

1.)

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. dfuller spot, trend lag(1) regress
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Augmented Dickey-Fuller test for unit root			Number of obs	=	7682
Test Statistic	Interpolated Dickey-Fuller				
	1% Critical Value	5% Critical Value	10% Critical Value		
Z(t)	-2.438	-3.960	-3.410	-3.120	
MacKinnon approximate p-value for Z(t) = 0.3597					
D.spot	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
spot					
L1.	-.001489	.0006108	-2.44	0.015	-.0026862 -.0002917
LD.	.0440347	.0114011	3.86	0.000	.0216855 .0663839
_trend	.0000171	8.32e-06	2.05	0.040	7.62e-07 .0000334
_cons	.7447753	.302873	2.46	0.014	.1510615 1.338489

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. dfuller future, trend lag(1) regress
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Augmented Dickey-Fuller test for unit root				Number of obs	=	7682
Test Statistic	Interpolated Dickey-Fuller					
	1% Critical Value	5% Critical Value	10% Critical Value			
Z(t)	-2.563	-3.960	-3.410	-3.120		
MacKinnon approximate p-value for Z(t) = 0.2971						
D.future	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
future						
L1.	-.001768	.0006898	-2.56	0.010	-.0031202	-.0004159
LD.	-.0275938	.0114077	-2.42	0.016	-.0499561	-.0052315
_trend	.0000222	.00001	2.22	0.026	2.62e-06	.0000418
_cons	.86276	.3338726	2.58	0.010	.2082785	1.517241

The result shows p-value (of spot) = 0.3597 (more than 0.05) and p-value (of future) = 0.2971 (more than 0.05). We fail to reject null hypothesis of unit root. However, the trend for both spot and future are significant (p-value=0.04 and 0.026), respectively. Thus, the series of spot and future are non stationary series.

2.)

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. dfuller d.spot, trend lag(1) regress
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Augmented Dickey-Fuller test for unit root				Number of obs	=	7681
Test Statistic	Interpolated Dickey-Fuller					
	1% Critical Value	5% Critical Value	10% Critical Value			
Z(t)	-63.765	-3.960	-3.410	-3.120		
MacKinnon approximate p-value for Z(t) = 0.0000						

D2.spot	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
D.spot						
L1.	-1.005364	.0157667	-63.77	0.000	-1.036271	-.974457
LD.	.0508571	.011398	4.46	0.000	.0285139	.0732003
_trend	7.82e-07	4.94e-06	0.16	0.874	-8.90e-06	.0000105
_cons	.0088178	.0219189	0.40	0.687	-.0341492	.0517848

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. dfuller d.future, trend lag(1) regress
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Augmented Dickey-Fuller test for unit root Number of obs = **7681**

	Test Statistic	1% Critical Value	Interpolated Dickey-Fuller 5% Critical Value	10% Critical Value
Z(t)	-65.269	-3.960	-3.410	-3.120

MacKinnon approximate p-value for Z(t) = **0.0000**

D2.future	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
D.future					
L1.	-1.067592	.0163567	-65.27	0.000	-1.099655 -1.035528
LD.	.038008	.0114045	3.33	0.001	.0156522 .0603639
_trend	1.01e-06	5.59e-06	0.18	0.856	-9.94e-06 .000012
_cons	.0096235	.0247823	0.39	0.698	-.0389566 .0582036

From this, the series of spot and future are integrated of order 1. (stationary at order 1)

3.)

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. generate rspot=(spot/l.spot)-1
(1 missing value generated)

. generate rfuture=(future/l.future)-1
(1 missing value generated)

. dfuller rspot, trend lag(1) regress
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Augmented Dickey-Fuller test for unit root Number of obs = **7681**

	Test Statistic	1% Critical Value	Interpolated Dickey-Fuller 5% Critical Value	10% Critical Value
Z(t)	-63.787	-3.960	-3.410	-3.120

MacKinnon approximate p-value for Z(t) = **0.0000**

D.rspot	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
rspot					
L1.	-1.005168	.0157581	-63.79	0.000	-1.036058 -.9742776
LD.	.0517018	.0113974	4.54	0.000	.0293598 .0740439
_trend	9.56e-10	9.19e-09	0.10	0.917	-1.71e-08 1.90e-08
_cons	.0000199	.0000408	0.49	0.626	-.00006 .0000998

. dfuller rfuture, trend lag(1) regress					
Augmented Dickey-Fuller test for unit root			Number of obs	=	7681
Test Statistic	Interpolated Dickey-Fuller				
	1% Critical Value	5% Critical Value	10% Critical Value		
Z(t)	-65.070	-3.960	-3.410	-3.120	
MacKinnon approximate p-value for Z(t) = 0.0000					
D.rfuture	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
rfuture					
L1.	-1.063572	.0163449	-65.07	0.000	-1.095612 -1.031531
LD.	.03575	.0114053	3.13	0.002	.0133924 .0581076
_trend	1.17e-09	1.06e-08	0.11	0.912	-1.96e-08 2.19e-08
_cons	.0000231	.000047	0.49	0.624	-.0000691 .0001152

The MacKinnon p-value of spot and future are both significant with the p-value=0.0000&0.0000, respectively. Thus, series of the return of spot and the return of future are stationary.