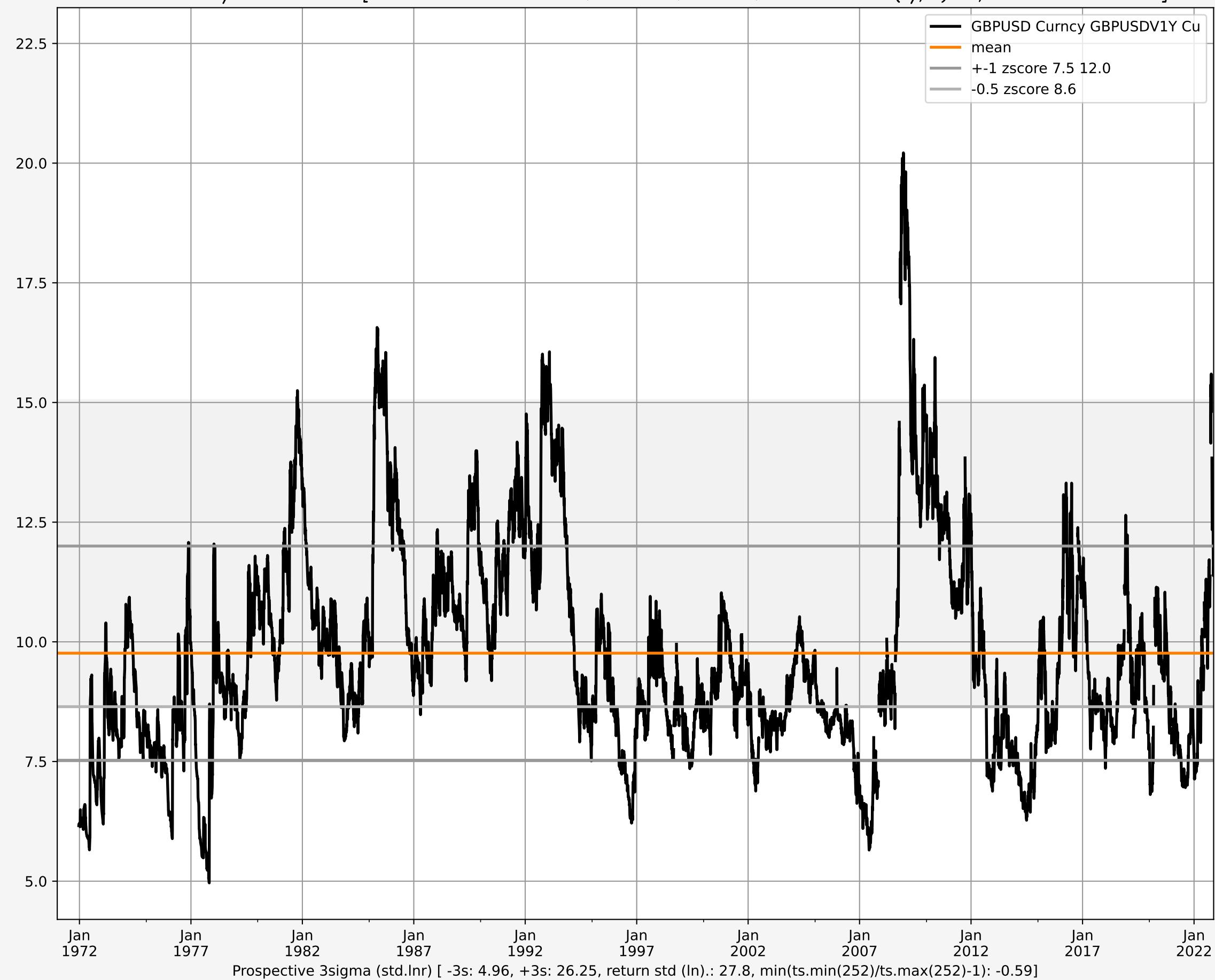
+-----ADF Test of Resids.: +4.228- {5% --2.8620, -1% --3.4313 -----+ | 0 || 0 |

USDJPY Curncy Stats	Value	USDJPYV1Y Cu Stats	Value
start	01-04-1971	start	12-22-1971
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	-0.608	total_return	0.197
cagr	-0.018	cagr	0.004
max_drawdown	-0.788	max_drawdown	-0.681
calmar	-0.023	calmar	0.005
mtd	-0.056	mtd	0.114
three_month	0.033	three_month	0.149
six_month	0.095	six_month	0.384
ytd	0.220	ytd	0.879
one_year	0.229	one_year	0.901
three_year	0.089	three_year	0.223
five_year	0.045	five_year	0.071
ten_year	0.056	ten_year	0.051
incep	-0.018	incep	0.004
daily_sharpe	-0.125	daily_sharpe	0.105
daily_sortino	-0.193	daily_sortino	0.276
daily_mean	-0.012	daily_mean	0.022
daily_vol	0.100	daily_vol	0.208
daily_skew	-0.556	daily_skew	26.260
daily_kurt	12.521	daily_kurt	1640.314
best_day	0.068	best_day	0.889
worst_day	-0.100	worst_day	-0.143
monthly_sharpe	-0.112	monthly_sharpe	0.128
monthly_sortino	-0.174	monthly_sortino	0.372
monthly_mean	-0.012	monthly_mean	0.036
monthly_vol	0.108	monthly_vol	0.285
monthly_skew	-0.345	monthly_skew	5.792
monthly_kurt	1.881	monthly_kurt	69.571
best_month	0.109	best_month	1.166
worst_month	-0.150	worst_month	-0.182
yearly_sharpe	-0.072	yearly_sharpe	0.132
yearly_sortino	-0.124	yearly_sortino	0.346
yearly_mean	-0.009	yearly_mean	0.037
yearly_vol	0.120	yearly_vol	0.281
yearly_skew	0.128	yearly_skew	1.032
yearly_kurt	-0.700	yearly_kurt	0.561
best_year	0.237	best_year	0.879
worst_year	-0.234	worst_year	-0.347
avg_drawdown	-0.394	avg_drawdown	-0.133
avg_drawdown_days	9469.500	avg_drawdown_days	1427.308
avg_up_month	0.022	avg_up_month	0.064
avg_down_month	-0.023	avg_down_month	-0.038
win_year_perc	0.431	win_year_perc	0.471
twelve_month_win_perc	0.436	twelve_month_win_perc	0.471

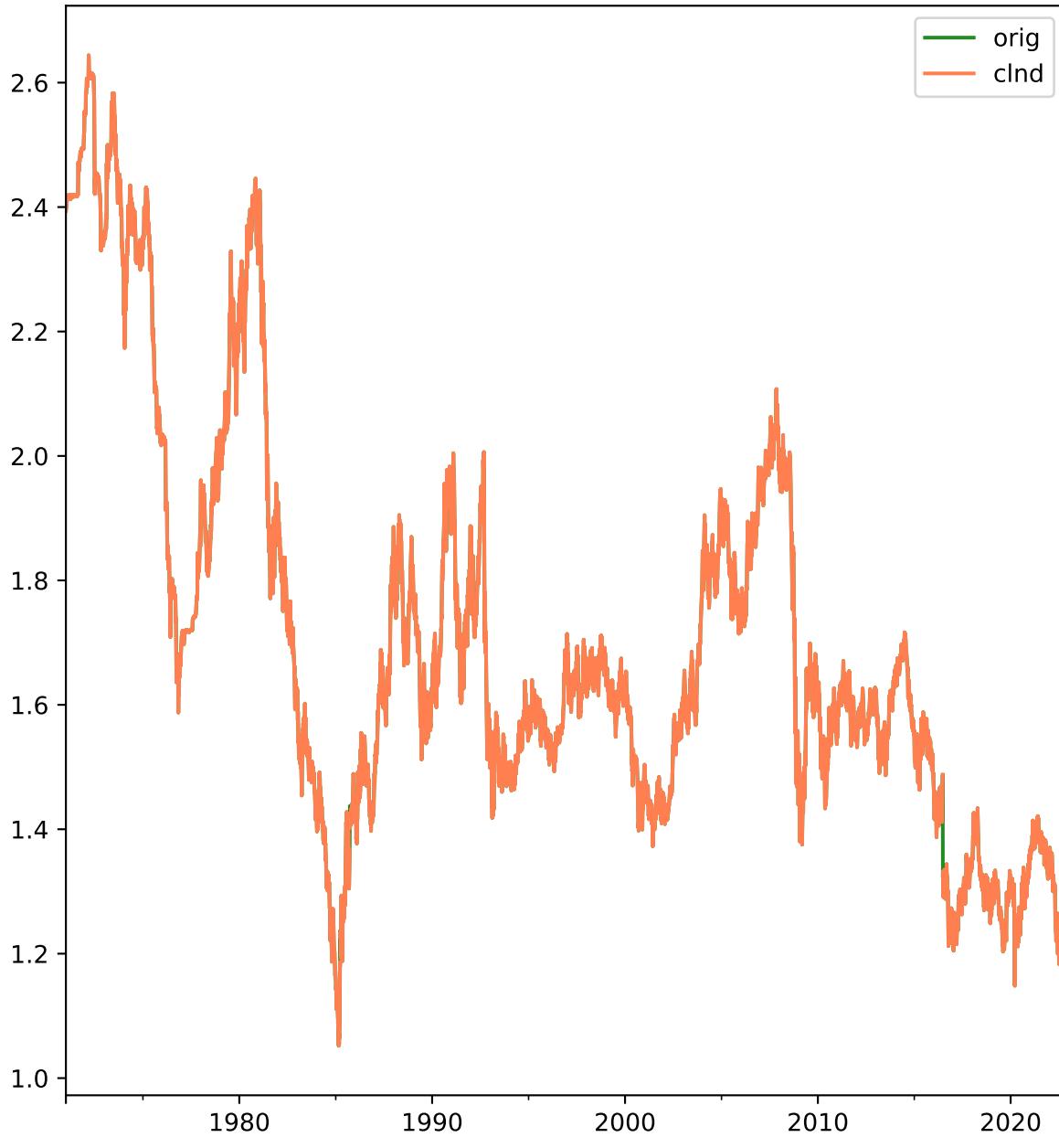
USDJPYV1Y Cu original, cleaned & regressed backfill



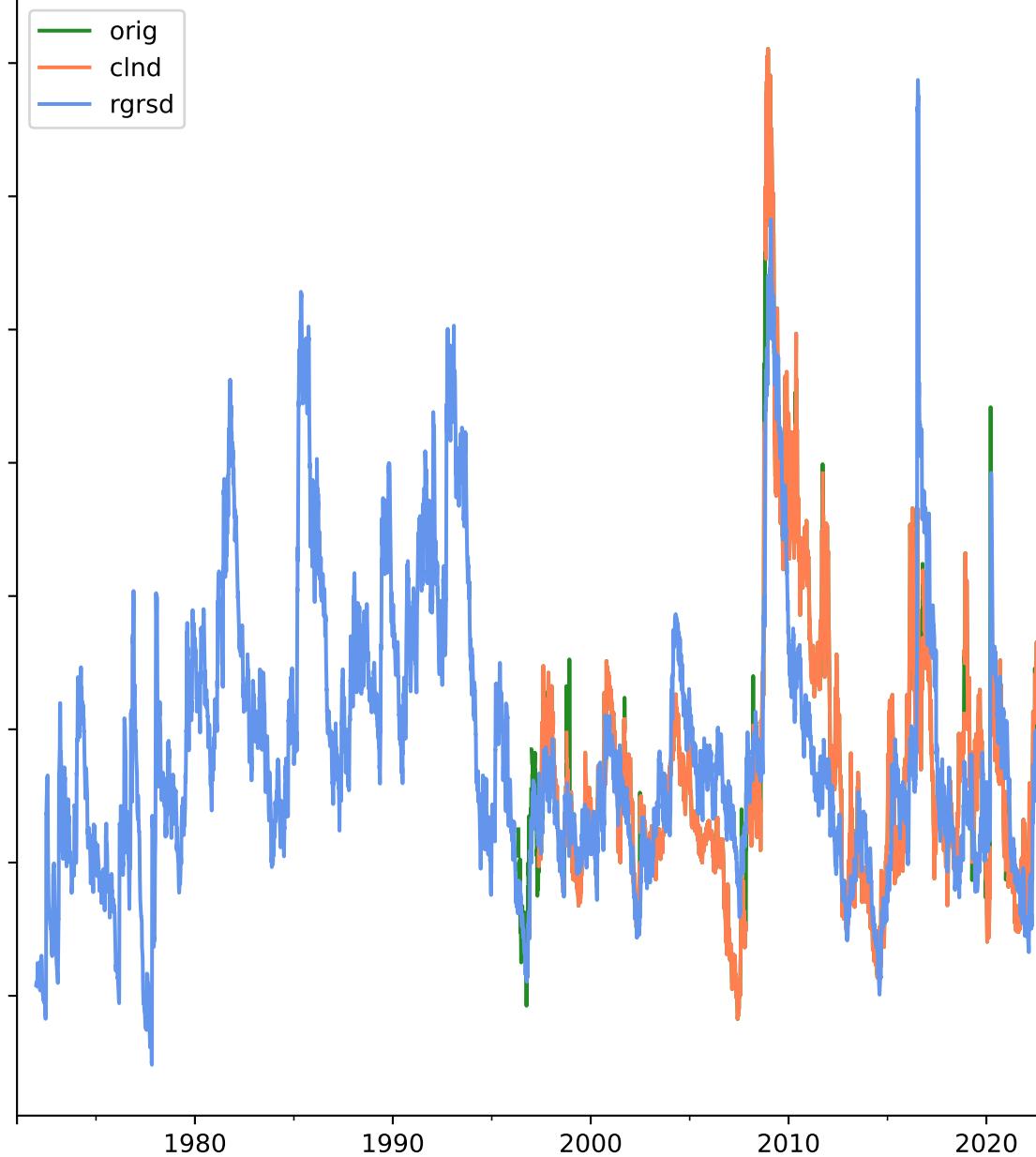
GBPUSD Curncy GBPUSDV1Y Cu [Retro. Stats -- last:11.41 max:20.21 min:4.96 mean:9.76 lvl std (1y,all):2.0,2.2 %-ile:78.4 Z:0.74]



GBPUSD Curncy original & cleaned data



GBPUSDV1Y Cu original, cleaned & regressed backfill



	GBPUSD Curncy		GBPUSDV1Y Cu
count	13526.000	count	13283.000
mean	1.701	mean	9.733
std	0.326	std	2.105
min	1.052	min	4.964
25%	1.492	25%	8.365
50%	1.623	50%	9.291
75%	1.851	75%	10.697
max	2.644	max	19.747

OLS Regression Results

Dep. Variable:	y	R-squared (uncentered):	0.979			
Model:	OLS	Adj. R-squared (uncentered):	0.979			
Method:	Least Squares	F-statistic:	6.101e+04			
Date:	Sun, 20 Nov 2022	Prob (F-statistic):	0.00			
Time:	14:56:13	Log-Likelihood:	-11665.			
No. Observations:	6624	AIC:	2.334e+04			
Df Residuals:	6619	BIC:	2.337e+04			
Df Model:	5	Covariance Type:	nonrobust			
<hr/>						
	coef	std err	t	P> t	[0.025	0.975]
x1	1.5781	0.035	45.209	0.000	1.510	1.647
x2	0.1775	0.008	21.654	0.000	0.161	0.194
x3	0.1985	0.011	17.393	0.000	0.176	0.221
x4	0.1045	0.010	10.949	0.000	0.086	0.123
x5	0.3245	0.014	23.115	0.000	0.297	0.352
<hr/>						
Omnibus:	538.177	Durbin-Watson:	0.027			
Prob(Omnibus):	0.000	Jarque-Bera (JB):	2724.936			
Skew:	-0.215	Prob(JB):	0.00			
Kurtosis:	6.113	Cond. No.	36.5			

Notes:

- [1] R^2 is computed without centering (uncentered) since the model does not contain a constant.
- [2] Standard Errors assume that the covariance matrix of the errors is correctly specified.

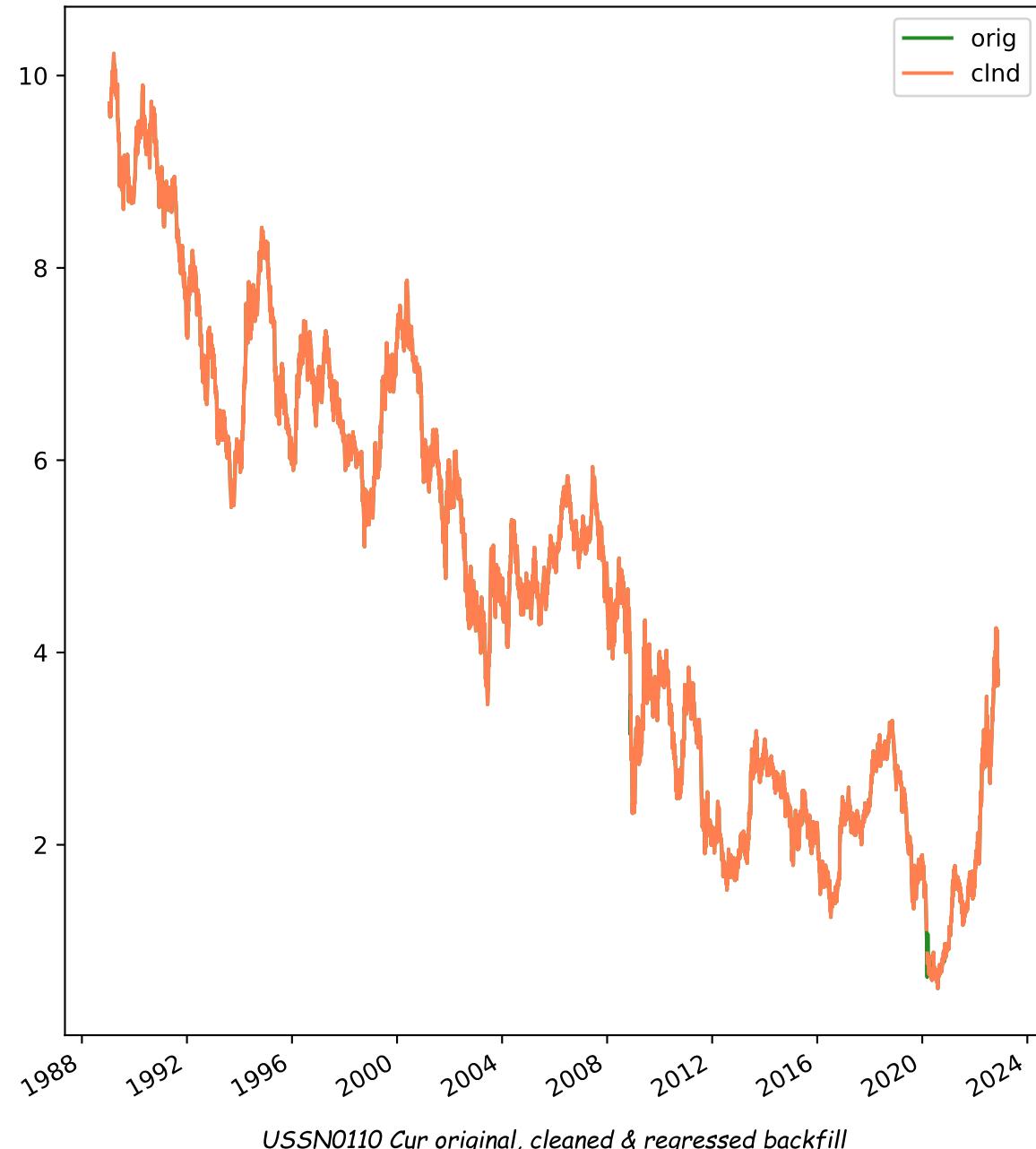
----- ADF-Test-of-Resids.: +5.675 -{5%} -2.8620, -1% -3.4313 -----

GBPUSD Curncy Stats	Value	GBPUSDV1Y Cu Stats	Value
start	01-04-1971	start	12-22-1971
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	-0.503	total_return	1.265
cagr	-0.013	cagr	0.016
max_drawdown	-0.602	max_drawdown	-0.663
calmar	-0.022	calmar	0.024
mtd	0.037	mtd	0.087
three_month	-0.003	three_month	0.500
six_month	-0.037	six_month	0.503
ytd	-0.121	ytd	0.951
one_year	-0.119	one_year	0.795
three_year	-0.028	three_year	0.196
five_year	-0.021	five_year	0.091
ten_year	-0.029	ten_year	0.067
incep	-0.013	incep	0.016
daily_sharpe	-0.092	daily_sharpe	0.179
daily_sortino	-0.145	daily_sortino	0.421
daily_mean	-0.009	daily_mean	0.049
daily_vol	0.094	daily_vol	0.276
daily_skew	-0.537	daily_skew	14.622
daily_kurt	10.872	daily_kurt	577.533
best_day	0.038	best_day	0.816
worst_day	-0.105	worst_day	-0.223
monthly_sharpe	-0.092	monthly_sharpe	0.195
monthly_sortino	-0.150	monthly_sortino	0.523
monthly_mean	-0.009	monthly_mean	0.069
monthly_vol	0.097	monthly_vol	0.355
monthly_skew	-0.052	monthly_skew	3.421
monthly_kurt	2.087	monthly_kurt	23.990
best_month	0.146	best_month	1.065
worst_month	-0.123	worst_month	-0.214
yearly_sharpe	-0.073	yearly_sharpe	0.169
yearly_sortino	-0.121	yearly_sortino	0.417
yearly_mean	-0.008	yearly_mean	0.042
yearly_vol	0.114	yearly_vol	0.249
yearly_skew	0.120	yearly_skew	1.273
yearly_kurt	0.072	yearly_kurt	2.792
best_year	0.272	best_year	0.951
worst_year	-0.265	worst_year	-0.309
avg_drawdown	-0.021	avg_drawdown	-0.098
avg_drawdown_days	607.806	avg_drawdown_days	361.824
avg_up_month	0.021	avg_up_month	0.081
avg_down_month	-0.021	avg_down_month	-0.052
win_year_perc	0.451	win_year_perc	0.569
twelve_month_win_perc	0.475	twelve_month_win_perc	0.491

USSW10 Curncy USSN0110 Cur [Retro. Stats -- last:117.30 max:182.38 min:54.03 mean:109.31 lvl std (1y,all):16.9,29.4 %-ile:57.1 Z:0.27]



USSW10 Curncy original & cleaned data



USSW10 Curncy		USSN0110 Cur	
count	8767.000	count	8535.000
mean	4.722	mean	109.223
std	2.337	std	26.720
min	0.506	min	60.947
25%	2.590	25%	85.232
50%	4.684	50%	107.272
75%	6.565	75%	126.823
max	10.230	max	182.379

OLS Regression Results

Dep. Variable: y R-squared (uncentered): 0.966
 Model: OLS Adj. R-squared (uncentered): 0.966
 Method: Least Squares F-statistic: 2.349e+04
 Date: Sun, 20 Nov 2022 Prob (F-statistic): 0.00
 Time: 14:56:15 Log-Likelihood: -17822.
 No. Observations: 4189 AIC: 3.565e+04
 Df Residuals: 4184 BIC: 3.569e+04
 Df Model: 5
 Covariance Type: nonrobust

	coef	std err	t	P> t	[0.025	0.975]
x1	17.2098	0.141	122.072	0.000	16.933	17.486
x2	0.2429	0.037	6.571	0.000	0.170	0.315
x3	0.2865	0.050	5.736	0.000	0.189	0.384
x4	-0.1156	0.039	-2.989	0.003	-0.191	-0.040
x5	0.7746	0.049	15.882	0.000	0.679	0.870

Omnibus:	71.004	Durbin-Watson:	0.012
Prob(Omnibus):	0.000	Jarque-Bera (JB):	80.940
Skew:	-0.271	Prob(JB):	2.66e-18
Kurtosis:	3.411	Cond. No.	40.7

Notes:
 [1] R² is computed without centering (uncentered) since the model does not contain a constant.
 [2] Standard Errors assume that the covariance matrix of the errors is correctly specified.

ADF Test of Resids.: 3.032 {5% -2.8622, 1% -3.4319} | 0

USSW10 Curncy Stats	Value	USSN0110 Cur Stats	Value
start	01-17-1989	start	02-02-1990
end	11-18-2022	end	11-18-2022
rf	0.000	rf	0.000
total_return	-0.607	total_return	-0.339
cagr	-0.027	cagr	-0.013
max_drawdown	-0.951	max_drawdown	-0.666
calmar	-0.029	calmar	-0.019
mtd	-0.068	mtd	-0.053
three_month	0.302	three_month	0.082
six_month	0.292	six_month	0.059
ytd	1.413	ytd	0.381
one_year	1.345	one_year	0.365
three_year	0.306	three_year	0.131
five_year	0.101	five_year	0.100
ten_year	0.087	ten_year	0.045
incep	-0.027	incep	-0.013
daily_sharpe	0.056	daily_sharpe	0.031
daily_sortino	0.091	daily_sortino	0.072
daily_mean	0.016	daily_mean	0.006
daily_vol	0.293	daily_vol	0.192
daily_skew	-0.095	daily_skew	2.333
daily_kurt	8.625	daily_kurt	14.585
best_day	0.130	best_day	0.156
worst_day	-0.226	worst_day	-0.071
monthly_sharpe	0.052	monthly_sharpe	0.035
monthly_sortino	0.090	monthly_sortino	0.071
monthly_mean	0.015	monthly_mean	0.007
monthly_vol	0.291	monthly_vol	0.204
monthly_skew	0.395	monthly_skew	0.875
monthly_kurt	3.678	monthly_kurt	1.928
best_month	0.361	best_month	0.254
worst_month	-0.359	worst_month	-0.169
yearly_sharpe	0.080	yearly_sharpe	0.008
yearly_sortino	0.208	yearly_sortino	0.015
yearly_mean	0.030	yearly_mean	0.001
yearly_vol	0.380	yearly_vol	0.165
yearly_skew	1.794	yearly_skew	0.353
yearly_kurt	4.596	yearly_kurt	-0.578
best_year	1.413	best_year	0.381
worst_year	-0.512	worst_year	-0.253
avg_drawdown	-0.197	avg_drawdown	-0.146
avg_drawdown_days	2467.000	avg_drawdown_days	2392.200
avg_up_month	0.062	avg_up_month	0.050
avg_down_month	-0.052	avg_down_month	-0.039
win_year_perc	0.394	win_year_perc	0.500
twelve_month_win_perc	0.407	twelve_month_win_perc	0.431