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*Research article*

## **Stock returns and calendar anomalies on the London Stock Exchange in the dynamic perspective of the Adaptive Market Hypothesis: A study of FTSE100 & FTSE250 indices over a ten year period**

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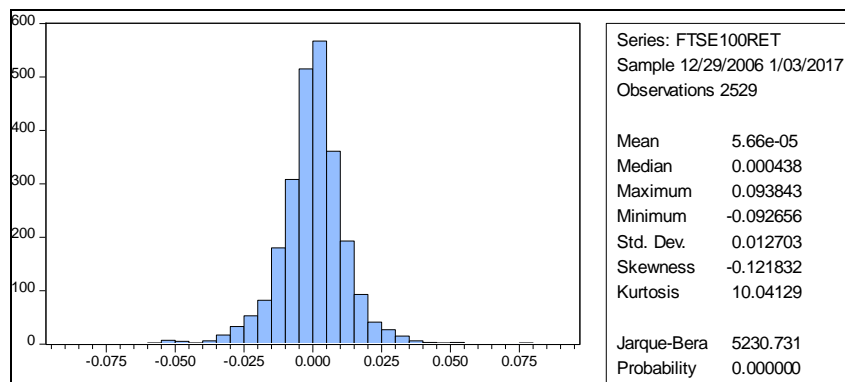
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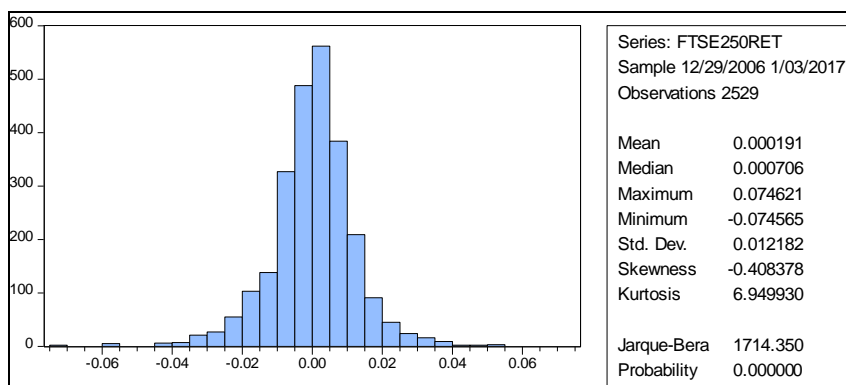
### **Appendix A**

#### **Descriptive statistics of data**

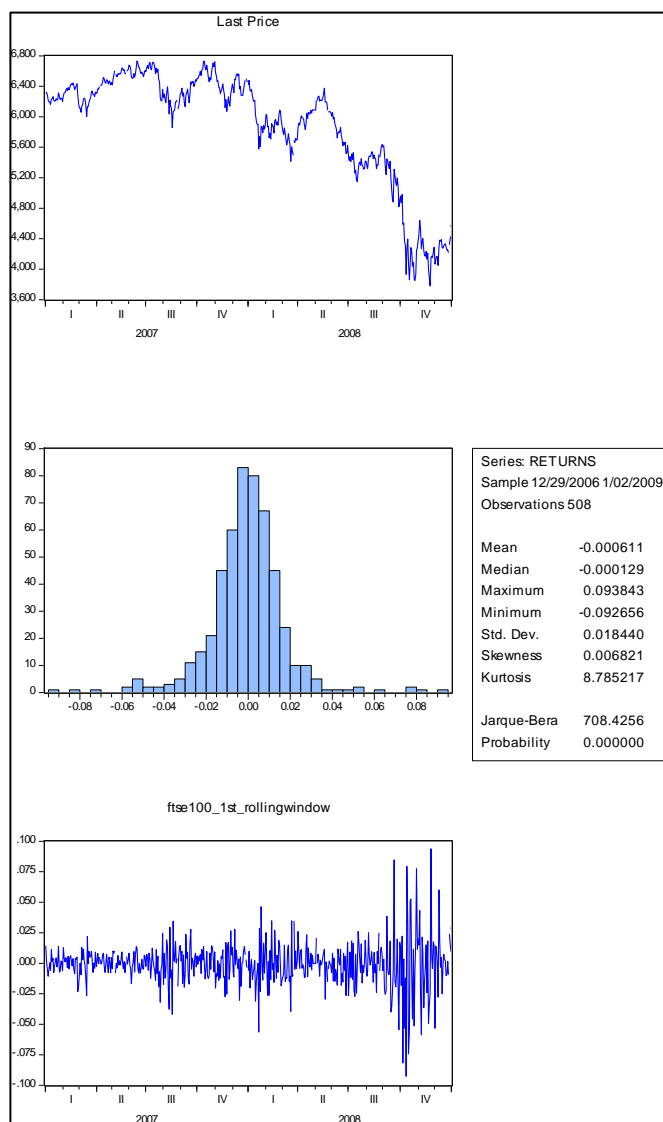
##### **FTSE100 distribution of returns 2007–2016**



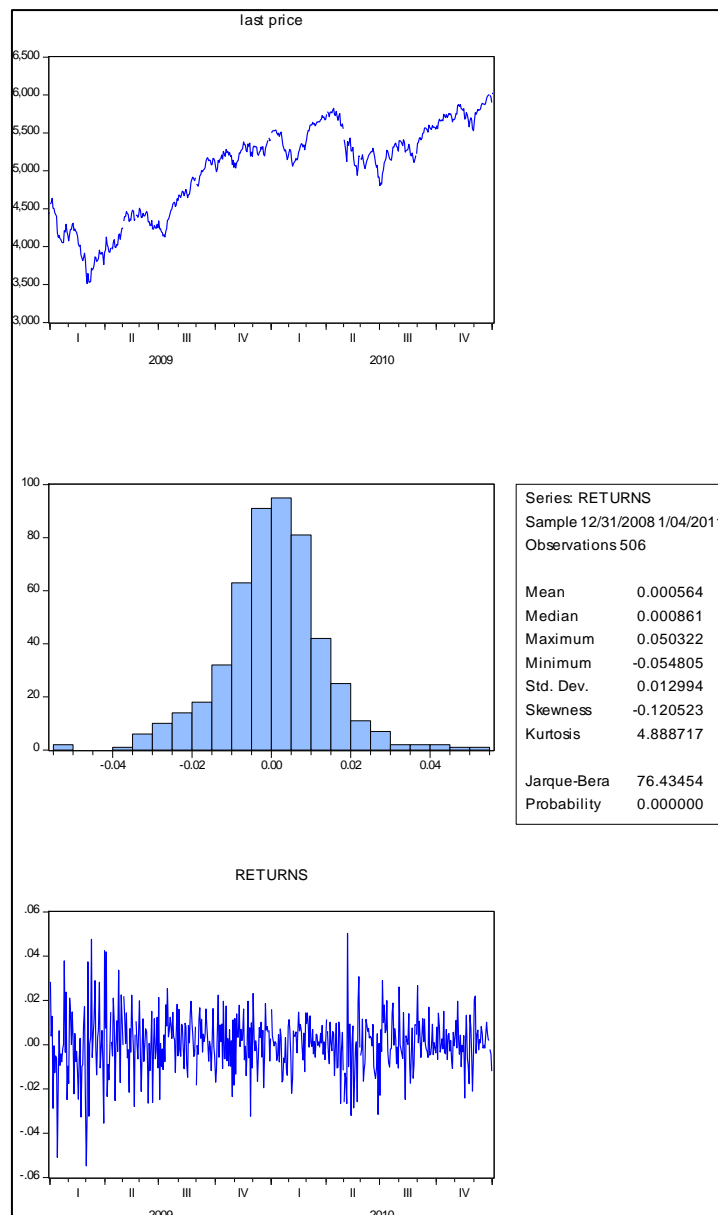
## FTSE250 distribution of returns 2007–2016



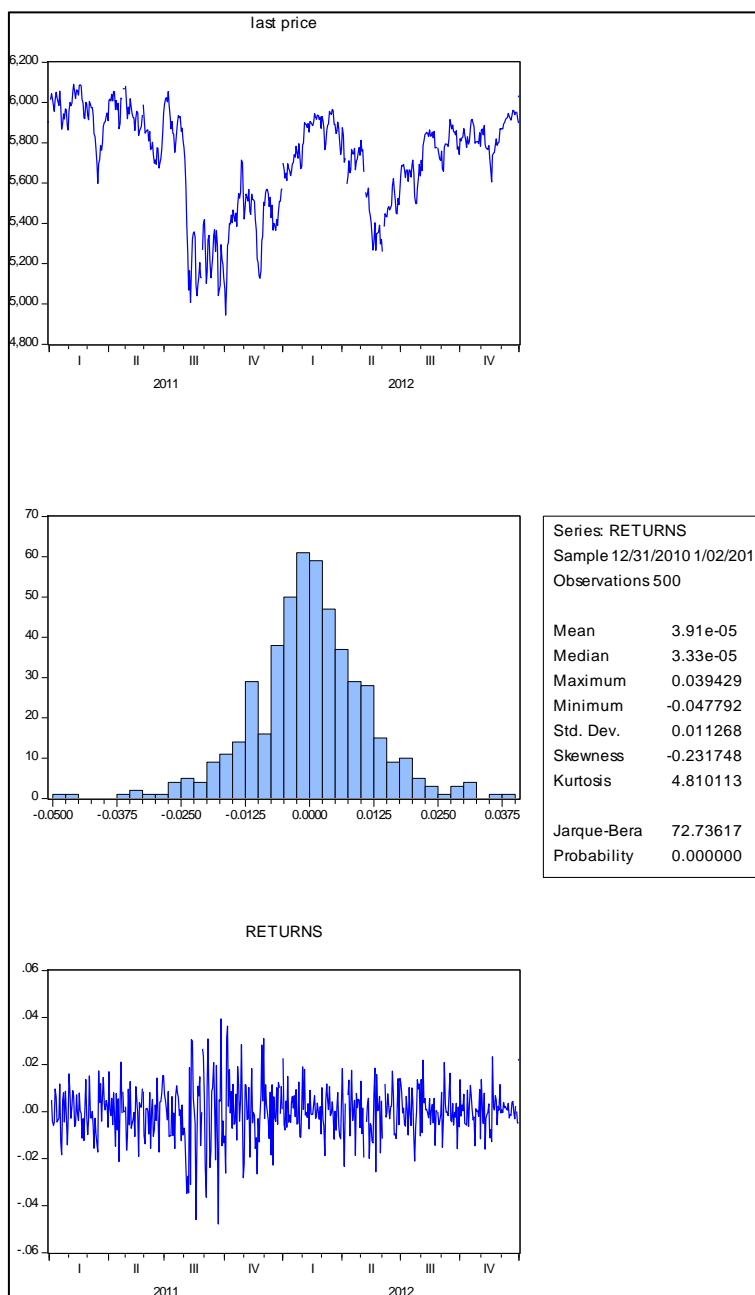
## 1<sup>ST</sup> SUB SAMPLE FTSE100

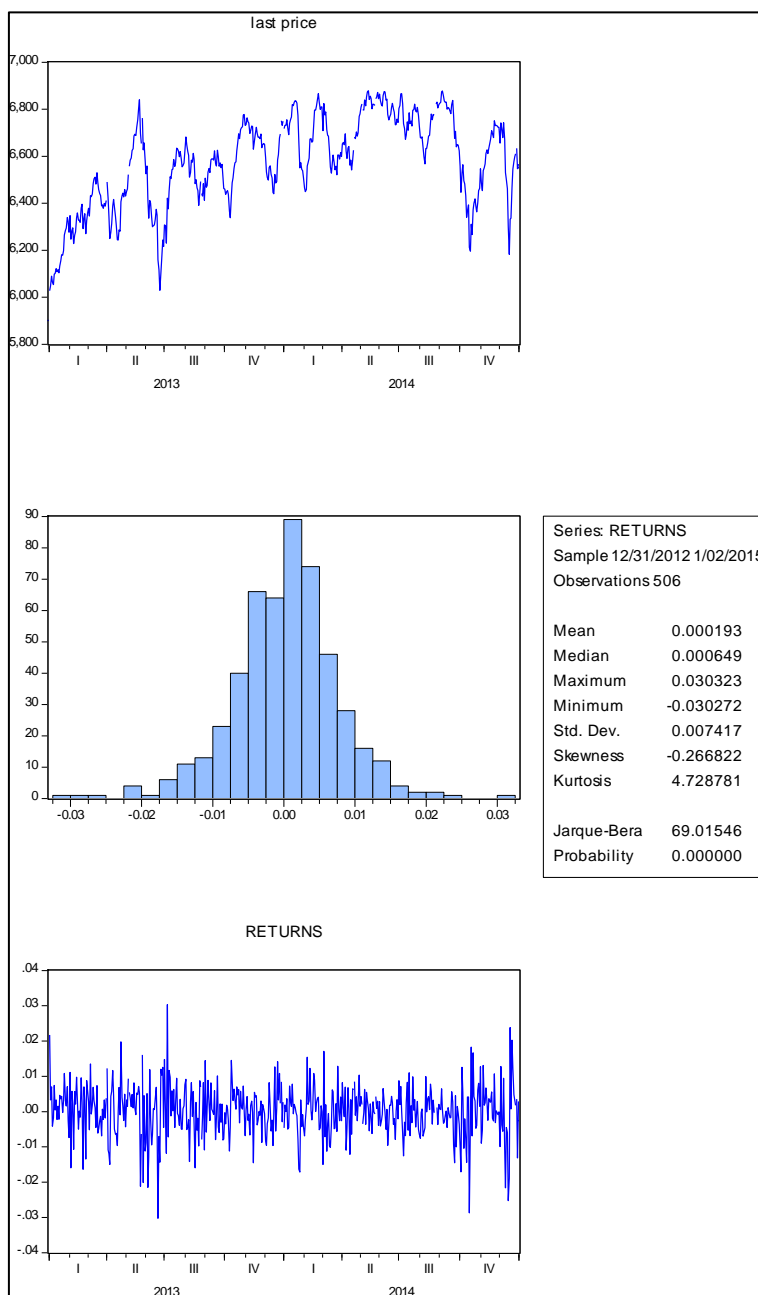


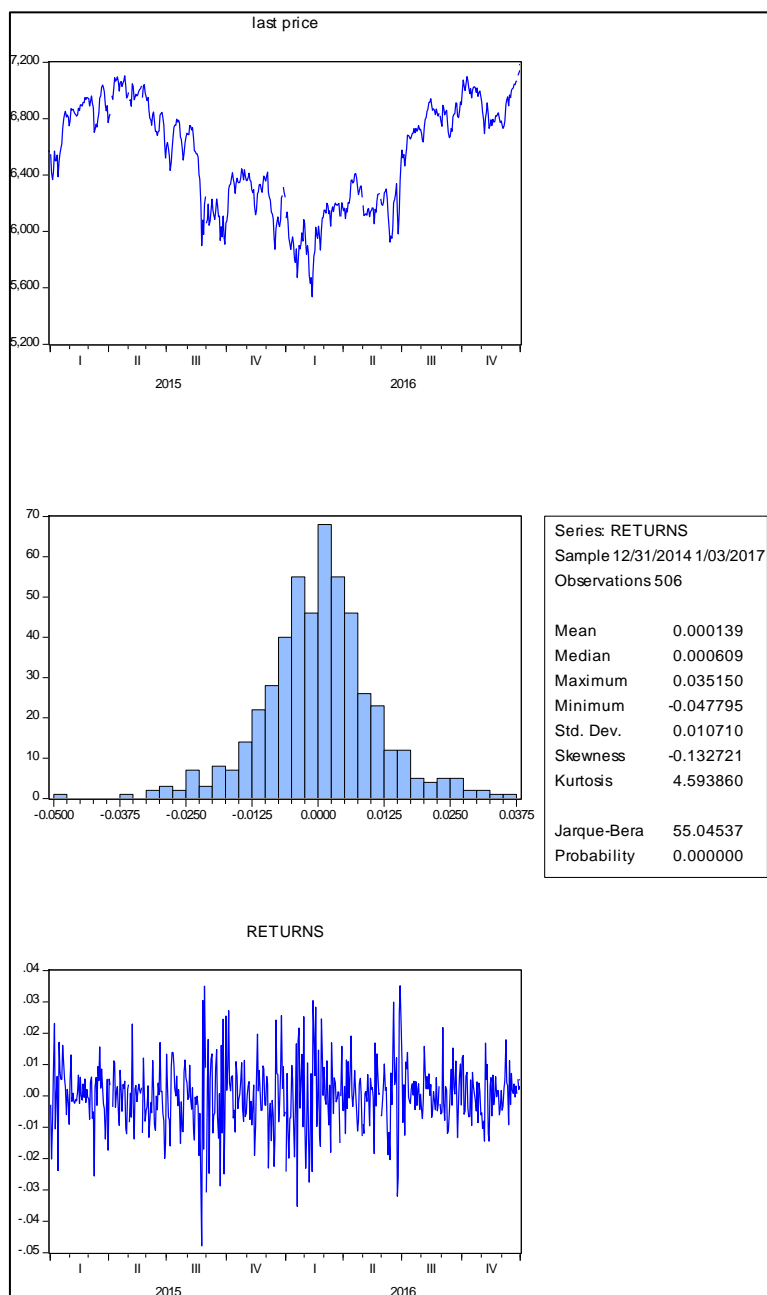
## 2<sup>ND</sup> SUB SAMPLE FTSE100



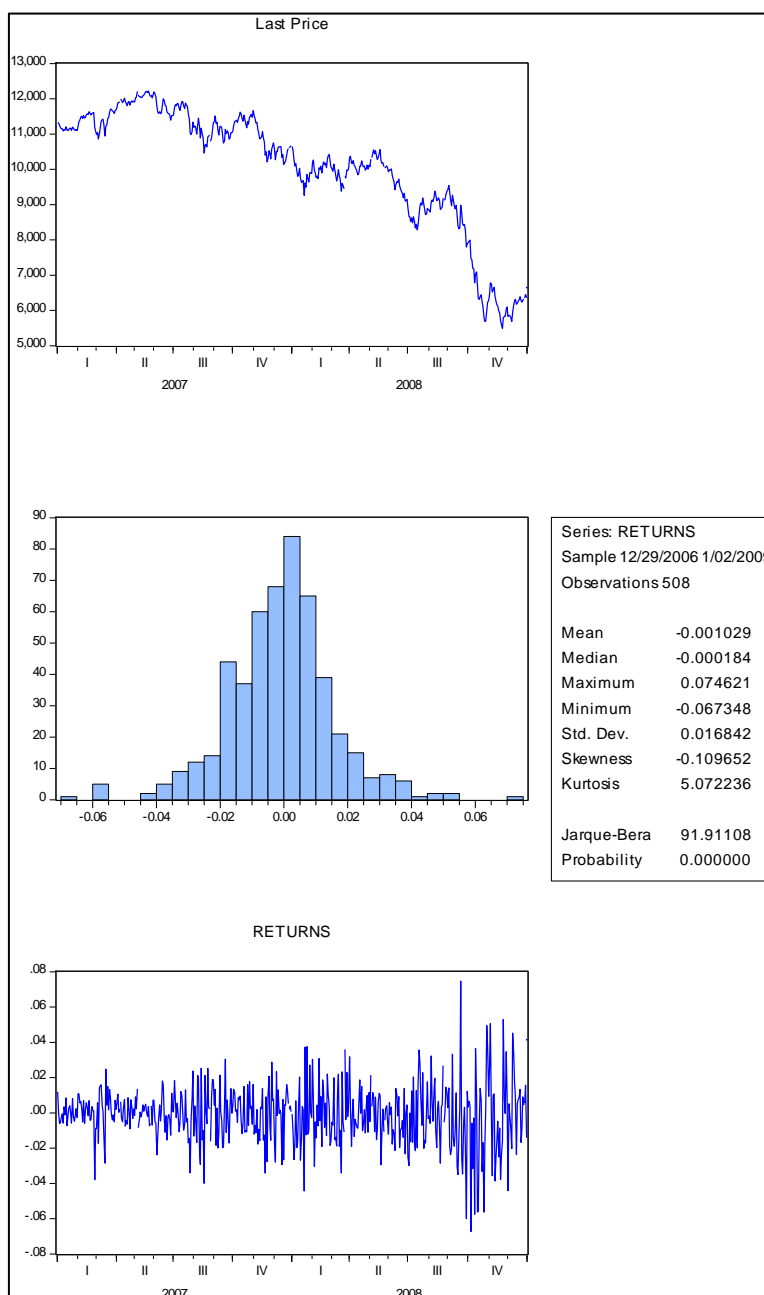
### 3<sup>RD</sup> SUB SAMPLE FTSE100

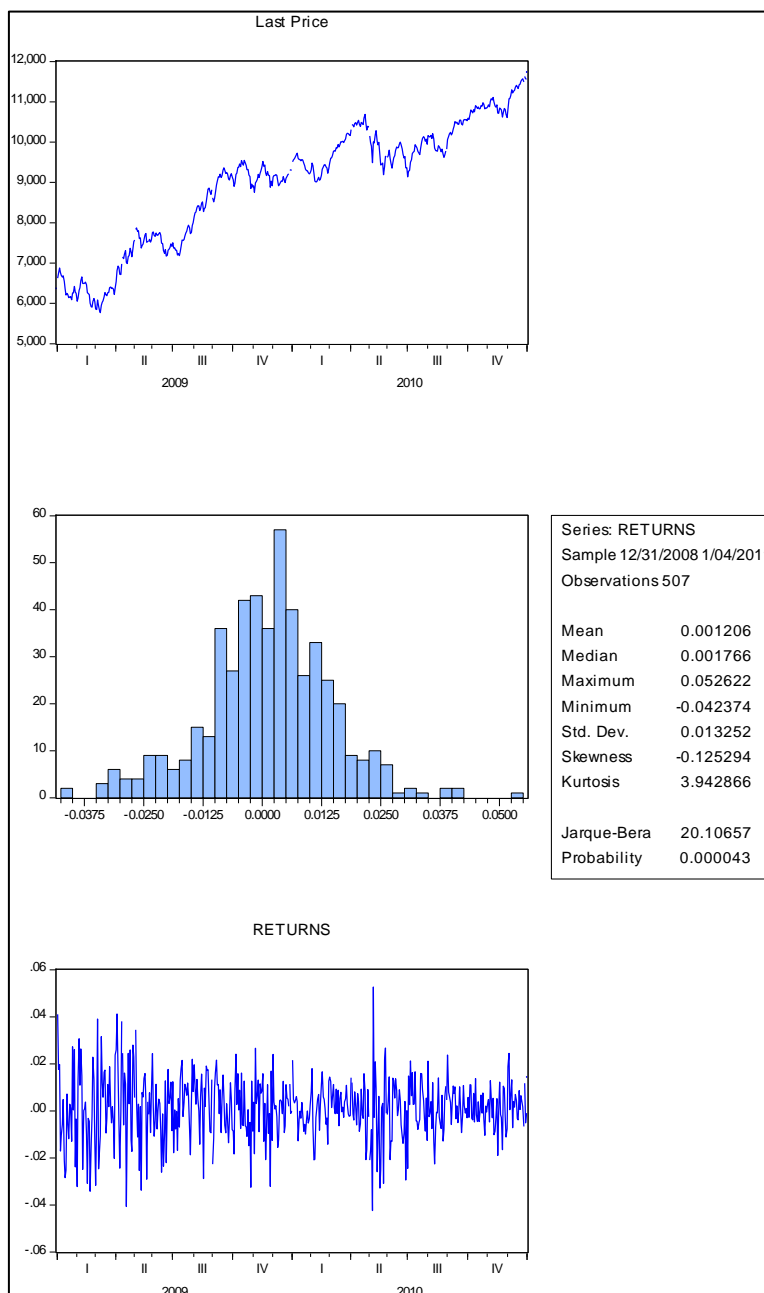


**4<sup>TH</sup> SUB SAMPLE FTSE100**

**5TH SUB SAMPLE FTSE100**

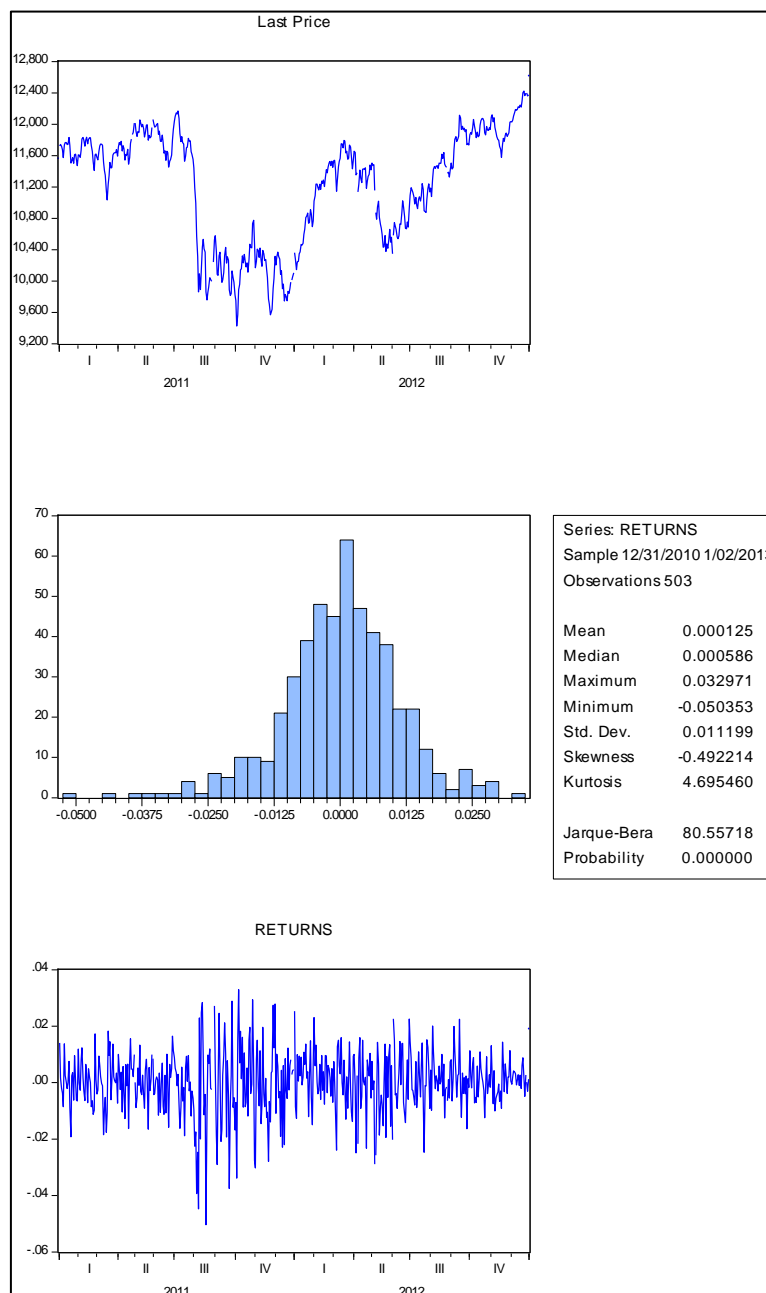
## 1<sup>ST</sup> SUB SAMPLE FTSE 250

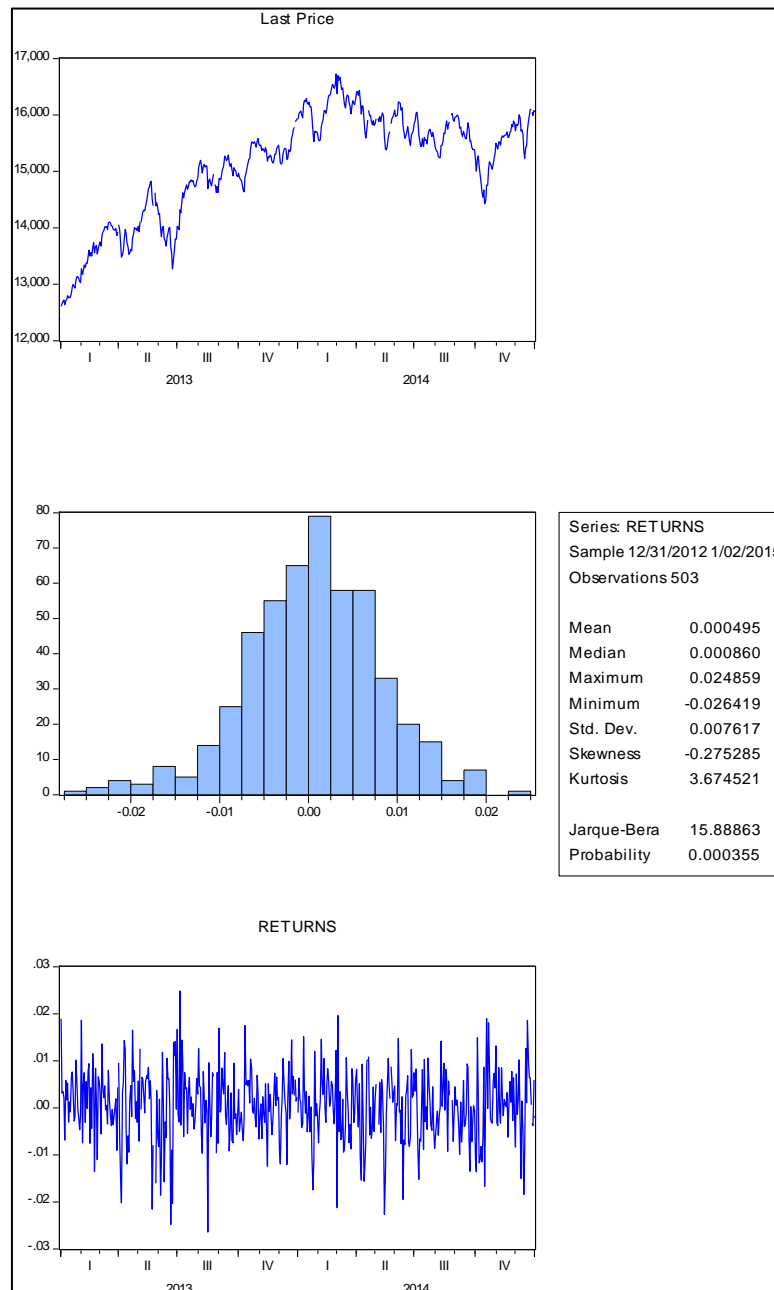


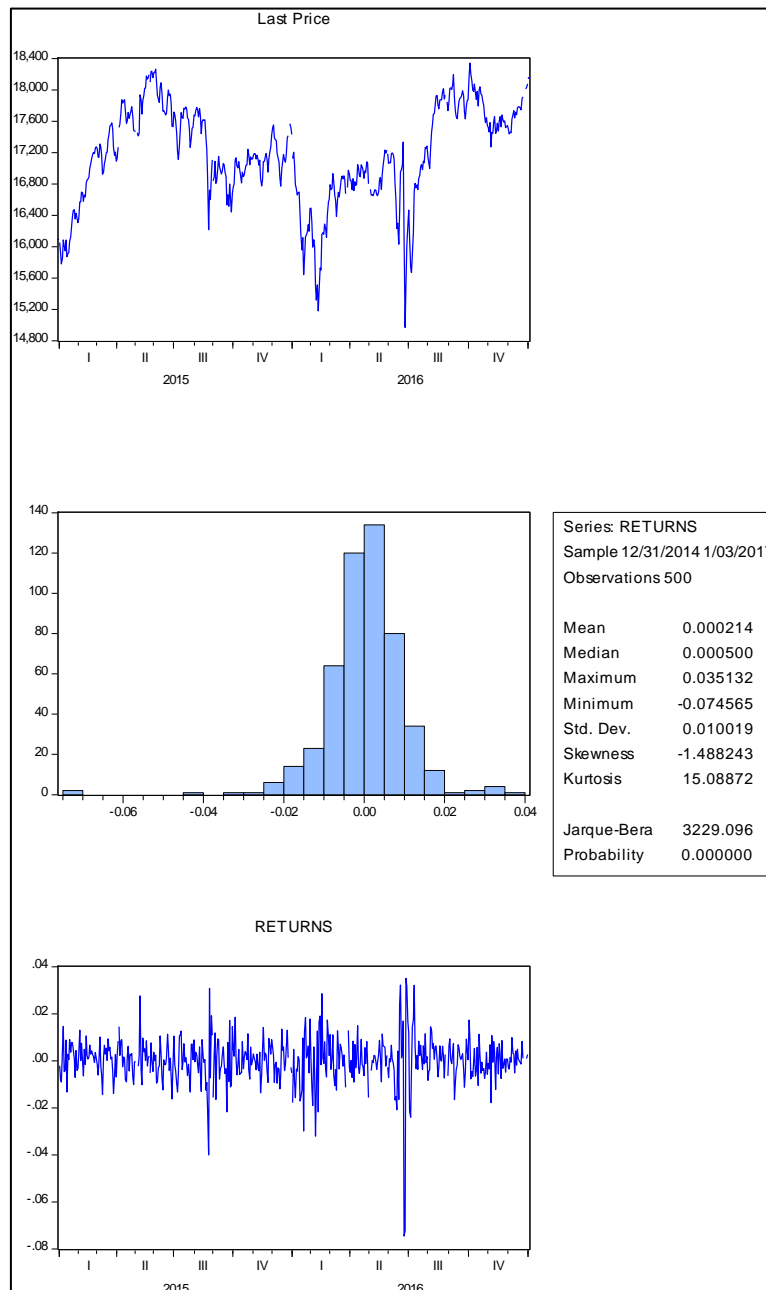
**2<sup>ND</sup> SUB SAMPLE FTSE 250**



### 3<sup>RD</sup> SUB SAMPLE FTSE 250



**4<sup>th</sup> SUB SAMPLE FTSE 250**

**5<sup>th</sup> SUB SAMPLE FTSE 250**

## Appendix B Unit Root tests

### Full Sample FTSE100

Null Hypothesis: D(FTSE100) has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=26)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-51.74483	0.0001
Test critical values: 1% level	-3.432743	
5% level	-2.862483	
10% level	-2.567317	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(FTSE100,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 12:11  
 Sample (adjusted): 1/03/2007 1/03/2017  
 Included observations: 2528 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE100(-1))	-1.028830	0.019883	-51.74483	0.0000
C	0.353470	1.357661	0.260352	0.7946
R-squared	0.514560	Mean dependent var		-0.021772
Adjusted R-squared	0.514368	S.D. dependent var		97.95353
S.E. of regression	68.26118	Akaike info criterion		11.28535
Sum squared resid	11770120	Schwarz criterion		11.28997
Log likelihood	-14262.68	Hannan-Quinn criter.		11.28703
F-statistic	2677.528	Durbin-Watson stat		2.002289
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE100) has a unit root  
 Exogenous: Constant  
 Bandwidth: 12 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-52.12335	0.0001
Test critical values:		
1% level	-3.432743	
5% level	-2.862483	
10% level	-2.567317	

\*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	4655.902
HAC corrected variance (Bartlett kernel)	3847.824

Phillips-Perron Test Equation  
 Dependent Variable: D(FTSE100,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 12:12  
 Sample (adjusted): 1/03/2007 1/03/2017  
 Included observations: 2528 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE100(-1))	-1.028830	0.019883	-51.74483	0.0000
C	0.353470	1.357661	0.260352	0.7946
R-squared	0.514560	Mean dependent var		-0.021772
Adjusted R-squared	0.514368	S.D. dependent var		97.95353
S.E. of regression	68.26118	Akaike info criterion		11.28535
Sum squared resid	11770120	Schwarz criterion		11.28997
Log likelihood	-14262.68	Hannan-Quinn criter.		11.28703
F-statistic	2677.528	Durbin-Watson stat		2.002289
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE100) is stationary  
 Exogenous: Constant  
 Bandwidth: 13 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.108229
Asymptotic critical values*:	
1% level	0.739000
5% level	0.463000
10% level	0.347000

\*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

Residual variance (no correction)	4661.119
HAC corrected variance (Bartlett kernel)	3618.001

KPSS Test Equation  
 Dependent Variable: D(FTSE100)  
 Method: Least Squares  
 Date: 01/21/20 Time: 12:13  
 Sample (adjusted): 1/02/2007 1/03/2017  
 Included observations: 2529 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.378446	1.357865	0.278707	0.7805
R-squared	0.000000	Mean dependent var		0.378446
Adjusted R-squared	0.000000	S.D. dependent var		68.28589
S.E. of regression	68.28589	Akaike info criterion		11.28568
Sum squared resid	11787970	Schwarz criterion		11.28799
Log likelihood	-14269.74	Hannan-Quinn criter.		11.28652
Durbin-Watson stat	2.056868			

## FTSE100 SS1 2007-2008

Null Hypothesis: D(FTSE100SS1) has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=18)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-24.97469	0.0000
Test critical values:		
1% level	-3.443021	
5% level	-2.867021	
10% level	-2.569751	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(FTSE100SS1,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 13:34  
 Sample (adjusted): 1/03/2007 1/02/2009  
 Included observations: 507 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE100SS1(-1))	-1.106142	0.044291	-24.97469	0.0000
C	-3.823957	4.147557	-0.921978	0.3570
R-squared	0.552597	Mean dependent var		0.074004
Adjusted R-squared	0.551711	S.D. dependent var		139.3829
S.E. of regression	93.32299	Akaike info criterion		11.91395
Sum squared resid	4398136.	Schwarz criterion		11.93063
Log likelihood	-3018.186	Hannan-Quinn criter.		11.92049
F-statistic	623.7353	Durbin-Watson stat		2.012113
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE100SS1) has a unit root  
 Exogenous: Constant  
 Bandwidth: 10 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-25.49727	0.0000
Test critical values:		
1% level	-3.443021	
5% level	-2.867021	
10% level	-2.569751	

\*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	8674.824
HAC corrected variance (Bartlett kernel)	6742.037

Phillips-Perron Test Equation  
 Dependent Variable: D(FTSE100SS1,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 13:35  
 Sample (adjusted): 1/03/2007 1/02/2009  
 Included observations: 507 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE100SS1(-1))	-1.106142	0.044291	-24.97469	0.0000
C	-3.823957	4.147557	-0.921978	0.3570
R-squared	0.552597	Mean dependent var		0.074004
Adjusted R-squared	0.551711	S.D. dependent var		139.3829
S.E. of regression	93.32299	Akaike info criterion		11.91395
Sum squared resid	4398136.	Schwarz criterion		11.93063
Log likelihood	-3018.186	Hannan-Quinn criter.		11.92049
F-statistic	623.7353	Durbin-Watson stat		2.012113
Prob(F-statistic)	0.000000			



Null Hypothesis: D(FTSE100SS1) is stationary  
 Exogenous: Constant  
 Bandwidth: 12 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.151767
Asymptotic critical values*:	
1% level	0.739000
5% level	0.463000
10% level	0.347000

\*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

Residual variance (no correction)	8773.403
HAC corrected variance (Bartlett kernel)	5714.688

KPSS Test Equation

Dependent Variable: D(FTSE100SS1)

Method: Least Squares

Date: 01/21/20 Time: 13:36

Sample (adjusted): 1/02/2007 1/02/2009

Included observations: 508 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.265768	4.159873	-0.785064	0.4328
R-squared	0.000000	Mean dependent var		-3.265768
Adjusted R-squared	0.000000	S.D. dependent var		93.75877
S.E. of regression	93.75877	Akaike info criterion		11.92129
Sum squared resid	4456889.	Schwarz criterion		11.92962
Log likelihood	-3027.009	Hannan-Quinn criter.		11.92456
Durbin-Watson stat	2.205656			

**FTSE100 SS2 -200910**

Null Hypothesis: D(FTSE100SS2) has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=18)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-22.89138	0.0000
Test critical values:		
1% level	-3.443046	
5% level	-2.867032	
10% level	-2.569757	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(FTSE100SS2,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 19:11  
 Sample (adjusted): 1/05/2009 1/04/2011  
 Included observations: 506 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE100SS2(-1))	-1.018617	0.044498	-22.89138	0.0000
C	2.923652	2.725052	1.072880	0.2838
R-squared	0.509735	Mean dependent var		-0.027055
Adjusted R-squared	0.508762	S.D. dependent var		87.36103
S.E. of regression	61.22991	Akaike info criterion		11.07109
Sum squared resid	1889547.	Schwarz criterion		11.08780
Log likelihood	-2798.987	Hannan-Quinn criter.		11.07765
F-statistic	524.0154	Durbin-Watson stat		1.995623
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE100SS2) has a unit root  
 Exogenous: Constant  
 Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-22.89161	0.0000
Test critical values:		
1% level	-3.443046	
5% level	-2.867032	
10% level	-2.569757	

\*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	3734.283
HAC corrected variance (Bartlett kernel)	3730.272

Phillips-Perron Test Equation  
 Dependent Variable: D(FTSE100SS2,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 19:12  
 Sample (adjusted): 1/05/2009 1/04/2011  
 Included observations: 506 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE100SS2(-1))	-1.018617	0.044498	-22.89138	0.0000
C	2.923652	2.725052	1.072880	0.2838
R-squared	0.509735	Mean dependent var		-0.027055
Adjusted R-squared	0.508762	S.D. dependent var		87.36103
S.E. of regression	61.22991	Akaike info criterion		11.07109
Sum squared resid	1889547.	Schwarz criterion		11.08780
Log likelihood	-2798.987	Hannan-Quinn criter.		11.07765
F-statistic	524.0154	Durbin-Watson stat		1.995623
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE100SS2) is stationary  
 Exogenous: Constant  
 Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.071049
Asymptotic critical values*:	
1% level	0.739000
5% level	0.463000
10% level	0.347000

\*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

Residual variance (no correction)	3758.847
HAC corrected variance (Bartlett kernel)	3758.847

KPSS Test Equation  
 Dependent Variable: D(FTSE100SS2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 19:13  
 Sample (adjusted): 1/02/2009 1/04/2011  
 Included observations: 507 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.115779	2.725537	1.143180	0.2535
R-squared	0.000000	Mean dependent var		3.115779
Adjusted R-squared	0.000000	S.D. dependent var		61.36999
S.E. of regression	61.36999	Akaike info criterion		11.07369
Sum squared resid	1905735.	Schwarz criterion		11.08203
Log likelihood	-2806.180	Hannan-Quinn criter.		11.07696
Durbin-Watson stat	2.022387			

## FTSE100 ss3 2011-2012

Null Hypothesis: D(FTSE100SS3) has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=17)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-21.47349	0.0000
Test critical values:		
1% level	-3.443123	
5% level	-2.867066	
10% level	-2.569775	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(FTSE100SS3,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 19:36  
 Sample (adjusted): 1/05/2011 1/02/2013  
 Included observations: 503 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE100SS3(-1))	-0.959506	0.044683	-21.47349	0.0000
C	0.027010	2.794018	0.009667	0.9923
R-squared	0.479270	Mean dependent var		0.031074
Adjusted R-squared	0.478230	S.D. dependent var		86.75088
S.E. of regression	62.66330	Akaike info criterion		11.11740
Sum squared resid	1967271.	Schwarz criterion		11.13418
Log likelihood	-2794.025	Hannan-Quinn criter.		11.12398
F-statistic	461.1106	Durbin-Watson stat		1.990911
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE100SS3) has a unit root  
 Exogenous: Constant  
 Bandwidth: 12 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-21.70468	0.0000
Test critical values:		
1% level	-3.443123	
5% level	-2.867066	
10% level	-2.569775	

\*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	3911.076
HAC corrected variance (Bartlett kernel)	2632.632

Phillips-Perron Test Equation  
 Dependent Variable: D(FTSE100SS3,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 19:36  
 Sample (adjusted): 1/05/2011 1/02/2013  
 Included observations: 503 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE100SS3(-1))	-0.959506	0.044683	-21.47349	0.0000
C	0.027010	2.794018	0.009667	0.9923
R-squared	0.479270	Mean dependent var		0.031074
Adjusted R-squared	0.478230	S.D. dependent var		86.75088
S.E. of regression	62.66330	Akaike info criterion		11.11740
Sum squared resid	1967271.	Schwarz criterion		11.13418
Log likelihood	-2794.025	Hannan-Quinn criter.		11.12398
F-statistic	461.1106	Durbin-Watson stat		1.990911
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE100SS3) is stationary  
 Exogenous: Constant  
 Bandwidth: 11 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.087951
Asymptotic critical values*:	
1% level	0.739000
5% level	0.463000
10% level	0.347000

\*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

Residual variance (no correction)	3935.405
HAC corrected variance (Bartlett kernel)	2916.507

KPSS Test Equation  
 Dependent Variable: D(FTSE100SS3)  
 Method: Least Squares  
 Date: 01/21/20 Time: 19:37  
 Sample (adjusted): 1/04/2011 1/02/2013  
 Included observations: 504 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.252837	2.797118	0.090392	0.9280
R-squared	0.000000	Mean dependent var		0.252837
Adjusted R-squared	0.000000	S.D. dependent var		62.79513
S.E. of regression	62.79513	Akaike info criterion		11.11961
Sum squared resid	1983444.	Schwarz criterion		11.12799
Log likelihood	-2801.143	Hannan-Quinn criter.		11.12290
Durbin-Watson stat	1.904722			

## FTSE100 ss4 2013-2014

Null Hypothesis: D(FTSE100SS4) has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=18)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-22.70237	0.0000
Test critical values:		
1% level	-3.443046	
5% level	-2.867032	
10% level	-2.569757	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(FTSE100SS4,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 19:53  
 Sample (adjusted): 1/03/2013 1/02/2015  
 Included observations: 506 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE100SS4(-1))	-1.004258	0.044236	-22.70237	0.0000
C	1.034142	2.128994	0.485742	0.6274
R-squared	0.505590	Mean dependent var		-0.292194
Adjusted R-squared	0.504609	S.D. dependent var		68.01617
S.E. of regression	47.87249	Akaike info criterion		10.57890
Sum squared resid	1155055.	Schwarz criterion		10.59561
Log likelihood	-2674.463	Hannan-Quinn criter.		10.58546
F-statistic	515.3976	Durbin-Watson stat		2.003621
Prob(F-statistic)	0.000000			



Null Hypothesis: D(FTSE100SS4) has a unit root  
 Exogenous: Constant  
 Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-22.70277	0.0000
Test critical values:		
1% level	-3.443046	
5% level	-2.867032	
10% level	-2.569757	

\*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	2282.717
HAC corrected variance (Bartlett kernel)	2277.843

Phillips-Perron Test Equation  
 Dependent Variable: D(FTSE100SS4,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 19:54  
 Sample (adjusted): 1/03/2013 1/02/2015  
 Included observations: 506 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE100SS4(-1))	-1.004258	0.044236	-22.70237	0.0000
C	1.034142	2.128994	0.485742	0.6274
R-squared	0.505590	Mean dependent var		-0.292194
Adjusted R-squared	0.504609	S.D. dependent var		68.01617
S.E. of regression	47.87249	Akaike info criterion		10.57890
Sum squared resid	1155055.	Schwarz criterion		10.59561
Log likelihood	-2674.463	Hannan-Quinn criter.		10.58546
F-statistic	515.3976	Durbin-Watson stat		2.003621
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE100SS4) is stationary  
 Exogenous: Constant  
 Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.133601
Asymptotic critical values*:	
1% level	0.739000
5% level	0.463000
10% level	0.347000

\*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

Residual variance (no correction)	2310.777
HAC corrected variance (Bartlett kernel)	2310.777

KPSS Test Equation

Dependent Variable: D(FTSE100SS4)

Method: Least Squares

Date: 01/21/20 Time: 19:54

Sample (adjusted): 1/02/2013 1/02/2015

Included observations: 507 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.282032	2.136996	0.599922	0.5488
R-squared	0.000000	Mean dependent var		1.282032
Adjusted R-squared	0.000000	S.D. dependent var		48.11802
S.E. of regression	48.11802	Akaike info criterion		10.58716
Sum squared resid	1171564.	Schwarz criterion		10.59550
Log likelihood	-2682.845	Hannan-Quinn criter.		10.59043
Durbin-Watson stat	1.994150			

## FTSE100ss5 2015-2016

Null Hypothesis: D(FTSE100SS5) has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=18)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-21.67450	0.0000
Test critical values:		
1% level	-3.443046	
5% level	-2.867032	
10% level	-2.569757	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(FTSE100SS5,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 20:09  
 Sample (adjusted): 1/05/2015 1/03/2017  
 Included observations: 506 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE100SS5(-1))	-0.965029	0.044524	-21.67450	0.0000
C	1.205378	3.004823	0.401148	0.6885
R-squared	0.482431	Mean dependent var		0.105435
Adjusted R-squared	0.481405	S.D. dependent var		93.84645
S.E. of regression	67.58218	Akaike info criterion		11.26851
Sum squared resid	2301945.	Schwarz criterion		11.28522
Log likelihood	-2848.933	Hannan-Quinn criter.		11.27506
F-statistic	469.7841	Durbin-Watson stat		1.990173
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE100SS5) has a unit root  
 Exogenous: Constant  
 Bandwidth: 17 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-22.15540	0.0000
Test critical values:		
1% level	-3.443046	
5% level	-2.867032	
10% level	-2.569757	

\*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	4549.299
HAC corrected variance (Bartlett kernel)	2753.802

Phillips-Perron Test Equation  
 Dependent Variable: D(FTSE100SS5,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 20:10  
 Sample (adjusted): 1/05/2015 1/03/2017  
 Included observations: 506 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE100SS5(-1))	-0.965029	0.044524	-21.67450	0.0000
C	1.205378	3.004823	0.401148	0.6885
R-squared	0.482431	Mean dependent var		0.105435
Adjusted R-squared	0.481405	S.D. dependent var		93.84645
S.E. of regression	67.58218	Akaike info criterion		11.26851
Sum squared resid	2301945.	Schwarz criterion		11.28522
Log likelihood	-2848.933	Hannan-Quinn criter.		11.27506
F-statistic	469.7841	Durbin-Watson stat		1.990173
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE100SS5) is stationary  
 Exogenous: Constant  
 Bandwidth: 16 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.192030
Asymptotic critical values*:	
1% level	0.739000
5% level	0.463000
10% level	0.347000

\*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

Residual variance (no correction)	4546.634
HAC corrected variance (Bartlett kernel)	3002.071

KPSS Test Equation  
 Dependent Variable: D(FTSE100SS5)  
 Method: Least Squares  
 Date: 01/21/20 Time: 20:10  
 Sample (adjusted): 1/02/2015 1/03/2017  
 Included observations: 507 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.206706	2.997573	0.402561	0.6874
R-squared	0.000000	Mean dependent var		1.206706
Adjusted R-squared	0.000000	S.D. dependent var		67.49533
S.E. of regression	67.49533	Akaike info criterion		11.26396
Sum squared resid	2305144.	Schwarz criterion		11.27230
Log likelihood	-2854.415	Hannan-Quinn criter.		11.26724
Durbin-Watson stat	1.929433			

## FTSE250 Full sample

Null Hypothesis: D(FTSE250) has a unit root  
 Exogenous: Constant  
 Lag Length: 1 (Automatic - based on SIC, maxlag=26)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-36.03879	0.0000
Test critical values:		
1% level	-3.432744	
5% level	-2.862484	
10% level	-2.567317	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(FTSE250,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 12:22  
 Sample (adjusted): 1/04/2007 1/03/2017  
 Included observations: 2527 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE250(-1))	-0.967782	0.026854	-36.03879	0.0000
D(FTSE250(-1),2)	0.059611	0.019867	3.000587	0.0027
C	2.616551	2.660092	0.983632	0.3254
R-squared	0.458578	Mean dependent var		0.023787
Adjusted R-squared	0.458149	S.D. dependent var		181.5927
S.E. of regression	133.6714	Akaike info criterion		12.62983
Sum squared resid	45098944	Schwarz criterion		12.63676
Log likelihood	-15954.79	Hannan-Quinn criter.		12.63235
F-statistic	1068.898	Durbin-Watson stat		2.003057
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE250) has a unit root  
 Exogenous: Constant  
 Bandwidth: 18 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-46.06155	0.0001
Test critical values:		
1% level	-3.432743	
5% level	-2.862483	
10% level	-2.567317	

\*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	17903.46
HAC corrected variance (Bartlett kernel)	12801.12

Phillips-Perron Test Equation  
 Dependent Variable: D(FTSE250,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 12:23  
 Sample (adjusted): 1/03/2007 1/03/2017  
 Included observations: 2528 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE250(-1))	-0.913365	0.019819	-46.08536	0.0000
C	2.464535	2.662817	0.925536	0.3548
R-squared	0.456758	Mean dependent var		-0.028240
Adjusted R-squared	0.456543	S.D. dependent var		181.5757
S.E. of regression	133.8568	Akaike info criterion		12.63221
Sum squared resid	45259937	Schwarz criterion		12.63682
Log likelihood	-15965.11	Hannan-Quinn criter.		12.63388
F-statistic	2123.860	Durbin-Watson stat		1.989532
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE250) is stationary  
 Exogenous: Constant  
 Bandwidth: 15 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.214542
Asymptotic critical values*:	
1% level	0.739000
5% level	0.463000
10% level	0.347000

\*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

Residual variance (no correction)	18038.65
HAC corrected variance (Bartlett kernel)	15342.10

KPSS Test Equation

Dependent Variable: D(FTSE250)

Method: Least Squares

Date: 01/21/20 Time: 12:19

Sample (adjusted): 1/02/2007 1/03/2017

Included observations: 2529 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.753215	2.671244	1.030686	0.3028
R-squared	0.000000	Mean dependent var		2.753215
Adjusted R-squared	0.000000	S.D. dependent var		134.3346
S.E. of regression	134.3346	Akaike info criterion		12.63894
Sum squared resid	45619758	Schwarz criterion		12.64125
Log likelihood	-15980.94	Hannan-Quinn criter.		12.63978
Durbin-Watson stat	1.826281			



## FTSE250 SS1 2007-2008

Null Hypothesis: D(FTSE250SS1) is stationary  
 Exogenous: Constant  
 Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.185583
Asymptotic critical values*:	
1% level	0.739000
5% level	0.463000
10% level	0.347000

\*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

Residual variance (no correction)	22744.48
HAC corrected variance (Bartlett kernel)	21466.43

### KPSS Test Equation

Dependent Variable: D(FTSE250SS1)

Method: Least Squares

Date: 01/21/20 Time: 14:54

Sample (adjusted): 1/02/2007 1/02/2009

Included observations: 508 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.957933	6.697828	-1.337438	0.1817
R-squared	0.000000	Mean dependent var		-8.957933
Adjusted R-squared	0.000000	S.D. dependent var		150.9614
S.E. of regression	150.9614	Akaike info criterion		12.87389
Sum squared resid	11554194	Schwarz criterion		12.88222
Log likelihood	-3268.968	Hannan-Quinn criter.		12.87716
Durbin-Watson stat	1.964202			

Null Hypothesis: D(FTSE250SS1) has a unit root  
 Exogenous: Constant  
 Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-22.10980	0.0000
Test critical values:		
1% level	-3.443021	
5% level	-2.867021	
10% level	-2.569751	

\*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	22744.18
HAC corrected variance (Bartlett kernel)	21039.37

Phillips-Perron Test Equation  
 Dependent Variable: D(FTSE250SS1,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 14:55  
 Sample (adjusted): 1/03/2007 1/02/2009  
 Included observations: 507 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE250SS1(-1))	-0.986191	0.044602	-22.11086	0.0000
C	-9.110277	6.724399	-1.354809	0.1761
R-squared	0.491895	Mean dependent var		0.259408
Adjusted R-squared	0.490889	S.D. dependent var		211.7812
S.E. of regression	151.1101	Akaike info criterion		12.87783
Sum squared resid	11531298	Schwarz criterion		12.89451
Log likelihood	-3262.530	Hannan-Quinn criter.		12.88437
F-statistic	488.8900	Durbin-Watson stat		1.992499
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE250SS1) has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=18)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-22.11086	0.0000
Test critical values:		
1% level	-3.443021	
5% level	-2.867021	
10% level	-2.569751	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(FTSE250SS1,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 14:55  
 Sample (adjusted): 1/03/2007 1/02/2009  
 Included observations: 507 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE250SS1(-1))	-0.986191	0.044602	-22.11086	0.0000
C	-9.110277	6.724399	-1.354809	0.1761
R-squared	0.491895	Mean dependent var		0.259408
Adjusted R-squared	0.490889	S.D. dependent var		211.7812
S.E. of regression	151.1101	Akaike info criterion		12.87783
Sum squared resid	11531298	Schwarz criterion		12.89451
Log likelihood	-3262.530	Hannan-Quinn criter.		12.88437
F-statistic	488.8900	Durbin-Watson stat		1.992499
Prob(F-statistic)	0.000000			

## FTSE250 ss2 2009-2010

Null Hypothesis: D(FTSE250SS2) has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=18)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-20.95175	0.0000
Test critical values:		
1% level	-3.443046	
5% level	-2.867032	
10% level	-2.569757	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(FTSE250SS2,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 19:21  
 Sample (adjusted): 1/05/2009 1/04/2011  
 Included observations: 506 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE250SS2(-1))	-0.927644	0.044275	-20.95175	0.0000
C	9.326652	4.923149	1.894448	0.0587
R-squared	0.465522	Mean dependent var		-0.202688
Adjusted R-squared	0.464461	S.D. dependent var		150.6820
S.E. of regression	110.2699	Akaike info criterion		12.24768
Sum squared resid	6128362.	Schwarz criterion		12.26439
Log likelihood	-3096.664	Hannan-Quinn criter.		12.25424
F-statistic	438.9757	Durbin-Watson stat		2.002513
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE250SS2) has a unit root  
 Exogenous: Constant  
 Bandwidth: 10 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-20.91415	0.0000
Test critical values:		
1% level	-3.443046	
5% level	-2.867032	
10% level	-2.569757	

\*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	12111.39
HAC corrected variance (Bartlett kernel)	9960.648

Phillips-Perron Test Equation  
 Dependent Variable: D(FTSE250SS2,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 19:21  
 Sample (adjusted): 1/05/2009 1/04/2011  
 Included observations: 506 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE250SS2(-1))	-0.927644	0.044275	-20.95175	0.0000
C	9.326652	4.923149	1.894448	0.0587
R-squared	0.465522	Mean dependent var		-0.202688
Adjusted R-squared	0.464461	S.D. dependent var		150.6820
S.E. of regression	110.2699	Akaike info criterion		12.24768
Sum squared resid	6128362.	Schwarz criterion		12.26439
Log likelihood	-3096.664	Hannan-Quinn criter.		12.25424
F-statistic	438.9757	Durbin-Watson stat		2.002513
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE250SS2) is stationary  
 Exogenous: Constant  
 Bandwidth: 9 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.045535
Asymptotic critical values*:	
1% level	0.739000
5% level	0.463000
10% level	0.347000

\*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

Residual variance (no correction)	12280.81
HAC corrected variance (Bartlett kernel)	11691.57

KPSS Test Equation

Dependent Variable: D(FTSE250SS2)

Method: Least Squares

Date: 01/21/20 Time: 19:22

Sample (adjusted): 1/02/2009 1/04/2011

Included observations: 507 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.57536	4.926497	2.146630	0.0323
R-squared	0.000000	Mean dependent var		10.57536
Adjusted R-squared	0.000000	S.D. dependent var		110.9283
S.E. of regression	110.9283	Akaike info criterion		12.25762
Sum squared resid	6226371.	Schwarz criterion		12.26596
Log likelihood	-3106.305	Hannan-Quinn criter.		12.26089
Durbin-Watson stat	1.841536			

## FTSE250 ss3 2011-2012

Null Hypothesis: D(FTSE250SS3) has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=17)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-19.67856	0.0000
Test critical values:		
1% level	-3.443123	
5% level	-2.867066	
10% level	-2.569775	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(FTSE250SS3,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 19:46  
 Sample (adjusted): 1/05/2011 1/02/2013  
 Included observations: 503 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE250SS3(-1))	-0.873911	0.044409	-19.67856	0.0000
C	1.563380	5.361079	0.291617	0.7707
R-squared	0.435967	Mean dependent var		0.145368
Adjusted R-squared	0.434841	S.D. dependent var		159.9233
S.E. of regression	120.2256	Akaike info criterion		12.42059
Sum squared resid	7241552.	Schwarz criterion		12.43737
Log likelihood	-3121.777	Hannan-Quinn criter.		12.42717
F-statistic	387.2458	Durbin-Watson stat		1.981282
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE250SS3) has a unit root  
 Exogenous: Constant  
 Bandwidth: 12 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-19.51918	0.0000
Test critical values:		
1% level	-3.443123	
5% level	-2.867066	
10% level	-2.569775	

\*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	14396.72
HAC corrected variance (Bartlett kernel)	10184.96

Phillips-Perron Test Equation  
 Dependent Variable: D(FTSE250SS3,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 19:46  
 Sample (adjusted): 1/05/2011 1/02/2013  
 Included observations: 503 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE250SS3(-1))	-0.873911	0.044409	-19.67856	0.0000
C	1.563380	5.361079	0.291617	0.7707
R-squared	0.435967	Mean dependent var		0.145368
Adjusted R-squared	0.434841	S.D. dependent var		159.9233
S.E. of regression	120.2256	Akaike info criterion		12.42059
Sum squared resid	7241552.	Schwarz criterion		12.43737
Log likelihood	-3121.777	Hannan-Quinn criter.		12.42717
F-statistic	387.2458	Durbin-Watson stat		1.981282
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE250SS3) is stationary  
 Exogenous: Constant  
 Bandwidth: 9 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.193550
Asymptotic critical values*:	
1% level	0.739000
5% level	0.463000
10% level	0.347000

\*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

Residual variance (no correction)	14651.31
HAC corrected variance (Bartlett kernel)	13247.71

KPSS Test Equation  
 Dependent Variable: D(FTSE250SS3)  
 Method: Least Squares



Date: 01/21/20 Time: 19:44  
 Sample (adjusted): 1/04/2011 1/02/2013  
 Included observations: 504 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.089385	5.397023	0.387137	0.6988
R-squared	0.000000	Mean dependent var		2.089385
Adjusted R-squared	0.000000	S.D. dependent var		121.1629
S.E. of regression	121.1629	Akaike info criterion		12.43413
Sum squared resid	7384262.	Schwarz criterion		12.44251
Log likelihood	-3132.401	Hannan-Quinn criter.		12.43742
Durbin-Watson stat	1.738683			

### FTSE250 ss4 2013-2014

Null Hypothesis: D(FTSE250SS4) has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=18)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-20.61355	0.0000
Test critical values:		
1% level	-3.443046	
5% level	-2.867032	
10% level	-2.569757	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(FTSE250SS4,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 20:02  
 Sample (adjusted): 1/03/2013 1/02/2015  
 Included observations: 506 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE250SS4(-1))	-0.910993	0.044194	-20.61355	0.0000
C	6.145955	5.070189	1.212175	0.2260
R-squared	0.457434	Mean dependent var		-0.534308
Adjusted R-squared	0.456357	S.D. dependent var		154.3667
S.E. of regression	113.8179	Akaike info criterion		12.31102
Sum squared resid	6529073.	Schwarz criterion		12.32773
Log likelihood	-3112.688	Hannan-Quinn criter.		12.31757
F-statistic	424.9185	Durbin-Watson stat		1.997377
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE250SS4) has a unit root  
 Exogenous: Constant  
 Bandwidth: 10 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-20.56673	0.0000
Test critical values:		
1% level	-3.443046	
5% level	-2.867032	
10% level	-2.569757	

\*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	12903.31
HAC corrected variance (Bartlett kernel)	12036.18

Phillips-Perron Test Equation  
 Dependent Variable: D(FTSE250SS4,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 20:02  
 Sample (adjusted): 1/03/2013 1/02/2015  
 Included observations: 506 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE250SS4(-1))	-0.910993	0.044194	-20.61355	0.0000
C	6.145955	5.070189	1.212175	0.2260
R-squared	0.457434	Mean dependent var		-0.534308
Adjusted R-squared	0.456357	S.D. dependent var		154.3667
S.E. of regression	113.8179	Akaike info criterion		12.31102
Sum squared resid	6529073.	Schwarz criterion		12.32773
Log likelihood	-3112.688	Hannan-Quinn criter.		12.31757
F-statistic	424.9185	Durbin-Watson stat		1.997377
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE250SS4) is stationary  
 Exogenous: Constant  
 Bandwidth: 7 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.171606
Asymptotic critical values*:	
1% level	0.739000
5% level	0.463000
10% level	0.347000

\*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

Residual variance (no correction)	13085.70
HAC corrected variance (Bartlett kernel)	14372.45

KPSS Test Equation

Dependent Variable: D(FTSE250SS4)

Method: Least Squares

Date: 01/21/20 Time: 20:01

Sample (adjusted): 1/02/2013 1/02/2015

Included observations: 507 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.252446	5.085379	1.426137	0.1544
R-squared	0.000000	Mean dependent var		7.252446
Adjusted R-squared	0.000000	S.D. dependent var		114.5057
S.E. of regression	114.5057	Akaike info criterion		12.32110
Sum squared resid	6634452.	Schwarz criterion		12.32944
Log likelihood	-3122.398	Hannan-Quinn criter.		12.32437
Durbin-Watson stat	1.813839			

## FTSE250 ss5 2015-2016

Null Hypothesis: D(FTSE250SS5) has a unit root  
 Exogenous: Constant  
 Lag Length: 3 (Automatic - based on SIC, maxlag=18)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-14.69851	0.0000
Test critical values:		
1% level	-3.443123	
5% level	-2.867066	
10% level	-2.569775	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(FTSE250SS5,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 20:18  
 Sample (adjusted): 1/08/2015 1/03/2017  
 Included observations: 503 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE250SS5(-1))	-1.229967	0.083680	-14.69851	0.0000
D(FTSE250SS5(-1),2)	0.375654	0.071689	5.240029	0.0000
D(FTSE250SS5(-2),2)	0.193985	0.057190	3.391958	0.0007
D(FTSE250SS5(-3),2)	0.241408	0.043442	5.557002	0.0000
C	5.336800	7.083756	0.753386	0.4516
R-squared	0.482331	Mean dependent var		-0.019145
Adjusted R-squared	0.478173	S.D. dependent var		219.6733
S.E. of regression	158.6868	Akaike info criterion		12.98163
Sum squared resid	12540381	Schwarz criterion		13.02359
Log likelihood	-3259.880	Hannan-Quinn criter.		12.99809
F-statistic	116.0010	Durbin-Watson stat		2.047257
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE250SS5) has a unit root  
 Exogenous: Constant  
 Bandwidth: 96 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-22.75019	0.0000
Test critical values:		
1% level	-3.443046	
5% level	-2.867032	
10% level	-2.569757	

\*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	26967.94
HAC corrected variance (Bartlett kernel)	6914.231

Phillips-Perron Test Equation  
 Dependent Variable: D(FTSE250SS5,2)  
 Method: Least Squares  
 Date: 01/21/20 Time: 20:19  
 Sample (adjusted): 1/05/2015 1/03/2017  
 Included observations: 506 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FTSE250SS5(-1))	-0.876083	0.044204	-19.81925	0.0000
C	3.640117	7.316973	0.497489	0.6191
R-squared	0.438003	Mean dependent var		0.191482
Adjusted R-squared	0.436888	S.D. dependent var		219.2737
S.E. of regression	164.5447	Akaike info criterion		13.04819
Sum squared resid	13645779	Schwarz criterion		13.06489
Log likelihood	-3299.191	Hannan-Quinn criter.		13.05474
F-statistic	392.8026	Durbin-Watson stat		1.963390
Prob(F-statistic)	0.000000			

Null Hypothesis: D(FTSE250SS5) is stationary  
 Exogenous: Constant  
 Bandwidth: 61 (Newey-West automatic) using Bartlett kernel

	LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic	0.106176
Asymptotic critical values*:	
1% level	0.739000
5% level	0.463000
10% level	0.347000

\*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

Residual variance (no correction)	27337.20
HAC corrected variance (Bartlett kernel)	11669.39

KPSS Test Equation

Dependent Variable: D(FTSE250SS5)

Method: Least Squares

Date: 01/21/20 Time: 20:18

Sample (adjusted): 1/02/2015 1/03/2017

Included observations: 507 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.053728	7.350244	0.551509	0.5815
R-squared	0.000000	Mean dependent var		4.053728
Adjusted R-squared	0.000000	S.D. dependent var		165.5030
S.E. of regression	165.5030	Akaike info criterion		13.05783
Sum squared resid	13859961	Schwarz criterion		13.06617
Log likelihood	-3309.159	Hannan-Quinn criter.		13.06110
Durbin-Watson stat	1.751874			

## Appendix C Autocorrelation tests

### Full Sample FTSE100

FTSE 100

Date: 01/21/20 Time: 12:16  
 Sample: 12/29/2006 1/03/2017  
 Included observations: 2529

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
		1	-0.029	-0.029	2.1040	0.147
		2	-0.038	-0.039	5.7755	0.056
		3	-0.034	-0.036	8.6257	0.035
		4	0.013	0.009	9.0587	0.060
		5	-0.047	-0.049	14.649	0.012
		6	-0.018	-0.021	15.455	0.017
		7	0.012	0.007	15.799	0.027
		8	0.014	0.009	16.279	0.039
		9	-0.012	-0.011	16.626	0.055
		10	0.006	0.005	16.717	0.081
		11	-0.018	-0.020	17.587	0.092
		12	0.002	0.001	17.598	0.128
		13	-0.010	-0.009	17.829	0.164
		14	-0.019	-0.022	18.792	0.173
		15	-0.024	-0.026	20.211	0.164
		16	0.031	0.026	22.699	0.122
		17	0.005	0.003	22.773	0.157
		18	-0.027	-0.027	24.597	0.136
		19	0.002	0.001	24.607	0.174
		20	-0.001	-0.006	24.608	0.217
		21	0.012	0.012	24.953	0.249
		22	0.020	0.023	25.974	0.253
		23	-0.029	-0.031	28.190	0.209
		24	-0.036	-0.038	31.549	0.139
		25	0.021	0.018	32.651	0.140
		26	0.038	0.035	36.435	0.084
		27	-0.047	-0.044	42.093	0.032
		28	0.007	0.006	42.219	0.041
		29	-0.001	-0.009	42.222	0.054
		30	-0.012	-0.014	42.597	0.064

## FTSE100 ss1 2007-8

Date: 01/21/20 Time: 13:37  
 Sample: 12/29/2006 1/02/2009  
 Included observations: 508

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
* .	* .	1	-0.106	-0.106	5.7122	0.017
-.	* .	2	-0.061	-0.073	7.5976	0.022
* .	* .	3	-0.095	-0.111	12.222	0.007
.*	.*	4	0.125	0.099	20.256	0.000
* .	* .	5	-0.085	-0.077	24.021	0.000
* .	* .	6	-0.074	-0.089	26.831	0.000
-.	-.	7	0.058	0.053	28.552	0.000
-.	-.	8	0.069	0.044	31.022	0.000
-.	-.	9	-0.031	-0.011	31.514	0.000
-.	-.	10	0.035	0.063	32.157	0.000
-.	-.	11	-0.000	-0.006	32.157	0.001
-.	-.	12	0.022	0.015	32.402	0.001
-.	-.	13	-0.042	-0.006	33.317	0.002
-.	-.	14	-0.027	-0.041	33.710	0.002
-.	-.	15	-0.047	-0.058	34.879	0.003
-.	-.	16	0.064	0.049	37.012	0.002
-.	-.	17	0.009	0.010	37.057	0.003
-.	-.	18	-0.012	-0.015	37.140	0.005
-.	-.	19	-0.003	0.010	37.146	0.008
-.	-.	20	-0.004	-0.030	37.154	0.011
-.	-.	21	0.023	0.024	37.427	0.015
-.	-.	22	0.030	0.059	37.899	0.019
-.	-.	23	-0.059	-0.056	39.735	0.016
-.	-.	24	-0.008	-0.015	39.773	0.023
-.	-.	25	0.001	0.003	39.774	0.031
.*	-.	26	0.083	0.062	43.497	0.017
* .	* .	27	-0.105	-0.078	49.475	0.005
-.	-.	28	0.044	0.033	50.497	0.006
-.	-.	29	0.069	0.065	53.071	0.004
-.	-.	30	0.005	-0.007	53.083	0.006
* .	-.	31	-0.116	-0.064	60.405	0.001
-.	-.	32	0.034	0.015	61.022	0.001
-.	* .	33	-0.033	-0.077	61.610	0.002
* .	* .	34	-0.113	-0.129	68.640	0.000
-.	-.	35	-0.044	-0.033	69.677	0.000
.*	-.	36	0.116	0.053	77.088	0.000



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**FTSE100 ss2 2009-10**

Date: 01/21/20 Time: 19:13  
 Sample: 12/31/2008 1/04/2011  
 Included observations: 507

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
. .	. .	1	-0.018	-0.018	0.1742	0.676
. .	. .	2	0.004	0.004	0.1820	0.913
. .	. .	3	-0.035	-0.035	0.8198	0.845
. .	. .	4	0.037	0.036	1.5318	0.821
. .	. .	5	-0.010	-0.008	1.5810	0.904
. .	. .	6	0.018	0.016	1.7478	0.941
. .	. .	7	-0.017	-0.014	1.8967	0.965
. .	. .	8	-0.006	-0.009	1.9175	0.983
. .	. .	9	0.023	0.025	2.1929	0.988
. .	. .	10	-0.018	-0.020	2.3638	0.993
. .	. .	11	-0.026	-0.026	2.7051	0.994
. .	. .	12	-0.011	-0.010	2.7679	0.997
. *	. .	13	0.074	0.072	5.6581	0.958
. .	. .	14	-0.039	-0.037	6.4556	0.954
. .	. .	15	-0.006	-0.009	6.4777	0.971
. .	. .	16	-0.002	0.005	6.4797	0.982
. .	. .	17	-0.008	-0.015	6.5096	0.989
. *	. *	18	-0.101	-0.101	11.922	0.851
. .	. .	19	0.004	-0.001	11.932	0.889
. *	. *	20	-0.070	-0.067	14.511	0.804
. .	. .	21	0.040	0.032	15.346	0.805
. .	. .	22	0.006	0.009	15.364	0.846
. .	. .	23	0.053	0.053	16.886	0.815
. .	. .	24	-0.052	-0.038	18.304	0.788
. .	. .	25	0.068	0.062	20.761	0.706
. .	. .	26	0.003	0.002	20.765	0.754
. .	. .	27	-0.009	-0.009	20.813	0.795
. .	. .	28	-0.034	-0.034	21.438	0.807
. .	. .	29	0.044	0.037	22.486	0.800
. .	. .	30	0.018	0.017	22.658	0.829
. .	. .	31	0.013	0.022	22.749	0.858
. .	. .	32	-0.030	-0.035	23.232	0.871
. .	. .	33	0.007	0.021	23.256	0.896
. .	. .	34	0.011	-0.000	23.328	0.916
. .	. .	35	-0.050	-0.057	24.671	0.903
. .	. .	36	0.033	0.021	25.280	0.909

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**FTSE100 ss3 2011-12**

Date: 01/21/20 Time: 19:37  
 Sample: 12/31/2010 1/02/2013  
 Included observations: 504

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
. .	. .	1	0.040	0.040	0.8180	0.366
. .	. .	2	-0.035	-0.037	1.4507	0.484
* .	* .	3	-0.083	-0.080	4.9615	0.175
. .	. .	4	-0.053	-0.048	6.3959	0.171
. .	. .	5	-0.003	-0.005	6.4001	0.269
. .	. .	6	-0.014	-0.024	6.5013	0.369
. .	. .	7	-0.032	-0.040	7.0391	0.425
. .	. .	8	-0.060	-0.063	8.8980	0.351
. .	. .	9	0.001	-0.001	8.8986	0.447
. .	. .	10	-0.001	-0.014	8.8990	0.542
. .	. .	11	0.034	0.021	9.5025	0.576
. .	. .	12	-0.044	-0.054	10.489	0.573
. .	. .	13	-0.036	-0.035	11.172	0.596
. .	. .	14	0.053	0.053	12.659	0.554
. .	. .	15	0.021	0.006	12.889	0.611
. .	. .	16	-0.002	-0.015	12.892	0.681
. .	. .	17	0.018	0.024	13.059	0.732
* .	* .	18	-0.069	-0.066	15.554	0.624
. .	. .	19	-0.019	-0.013	15.735	0.675
. .	. .	20	-0.026	-0.033	16.079	0.712
. *	. .	21	0.076	0.070	19.123	0.577
. .	* .	22	-0.053	-0.067	20.627	0.544
. .	. .	23	0.040	0.048	21.496	0.551
. .	. .	24	-0.001	-0.003	21.497	0.609
* .	* .	25	-0.082	-0.093	25.111	0.456
. .	. .	26	0.028	0.031	25.523	0.490
. .	. .	27	0.043	0.045	26.519	0.490
. .	. .	28	-0.039	-0.066	27.349	0.499
. .	. .	29	-0.016	-0.003	27.482	0.546
. .	. .	30	-0.018	-0.021	27.664	0.588
. .	. .	31	-0.006	-0.013	27.682	0.638
. .	. .	32	0.040	0.026	28.539	0.642
. .	. .	33	-0.033	-0.036	29.135	0.660
. .	. .	34	0.019	0.022	29.329	0.696
. .	. .	35	0.000	-0.006	29.329	0.738
. .	. .	36	-0.059	-0.060	31.213	0.696

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**FTSE100 ss4 2013-14**

Date: 01/21/20 Time: 19:55  
 Sample: 12/31/2012 1/02/2015  
 Included observations: 507

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
. .	. .	1	-0.004	-0.004	0.0093	0.923
. .	. .	2	0.008	0.008	0.0396	0.980
. *	. *	3	0.128	0.128	8.4791	0.037
* .	* .	4	-0.084	-0.084	12.118	0.016
. .	. .	5	-0.014	-0.016	12.212	0.032
. .	. .	6	0.061	0.047	14.140	0.028
. .	. .	7	0.035	0.058	14.783	0.039
. .	. .	8	-0.023	-0.029	15.055	0.058
. .	. .	9	-0.000	-0.018	15.055	0.089
. .	. .	10	0.022	0.021	15.312	0.121
. .	. .	11	-0.038	-0.022	16.058	0.139
* .	* .	12	-0.067	-0.074	18.385	0.104
. .	. .	13	0.019	0.008	18.571	0.137
* .	* .	14	-0.094	-0.082	23.187	0.057
. .	. .	15	-0.057	-0.043	24.872	0.052
. .	. .	16	0.011	-0.006	24.936	0.071
. .	. .	17	-0.009	0.017	24.977	0.095
. .	. .	18	-0.020	-0.013	25.182	0.120
. .	. .	19	0.006	-0.003	25.201	0.154
* .	* .	20	-0.089	-0.089	29.375	0.081
* .	* .	21	-0.165	-0.154	43.815	0.002
. .	. .	22	0.009	0.009	43.860	0.004
* .	* .	23	-0.077	-0.064	47.018	0.002
* .	* .	24	-0.094	-0.081	51.755	0.001
. *	. .	25	0.082	0.053	55.391	0.000
* .	* .	26	-0.083	-0.079	59.083	0.000
* .	. .	27	-0.072	-0.057	61.892	0.000
. .	. .	28	0.010	-0.023	61.941	0.000
. .	. .	29	-0.018	-0.004	62.124	0.000
* .	* .	30	-0.075	-0.075	65.173	0.000
. .	. .	31	-0.010	-0.031	65.230	0.000
. .	. .	32	-0.016	-0.049	65.366	0.000
. .	. .	33	0.049	0.057	66.649	0.000
. .	. .	34	0.044	0.028	67.700	0.001
. .	. .	35	0.034	-0.025	68.347	0.001
. .	* .	36	-0.051	-0.096	69.763	0.001

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**FTSE100 ss5 2015-16**

Date: 01/21/20 Time: 20:11  
 Sample: 12/31/2014 1/03/2017  
 Included observations: 507

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
. .	. .	1	0.035	0.035	0.6231	0.430
. .	. .	2	-0.057	-0.059	2.3033	0.316
. .	. .	3	0.036	0.041	2.9840	0.394
* .	* .	4	-0.125	-0.132	10.993	0.027
. .	. .	5	-0.061	-0.047	12.899	0.024
. .	. .	6	0.029	0.016	13.330	0.038
. .	. .	7	-0.033	-0.032	13.877	0.053
. .	. .	8	0.010	0.003	13.927	0.084
. .	. .	9	-0.013	-0.034	14.013	0.122
. .	. .	10	-0.039	-0.032	14.808	0.139
* .	* .	11	-0.070	-0.079	17.368	0.097
. .	. .	12	0.030	0.031	17.829	0.121
. .	. .	13	-0.027	-0.042	18.217	0.149
. .	. .	14	-0.029	-0.032	18.667	0.178
. .	. .	15	-0.008	-0.034	18.697	0.228
. .	. .	16	0.038	0.038	19.462	0.245
. .	. .	17	-0.027	-0.036	19.847	0.282
. .	. .	18	0.045	0.037	20.933	0.283
. .	. .	19	0.018	0.002	21.100	0.331
. *	. *	20	0.092	0.103	25.559	0.181
. .	. .	21	-0.004	-0.023	25.568	0.223
. *	. *	22	0.092	0.113	30.115	0.116
* .	* .	23	-0.077	-0.089	33.272	0.076
. .	. .	24	-0.060	-0.022	35.188	0.066
. *	. *	25	0.092	0.090	39.729	0.031
. .	. .	26	0.031	0.048	40.256	0.037
. .	. .	27	-0.031	-0.018	40.784	0.043
. .	. .	28	0.029	-0.000	41.235	0.051
* .	* .	29	-0.140	-0.112	51.752	0.006
. .	. .	30	-0.030	0.006	52.228	0.007
. .	. .	31	-0.012	-0.018	52.307	0.010
* .	* .	32	-0.107	-0.104	58.551	0.003
. .	. .	33	0.011	0.008	58.620	0.004
. .	. .	34	0.067	0.018	61.078	0.003
. .	. .	35	-0.036	-0.015	61.796	0.003
. .	. .	36	0.037	0.016	62.539	0.004

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## FTSE250 Full sample

Date: 01/21/20 Time: 12:27  
 Sample: 12/29/2006 1/03/2017  
 Included observations: 2529

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
*	*	1	0.087	0.087	19.001	0.000
		2	-0.052	-0.060	25.760	0.000
		3	-0.036	-0.027	29.110	0.000
*	*	4	-0.067	-0.066	40.659	0.000
*		5	-0.070	-0.063	53.236	0.000
		6	0.005	0.008	53.291	0.000
		7	0.026	0.014	55.039	0.000
		8	0.014	0.004	55.568	0.000
		9	0.000	-0.007	55.568	0.000
		10	-0.015	-0.016	56.132	0.000
		11	-0.015	-0.009	56.723	0.000
		12	0.012	0.016	57.101	0.000
		13	-0.001	-0.005	57.102	0.000
		14	0.008	0.006	57.252	0.000
		15	-0.011	-0.016	57.555	0.000
		16	0.002	0.006	57.568	0.000
		17	0.009	0.010	57.797	0.000
		18	-0.015	-0.017	58.388	0.000
		19	0.009	0.012	58.589	0.000
		20	0.019	0.014	59.477	0.000
		21	-0.002	-0.003	59.483	0.000
		22	0.038	0.042	63.208	0.000
		23	-0.008	-0.015	63.386	0.000
		24	-0.028	-0.019	65.428	0.000
		25	0.012	0.019	65.769	0.000
		26	0.042	0.041	70.338	0.000
		27	-0.031	-0.035	72.873	0.000
		28	0.002	0.009	72.888	0.000
		29	-0.029	-0.035	75.034	0.000
		30	-0.020	-0.008	76.073	0.000
		31	-0.027	-0.026	77.962	0.000
		32	-0.002	-0.005	77.977	0.000
		33	-0.006	-0.014	78.071	0.000
		34	-0.017	-0.026	78.840	0.000
		35	-0.025	-0.027	80.461	0.000
		36	0.036	0.037	83.862	0.000

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**FTSE250 ss1 2007-8**

Date: 01/21/20 Time: 14:56  
 Sample: 12/29/2006 1/02/2009  
 Included observations: 508

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
. .	. .	1	0.014	0.014	0.0963	0.756
. .	. .	2	-0.040	-0.040	0.9207	0.631
* .	* .	3	-0.072	-0.071	3.5875	0.310
. .	. .	4	0.069	0.070	6.0488	0.196
. .	. .	5	-0.025	-0.033	6.3661	0.272
* .	* .	6	-0.088	-0.088	10.405	0.109
. .	. .	7	0.046	0.058	11.519	0.118
. .	. .	8	0.028	0.011	11.934	0.154
. .	. .	9	-0.001	-0.009	11.935	0.217
. .	. .	10	-0.016	0.006	12.064	0.281
. .	. .	11	-0.020	-0.030	12.271	0.344
. .	. .	12	0.020	0.012	12.484	0.408
. .	. .	13	-0.012	-0.004	12.557	0.483
. .	. .	14	0.019	0.018	12.747	0.547
. .	. .	15	-0.006	-0.004	12.765	0.620
. .	. .	16	0.024	0.020	13.072	0.668
. .	. .	17	0.005	0.006	13.086	0.730
. .	. .	18	0.001	0.004	13.087	0.786
. .	. .	19	-0.006	-0.003	13.107	0.833
. .	. .	20	0.002	0.003	13.109	0.873
. .	. .	21	0.006	0.004	13.130	0.904
. .	. .	22	0.032	0.035	13.664	0.913
. .	. .	23	-0.021	-0.021	13.891	0.930
. .	. .	24	0.042	0.045	14.849	0.925
. .	. .	25	-0.048	-0.048	16.106	0.912
. .	. .	26	0.022	0.019	16.356	0.927
* .	* .	27	-0.085	-0.077	20.210	0.822
. .	. .	28	0.048	0.044	21.430	0.807
. .	. .	29	0.073	0.073	24.295	0.714
. .	. .	30	-0.033	-0.047	24.900	0.730
. .	. .	31	-0.025	-0.011	25.236	0.757
. .	. .	32	0.052	0.062	26.733	0.730
. .	* .	33	-0.049	-0.085	28.057	0.712
* .	* .	34	-0.099	-0.076	33.437	0.495
. .	. .	35	-0.011	0.015	33.500	0.541
. *	. .	36	0.114	0.072	40.571	0.276

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**FTSE250 ss2 2009-10**

Date: 01/21/20 Time: 19:22  
 Sample: 12/31/2008 1/04/2011  
 Included observations: 507

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
. .	. .	1	0.072	0.072	2.6509	0.103
. .	. .	2	0.007	0.002	2.6768	0.262
. .	. .	3	-0.039	-0.040	3.4498	0.327
. .	. .	4	-0.026	-0.020	3.7870	0.436
. .	. .	5	-0.065	-0.062	5.9480	0.311
. .	. .	6	-0.018	-0.010	6.1142	0.411
. .	. .	7	-0.027	-0.026	6.4888	0.484
. .	. .	8	-0.005	-0.006	6.5010	0.591
. .	. .	9	-0.033	-0.036	7.0751	0.629
. .	. .	10	-0.029	-0.031	7.5019	0.677
. .	. .	11	0.005	0.006	7.5166	0.756
. .	. .	12	0.060	0.054	9.3838	0.670
. .	. .	13	0.055	0.042	10.940	0.616
. .	. .	14	0.002	-0.011	10.941	0.691
. .	. .	15	-0.012	-0.013	11.022	0.751
. .	. .	16	-0.032	-0.027	11.571	0.773
. .	. .	17	0.011	0.023	11.636	0.822
* .	* .	18	-0.075	-0.073	14.616	0.688
. .	. .	19	0.021	0.030	14.848	0.732
* .	* .	20	-0.082	-0.087	18.448	0.558
. .	. .	21	0.021	0.029	18.682	0.606
. .	. .	22	0.042	0.046	19.639	0.606
. .	. .	23	0.047	0.029	20.823	0.592
. .	. .	24	-0.023	-0.034	21.107	0.632
. .	. .	25	0.057	0.046	22.846	0.587
. .	. .	26	0.021	0.018	23.075	0.629
. .	. .	27	-0.011	-0.014	23.143	0.677
. .	. .	28	-0.008	0.005	23.177	0.724
. .	. .	29	-0.017	-0.019	23.341	0.761
. .	. .	30	0.028	0.042	23.772	0.782
. .	. .	31	-0.035	-0.033	24.443	0.792
. .	. .	32	-0.025	-0.009	24.780	0.815
. .	. .	33	-0.051	-0.045	26.215	0.793
. .	. .	34	-0.047	-0.055	27.409	0.781
* .	* .	35	-0.103	-0.101	33.154	0.557
. .	. .	36	0.006	0.003	33.173	0.604

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**FTSE250 ss3 2011-12**

Date: 01/21/20 Time: 19:47  
 Sample: 12/31/2010 1/02/2013  
 Included observations: 504

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. *	. *	1	0.125	0.125	7.9418	0.005
. .	. .	2	-0.027	-0.044	8.3187	0.016
* .	* .	3	-0.078	-0.070	11.423	0.010
. .	. .	4	-0.036	-0.019	12.100	0.017
. .	. .	5	-0.040	-0.038	12.903	0.024
. .	. .	6	-0.041	-0.040	13.784	0.032
. .	. .	7	-0.041	-0.039	14.664	0.041
* .	* .	8	-0.073	-0.073	17.368	0.026
. .	. .	9	0.011	0.019	17.432	0.042
. .	. .	10	0.052	0.035	18.802	0.043
. *	. .	11	0.074	0.051	21.667	0.027
. .	. .	12	0.012	-0.007	21.736	0.041
. .	. .	13	-0.032	-0.030	22.257	0.052
. .	. .	14	0.043	0.058	23.216	0.057
. .	. .	15	0.020	0.010	23.429	0.075
. .	. .	16	-0.016	-0.018	23.561	0.100
. .	. .	17	0.031	0.053	24.068	0.118
. .	. .	18	-0.057	-0.058	25.782	0.105
. .	. .	19	-0.017	0.007	25.937	0.132
. .	. .	20	-0.004	-0.000	25.944	0.168
. .	. .	21	0.028	0.015	26.345	0.194
. .	. .	22	-0.019	-0.022	26.529	0.230
. .	. *	23	0.069	0.078	29.023	0.180
. .	. .	24	-0.009	-0.032	29.069	0.218
. .	. .	25	-0.063	-0.063	31.185	0.183
. .	. .	26	0.045	0.064	32.278	0.184
. .	. .	27	0.023	0.010	32.557	0.212
. .	. .	28	-0.034	-0.047	33.188	0.229
. .	. .	29	-0.023	0.004	33.465	0.259
. .	. .	30	0.002	0.008	33.467	0.303
. .	. .	31	0.006	-0.003	33.485	0.348
. .	. .	32	0.022	0.020	33.746	0.383
. .	. .	33	0.015	0.006	33.872	0.425
. .	. .	34	0.040	0.036	34.722	0.433
. .	. .	35	-0.001	-0.000	34.723	0.481
. .	. .	36	-0.057	-0.052	36.506	0.445

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**FTSE250 ss4 2013-14**

Date: 01/21/20 Time: 20:03  
 Sample: 12/31/2012 1/02/2015  
 Included observations: 507

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. *	. *	1	0.089	0.089	4.0381	0.044
. .	. .	2	-0.009	-0.017	4.0812	0.130
. .	. .	3	0.033	0.035	4.6283	0.201
* .	* .	4	-0.094	-0.102	9.2016	0.056
. .	. .	5	-0.036	-0.017	9.8679	0.079
. .	. .	6	0.052	0.054	11.268	0.080
. .	. .	7	0.044	0.041	12.247	0.093
. .	. .	8	0.001	-0.013	12.247	0.141
. .	. .	9	-0.024	-0.032	12.544	0.184
. .	. .	10	-0.032	-0.022	13.081	0.219
. .	. .	11	-0.003	0.013	13.086	0.288
. .	. .	12	-0.020	-0.021	13.293	0.348
. .	. .	13	-0.027	-0.032	13.677	0.397
* .	* .	14	-0.079	-0.086	16.974	0.258
. .	. .	15	-0.045	-0.028	18.054	0.260
. .	. .	16	-0.004	0.005	18.062	0.320
. .	. .	17	-0.034	-0.034	18.688	0.347
. .	. .	18	0.001	-0.008	18.688	0.411
. .	. .	19	0.008	-0.002	18.724	0.475
. .	. .	20	-0.039	-0.030	19.519	0.488
* .	. .	21	-0.071	-0.064	22.231	0.386
. .	. *	22	0.072	0.083	25.003	0.297
. .	* .	23	-0.061	-0.079	26.985	0.257
* .	* .	24	-0.073	-0.067	29.799	0.192
. *	. .	25	0.075	0.065	32.817	0.136
. .	. .	26	0.005	0.005	32.829	0.167
. .	. .	27	-0.043	-0.048	33.841	0.171
. .	. .	28	-0.011	-0.038	33.905	0.204
* .	* .	29	-0.069	-0.071	36.484	0.160
* .	. .	30	-0.080	-0.060	39.917	0.106
. .	. .	31	-0.054	-0.059	41.495	0.099
. .	. .	32	-0.004	-0.009	41.505	0.121
. .	. .	33	0.028	0.005	41.921	0.137
. .	. .	34	0.061	0.043	43.927	0.119
. .	. .	35	0.019	-0.003	44.131	0.139
. .	. .	36	-0.017	-0.017	44.292	0.162

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**FTSE250 ss5 2015-16**

Date: 01/21/20 Time: 20:20  
 Sample: 12/31/2014 1/03/2017  
 Included observations: 507

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
. *	. *	1	0.124	0.124	7.8273	0.005
* .	* .	2	-0.127	-0.145	16.096	0.000
. .	. .	3	-0.024	0.013	16.382	0.001
** .	** .	4	-0.216	-0.241	40.233	0.000
* .	* .	5	-0.153	-0.099	52.339	0.000
. *	. .	6	0.089	0.059	56.387	0.000
. .	. .	7	0.059	0.002	58.162	0.000
. .	. .	8	0.056	0.028	59.765	0.000
. .	. .	9	0.018	-0.044	59.937	0.000
. .	. .	10	-0.044	-0.016	60.949	0.000
* .	. .	11	-0.082	-0.052	64.434	0.000
. .	. .	12	-0.012	0.014	64.513	0.000
. .	. .	13	0.003	-0.015	64.517	0.000
. .	. .	14	0.011	-0.010	64.576	0.000
. .	. .	15	-0.021	-0.062	64.814	0.000
. .	. .	16	0.008	0.005	64.844	0.000
. .	. .	17	0.006	0.002	64.865	0.000
. .	. .	18	0.008	0.014	64.902	0.000
. .	. .	19	0.024	0.012	65.203	0.000
. *	. *	20	0.099	0.096	70.406	0.000
. .	. .	21	-0.015	-0.031	70.526	0.000
. .	. *	22	0.051	0.100	71.900	0.000
. .	* .	23	-0.045	-0.069	72.994	0.000
* .	. .	24	-0.080	-0.004	76.394	0.000
. .	. .	25	0.051	0.063	77.811	0.000
. *	. .	26	0.078	0.061	81.048	0.000
. .	. .	27	-0.027	-0.028	81.437	0.000
. .	. .	28	-0.016	-0.043	81.581	0.000
* .	* .	29	-0.113	-0.109	88.478	0.000
. .	. .	30	-0.024	0.054	88.785	0.000
. .	* .	31	-0.043	-0.073	89.807	0.000
. .	* .	32	-0.063	-0.077	91.969	0.000
. .	. .	33	0.023	-0.029	92.250	0.000
. .	* .	34	-0.013	-0.079	92.344	0.000
. .	. .	35	-0.036	-0.019	93.059	0.000
. .	. .	36	0.050	0.012	94.444	0.000

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## Appendix D

### VARIANCE RATIO TESTS

#### Full Sample FTSE100

Null Hypothesis: FTSE100 is a random walk  
 Date: 01/21/20 Time: 14:12  
 Sample: 12/29/2006 1/03/2017  
 Included observations: 2529 (after adjustments)  
 Standard error estimates assume no heteroskedasticity  
 Compute variances assuming zero mean  
 Use biased variance estimates  
 User-specified lags: 2 4 8 16

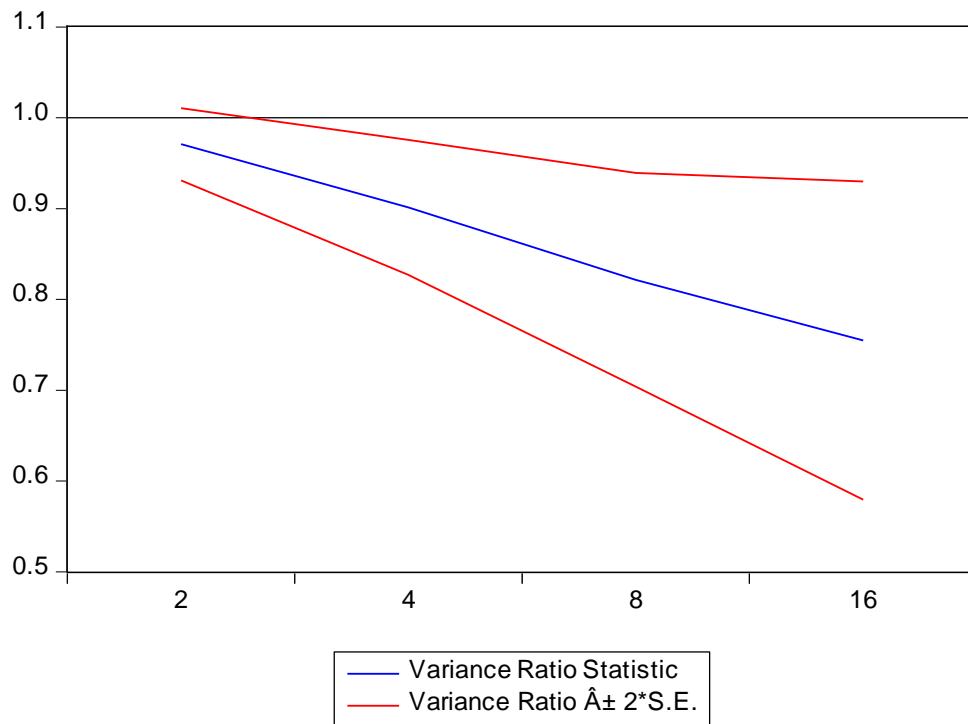
Joint Tests	Value	df	Probability
Max  z  (at period 8)*	3.034289	2529	0.0096
Wald (Chi-Square)	9.847998	4	0.0431

Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	0.970805	0.019885	-1.468210	0.1420
4	0.901326	0.037201	-2.652418	0.0080
8	0.821521	0.058821	-3.034289	0.0024
16	0.754638	0.087528	-2.803241	0.0051

\*Probability approximation using studentized maximum modulus with parameter value 4 and infinite degrees of freedom

Test Details (Mean = 0)

Period	Variance	Var. Ratio	Obs.
1	4661.26	--	2529
2	4525.17	0.97080	2528
4	4201.32	0.90133	2526
8	3829.33	0.82152	2522
16	3517.57	0.75464	2514

Variance Ratio Statistic for FTSE100 with  $\hat{A} \pm 2^*S.E.$  Bands

## 1<sup>TH</sup> SUB SAMPLE FTSE 100

Null Hypothesis: Log LAST\_PRICE is a random walk  
 Date: 07/27/19 Time: 14:57  
 Sample: 12/29/2006 1/02/2009  
 Included observations: 508 (after adjustments)  
 Standard error estimates assume no heteroskedasticity  
 Use biased variance estimates  
 User-specified lags: 2 4 8 16

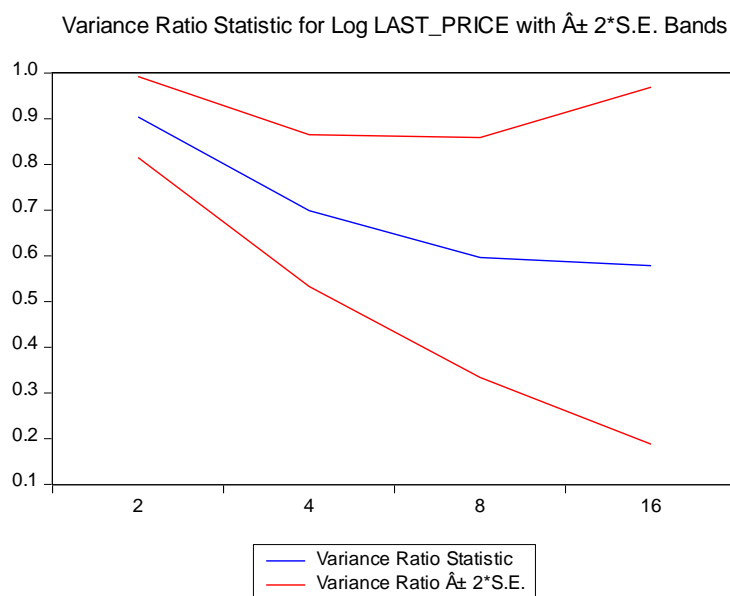
Joint Tests	Value	df	Probability
Max  z  (at period 4)*	3.628224	508	0.0011
Wald (Chi-Square)	14.99878	4	0.0047

Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	0.903639	0.044368	-2.171866	0.0299
4	0.698841	0.083005	-3.628224	0.0003
8	0.596028	0.131242	-3.078071	0.0021
16	0.578512	0.195294	-2.158224	0.0309

\*Probability approximation using studentized maximum modulus with parameter value 4 and infinite degrees of freedom

Test Details (Mean = -0.000610597294258)

Period	Variance	Var. Ratio	Obs.
1	0.00034	--	508
2	0.00031	0.90364	507
4	0.00024	0.69884	505
8	0.00020	0.59603	501
16	0.00020	0.57851	493



## 2<sup>ND</sup> SUB SAMPLE FTSE 100

Null Hypothesis: Log LAST\_PRICE is a random walk  
 Date: 07/27/19 Time: 15:03  
 Sample: 12/31/2008 1/04/2011  
 Included observations: 506 (after adjustments)  
 Standard error estimates assume no heteroskedasticity  
 Use biased variance estimates  
 User-specified lags: 2 4 8 16

Joint Tests	Value	df	Probability
Max  z  (at period 4)*	0.644819	506	0.9465
Wald (Chi-Square)	1.304513	4	0.8606

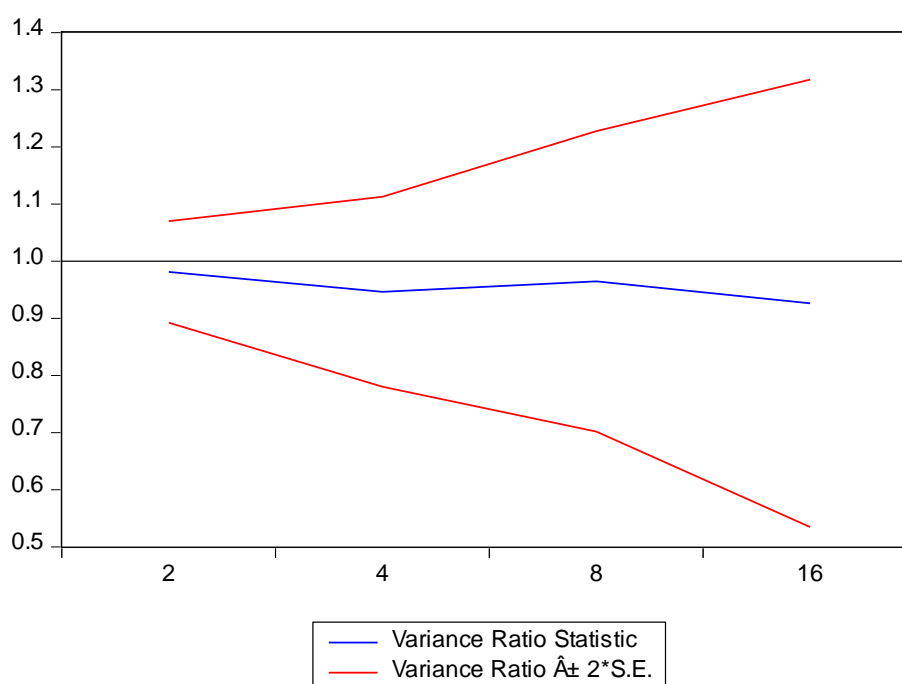
Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	0.980985	0.044455	-0.427723	0.6689
4	0.946371	0.083168	-0.644819	0.5190
8	0.964556	0.131501	-0.269531	0.7875
16	0.926110	0.195680	-0.377609	0.7057

\*Probability approximation using studentized maximum modulus with parameter value 4 and infinite degrees of freedom

Test Details (Mean = 0.000564430298044)

Period	Variance	Var. Ratio	Obs.
1	0.00017	--	506
2	0.00017	0.98099	506
4	0.00016	0.94637	504
8	0.00016	0.96456	500
16	0.00016	0.92611	492

Variance Ratio Statistic for Log LAST\_PRICE with  $\hat{A} \pm 2^*S.E.$  Bands



### 3<sup>RD</sup> SUB SAMPLE FTSE 100

Null Hypothesis: Log LAST\_PRICE is a random walk  
 Date: 07/27/19 Time: 15:10  
 Sample: 12/31/2010 1/02/2013  
 Included observations: 500 (after adjustments)  
 Standard error estimates assume no heteroskedasticity  
 Use biased variance estimates  
 User-specified lags: 2 4 8 16

Joint Tests	Value	df	Probability
Max  z  (at period 16)*	1.637043	500	0.3486
Wald (Chi-Square)	6.871707	4	0.1428

Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	1.045812	0.044721	1.024397	0.3056
4	0.988338	0.083666	-0.139389	0.8891
8	0.831771	0.132288	-1.271695	0.2035
16	0.677748	0.196850	-1.637043	0.1016

\*Probability approximation using studentized maximum modulus with parameter value 4 and infinite degrees of freedom

Test Details (Mean = 3.90585931745e-05)

Period	Variance	Var. Ratio	Obs.
1	0.00013	--	500
2	0.00013	1.04581	500
4	0.00013	0.98834	498
8	0.00011	0.83177	494
16	8.6E-05	0.67775	486

## 4<sup>TH</sup> SUB SAMPLE FTSE 100

Null Hypothesis: Log LAST\_PRICE is a random walk  
 Date: 07/27/19 Time: 15:13  
 Sample: 12/31/2012 1/02/2015  
 Included observations: 506 (after adjustments)  
 Standard error estimates assume no heteroskedasticity  
 Use biased variance estimates  
 User-specified lags: 2 4 8 16

Joint Tests	Value	df	Probability
Max  z  (at period 8)*	0.559361	506	0.9677
Wald (Chi-Square)	1.987681	4	0.7380

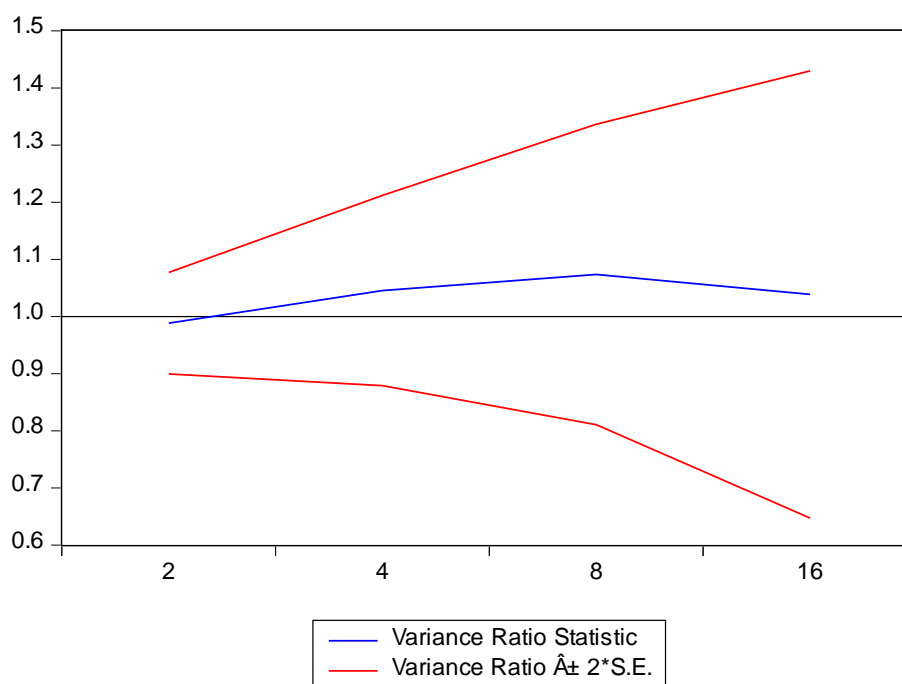
Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	0.988175	0.044455	-0.266004	0.7902
4	1.045289	0.083168	0.544543	0.5861
8	1.073556	0.131501	0.559361	0.5759
16	1.038478	0.195680	0.196635	0.8441

\*Probability approximation using studentized maximum modulus with parameter value 4 and infinite degrees of freedom

Test Details (Mean = 0.000192806727634)

Period	Variance	Var. Ratio	Obs.
1	5.5E-05	--	506
2	5.4E-05	0.98817	505
4	5.7E-05	1.04529	503
8	5.9E-05	1.07356	499
16	5.7E-05	1.03848	491

Variance Ratio Statistic for Log LAST\_PRICE with  $\hat{A} \pm 2 * S.E.$  Bands





## 5<sup>TH</sup> SUB SAMPLE FTSE 100

Null Hypothesis: Log LAST\_PRICE is a random walk  
 Date: 07/27/19 Time: 15:17  
 Sample: 12/31/2014 1/03/2017  
 Included observations: 506 (after adjustments)  
 Standard error estimates assume no heteroskedasticity  
 Use biased variance estimates  
 User-specified lags: 2 4 8 16

Joint Tests	Value	df	Probability
Max  z  (at period 16)*	1.840849	506	0.2378
Wald (Chi-Square)	6.306977	4	0.1774

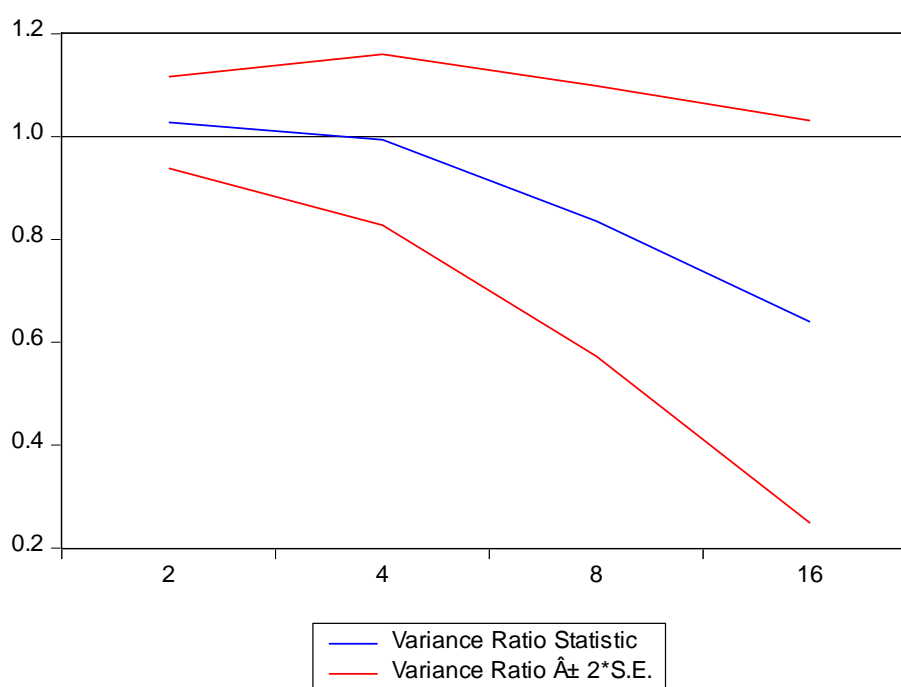
Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	1.027463	0.044455	0.617773	0.5367
4	0.993828	0.083168	-0.074209	0.9408
8	0.835649	0.131501	-1.249807	0.2114
16	0.639783	0.195680	-1.840849	0.0656

\*Probability approximation using studentized maximum modulus with parameter value 4 and infinite degrees of freedom

Test Details (Mean = 0.000139297082163)

Period	Variance	Var. Ratio	Obs.
1	0.00011	--	506
2	0.00012	1.02746	505
4	0.00011	0.99383	503
8	9.6E-05	0.83565	499
16	7.3E-05	0.63978	491

Variance Ratio Statistic for Log LAST\_PRICE with  $\hat{A} \pm 2^*S.E.$  Bands



## VARIANCE RATIO TEST

### 1<sup>ST</sup> SUB SAMPLE FTSE 250

Null Hypothesis: Log LAST\_PRICE is a random walk  
 Date: 07/27/19 Time: 15:31  
 Sample: 12/29/2006 1/02/2009  
 Included observations: 508 (after adjustments)  
 Standard error estimates assume no heteroskedasticity  
 Use biased variance estimates  
 User-specified lags: 2 4 8 16

Joint Tests	Value	df	Probability
Max  z  (at period 2)*	0.993663	508	0.7867
Wald (Chi-Square)	2.915724	4	0.5720

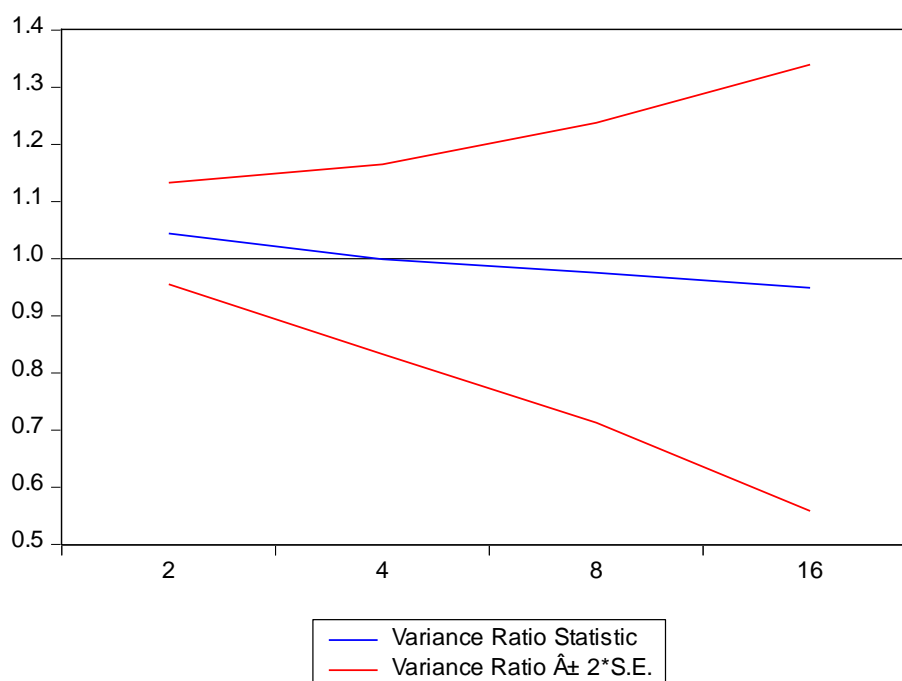
Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	1.044087	0.044368	0.993663	0.3204
4	0.998725	0.083005	-0.015358	0.9877
8	0.975082	0.131242	-0.189862	0.8494
16	0.948806	0.195294	-0.262136	0.7932

\*Probability approximation using studentized maximum modulus with parameter value 4 and infinite degrees of freedom

Test Details (Mean = -0.00102903898226)

Period	Variance	Var. Ratio	Obs.
1	0.00028	--	508
2	0.00030	1.04409	507
4	0.00028	0.99873	505
8	0.00028	0.97508	501
16	0.00027	0.94881	493

Variance Ratio Statistic for Log LAST\_PRICE with  $\hat{A} \pm 2^*S.E.$  Bands



## 2<sup>ND</sup> SUB SAMPLE FTSE 250

Null Hypothesis: Log LAST\_PRICE is a random walk  
 Date: 07/27/19 Time: 15:34  
 Sample: 12/31/2008 1/04/2011  
 Included observations: 507 (after adjustments)  
 Standard error estimates assume no heteroskedasticity  
 Use biased variance estimates  
 User-specified lags: 2 4 8 16

Joint Tests	Value	df	Probability
Max  z  (at period 2)*	1.912009	507	0.2055
Wald (Chi-Square)	6.386868	4	0.1721

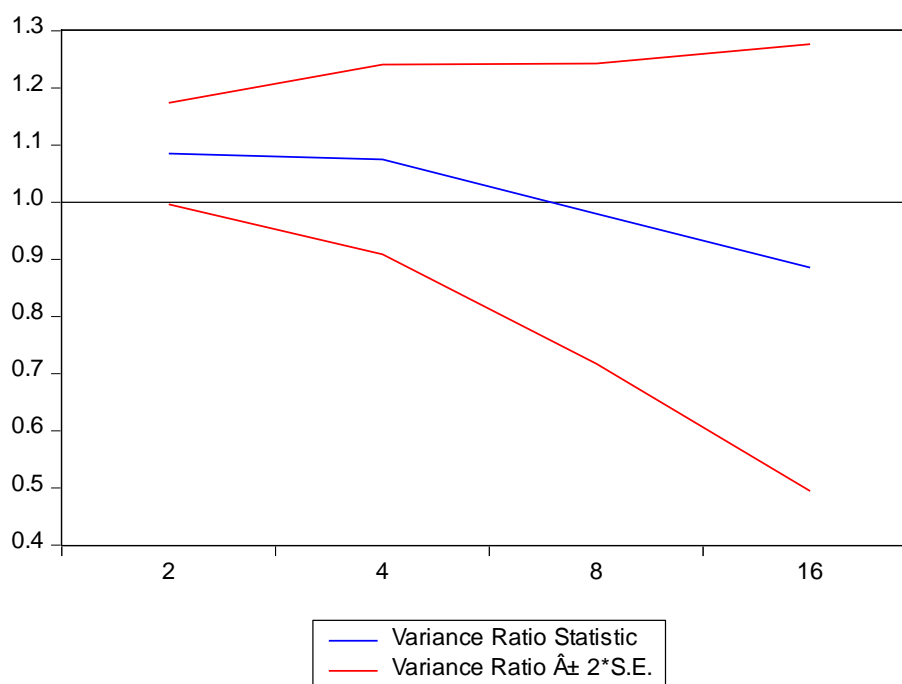
Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	1.084915	0.044412	1.912009	0.0559
4	1.074729	0.083086	0.899415	0.3684
8	0.979762	0.131371	-0.154053	0.8776
16	0.885459	0.195487	-0.585928	0.5579

\*Probability approximation using studentized maximum modulus with parameter value 4 and infinite degrees of freedom

Test Details (Mean = 0.00120582480101)

Period	Variance	Var. Ratio	Obs.
1	0.00018	--	507
2	0.00019	1.08492	506
4	0.00019	1.07473	504
8	0.00017	0.97976	500
16	0.00016	0.88546	492

Variance Ratio Statistic for Log LAST\_PRICE with  $\hat{A} \pm 2^*S.E.$  Bands



### 3<sup>RD</sup> SUB SAMPLE FTSE 250

Null Hypothesis: Log LAST\_PRICE is a random walk  
 Date: 07/27/19 Time: 15:36  
 Sample: 12/31/2010 1/02/2013  
 Included observations: 503 (after adjustments)  
 Standard error estimates assume no heteroskedasticity  
 Use biased variance estimates  
 User-specified lags: 2 4 8 16

Joint Tests	Value	df	Probability
Max  z  (at period 2)*	2.520664	503	0.0460
Wald (Chi-Square)	12.68361	4	0.0129

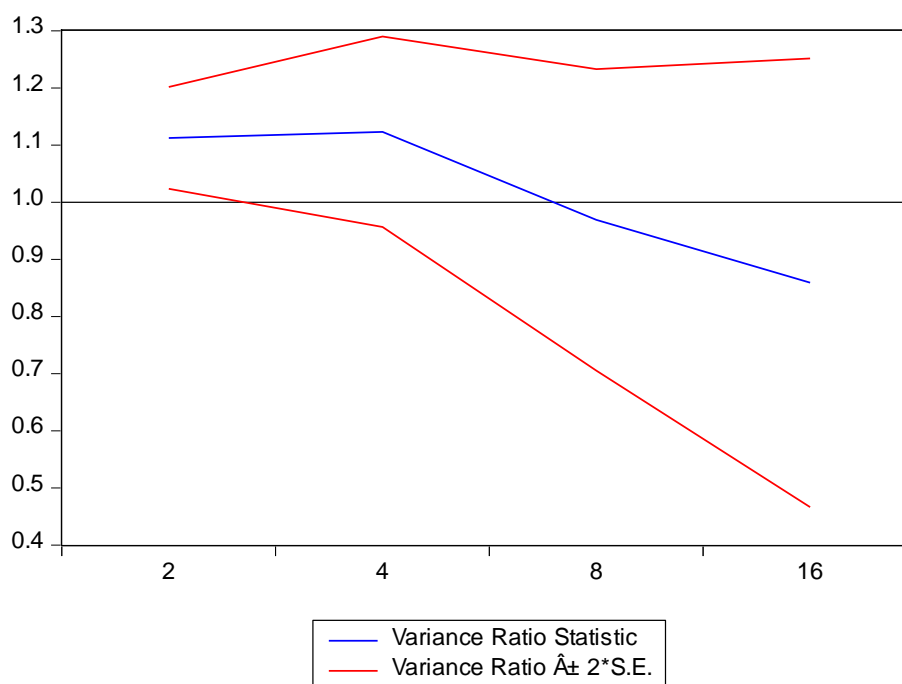
Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	1.112391	0.044588	2.520664	0.0117
4	1.123120	0.083416	1.475970	0.1400
8	0.969058	0.131892	-0.234597	0.8145
16	0.859035	0.196262	-0.718247	0.4726

\*Probability approximation using studentized maximum modulus with parameter value 4 and infinite degrees of freedom

Test Details (Mean = 0.000125001308134)

Period	Variance	Var. Ratio	Obs.
1	0.00013	--	503
2	0.00014	1.11239	502
4	0.00014	1.12312	500
8	0.00012	0.96906	496
16	0.00011	0.85904	488

Variance Ratio Statistic for Log LAST\_PRICE with  $\hat{A} \pm 2^*S.E.$  Bands



## 4<sup>TH</sup> SUB SAMPLE FTSE 250

Null Hypothesis: Log LAST\_PRICE is a random walk  
 Date: 07/27/19 Time: 15:46  
 Sample: 12/31/2012 1/02/2015  
 Included observations: 503 (after adjustments)  
 Standard error estimates assume no heteroskedasticity  
 Use biased variance estimates  
 User-specified lags: 2 4 8 16

Joint Tests	Value	df	Probability
Max  z  (at period 2)*	2.053717	503	0.1507
Wald (Chi-Square)	5.751405	4	0.2185

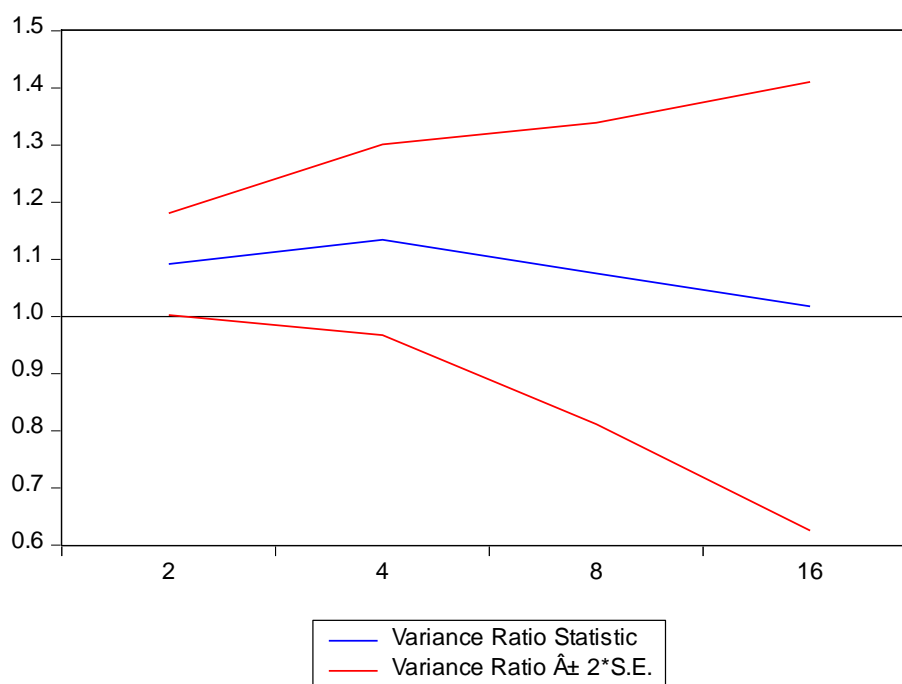
Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	1.091571	0.044588	2.053717	0.0400
4	1.134124	0.083416	1.607887	0.1079
8	1.075383	0.131892	0.571552	0.5676
16	1.017852	0.196262	0.090960	0.9275

\*Probability approximation using studentized maximum modulus with parameter value 4 and infinite degrees of freedom

Test Details (Mean = 0.000494983939716)

Period	Variance	Var. Ratio	Obs.
1	5.8E-05	--	503
2	6.3E-05	1.09157	502
4	6.6E-05	1.13412	500
8	6.2E-05	1.07538	496
16	5.9E-05	1.01785	488

Variance Ratio Statistic for Log LAST\_PRICE with  $\hat{\Delta} \pm 2^*S.E.$  Bands



## 5<sup>TH</sup> SUB SAMPLE FTSE 250

Null Hypothesis: Log LAST\_PRICE is a random walk  
 Date: 07/27/19 Time: 15:52  
 Sample: 12/31/2014 1/03/2017  
 Included observations: 500 (after adjustments)  
 Standard error estimates assume no heteroskedasticity  
 Use biased variance estimates  
 User-specified lags: 2 4 8 16

Joint Tests	Value	df	Probability
Max  z  (at period 2)*	2.606943	500	0.0360
Wald (Chi-Square)	31.73437	4	0.0000

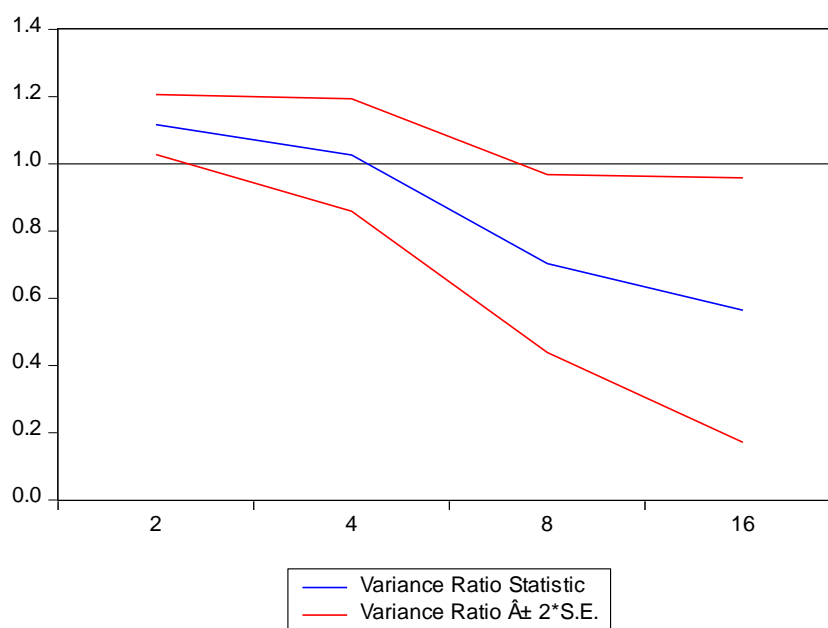
Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	1.116586	0.044721	2.606943	0.0091
4	1.026298	0.083666	0.314322	0.7533
8	0.703029	0.132288	-2.244891	0.0248
16	0.564535	0.196850	-2.212163	0.0270

\*Probability approximation using studentized maximum modulus with parameter value 4 and infinite degrees of freedom

Test Details (Mean = 0.00021426021164)

Period	Variance	Var. Ratio	Obs.
1	0.00010	--	500
2	0.00011	1.11659	499
4	0.00010	1.02630	498
8	7.0E-05	0.70303	495
16	5.7E-05	0.56454	487

Variance Ratio Statistic for Log LAST\_PRICE with  $\hat{\mu} \pm 2^*S.E.$  Bands



## Appendix E

### BDS tests

#### Full sample FTSE100

##### FTSE100 Full sample regression

Dependent Variable: FTSE100  
 Method: Least Squares  
 Date: 01/21/20 Time: 12:31  
 Sample (adjusted): 1/02/2007 1/03/2017  
 Included observations: 2529 after adjustments  
 HAC standard errors & covariance (Bartlett kernel, Newey-West fixed  
 bandwidth = 9.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	21.96661	11.50470	1.909360	0.0563
FTSE100(-1)	0.996369	0.001869	533.2331	0.0000
R-squared	0.991745	Mean dependent var		5945.077
Adjusted R-squared	0.991741	S.D. dependent var		750.9547
S.E. of regression	68.24497	Akaike info criterion		11.28487
Sum squared resid	11769188	Schwarz criterion		11.28949
Log likelihood	-14267.72	Hannan-Quinn criter.		11.28655
F-statistic	303573.0	Durbin-Watson stat		2.052680
Prob(F-statistic)	0.000000	Wald F-statistic		284337.5
Prob(Wald F-statistic)	0.000000			

**BDS tests**  $S=0.75, m=2$ 

M=2, s=0.75 ftse100

## BDS Test for RESID01

Date: 01/21/20 Time: 13:54

Sample: 12/29/2006 1/03/2017

Included observations: 2530

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>	
2	0.011825	0.001400	8.447947	0.0000	
Raw epsilon		51.16348			
Pairs within epsilon		2941507.	V-Statistic	0.459909	
Triples within epsilon		3.99E+09	V-Statistic	0.246705	
<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	712570.0	0.223087	1468127.	0.459633	0.211263

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s=1.5, m=6

## BDS Test for RESID01

Date: 01/21/20 Time: 12:54

Sample: 12/29/2006 1/03/2017

Included observations: 2530

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>	
2	0.015524	0.001627	9.539733	0.0000	
3	0.034675	0.002763	12.55106	0.0000	
4	0.052052	0.003514	14.81384	0.0000	
5	0.064487	0.003911	16.48795	0.0000	
6	0.072804	0.004028	18.07530	0.0000	
Raw epsilon		102.3270			
Pairs within epsilon		4820525.	V-Statistic	0.753697	
Triples within epsilon		9.85E+09	V-Statistic	0.608968	
<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	1863249.	0.583336	2406881.	0.753533	0.567812
3	1475759.	0.462388	2404693.	0.753444	0.427714
4	1193176.	0.374145	2402482.	0.753348	0.322093
5	978398.0	0.307040	2400392.	0.753289	0.242553
6	813082.0	0.255363	2398154.	0.753183	0.182559

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s=2,m=10

BDS Test for RESID01

Date: 01/21/20 Time: 12:53

Sample: 12/29/2006 1/03/2017

Included observations: 2530

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.011376	0.001124	10.12056	0.0000
3	0.028944	0.002173	13.32261	0.0000
4	0.048796	0.003144	15.52034	0.0000
5	0.067684	0.003981	17.00151	0.0000
6	0.085398	0.004663	18.31296	0.0000
7	0.100947	0.005190	19.45220	0.0000
8	0.113166	0.005569	20.31998	0.0000
9	0.123024	0.005817	21.14978	0.0000
10	0.130013	0.005949	21.85432	0.0000

Raw epsilon	136.4360		
Pairs within epsilon	5506193.	V-Statistic	0.860902
Triples within epsilon	1.24E+10	V-Statistic	0.769411

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<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	2403111.	0.752353	2749505.	0.860800	0.740976
3	2127683.	0.666651	2747149.	0.860743	0.637707
4	1905603.	0.597541	2744779.	0.860682	0.548745
5	1720265.	0.539852	2742458.	0.860635	0.472168
6	1565223.	0.491586	2740088.	0.860573	0.406188
7	1432760.	0.450341	2737736.	0.860517	0.349393
8	1314945.	0.413637	2735353.	0.860450	0.300472
9	1211557.	0.381417	2733011.	0.860395	0.258394
10	1117766.	0.352170	2730642.	0.860332	0.222157

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**FTSE100 SS1 2007-8**

Dependent Variable: FTSE100SS1

Method: Least Squares

Date: 01/21/20 Time: 13:38

Sample: 12/29/2006 1/02/2009

Included observations: 509

HAC standard errors &amp; covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.00E-11	1.71E-11	4.679861	0.0000
FTSE100SS1	1.000000	2.78E-15	3.60E+14	0.0000
R-squared	1.000000	Mean dependent var		5880.442
Adjusted R-squared	1.000000	S.D. dependent var		738.3583
S.E. of regression	1.00E-11	Akaike info criterion		-47.80716
Sum squared resid	5.11E-20	Schwarz criterion		-47.79053
Log likelihood	12168.92	Hannan-Quinn criter.		-47.80064
F-statistic	2.75E+30	Durbin-Watson stat		0.016964
Prob(F-statistic)	0.000000	Wald F-statistic		1.30E+29
Prob(Wald F-statistic)	0.000000			

BDS Test for RESID04

Date: 01/21/20 Time: 14:50

Sample: 12/29/2006 1/02/2009

Included observations: 509

<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>	
2	0.222189	0.003944	56.34211	0.0000	
Raw epsilon	7.51E-12				
Pairs within epsilon	135133.0	V-Statistic		0.521586	
Triples within epsilon	41736715	V-Statistic		0.316494	
<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	63730.00	0.494883	67248.00	0.522201	0.272694

## BDS Test for RESID01

Date: 01/21/20 Time: 13:41

Sample: 12/29/2006 1/02/2009

Included observations: 509

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.174066	0.004267	40.79705	0.0000
3	0.302490	0.007140	42.36568	0.0000
4	0.396493	0.008953	44.28511	0.0000
5	0.465056	0.009827	47.32544	0.0000
6	0.514872	0.009979	51.59317	0.0000

Raw epsilon	1.50E-11			
Pairs within epsilon	192029.0	V-Statistic	0.741193	
Triples within epsilon	78786979	V-Statistic	0.597449	

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<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	93408.00	0.725341	95615.00	0.742479	0.551276
3	91717.00	0.715025	95488.00	0.744424	0.412535
4	90335.00	0.707040	95377.00	0.746503	0.310547
5	89127.00	0.700354	95283.00	0.748727	0.235298
6	88013.00	0.694350	95200.00	0.751049	0.179478

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## BDS Test for RESID01

Date: 01/21/20 Time: 13:42

Sample: 12/29/2006 1/02/2009

Included observations: 509

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.134027	0.003468	38.64507	0.0000
3	0.243416	0.006432	37.84675	0.0000
4	0.332223	0.008933	37.18970	0.0000
5	0.404429	0.010858	37.24663	0.0000
6	0.462965	0.012210	37.91769	0.0000
7	0.510754	0.013045	39.15425	0.0000
8	0.550189	0.013440	40.93591	0.0000
9	0.582614	0.013478	43.22658	0.0000
10	0.609152	0.013236	46.02370	0.0000

Raw epsilon	2.00E-11			
Pairs within epsilon	213431.0	V-Statistic	0.823800	
Triples within epsilon	94648785	V-Statistic	0.717731	

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<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	104893.0	0.814526	106232.0	0.824924	0.680499
3	103686.0	0.808335	106037.0	0.826664	0.564920
4	102662.0	0.803522	105861.0	0.828560	0.471299
5	101765.0	0.799662	105697.0	0.830559	0.395233
6	100927.0	0.796231	105544.0	0.832655	0.333265
7	100146.0	0.793217	105392.0	0.834768	0.282463
8	99449.00	0.790841	105241.0	0.836900	0.240651
9	98765.00	0.788543	105081.0	0.838970	0.205929
10	98087.00	0.786269	104922.0	0.841058	0.177117

**FTSE100 SS2 2009-10**

Dependent Variable: FTSE100SS2

Method: Least Squares

Date: 01/29/20 Time: 21:20

Sample (adjusted): 1/02/2009 1/04/2011

Included observations: 507 after adjustments

HAC standard errors &amp; covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	19.91655	24.28703	0.820049	0.4126
FTSE100SS2(-1)	0.996651	0.004677	213.0830	0.0000
R-squared	0.989888	Mean dependent var		5020.103
Adjusted R-squared	0.989868	S.D. dependent var		609.9694
S.E. of regression	61.39680	Akaike info criterion		11.07653
Sum squared resid	1903631.	Schwarz criterion		11.09321
Log likelihood	-2805.900	Hannan-Quinn criter.		11.08307
F-statistic	49438.06	Durbin-Watson stat		2.017848
Prob(F-statistic)	0.000000	Wald F-statistic		45404.37
Prob(Wald F-statistic)	0.000000			

BDS Test for RESID01

Date: 01/21/20 Time: 19:16

Sample: 12/31/2008 1/04/2011

Included observations: 508

<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>	
2	-0.000717	0.002702	-0.265273	0.7908	
Raw epsilon	45.95669				
Pairs within epsilon	111377.0	V-Statistic		0.433291	
Triples within epsilon	28427503	V-Statistic		0.218130	
<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	23913.00	0.187164	55380.00	0.433452	0.187881

## BDS Test for RESID01

Date: 01/21/20 Time: 19:16

Sample: 12/31/2008 1/04/2011

Included observations: 508

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.001342	0.003438	0.390483	0.6962
3	0.002851	0.005659	0.503692	0.6145
4	0.010200	0.006979	1.461402	0.1439
5	0.016419	0.007533	2.179547	0.0293
6	0.022297	0.007522	2.964131	0.0030

Raw epsilon	91.91337		
Pairs within epsilon	187697.0	V-Statistic	0.730199
Triples within epsilon	74526601	V-Statistic	0.571857

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<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	68476.00	0.535953	93418.00	0.731171	0.534610
3	50185.00	0.394350	93097.00	0.731550	0.391500
4	37511.00	0.295931	92674.00	0.731121	0.285731
5	28356.00	0.224597	92242.00	0.730612	0.208178
6	21844.00	0.173708	91806.00	0.730062	0.151411

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## BDS Test for RESID01

Date: 01/21/20 Time: 19:17

Sample: 12/31/2008 1/04/2011

Included observations: 508

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.001815	0.002330	0.778763	0.4361
3	0.004338	0.004442	0.976689	0.3287
4	0.012224	0.006339	1.928450	0.0538
5	0.021584	0.007916	2.726817	0.0064
6	0.031652	0.009144	3.461537	0.0005
7	0.039714	0.010035	3.957533	0.0001
8	0.045332	0.010620	4.268357	0.0000
9	0.051343	0.010939	4.693457	0.0000
10	0.056077	0.011033	5.082488	0.0000

Raw epsilon	122.5512		
Pairs within epsilon	218109.0	V-Statistic	0.848511
Triples within epsilon	97244957	V-Statistic	0.746179

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<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	92387.00	0.723101	108509.0	0.849286	0.721286
3	78528.00	0.617067	108089.0	0.849356	0.612729
4	67404.00	0.531762	107615.0	0.848993	0.519538
5	58294.00	0.461724	107142.0	0.848629	0.440139
6	50842.00	0.404307	106675.0	0.848303	0.372655
7	44462.00	0.354986	106209.0	0.847976	0.315272
8	38923.00	0.312008	105752.0	0.847711	0.266676
9	34437.00	0.277157	105316.0	0.847607	0.225814
10	30534.00	0.246733	104853.0	0.847276	0.190656

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**FTSE100 SS3 20011-12**

Dependent Variable: FTSE100SS3  
Method: Least Squares  
Date: 01/29/20 Time: 21:33  
Sample (adjusted): 1/04/2011 1/02/2013  
Included observations: 504 after adjustments  
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed  
bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	172.5101	66.76072	2.584006	0.0100
FTSE100SS3(-1)	0.969847	0.011454	84.67266	0.0000
R-squared	0.938718	Mean dependent var		5713.010
Adjusted R-squared	0.938596	S.D. dependent var		251.8074
S.E. of regression	62.39739	Akaike info criterion		11.10888
Sum squared resid	1954504.	Schwarz criterion		11.12564
Log likelihood	-2797.439	Hannan-Quinn criter.		11.11546
F-statistic	7689.661	Durbin-Watson stat		1.875615
Prob(F-statistic)	0.000000	Wald F-statistic		7169.460
Prob(Wald F-statistic)	0.000000			

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**BDS Test for RESID01**

Date: 01/21/20 Time: 19:39  
Sample: 12/31/2010 1/02/2013  
Included observations: 505

Dimension	BDS Statistic	Std. Error	z-Statistic	Prob.	
2	0.004559	0.002985	1.527199	0.1267	
Raw epsilon	46.70510				
Pairs within epsilon	111906.0	V-Statistic	0.440547		
Triples within epsilon	29133146	V-Statistic	0.227560		
Dimension	C(m,n)	c(m,n)	C(1,n-(m-1))	c(1,n-(m-1))	c(1,n-(m-1))^k
2	25121.00	0.198973	55668.00	0.440924	0.194414

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## BDS Test for RESID01

Date: 01/21/20 Time: 19:40

Sample: 12/31/2010 1/02/2013

Included observations: 505

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.009695	0.003530	2.746368	0.0060
3	0.029735	0.005847	5.085254	0.0000
4	0.040788	0.007256	5.621438	0.0000
5	0.047710	0.007880	6.054706	0.0000
6	0.050669	0.007917	6.399747	0.0000

Raw epsilon	93.41020		
Pairs within epsilon	186610.0	V-Statistic	0.734639
Triples within epsilon	74161976	V-Statistic	0.579282

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<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	69641.00	0.551599	92940.00	0.736141	0.541903
3	53802.00	0.427846	92508.00	0.735644	0.398110
4	41691.00	0.332862	92077.00	0.735146	0.292075
5	32638.00	0.261627	91641.00	0.734597	0.213918
6	25746.00	0.207210	91216.00	0.734127	0.156541

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## BDS Test for RESID01

Date: 01/21/20 Time: 19:40

Sample: 12/31/2010 1/02/2013

Included observations: 505

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.009129	0.002389	3.821599	0.0001
3	0.028800	0.004564	6.310867	0.0000
4	0.045690	0.006527	6.999674	0.0000
5	0.060644	0.008169	7.423387	0.0000
6	0.074321	0.009458	7.857951	0.0000
7	0.085143	0.010403	8.184378	0.0000
8	0.093388	0.011035	8.463251	0.0000
9	0.099866	0.011391	8.766920	0.0000
10	0.103635	0.011515	9.000017	0.0000

Raw epsilon	124.5469		
Pairs within epsilon	215998.0	V-Statistic	0.850332
Triples within epsilon	95999304	V-Statistic	0.749854

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<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	92743.00	0.734581	107534.0	0.851734	0.725451
3	81232.00	0.645975	107065.0	0.851405	0.617175
4	71435.00	0.570339	106597.0	0.851074	0.524649
5	63149.00	0.506204	106126.0	0.850709	0.445560
6	56220.00	0.452471	105660.0	0.850375	0.378150
7	50209.00	0.405719	105190.0	0.850000	0.320576
8	44980.00	0.364932	104722.0	0.849630	0.271543
9	40490.00	0.329831	104263.0	0.849324	0.229964
10	36467.00	0.298262	103806.0	0.849025	0.194627

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**FTSE100 SS4 2013- 14**

Dependent Variable: FTSE100SS4

Method: Least Squares

Date: 01/21/20 Time: 19:55

Sample (adjusted): 1/02/2013 1/02/2015

Included observations: 507 after adjustments

HAC standard errors &amp; covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	278.0280	68.19773	4.076792	0.0001
FTSE100SS4(-1)	0.957910	0.010314	92.87851	0.0000
R-squared	0.939857	Mean dependent var		6576.398
Adjusted R-squared	0.939738	S.D. dependent var		193.3130
S.E. of regression	47.45508	Akaike info criterion		10.56138
Sum squared resid	1137252.	Schwarz criterion		10.57806
Log likelihood	-2675.310	Hannan-Quinn criter.		10.56792
F-statistic	7891.674	Durbin-Watson stat		1.969065
Prob(F-statistic)	0.000000	Wald F-statistic		8626.418
Prob(Wald F-statistic)	0.000000			

BDS Test for RESID01

Date: 01/21/20 Time: 19:57

Sample: 12/31/2012 1/02/2015

Included observations: 508

Dimension	BDS Statistic	Std. Error	z-Statistic	Prob.	
2	0.009751	0.002692	3.622485	0.0003	
Raw epsilon	35.52104				
Pairs within epsilon	112523.0	V-Statistic	0.437749		
Triples within epsilon	28918811	V-Statistic	0.221900		
Dimension	$C(m,n)$	$c(m,n)$	$C(1,n-(m-1))$	$c(1,n-(m-1))$	$c(1,n-(m-1))^k$
2	25567.00	0.200110	55744.00	0.436301	0.190359



## BDS Test for RESID01

Date: 01/21/20 Time: 19:57

Sample: 12/31/2012 1/02/2015

Included observations: 508

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.014683	0.003420	4.293055	0.0000
3	0.028153	0.005693	4.945435	0.0000
4	0.039558	0.007098	5.573047	0.0000
5	0.047197	0.007746	6.093178	0.0000
6	0.050311	0.007820	6.433296	0.0000

Raw epsilon	71.04208		
Pairs within epsilon	189817.0	V-Statistic	0.738447
Triples within epsilon	76079179	V-Statistic	0.583770

<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	71373.00	0.558627	94230.00	0.737526	0.543944
3	54534.00	0.428524	93795.00	0.737034	0.400372
4	42734.00	0.337136	93620.00	0.738584	0.297578
5	33622.00	0.266307	93191.00	0.738129	0.219110
6	26572.00	0.211306	92750.00	0.737569	0.160996

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## BDS Test for RESID01

Date: 01/21/20 Time: 19:57

Sample: 12/31/2012 1/02/2015

Included observations: 508

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.011268	0.002408	4.679586	0.0000
3	0.025078	0.004617	5.431504	0.0000
4	0.040223	0.006629	6.067667	0.0000
5	0.053706	0.008328	6.448761	0.0000
6	0.064351	0.009678	6.649046	0.0000
7	0.072567	0.010686	6.791040	0.0000
8	0.078495	0.011377	6.899307	0.0000
9	0.080788	0.011790	6.852528	0.0000
10	0.077934	0.011963	6.514738	0.0000

Raw epsilon	94.72278		
Pairs within epsilon	219403.0	V-Statistic	0.853545
Triples within epsilon	98475465	V-Statistic	0.755621

<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	94388.00	0.738763	108975.0	0.852933	0.727495
3	82069.00	0.644892	108504.0	0.852617	0.619814
4	72454.00	0.571602	108223.0	0.853790	0.531379
5	63960.00	0.506602	107756.0	0.853493	0.452896
6	56585.00	0.449977	107285.0	0.853154	0.385625
7	50192.00	0.400735	106819.0	0.852846	0.328167
8	44624.00	0.357707	106361.0	0.852593	0.279213
9	39794.00	0.320271	106006.0	0.853160	0.239483
10	35620.00	0.287831	105866.0	0.855462	0.209898

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**FTSE100 SS5 2015-16**

Dependent Variable: FTSE100SS5

Method: Least Squares

Date: 01/21/20 Time: 20:12

Sample (adjusted): 1/02/2015 1/03/2017

Included observations: 507 after adjustments

HAC standard errors &amp; covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	88.38460	54.23656	1.629613	0.1038
FTSE100SS5(-1)	0.986655	0.008137	121.2519	0.0000
R-squared	0.967819	Mean dependent var		6533.615
Adjusted R-squared	0.967756	S.D. dependent var		375.2187
S.E. of regression	67.37702	Akaike info criterion		11.26242
Sum squared resid	2292530.	Schwarz criterion		11.27910
Log likelihood	-2853.024	Hannan-Quinn criter.		11.26896
F-statistic	15187.64	Durbin-Watson stat		1.914342
Prob(F-statistic)	0.000000	Wald F-statistic		14702.03
Prob(Wald F-statistic)	0.000000			

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.116781	Prob. F(2,503)	0.3281
Obs*R-squared	2.241371	Prob. Chi-Square(2)	0.3261

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 01/21/20 Time: 20:13

Sample: 1/02/2015 1/03/2017

Included observations: 507

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.747298	54.07289	-0.032314	0.9742
FTSE100SS5(-1)	0.000267	0.008265	0.032298	0.9742
RESID(-1)	0.044291	0.045230	0.979257	0.3279
RESID(-2)	-0.051545	0.045270	-1.138608	0.2554
R-squared	0.004421	Mean dependent var		-8.24E-13
Adjusted R-squared	-0.001517	S.D. dependent var		67.31041
S.E. of regression	67.36144	Akaike info criterion		11.26588
Sum squared resid	2282395.	Schwarz criterion		11.29924
Log likelihood	-2851.901	Hannan-Quinn criter.		11.27896
F-statistic	0.744521	Durbin-Watson stat		1.994148
Prob(F-statistic)	0.525901			

## Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	50.77563	Prob. F(1,505)	0.0000
Obs*R-squared	46.31949	Prob. Chi-Square(1)	0.0000
Scaled explained SS	73.91005	Prob. Chi-Square(1)	0.0000

## Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 01/21/20 Time: 20:13

Sample: 1/02/2015 1/03/2017

Included observations: 507

HAC standard errors &amp; covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	47363.96	8551.098	5.538933	0.0000
FTSE100SS5(-1)	-6.558409	1.249965	-5.246875	0.0000

R-squared	0.091360	Mean dependent var	4521.755
Adjusted R-squared	0.089561	S.D. dependent var	8117.777
S.E. of regression	7745.735	Akaike info criterion	20.75161
Sum squared resid	3.03E+10	Schwarz criterion	20.76829
Log likelihood	-5258.533	Hannan-Quinn criter.	20.75815
F-statistic	50.77563	Durbin-Watson stat	1.624175
Prob(F-statistic)	0.000000		

## BDS Test for RESID01

Date: 01/21/20 Time: 20:13

Sample: 12/31/2014 1/03/2017

Included observations: 508

Dimension	BDS Statistic	Std. Error	z-Statistic	Prob.	
2	0.014507	0.002877	5.042428	0.0000	
Raw epsilon	50.43300				
Pairs within epsilon	112881.0	V-Statistic	0.439142		
Triples within epsilon	29349473	V-Statistic	0.225204		
Dimension	C(m,n)	c(m,n)	C(1,n-(m-1))	c(1,n-(m-1))	c(1,n-(m-1))^k
2	26339.00	0.206152	55932.00	0.437772	0.191645

## BDS Test for RESID01

Date: 01/21/20 Time: 20:14

Sample: 12/31/2014 1/03/2017

Included observations: 508

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.017409	0.003619	4.810485	0.0000
3	0.035254	0.005984	5.891216	0.0000
4	0.052251	0.007413	7.048193	0.0000
5	0.061249	0.008038	7.619890	0.0000
6	0.066156	0.008063	8.204387	0.0000

Raw epsilon	100.8660		
Pairs within epsilon	188481.0	V-Statistic	0.733249
Triples within epsilon	75373673	V-Statistic	0.578357

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<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	70757.00	0.553806	93574.00	0.732392	0.536397
3	54397.00	0.427448	93152.00	0.731982	0.392194
4	42907.00	0.338501	92716.00	0.731453	0.286249
5	34113.00	0.270196	92310.00	0.731151	0.208947
6	27444.00	0.218241	91874.00	0.730603	0.152085

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## BDS Test for RESID01

Date: 01/21/20 Time: 20:14

Sample: 12/31/2014 1/03/2017

Included observations: 508

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.011537	0.002476	4.660181	0.0000
3	0.028303	0.004718	5.998609	0.0000
4	0.048139	0.006733	7.150028	0.0000
5	0.065859	0.008406	7.834455	0.0000
6	0.080990	0.009710	8.341166	0.0000
7	0.094335	0.010655	8.853659	0.0000
8	0.103991	0.011275	9.223039	0.0000
9	0.110498	0.011612	9.515471	0.0000
10	0.114001	0.011711	9.734421	0.0000

Raw epsilon	134.4880		
Pairs within epsilon	218021.0	V-Statistic	0.848169
Triples within epsilon	97382637	V-Statistic	0.747236

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<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	93261.00	0.729942	108292.0	0.847587	0.718404
3	80997.00	0.636469	107820.0	0.847242	0.608166
4	71315.00	0.562616	107352.0	0.846918	0.514478
5	63236.00	0.500867	106891.0	0.846641	0.435008
6	56386.00	0.448394	106423.0	0.846299	0.367404
7	50652.00	0.404407	105957.0	0.845964	0.310073
8	45592.00	0.365467	105492.0	0.845627	0.261476
9	41104.00	0.330814	105028.0	0.845289	0.220316
10	37060.00	0.299467	104564.0	0.844941	0.185466

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## FTSE250 Full sample 2007-16

Dependent Variable: FTSE250  
 Method: Least Squares  
 Date: 01/29/20 Time: 21:35  
 Sample (adjusted): 1/02/2007 1/03/2017  
 Included observations: 2529 after adjustments  
 HAC standard errors & covariance (Bartlett kernel, Newey-West fixed  
 bandwidth = 9.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.233708	10.69927	0.582629	0.5602
FTSE250(-1)	0.999722	0.000822	1216.288	0.0000
R-squared	0.998376	Mean dependent var		12506.44
Adjusted R-squared	0.998375	S.D. dependent var		3333.384
S.E. of regression	134.3580	Akaike info criterion		12.63968
Sum squared resid	45617584	Schwarz criterion		12.64430
Log likelihood	-15980.88	Hannan-Quinn criter.		12.64136
F-statistic	1553513.	Durbin-Watson stat		1.825859
Prob(F-statistic)	0.000000	Wald F-statistic		1479356.
Prob(Wald F-statistic)	0.000000			

### BDS Test for RESID02

Date: 01/21/20 Time: 14:37  
 Sample: 12/29/2006 1/03/2017  
 Included observations: 2530

Dimension	BDS Statistic	Std. Error	z-Statistic	Prob.	
2	0.007625	0.001211	6.298420	0.0000	
Raw epsilon		100.7286			
Pairs within epsilon		2854863.	V-Statistic	0.446362	
Triples within epsilon		3.72E+09	V-Statistic	0.229675	
Dimension	$C(m,n)$	$c(m,n)$	$C(1,n-(m-1))$	$c(1,n-(m-1))$	$c(1,n-(m-1))^k$
2	659862.0	0.206586	1424741.	0.446050	0.198961

## BDS Test for RESID02

Date: 01/21/20 Time: 13:18

Sample: 12/29/2006 1/03/2017

Included observations: 2530

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.011982	0.001486	8.064553	0.0000
3	0.026913	0.002503	10.75224	0.0000
4	0.041085	0.003159	13.00636	0.0000
5	0.050288	0.003489	14.41452	0.0000
6	0.056524	0.003565	15.85638	0.0000

Raw epsilon	201.4573			
Pairs within epsilon	4786083.	V-Statistic	0.748312	
Triples within epsilon	9.66E+09	V-Statistic	0.597321	

<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	1825997.	0.571673	2389608.	0.748125	0.559691
3	1421770.	0.445472	2387413.	0.748030	0.418559
4	1128948.	0.354005	2385191.	0.747926	0.312920
5	905816.0	0.284262	2383166.	0.747883	0.233974
6	736665.0	0.231363	2380946.	0.747778	0.174839

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## BDS Test for RESID02

Date: 01/21/20 Time: 13:19

Sample: 12/29/2006 1/03/2017

Included observations: 2530

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.009337	0.000995	9.388377	0.0000
3	0.022448	0.001926	11.65485	0.0000
4	0.037886	0.002793	13.56582	0.0000
5	0.052536	0.003543	14.82730	0.0000
6	0.066288	0.004158	15.94099	0.0000
7	0.077562	0.004636	16.72861	0.0000
8	0.086823	0.004985	17.41616	0.0000
9	0.094009	0.005217	18.02077	0.0000
10	0.098894	0.005345	18.50065	0.0000

Raw epsilon	268.6097			
Pairs within epsilon	5519919.	V-Statistic	0.863048	
Triples within epsilon	1.25E+10	V-Statistic	0.769854	

<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	2408356.	0.753995	2756327.	0.862936	0.744658
3	2122083.	0.664896	2753941.	0.862871	0.642448
4	1888130.	0.592062	2751545.	0.862803	0.554176
5	1690760.	0.530593	2749265.	0.862772	0.478057
6	1523700.	0.478545	2746869.	0.862703	0.412257
7	1378368.	0.433244	2744722.	0.862712	0.355682
8	1250854.	0.393476	2742325.	0.862643	0.306653
9	1138286.	0.358350	2739930.	0.862573	0.264341
10	1037001.	0.326724	2737535.	0.862504	0.227829

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**FTSE250 SS1 2007-8**

Dependent Variable: FTSE250SS1

Method: Least Squares

Date: 01/29/20 Time: 21:14

Sample (adjusted): 1/02/2007 1/02/2009

Included observations: 508 after adjustments

HAC standard errors &amp; covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.214764	47.81892	-0.109052	0.9132
FTSE250SS1(-1)	0.999628	0.004485	222.8678	0.0000
R-squared	0.992343	Mean dependent var		10044.92
Adjusted R-squared	0.992328	S.D. dependent var		1725.173
S.E. of regression	151.1091	Akaike info criterion		12.87781
Sum squared resid	11553986	Schwarz criterion		12.89447
Log likelihood	-3268.964	Hannan-Quinn criter.		12.88434
F-statistic	65577.35	Durbin-Watson stat		1.963508
Prob(F-statistic)	0.000000	Wald F-statistic		49670.04
Prob(Wald F-statistic)	0.000000			

BDS Test for RESID05

Date: 01/21/20 Time: 14:58

Sample: 12/29/2006 1/02/2009

Included observations: 509

<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>	
2	0.004325	0.002421	1.786285	0.0741	
Raw epsilon	113.1085				
Pairs within epsilon	109070.0	V-Statistic	0.422647		
Triples within epsilon	26991620	V-Statistic	0.205891		
<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	23471.00	0.182980	54217.00	0.422675	0.178655

## BDS Test for RESID05

Date: 01/21/20 Time: 14:59

Sample: 12/29/2006 1/02/2009

Included observations: 509

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.002495	0.003216	0.775663	0.4379
3	0.008280	0.005255	1.575772	0.1151
4	0.018156	0.006431	2.823237	0.0048
5	0.028274	0.006888	4.104678	0.0000
6	0.037532	0.006826	5.498551	0.0000

Raw epsilon	226.2170		
Pairs within epsilon	187082.0	V-Statistic	0.724944
Triples within epsilon	73644022	V-Statistic	0.561754

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<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	67897.00	0.529325	93103.00	0.725830	0.526830
3	49829.00	0.390005	92682.00	0.725410	0.381725
4	37506.00	0.294719	92287.00	0.725185	0.276563
5	28910.00	0.228076	91852.00	0.724636	0.199802
6	22930.00	0.181619	91414.00	0.724054	0.144087

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## BDS Test for RESID05

Date: 01/21/20 Time: 15:00

Sample: 12/29/2006 1/02/2009

Included observations: 509

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.001361	0.002179	0.624675	0.5322
3	0.005563	0.004150	1.340579	0.1801
4	0.013832	0.005916	2.338057	0.0194
5	0.025266	0.007380	3.423821	0.0006
6	0.038998	0.008515	4.579856	0.0000
7	0.051643	0.009335	5.532373	0.0000
8	0.061957	0.009868	6.278557	0.0000
9	0.069253	0.010153	6.820965	0.0000
10	0.074624	0.010229	7.295593	0.0000

Raw epsilon	301.6227		
Pairs within epsilon	218788.0	V-Statistic	0.847805
Triples within epsilon	97445452	V-Statistic	0.743311

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<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	92539.00	0.721434	108847.0	0.848571	0.720072
3	78711.00	0.616061	108386.0	0.848323	0.610497
4	67591.00	0.531125	107926.0	0.848075	0.517293
5	58688.00	0.463000	107451.0	0.847700	0.437733
6	51647.00	0.409075	106977.0	0.847322	0.370077
7	45811.00	0.364299	106507.0	0.846967	0.312656
8	40816.00	0.325876	106038.0	0.846611	0.263919
9	36452.00	0.292200	105589.0	0.846405	0.222948
10	32635.00	0.262654	105129.0	0.846102	0.188030



**FTSE250 SS2 2009-10**

Dependent Variable: FTSE250SS2

Method: Least Squares

Date: 01/29/20 Time: 21:21

Sample (adjusted): 1/02/2009 1/04/2011

Included observations: 507 after adjustments

HAC standard errors &amp; covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	32.66463	31.19092	1.047248	0.2955
FTSE250SS2(-1)	0.997539	0.003351	297.6692	0.0000
R-squared	0.994517	Mean dependent var		8986.674
Adjusted R-squared	0.994506	S.D. dependent var		1497.222
S.E. of regression	110.9768	Akaike info criterion		12.26046
Sum squared resid	6219506.	Schwarz criterion		12.27714
Log likelihood	-3106.026	Hannan-Quinn criter.		12.26700
F-statistic	91594.79	Durbin-Watson stat		1.839020
Prob(F-statistic)	0.000000	Wald F-statistic		88606.95
Prob(Wald F-statistic)	0.000000			

**BDS Test for RESID02**

Date: 01/21/20 Time: 19:26

Sample: 12/31/2008 1/04/2011

Included observations: 508

Dimension	BDS Statistic	Std. Error	z-Statistic	Prob.	
2	0.126273	0.002127	59.36504	0.0000	
Raw epsilon	119.0577				
Pairs within epsilon	107843.0	V-Statistic	0.419543		
Triples within epsilon	26056877	V-Statistic	0.199939		
Dimension	C(m,n)	c(m,n)	C(1,n-(m-1))	c(1,n-(m-1))	c(1,n-(m-1))^k
2	38442.00	0.300881	53388.00	0.417861	0.174608

## BDS Test for RESID02

Date: 01/21/20 Time: 19:27

Sample: 12/31/2008 1/04/2011

Included observations: 508

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.130856	0.002767	47.29405	0.0000
3	0.229248	0.004347	52.74270	0.0000
4	0.297326	0.005115	58.13340	0.0000
5	0.341287	0.005267	64.79935	0.0000
6	0.367521	0.005018	73.24434	0.0000

Raw epsilon	238.1155		
Pairs within epsilon	179265.0	V-Statistic	0.697396
Triples within epsilon	67440111	V-Statistic	0.517481

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<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	78650.00	0.615583	88953.00	0.696224	0.484727
3	72105.00	0.566596	88590.00	0.696134	0.337348
4	67401.00	0.531738	88199.00	0.695817	0.234412
5	63596.00	0.503719	87776.00	0.695239	0.162432
6	60346.00	0.479885	87354.00	0.694658	0.112364

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## BDS Test for RESID02

Date: 01/21/20 Time: 19:27

Sample: 12/31/2008 1/04/2011

Included observations: 508

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.081925	0.001987	41.22880	0.0000
3	0.160794	0.003710	43.33498	0.0000
4	0.229156	0.005187	44.17602	0.0000
5	0.287647	0.006345	45.33247	0.0000
6	0.336021	0.007180	46.80005	0.0000
7	0.375167	0.007719	48.60614	0.0000
8	0.406261	0.008001	50.77335	0.0000
9	0.430275	0.008073	53.29870	0.0000
10	0.448135	0.007976	56.18877	0.0000

Raw epsilon	317.4873		
Pairs within epsilon	213755.0	V-Statistic	0.831573
Triples within epsilon	93033341	V-Statistic	0.713863

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<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	98639.00	0.772035	106138.0	0.830728	0.690109
3	93421.00	0.734096	105719.0	0.830732	0.573302
4	89360.00	0.704976	105276.0	0.830541	0.475821
5	86055.00	0.681608	104793.0	0.830024	0.393961
6	83228.00	0.661848	104314.0	0.829528	0.325827
7	80705.00	0.644351	103838.0	0.829046	0.269185
8	78389.00	0.628369	103362.0	0.828553	0.222107
9	76205.00	0.613315	102887.0	0.828058	0.183040
10	74170.00	0.599339	102450.0	0.827859	0.151204

**FTSE250 SS3 2011-12**

Dependent Variable: FTSE250SS3

Method: Least Squares

Date: 01/21/20 Time: 19:47

Sample (adjusted): 1/04/2011 1/02/2013

Included observations: 504 after adjustments

HAC standard errors &amp; covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	124.9591	92.73173	1.347534	0.1784
FTSE250SS3(-1)	0.989054	0.008056	122.7791	0.0000
R-squared	0.971328	Mean dependent var		11227.36
Adjusted R-squared	0.971271	S.D. dependent var		714.0703
S.E. of regression	121.0327	Akaike info criterion		12.43396
Sum squared resid	7353750.	Schwarz criterion		12.45071
Log likelihood	-3131.357	Hannan-Quinn criter.		12.44053
F-statistic	17006.33	Durbin-Watson stat		1.726950
Prob(F-statistic)	0.000000	Wald F-statistic		15074.71
Prob(Wald F-statistic)	0.000000			

BDS Test for RESID02

Date: 01/21/20 Time: 19:48

Sample: 12/31/2010 1/02/2013

Included observations: 505

<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>	
2	0.002631	0.002610	1.008042	0.3134	
Raw epsilon	90.59421				
Pairs within epsilon	110108.0	V-Statistic	0.433469		
Triples within epsilon	27802668	V-Statistic	0.217168		
<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	24086.00	0.190776	54763.00	0.433756	0.188144

## BDS Test for RESID02

Date: 01/21/20 Time: 19:49

Sample: 12/31/2010 1/02/2013

Included observations: 505

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.005765	0.003407	1.691952	0.0907
3	0.023312	0.005631	4.140250	0.0000
4	0.033594	0.006970	4.819617	0.0000
5	0.041260	0.007552	5.463627	0.0000
6	0.044414	0.007570	5.867369	0.0000

Raw epsilon	181.1884			
Pairs within epsilon	186216.0	V-Statistic	0.733088	
Triples within epsilon	73694138	V-Statistic	0.575627	

<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	68811.00	0.545025	92713.00	0.734343	0.539260
3	52617.00	0.418422	92275.00	0.733791	0.395110
4	40418.00	0.322699	91842.00	0.733269	0.289104
5	31493.00	0.252449	91406.00	0.732713	0.211189
6	24665.00	0.198509	90977.00	0.732203	0.154096

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## BDS Test for RESID02

Date: 01/21/20 Time: 19:49

Sample: 12/31/2010 1/02/2013

Included observations: 505

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.005610	0.002322	2.415947	0.0157
3	0.021796	0.004440	4.909395	0.0000
4	0.036082	0.006355	5.677571	0.0000
5	0.048977	0.007960	6.152922	0.0000
6	0.059460	0.009223	6.447141	0.0000
7	0.067036	0.010152	6.603234	0.0000
8	0.072564	0.010776	6.733569	0.0000
9	0.077241	0.011133	6.937806	0.0000
10	0.081215	0.011263	7.210921	0.0000

Raw epsilon	241.5845			
Pairs within epsilon	216194.0	V-Statistic	0.851104	
Triples within epsilon	96071576	V-Statistic	0.750418	

<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	92389.00	0.731777	107587.0	0.852154	0.726166
3	80460.00	0.639836	107115.0	0.851802	0.618040
4	70350.00	0.561677	106645.0	0.851457	0.525595
5	61814.00	0.495503	106172.0	0.851078	0.446526
6	54499.00	0.438620	105707.0	0.850754	0.379161
7	48103.00	0.388702	105241.0	0.850412	0.321666
8	42549.00	0.345208	104775.0	0.850060	0.272645
9	37908.00	0.308798	104343.0	0.849976	0.231557
10	33926.00	0.277479	103893.0	0.849736	0.196264

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**FTSE250 SS4 2013- 14**

Dependent Variable: FTSE250SS4

Method: Least Squares

Date: 01/21/20 Time: 20:04

Sample (adjusted): 1/02/2013 1/02/2015

Included observations: 507 after adjustments

HAC standard errors &amp; covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	224.3265	72.81112	3.080938	0.0022
FTSE250SS4(-1)	0.985619	0.004844	203.4800	0.0000
R-squared	0.985477	Mean dependent var		15101.63
Adjusted R-squared	0.985448	S.D. dependent var		943.3794
S.E. of regression	113.8000	Akaike info criterion		12.31070
Sum squared resid	6539973.	Schwarz criterion		12.32738
Log likelihood	-3118.762	Hannan-Quinn criter.		12.31724
F-statistic	34267.72	Durbin-Watson stat		1.813670
Prob(F-statistic)	0.000000	Wald F-statistic		41404.12
Prob(Wald F-statistic)	0.000000			

**BDS Test for RESID02**

Date: 01/21/20 Time: 20:05

Sample: 12/31/2012 1/02/2015

Included observations: 508

<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>	
2	0.005402	0.002268	2.382107	0.0172	
Raw epsilon	85.18149				
Pairs within epsilon	108219.0	V-Statistic	0.421005		
Triples within epsilon	26423253	V-Statistic	0.202751		
<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	23158.00	0.181255	53578.00	0.419348	0.175853

## BDS Test for RESID02

Date: 01/21/20 Time: 20:06

Sample: 12/31/2012 1/02/2015

Included observations: 508

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.010237	0.003216	3.183200	0.0015
3	0.018575	0.005252	3.537079	0.0004
4	0.027363	0.006424	4.259533	0.0000
5	0.030546	0.006877	4.441822	0.0000
6	0.031976	0.006811	4.694573	0.0000

Raw epsilon	170.3630		
Pairs within epsilon	186249.0	V-Statistic	0.724566
Triples within epsilon	73133577	V-Statistic	0.561168

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<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	68184.00	0.533667	92436.00	0.723485	0.523430
3	50535.00	0.397100	92057.00	0.723377	0.378525
4	38100.00	0.300577	91642.00	0.722980	0.273215
5	28721.00	0.227488	91224.00	0.722549	0.196941
6	21823.00	0.173541	90783.00	0.721927	0.141566

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## BDS Test for RESID02

Date: 01/21/20 Time: 20:06

Sample: 12/31/2012 1/02/2015

Included observations: 508

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.007406	0.002252	3.288427	0.0010
3	0.016631	0.004287	3.879030	0.0001
4	0.027090	0.006111	4.432801	0.0000
5	0.034511	0.007622	4.527825	0.0000
6	0.041038	0.008794	4.666673	0.0000
7	0.044318	0.009639	4.597751	0.0000
8	0.046570	0.010189	4.570873	0.0000
9	0.047129	0.010481	4.496521	0.0000
10	0.043088	0.010558	4.080992	0.0000

Raw epsilon	227.1507		
Pairs within epsilon	217869.0	V-Statistic	0.847578
Triples within epsilon	96924071	V-Statistic	0.743717

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<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	92584.00	0.724643	108204.0	0.846899	0.717237
3	79389.00	0.623833	107763.0	0.846794	0.607202
4	68511.00	0.540495	107296.0	0.846477	0.513405
5	59114.00	0.468219	106827.0	0.846134	0.433707
6	51180.00	0.406995	106353.0	0.845743	0.365957
7	44290.00	0.353613	105919.0	0.845661	0.309295
8	38409.00	0.307888	105484.0	0.845563	0.261317
9	33421.00	0.268980	105109.0	0.845941	0.221850
10	29173.00	0.235736	104962.0	0.848157	0.192648

**FTSE250 SS5 2015-16**

Dependent Variable: FTSE250SS5

Method: Least Squares

Date: 01/21/20 Time: 20:21

Sample (adjusted): 1/02/2015 1/03/2017

Included observations: 507 after adjustments

HAC standard errors &amp; covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	619.6105	219.5546	2.822125	0.0050
FTSE250SS5(-1)	0.964126	0.012695	75.94749	0.0000
R-squared	0.930474	Mean dependent var		17162.97
Adjusted R-squared	0.930336	S.D. dependent var		621.9357
S.E. of regression	164.1529	Akaike info criterion		13.04341
Sum squared resid	13607825	Schwarz criterion		13.06009
Log likelihood	-3304.505	Hannan-Quinn criter.		13.04995
F-statistic	6758.470	Durbin-Watson stat		1.721642
Prob(F-statistic)	0.000000	Wald F-statistic		5768.021
Prob(Wald F-statistic)	0.000000			

BDS Test for RESID02

Date: 01/21/20 Time: 20:22

Sample: 12/31/2014 1/03/2017

Included observations: 508

Dimension	BDS Statistic	Std. Error	z-Statistic	Prob.	
2	0.016189	0.003217	5.032432	0.0000	
Raw epsilon	122.8716				
Pairs within epsilon	126489.0	V-Statistic	0.492081		
Triples within epsilon	36272395	V-Statistic	0.278325		
Dimension	$C(m,n)$	$c(m,n)$	$C(1,n-(m-1))$	$c(1,n-(m-1))$	$c(1,n-(m-1))^k$
2	32841.00	0.257042	62703.00	0.490768	0.240853

## BDS Test for RESID02

Date: 01/21/20 Time: 20:22

Sample: 12/31/2014 1/03/2017

Included observations: 508

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.024021	0.003421	7.022538	0.0000
3	0.048178	0.006087	7.915448	0.0000
4	0.071743	0.008112	8.843865	0.0000
5	0.087607	0.009462	9.258961	0.0000
6	0.097692	0.010210	9.568272	0.0000

Raw epsilon	245.7433		
Pairs within epsilon	203103.0	V-Statistic	0.790133
Triples within epsilon	86376349	V-Statistic	0.662782

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<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	82685.00	0.647165	100857.0	0.789395	0.623144
3	68637.00	0.539345	100408.0	0.788999	0.491167
4	58107.00	0.458416	99955.00	0.788562	0.386673
5	49514.00	0.392181	99536.00	0.788385	0.304574
6	42376.00	0.336983	99083.00	0.787930	0.239291

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## BDS Test for RESID02

Date: 01/21/20 Time: 20:22

Sample: 12/31/2014 1/03/2017

Included observations: 508

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<u>Dimension</u>	<u>BDS Statistic</u>	<u>Std. Error</u>	<u>z-Statistic</u>	<u>Prob.</u>
2	0.018333	0.002272	8.068436	0.0000
3	0.038132	0.004529	8.419310	0.0000
4	0.062067	0.006759	9.182962	0.0000
5	0.087723	0.008825	9.939906	0.0000
6	0.110071	0.010660	10.32576	0.0000
7	0.128070	0.012233	10.46966	0.0000
8	0.143428	0.013536	10.59572	0.0000
9	0.155110	0.014579	10.63963	0.0000
10	0.164205	0.015374	10.68049	0.0000

Raw epsilon	327.6577		
Pairs within epsilon	228171.0	V-Statistic	0.887656
Triples within epsilon	1.06E+08	V-Statistic	0.813489

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<u>Dimension</u>	<u>C(m,n)</u>	<u>c(m,n)</u>	<u>C(1,n-(m-1))</u>	<u>c(1,n-(m-1))</u>	<u>c(1,n-(m-1))^k</u>
2	102925.0	0.805581	113362.0	0.887270	0.787247
3	93685.00	0.736170	112889.0	0.887074	0.698038
4	86267.00	0.680575	112410.0	0.886822	0.618509
5	80286.00	0.635914	111951.0	0.886720	0.548190
6	74860.00	0.595303	111473.0	0.886458	0.485232
7	69899.00	0.558076	111024.0	0.886419	0.430005
8	65320.00	0.523607	110545.0	0.886132	0.380179
9	61009.00	0.491014	110067.0	0.885844	0.335904
10	57021.00	0.460765	109589.0	0.885546	0.296560

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*Research article*

**Stock returns and calendar anomalies on the London Stock Exchange in the dynamic perspective of the Adaptive Market Hypothesis: A study of FTSE100 & FTSE250 indices over a ten year period**

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## Appendix F

### Calendar Anomalies

#### (i) MONDAY EFFECT

#### 1<sup>ST</sup> SUB SAMPLE FTSE 100

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/02/19 Time: 19:55

Sample (adjusted): 1/02/2007 1/02/2009

Included observations: 508 after adjustments

Convergence achieved after 24 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000448	0.000548	0.817398	0.4137
MONDAY	-0.001416	0.001421	-0.996947	0.3188

#### Variance Equation

C	3.55E-06	1.67E-06	2.120212	0.0340
RESID(-1)^2	0.162718	0.033743	4.822238	0.0000
GARCH(-1)	0.839523	0.030773	27.28114	0.0000

R-squared	-0.003131	Mean dependent var	-0.000611
Adjusted R-squared	-0.005114	S.D. dependent var	0.018440
S.E. of regression	0.018487	Akaike info criterion	-5.663689
Sum squared resid	0.172938	Schwarz criterion	-5.622050
Log likelihood	1443.577	Hannan-Quinn criter.	-5.647361
Durbin-Watson stat	2.174482		

Test for Equality of Medians of RETURNS

Categorized by values of MONDAY

Date: 08/02/19 Time: 19:59

Sample (adjusted): 1/02/2007 1/02/2009

Included observations: 508 after adjustments

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.518434	0.6042
Wilcoxon/Mann-Whitney (tie-adj.)		0.518434	0.6042
Med. Chi-square	1	1.284385	0.2571
Adj. Med. Chi-square	1	1.040352	0.3077
Kruskal-Wallis	1	0.269174	0.6039
Kruskal-Wallis (tie-adj.)	1	0.269174	0.6039
van der Waerden	1	0.087527	0.7673

#### Category Statistics

MONDAY	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	412	1.64E-05	211	256.1311	0.006275
1	96	-0.000748	43	247.5000	-0.026931
All	508	-0.000129	254	254.5000	-2.35E-10

## 2<sup>ND</sup> SUB SAMPLE FTSE 100

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/02/19 Time: 20:01

Sample (adjusted): 1/02/2009 12/31/2010

Included observations: 506 after adjustments

Convergence achieved after 26 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000440	0.000580	0.757569	0.4487
MONDAY	0.002981	0.001308	2.278866	0.0227

### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	2.88E-06	1.39E-06	2.073861	0.0381
RESID(-1)^2	0.068739	0.017894	3.841546	0.0001
GARCH(-1)	0.910002	0.020647	44.07516	0.0000

R-squared	0.005830	Mean dependent var	0.000564
Adjusted R-squared	0.003858	S.D. dependent var	0.012994
S.E. of regression	0.012969	Akaike info criterion	-5.988703
Sum squared resid	0.084770	Schwarz criterion	-5.946939
Log likelihood	1520.142	Hannan-Quinn criter.	-5.972323
Durbin-Watson stat	2.007572		

Test for Equality of Medians of RETURNS

Categorized by values of MONDAY

Date: 08/02/19 Time: 20:03

Sample (adjusted): 1/02/2009 12/31/2010

Included observations: 506 after adjustments

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		2.171342	0.0299
Wilcoxon/Mann-Whitney (tie-adj.)		2.171342	0.0299
Med. Chi-square	1	6.323693	0.0119
Adj. Med. Chi-square	1	5.761878	0.0164
Kruskal-Wallis	1	4.716422	0.0299
Kruskal-Wallis (tie-adj.)	1	4.716422	0.0299
van der Waerden	1	4.337022	0.0373

### Category Statistics

MONDAY	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	412	0.000292	195	246.7573	-0.043795
1	94	0.003338	58	283.0532	0.191953
All	506	0.000861	253	253.5000	0.000000

### 3<sup>RD</sup> SUB SAMPLE FTSE 100

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/02/19 Time: 20:04

Sample: 12/31/2010 1/02/2013

Included observations: 509

Convergence achieved after 27 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000571	0.000454	1.257266	0.2087
MONDAY	-0.001680	0.001083	-1.550827	0.1209

#### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	4.47E-06	1.71E-06	2.619322	0.0088
RESID(-1)^2	0.097867	0.026915	3.636084	0.0003
GARCH(-1)	0.864413	0.035534	24.32638	0.0000

R-squared	0.007651	Mean dependent var	3.84E-05
Adjusted R-squared	0.005694	S.D. dependent var	0.011168
S.E. of regression	0.011136	Akaike info criterion	-6.338462
Sum squared resid	0.062876	Schwarz criterion	-6.296886
Log likelihood	1618.139	Hannan-Quinn criter.	-6.322160
Durbin-Watson stat	1.896859		

Test for Equality of Medians of RETURNS

Categorized by values of MONDAY

Date: 08/02/19 Time: 20:06

Sample: 12/31/2010 1/02/2013

Included observations: 509

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		2.158444	0.0309
Wilcoxon/Mann-Whitney (tie-adj.)		2.158452	0.0309
Med. Chi-square	1	5.979831	0.0145
Adj. Med. Chi-square	1	5.440569	0.0197
Kruskal-Wallis	1	4.660537	0.0309
Kruskal-Wallis (tie-adj.)	1	4.660572	0.0309
van der Waerden	1	5.081978	0.0242

#### Category Statistics

MONDAY	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	412	0.000265	214	261.8289	0.048018
1	97	-0.001199	37	225.9948	-0.203953
All	509	0.000000	251	255.0000	1.44E-08

#### 4<sup>TH</sup> SUB SAMPLE FTSE 100

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/02/19 Time: 20:09

Sample: 12/31/2012 1/02/2015

Included observations: 509

Convergence achieved after 21 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000380	0.000322	1.180426	0.2378
MONDAY	-0.000349	0.000774	-0.451410	0.6517

#### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	4.26E-06	1.32E-06	3.233239	0.0012
RESID(-1)^2	0.126739	0.031808	3.984513	0.0001
GARCH(-1)	0.797096	0.037135	21.46478	0.0000

R-squared	0.000762	Mean dependent var	0.000192
Adjusted R-squared	-0.001209	S.D. dependent var	0.007395
S.E. of regression	0.007400	Akaike info criterion	-7.053073
Sum squared resid	0.027760	Schwarz criterion	-7.011497
Log likelihood	1800.007	Hannan-Quinn criter.	-7.036771
Durbin-Watson stat	2.003718		

Test for Equality of Medians of RETURNS

Categorized by values of MONDAY

Date: 08/02/19 Time: 20:09

Sample: 12/31/2012 1/02/2015

Included observations: 509

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.774632	0.4386
Wilcoxon/Mann-Whitney (tie-adj.)		0.774632	0.4386
Med. Chi-square	1	0.183199	0.6686
Adj. Med. Chi-square	1	0.099605	0.7523
Kruskal-Wallis	1	0.600647	0.4383
Kruskal-Wallis (tie-adj.)	1	0.600647	0.4383
van der Waerden	1	0.708262	0.4000

#### Category Statistics

MONDAY	Count	Median	> Overall Median	Mean Rank	Mean Score
0	411	0.000659	207	257.4672	0.018040
1	98	0.000000	47	244.6531	-0.075658
All	509	0.000630	254	255.0000	5.20E-09

## 5<sup>TH</sup> SUB SAMPLE FTSE 100

Dependent Variable: RETURNS  
 Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)  
 Date: 08/02/19 Time: 20:12  
 Sample: 12/31/2014 1/03/2017  
 Included observations: 509  
 Convergence achieved after 22 iterations  
 Coefficient covariance computed using outer product of gradients  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000426	0.000423	1.008812	0.3131
MONDAY	-0.001099	0.001031	-1.065736	0.2865

Variance Equation				
C	1.02E-05	3.23E-06	3.147023	0.0016
RESID(-1)^2	0.183485	0.042400	4.327464	0.0000
GARCH(-1)	0.723910	0.059687	12.12853	0.0000

R-squared	0.004481	Mean dependent var	0.000138
Adjusted R-squared	0.002517	S.D. dependent var	0.010679
S.E. of regression	0.010665	Akaike info criterion	-6.411282
Sum squared resid	0.057668	Schwarz criterion	-6.369706
Log likelihood	1636.671	Hannan-Quinn criter.	-6.394980
Durbin-Watson stat	1.950503		

### Test for Equality of Medians of RETURNS

Categorized by values of MONDAY  
 Date: 08/02/19 Time: 20:12  
 Sample: 12/31/2014 1/03/2017  
 Included observations: 509

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		1.888041	0.0590
Wilcoxon/Mann-Whitney (tie-adj.)		1.888041	0.0590
Med. Chi-square	1	6.735565	0.0095
Adj. Med. Chi-square	1	6.158013	0.0131
Kruskal-Wallis	1	3.566158	0.0590
Kruskal-Wallis (tie-adj.)	1	3.566160	0.0590
van der Waerden	1	3.151156	0.0759

### Category Statistics

MONDAY	Count	Median	> Overall Median	Mean Rank	Mean Score
0	414	0.000988	218	260.8973	0.037329
1	95	-0.001779	36	229.3000	-0.162677
All	509	0.000518	254	255.0000	7.91E-09

## 1<sup>ST</sup> SUB SAMPLE FTSE250

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/02/19 Time: 20:15

Sample: 12/29/2006 1/02/2009

Included observations: 509

Convergence achieved after 26 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-2.94E-05	0.000671	-0.043870	0.9650
MONDAY	-0.001029	0.001665	-0.618117	0.5365

### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	4.48E-06	1.69E-06	2.655233	0.0079
RESID(-1)^2	0.101305	0.029357	3.450820	0.0006
GARCH(-1)	0.886809	0.032642	27.16759	0.0000

R-squared	-0.001380	Mean dependent var	-0.001027
Adjusted R-squared	-0.003355	S.D. dependent var	0.016825
S.E. of regression	0.016853	Akaike info criterion	-5.591547
Sum squared resid	0.144007	Schwarz criterion	-5.549971
Log likelihood	1428.049	Hannan-Quinn criter.	-5.575245
Durbin-Watson stat	1.881453		

Test for Equality of Medians of RETURNS

Categorized by values of MONDAY

Date: 08/02/19 Time: 20:16

Sample: 12/29/2006 1/02/2009

Included observations: 509

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.434869	0.6637
Wilcoxon/Mann-Whitney (tie-adj.)		0.434869	0.6637
Med. Chi-square	1	0.000457	0.9830
Adj. Med. Chi-square	1	0.008452	0.9267
Kruskal-Wallis	1	0.189447	0.6634
Kruskal-Wallis (tie-adj.)	1	0.189447	0.6634
van der Waerden	1	0.355364	0.5511

### Category Statistics

MONDAY	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	413	-0.000178	206	256.3680	0.012617
1	96	-0.000176	48	249.1146	-0.054279
All	509	-0.000178	254	255.0000	-1.40E-17

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## 2<sup>ND</sup> SUB SAMPLE FTSE250

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 11:26

Sample: 12/31/2008 1/04/2011

Included observations: 508

Convergence achieved after 22 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.001189	0.000541	2.196175	0.0281
MONDAY	0.001437	0.001323	1.086355	0.2773

#### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	3.07E-06	1.79E-06	1.709744	0.0873
RESID(-1)^2	0.104473	0.023852	4.380090	0.0000
GARCH(-1)	0.876554	0.025742	34.05100	0.0000

R-squared	-0.000341	Mean dependent var	0.001203
Adjusted R-squared	-0.002318	S.D. dependent var	0.013239
S.E. of regression	0.013254	Akaike info criterion	-5.966086
Sum squared resid	0.088890	Schwarz criterion	-5.924448
Log likelihood	1520.386	Hannan-Quinn criter.	-5.949759
Durbin-Watson stat	1.802928		

Test for Equality of Medians of RETURNS

Categorized by values of MONDAY

Date: 08/03/19 Time: 11:26

Sample: 12/31/2008 1/04/2011

Included observations: 508

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.826205	0.4087
Wilcoxon/Mann-Whitney (tie-adj.)		0.826205	0.4087
Med. Chi-square	1	2.558536	0.1097
Adj. Med. Chi-square	1	2.206085	0.1375
Kruskal-Wallis	1	0.683257	0.4085
Kruskal-Wallis (tie-adj.)	1	0.683257	0.4085
van der Waerden	1	0.342016	0.5587

#### Category Statistics

MONDAY	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	414	0.001411	200	251.9348	-0.012245
1	94	0.003391	54	265.7979	0.053930
All	508	0.001751	254	254.5000	6.99E-18

### 3<sup>RD</sup> SUB SAMPLE FTSE250



Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 11:33

Sample: 12/31/2010 1/02/2013

Included observations: 506

Convergence achieved after 24 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.001034	0.000475	2.179122	0.0293
MONDAY	-0.002646	0.001052	-2.516167	0.0119

#### Variance Equation

C	1.82E-06	9.64E-07	1.891389	0.0586
RESID(-1)^2	0.068463	0.015662	4.371226	0.0000
GARCH(-1)	0.916625	0.019903	46.05493	0.0000

R-squared	0.011677	Mean dependent var	0.000124
Adjusted R-squared	0.009716	S.D. dependent var	0.011166
S.E. of regression	0.011112	Akaike info criterion	-6.313336
Sum squared resid	0.062228	Schwarz criterion	-6.271571
Log likelihood	1602.274	Hannan-Quinn criter.	-6.296956
Durbin-Watson stat	1.736617		

Test for Equality of Medians of RETURNS

Categorized by values of MONDAY

Date: 08/03/19 Time: 11:34

Sample: 12/31/2010 1/02/2013

Included observations: 506

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		2.504696	0.0123
Wilcoxon/Mann-Whitney (tie-adj.)		2.504696	0.0123
Med. Chi-square	1	4.678345	0.0305
Adj. Med. Chi-square	1	4.198847	0.0405
Kruskal-Wallis	1	6.275451	0.0122
Kruskal-Wallis (tie-adj.)	1	6.275453	0.0122
van der Waerden	1	6.610285	0.0101

#### Category Statistics

MONDAY	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	411	0.001333	215	261.3285	0.054421
1	95	-0.000772	38	219.6316	-0.235442
All	506	0.000510	253	253.5000	4.22E-09

## 4<sup>TH</sup> SUB SAMPLE FTSE250

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 11:35

Sample: 12/31/2012 1/02/2015

Included observations: 512

Convergence achieved after 20 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000690	0.000368	1.873919	0.0609
MONDAY	-0.000577	0.000904	-0.638693	0.5230

#### Variance Equation

C	1.04E-05	5.39E-06	1.932312	0.0533
RESID(-1)^2	0.070583	0.036275	1.945758	0.0517
GARCH(-1)	0.744515	0.115897	6.423937	0.0000

R-squared	0.001703	Mean dependent var	0.000486
Adjusted R-squared	-0.000254	S.D. dependent var	0.007550
S.E. of regression	0.007551	Akaike info criterion	-6.938592
Sum squared resid	0.029077	Schwarz criterion	-6.897202
Log likelihood	1781.280	Hannan-Quinn criter.	-6.922367
Durbin-Watson stat	1.795733		

Test for Equality of Medians of RETURNS

Categorized by values of MONDAY

Date: 08/03/19 Time: 11:36

Sample: 12/31/2012 1/02/2015

Included observations: 512

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		1.214588	0.2245
Wilcoxon/Mann-Whitney (tie-adj.)		1.214591	0.2245
Med. Chi-square	1	0.604370	0.4369
Adj. Med. Chi-square	1	0.444027	0.5052
Kruskal-Wallis	1	1.476135	0.2244
Kruskal-Wallis (tie-adj.)	1	1.476143	0.2244
van der Waerden	1	1.429678	0.2318

#### Category Statistics

MONDAY	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	411	0.000871	209	260.4380	0.025945
1	101	0.000000	47	240.4752	-0.105578
All	512	0.000706	256	256.5000	1.63E-07

## 5<sup>TH</sup> SUB SAMPLE FTSE250

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 11:38

Sample: 12/31/2014 1/03/2017

Included observations: 516

Convergence achieved after 17 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000658	0.000347	1.895168	0.0581
MONDAY	-0.001274	0.000785	-1.622778	0.1046

#### Variance Equation

C	7.85E-06	2.09E-06	3.756623	0.0002
RESID(-1)^2	0.197163	0.040516	4.866266	0.0000
GARCH(-1)	0.707981	0.055530	12.74949	0.0000

R-squared	0.005394	Mean dependent var	0.000208
Adjusted R-squared	0.003459	S.D. dependent var	0.009862
S.E. of regression	0.009845	Akaike info criterion	-6.766882
Sum squared resid	0.049822	Schwarz criterion	-6.725737
Log likelihood	1750.856	Hannan-Quinn criter.	-6.750759
Durbin-Watson stat	1.757290		

Test for Equality of Medians of RETURNS

Categorized by values of MONDAY

Date: 08/03/19 Time: 11:39

Sample: 12/31/2014 1/03/2017

Included observations: 516

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		1.715638	0.0862
Wilcoxon/Mann-Whitney (tie-adj.)		1.715664	0.0862
Med. Chi-square	1	2.769891	0.0961
Adj. Med. Chi-square	1	2.412883	0.1203
Kruskal-Wallis	1	2.944692	0.0862
Kruskal-Wallis (tie-adj.)	1	2.944779	0.0862
van der Waerden	1	2.845040	0.0917

#### Category Statistics

MONDAY	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	415	0.000585	215	264.0566	0.036284
1	101	0.000000	43	235.6683	-0.149085
All	516	0.000309	258	258.5000	6.82E-07

## Appendix F (cont'd)

### (ii) JANUARY EFFECT

#### 1<sup>ST</sup> SUB SAMPLE FTSE100

Dependent Variable: RETURNS  
 Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)  
 Date: 08/03/19 Time: 11:40  
 Sample (adjusted): 1/02/2007 1/02/2009  
 Included observations: 508 after adjustments  
 Convergence achieved after 24 iterations  
 Coefficient covariance computed using outer product of gradients  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000219	0.000559	0.390899	0.6959
JANUARY	-0.000214	0.001738	-0.122906	0.9022

Variance Equation				
C	3.60E-06	1.67E-06	2.148430	0.0317
RESID(-1)^2	0.159078	0.033130	4.801584	0.0000
GARCH(-1)	0.842275	0.030800	27.34669	0.0000

R-squared	-0.001844	Mean dependent var	-0.000611
Adjusted R-squared	-0.003824	S.D. dependent var	0.018440
S.E. of regression	0.018475	Akaike info criterion	-5.661422
Sum squared resid	0.172716	Schwarz criterion	-5.619783
Log likelihood	1443.001	Hannan-Quinn criter.	-5.645094
Durbin-Watson stat	2.176304		

Test for Equality of Medians of RETURNS  
 Categorized by values of JANUARY  
 Date: 08/03/19 Time: 11:41  
 Sample (adjusted): 1/02/2007 1/02/2009  
 Included observations: 508 after adjustments

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.779721	0.4356
Wilcoxon/Mann-Whitney (tie-adj.)		0.779721	0.4356
Med. Chi-square	1	0.219438	0.6395
Adj. Med. Chi-square	1	0.097528	0.7548
Kruskal-Wallis	1	0.608794	0.4352
Kruskal-Wallis (tie-adj.)	1	0.608794	0.4352
van der Waerden	1	0.323398	0.5696

#### Category Statistics

JANUARY	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	463	-4.83E-05	233	256.0842	0.007790
1	45	-0.001804	21	238.2000	-0.080154
All	508	-0.000129	254	254.5000	-2.35E-10

## 2<sup>ND</sup> SUB SAMPLE FTSE100

Dependent Variable: RETURNS  
 Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)  
 Date: 08/03/19 Time: 11:44  
 Sample (adjusted): 1/02/2009 12/31/2010  
 Included observations: 506 after adjustments  
 Convergence achieved after 25 iterations  
 Coefficient covariance computed using outer product of gradients  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.001261	0.000530	2.380974	0.0173
JANUARY	-0.003662	0.001849	-1.980552	0.0476

Variance Equation				
C	2.86E-06	1.35E-06	2.122271	0.0338
RESID(-1)^2	0.071845	0.018001	3.991203	0.0001
GARCH(-1)	0.907316	0.019997	45.37350	0.0000

R-squared	0.004446	Mean dependent var	0.000564
Adjusted R-squared	0.002471	S.D. dependent var	0.012994
S.E. of regression	0.012978	Akaike info criterion	-5.985190
Sum squared resid	0.084888	Schwarz criterion	-5.943426
Log likelihood	1519.253	Hannan-Quinn criter.	-5.968810
Durbin-Watson stat	2.031048		

### Test for Equality of Medians of RETURNS

Categorized by values of JANUARY  
 Date: 08/03/19 Time: 11:44  
 Sample (adjusted): 1/02/2009 12/31/2010  
 Included observations: 506 after adjustments

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		2.041238	0.0412
Wilcoxon/Mann-Whitney (tie-adj.)		2.041238	0.0412
Med. Chi-square	1	3.211435	0.0731
Adj. Med. Chi-square	1	2.654078	0.1033
Kruskal-Wallis	1	4.168928	0.0412
Kruskal-Wallis (tie-adj.)	1	4.168928	0.0412
van der Waerden	1	3.258494	0.0711

### Category Statistics

JANUARY	Count	Median	> Overall Median	Mean Rank	Mean Score
0	465	0.001290	238	257.4409	0.023599
1	41	-0.003475	15	208.8049	-0.267644
All	506	0.000861	253	253.5000	7.02E-18

### 3<sup>RD</sup> SUB SAMPLE FTSE100

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 11:46

Sample: 12/31/2010 1/02/2013

Included observations: 509

Convergence achieved after 31 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000202	0.000457	0.442213	0.6583
JANUARY	0.000352	0.001205	0.292468	0.7699

#### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	4.31E-06	1.69E-06	2.549467	0.0108
RESID(-1)^2	0.097402	0.027736	3.511792	0.0004
GARCH(-1)	0.866583	0.035637	24.31695	0.0000

R-squared	-0.000221	Mean dependent var	3.84E-05
Adjusted R-squared	-0.002194	S.D. dependent var	0.011168
S.E. of regression	0.011180	Akaike info criterion	-6.333293
Sum squared resid	0.063375	Schwarz criterion	-6.291717
Log likelihood	1616.823	Hannan-Quinn criter.	-6.316991
Durbin-Watson stat	1.908520		

Test for Equality of Medians of RETURNS

Categorized by values of JANUARY

Date: 08/03/19 Time: 11:47

Sample: 12/31/2010 1/02/2013

Included observations: 509

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.255193	0.7986
Wilcoxon/Mann-Whitney (tie-adj.)		0.255194	0.7986
Med. Chi-square	1	1.043465	0.3070
Adj. Med. Chi-square	1	0.743229	0.3886
Kruskal-Wallis	1	0.065400	0.7982
Kruskal-Wallis (tie-adj.)	1	0.065401	0.7982
van der Waerden	1	0.000270	0.9869

#### Category Statistics

JANUARY	Count	Median	> Overall Median	Mean Rank	Mean Score
0	466	1.01E-05	233	255.5064	0.000219
1	43	-0.001482	18	249.5116	-0.002374
All	509	0.000000	251	255.0000	1.44E-08

#### 4<sup>TH</sup> SUB SAMPLE FTSE100

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 11:48

Sample: 12/31/2012 1/02/2015

Included observations: 509

Convergence achieved after 20 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000253	0.000301	0.839244	0.4013
JANUARY	0.000808	0.001278	0.632126	0.5273

#### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	4.26E-06	1.31E-06	3.251295	0.0011
RESID(-1)^2	0.130778	0.031888	4.101175	0.0000
GARCH(-1)	0.793614	0.036667	21.64356	0.0000

R-squared	-0.000419	Mean dependent var	0.000192
Adjusted R-squared	-0.002392	S.D. dependent var	0.007395
S.E. of regression	0.007404	Akaike info criterion	-7.053668
Sum squared resid	0.027793	Schwarz criterion	-7.012091
Log likelihood	1800.158	Hannan-Quinn criter.	-7.037366
Durbin-Watson stat	2.007831		

Test for Equality of Medians of RETURNS

Categorized by values of JANUARY

Date: 08/03/19 Time: 11:49

Sample: 12/31/2012 1/02/2015

Included observations: 509

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.281841	0.7781
Wilcoxon/Mann-Whitney (tie-adj.)		0.281841	0.7781
Med. Chi-square	1	0.028878	0.8651
Adj. Med. Chi-square	1	0.000191	0.9890
Kruskal-Wallis	1	0.079734	0.7777
Kruskal-Wallis (tie-adj.)	1	0.079734	0.7777
van der Waerden	1	0.063936	0.8004

#### Category Statistics

JANUARY	Count	Median	> Overall Median	Mean Rank	Mean Score
0	464	0.000625	231	254.4267	-0.003457
1	45	0.001087	23	260.9111	0.035643
All	509	0.000630	254	255.0000	5.20E-09

## 5<sup>TH</sup> SUB SAMPLE FTSE100

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 11:50

Sample: 12/31/2014 1/03/2017

Included observations: 509

Convergence achieved after 25 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000274	0.000406	0.675685	0.4992
JANUARY	-0.001063	0.001428	-0.744728	0.4564

### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	1.07E-05	3.39E-06	3.147514	0.0016
RESID(-1)^2	0.189881	0.042737	4.443008	0.0000
GARCH(-1)	0.713299	0.060827	11.72666	0.0000

R-squared	-0.000805	Mean dependent var	0.000138
Adjusted R-squared	-0.002779	S.D. dependent var	0.010679
S.E. of regression	0.010693	Akaike info criterion	-6.409471
Sum squared resid	0.057975	Schwarz criterion	-6.367895
Log likelihood	1636.210	Hannan-Quinn criter.	-6.393169
Durbin-Watson stat	1.947849		

Test for Equality of Medians of RETURNS

Categorized by values of JANUARY

Date: 08/03/19 Time: 11:50

Sample: 12/31/2014 1/03/2017

Included observations: 509

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.413466	0.6793
Wilcoxon/Mann-Whitney (tie-adj.)		0.413466	0.6793
Med. Chi-square	1	0.112546	0.7373
Adj. Med. Chi-square	1	0.030410	0.8616
Kruskal-Wallis	1	0.171407	0.6789
Kruskal-Wallis (tie-adj.)	1	0.171407	0.6789
van der Waerden	1	0.045205	0.8316

### Category Statistics

JANUARY	Count	Median	> Overall Median	Mean Rank	Mean Score
0	467	0.000501	232	254.1906	-0.002799
1	42	0.002481	22	264.0000	0.031123
All	509	0.000518	254	255.0000	7.91E-09



## 1<sup>ST</sup> SUB SAMPLE FTSE250

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 11:52

Sample: 12/29/2006 1/02/2009

Included observations: 509

Convergence achieved after 24 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.000190	0.000665	-0.285508	0.7753
JANUARY	-7.94E-05	0.001965	-0.040432	0.9677

### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	4.44E-06	1.68E-06	2.639052	0.0083
RESID(-1)^2	0.100876	0.029056	3.471751	0.0005
GARCH(-1)	0.887429	0.032433	27.36194	0.0000

R-squared	-0.002447	Mean dependent var	-0.001027
Adjusted R-squared	-0.004424	S.D. dependent var	0.016825
S.E. of regression	0.016862	Akaike info criterion	-5.590583
Sum squared resid	0.144161	Schwarz criterion	-5.549007
Log likelihood	1427.803	Hannan-Quinn criter.	-5.574281
Durbin-Watson stat	1.881289		

### Test for Equality of Medians of RETURNS

Categorized by values of JANUARY

Date: 08/03/19 Time: 11:52

Sample: 12/29/2006 1/02/2009

Included observations: 509

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.594999	0.5518
Wilcoxon/Mann-Whitney (tie-adj.)		0.594999	0.5518
Med. Chi-square	1	1.164515	0.2805
Adj. Med. Chi-square	1	0.851918	0.3560
Kruskal-Wallis	1	0.354655	0.5515
Kruskal-Wallis (tie-adj.)	1	0.354655	0.5515
van der Waerden	1	0.062484	0.8026

### Category Statistics

JANUARY	Count	Median	> Overall Median	Mean Rank	Mean Score
0	464	0.000313	235	256.2091	0.003417
1	45	-0.001251	19	242.5333	-0.035236
All	509	-0.000178	254	255.0000	-3.75E-17

## 2<sup>ND</sup> SUB SAMPLE FTSE250

Dependent Variable: RETURNS  
 Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)  
 Date: 08/03/19 Time: 11:54  
 Sample: 12/31/2008 1/04/2011  
 Included observations: 508  
 Convergence achieved after 27 iterations  
 Coefficient covariance computed using outer product of gradients  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.001569	0.000514	3.052488	0.0023
JANUARY	-0.001274	0.001798	-0.708595	0.4786

Variance Equation				
C	3.18E-06	1.84E-06	1.733371	0.0830
RESID(-1)^2	0.107080	0.024458	4.378116	0.0000
GARCH(-1)	0.873494	0.026192	33.34971	0.0000

R-squared	0.000671	Mean dependent var	0.001203
Adjusted R-squared	-0.001304	S.D. dependent var	0.013239
S.E. of regression	0.013247	Akaike info criterion	-5.964458
Sum squared resid	0.088800	Schwarz criterion	-5.922819
Log likelihood	1519.972	Hannan-Quinn criter.	-5.948130
Durbin-Watson stat	1.813878		

### Test for Equality of Medians of RETURNS

Categorized by values of JANUARY  
 Date: 08/03/19 Time: 11:55  
 Sample: 12/31/2008 1/04/2011  
 Included observations: 508

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		1.337333	0.1811
Wilcoxon/Mann-Whitney (tie-adj.)		1.337333	0.1811
Med. Chi-square	1	1.661149	0.1974
Adj. Med. Chi-square	1	1.271817	0.2594
Kruskal-Wallis	1	1.789928	0.1809
Kruskal-Wallis (tie-adj.)	1	1.789928	0.1809
van der Waerden	1	0.822536	0.3644

### Category Statistics

JANUARY	Count	Median	> Overall Median	Mean Rank	Mean Score
0	466	0.001918	237	257.1159	0.011964
1	42	-0.000949	17	225.4762	-0.132745
All	508	0.001751	254	254.5000	2.45E-17

### 3<sup>RD</sup> SUB SAMPLE FTSE250

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 11:58

Sample: 12/31/2010 1/02/2013

Included observations: 506

Failure to improve likelihood (non-zero gradients) after 0 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-2.67E-05	0.001100	-0.024275	0.9806
JANUARY	0.001819	0.003796	0.479049	0.6319

#### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	8.07E-05	4.60E-05	1.754349	0.0794
RESID(-1)^2	0.150000	0.114159	1.313962	0.1889
GARCH(-1)	0.600000	0.203021	2.955365	0.0031

R-squared	0.002023	Mean dependent var	0.000124
Adjusted R-squared	0.000043	S.D. dependent var	0.011166
S.E. of regression	0.011166	Akaike info criterion	-5.988514
Sum squared resid	0.062836	Schwarz criterion	-5.946750
Log likelihood	1520.094	Hannan-Quinn criter.	-5.972135
Durbin-Watson stat	1.761219		

Test for Equality of Medians of RETURNS

Categorized by values of JANUARY

Date: 08/03/19 Time: 11:58

Sample: 12/31/2010 1/02/2013

Included observations: 506

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.875582	0.3813
Wilcoxon/Mann-Whitney (tie-adj.)		0.875582	0.3813
Med. Chi-square	1	0.934729	0.3336
Adj. Med. Chi-square	1	0.649117	0.4204
Kruskal-Wallis	1	0.767609	0.3810
Kruskal-Wallis (tie-adj.)	1	0.767610	0.3810
van der Waerden	1	0.834171	0.3611

#### Category Statistics

JANUARY	Count	Median	> Overall Median	Mean Rank	Mean Score
0	464	0.000459	229	251.7866	-0.012098
1	42	0.001625	24	272.4286	0.133652
All	506	0.000510	253	253.5000	4.22E-09

#### 4<sup>TH</sup> SUB SAMPLE FTSE250

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 12:00

Sample: 12/31/2012 1/02/2015

Included observations: 512

Convergence achieved after 21 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000532	0.000347	1.532305	0.1254
JANUARY	0.000521	0.001393	0.373737	0.7086

#### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	1.05E-05	5.20E-06	2.010366	0.0444
RESID(-1)^2	0.074438	0.036735	2.026332	0.0427
GARCH(-1)	0.740385	0.112188	6.599482	0.0000

R-squared	-0.000132	Mean dependent var	0.000486
Adjusted R-squared	-0.002093	S.D. dependent var	0.007550
S.E. of regression	0.007558	Akaike info criterion	-6.938026
Sum squared resid	0.029131	Schwarz criterion	-6.896637
Log likelihood	1781.135	Hannan-Quinn criter.	-6.921802
Durbin-Watson stat	1.801388		

Test for Equality of Medians of RETURNS

Categorized by values of JANUARY

Date: 08/03/19 Time: 12:01

Sample: 12/31/2012 1/02/2015

Included observations: 512

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.061192	0.9512
Wilcoxon/Mann-Whitney (tie-adj.)		0.061192	0.9512
Med. Chi-square	1	0.024364	0.8760
Adj. Med. Chi-square	1	0.000000	1.0000
Kruskal-Wallis	1	0.003809	0.9508
Kruskal-Wallis (tie-adj.)	1	0.003809	0.9508
van der Waerden	1	0.015333	0.9015

#### Category Statistics

JANUARY	Count	Median	> Overall Median	Mean Rank	Mean Score
0	467	0.000748	234	256.6253	-0.001682
1	45	0.000184	22	255.2000	0.017461
All	512	0.000706	256	256.5000	1.63E-07

## 5<sup>TH</sup> SUB SAMPLE FTSE250

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 12:02

Sample: 12/31/2014 1/03/2017

Included observations: 516

Convergence achieved after 19 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000514	0.000344	1.492611	0.1355
JANUARY	-0.001876	0.001190	-1.576686	0.1149

### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	8.70E-06	2.16E-06	4.023606	0.0001
RESID(-1)^2	0.209817	0.043624	4.809642	0.0000
GARCH(-1)	0.685681	0.058196	11.78228	0.0000

R-squared	0.000811	Mean dependent var	0.000208
Adjusted R-squared	-0.001133	S.D. dependent var	0.009862
S.E. of regression	0.009868	Akaike info criterion	-6.765160
Sum squared resid	0.050051	Schwarz criterion	-6.724016
Log likelihood	1750.411	Hannan-Quinn criter.	-6.749037
Durbin-Watson stat	1.757985		

Test for Equality of Medians of RETURNS

Categorized by values of JANUARY

Date: 08/03/19 Time: 12:03

Sample: 12/31/2014 1/03/2017

Included observations: 516

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.650576	0.5153
Wilcoxon/Mann-Whitney (tie-adj.)		0.650585	0.5153
Med. Chi-square	1	0.025370	0.8734
Adj. Med. Chi-square	1	0.000000	1.0000
Kruskal-Wallis	1	0.423944	0.5150
Kruskal-Wallis (tie-adj.)	1	0.423957	0.5150
van der Waerden	1	0.656296	0.4179

### Category Statistics

JANUARY	Count	Median	> Overall Median	Mean Rank	Mean Score
0	473	0.000252	236	259.7886	0.010651
1	43	0.000454	22	244.3256	-0.117158
All	516	0.000309	258	258.5000	6.82E-07

## AppendixF (cont'd)

### (iii) TOTM

#### 1<sup>ST</sup> SUB SAMPLE FTSE100

Dependent Variable: RETURNS  
 Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)  
 Date: 08/03/19 Time: 13:06  
 Sample (adjusted): 1/02/2007 1/02/2009  
 Included observations: 508 after adjustments  
 Convergence achieved after 24 iterations  
 Coefficient covariance computed using outer product of gradients  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	6.54E-05	0.000551	0.118730	0.9055
TOTM	0.000688	0.001278	0.538382	0.5903

#### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	3.68E-06	1.77E-06	2.076841	0.0378
RESID(-1)^2	0.158063	0.033074	4.779107	0.0000
GARCH(-1)	0.842585	0.031441	26.79908	0.0000

R-squared	0.000035	Mean dependent var	-0.000611
Adjusted R-squared	-0.001942	S.D. dependent var	0.018440
S.E. of regression	0.018458	Akaike info criterion	-5.661969
Sum squared resid	0.172392	Schwarz criterion	-5.620331
Log likelihood	1443.140	Hannan-Quinn criter.	-5.645641
Durbin-Watson stat	2.180517		

#### Test for Equality of Medians of RETURNS

Categorized by values of TOTM  
 Date: 07/30/19 Time: 14:08  
 Sample (adjusted): 1/02/2007 1/02/2009  
 Included observations: 508 after adjustments

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		2.277386	0.0228
Wilcoxon/Mann-Whitney (tie-adj.)		2.277386	0.0228
Med. Chi-square	1	2.153460	0.1422
Adj. Med. Chi-square	1	1.834901	0.1755
Kruskal-Wallis	1	5.188240	0.0227
Kruskal-Wallis (tie-adj.)	1	5.188240	0.0227
van der Waerden	1	4.418794	0.0355

#### Category Statistics

TOTM	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	411	-0.000501	199	247.2932	-0.044873
1	97	0.001830	55	285.0361	0.190134
All	508	-0.000129	254	254.5000	-2.35E-10

#### 2<sup>ND</sup> SUB SAMPLE FTSE100

Dependent Variable: RETURNS  
 Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)  
 Date: 08/03/19 Time: 13:00  
 Sample (adjusted): 1/02/2009 12/31/2010  
 Included observations: 506 after adjustments  
 Convergence achieved after 24 iterations  
 Coefficient covariance computed using outer product of gradients  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.001185	0.000606	1.953892	0.0507
TOTM	-0.000785	0.001088	-0.721219	0.4708

#### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	2.95E-06	1.42E-06	2.075428	0.0379
RESID(-1)^2	0.073324	0.018654	3.930699	0.0001
GARCH(-1)	0.905439	0.021069	42.97587	0.0000

R-squared	-0.001239	Mean dependent var	0.000564
Adjusted R-squared	-0.003226	S.D. dependent var	0.012994
S.E. of regression	0.013015	Akaike info criterion	-5.978848
Sum squared resid	0.085373	Schwarz criterion	-5.937084
Log likelihood	1517.648	Hannan-Quinn criter.	-5.962468
Durbin-Watson stat	2.019566		

#### Test for Equality of Medians of RETURNS

Categorized by values of TOTM  
 Date: 07/30/19 Time: 14:27  
 Sample (adjusted): 1/02/2009 12/31/2010  
 Included observations: 506 after adjustments

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.095769	0.9237
Wilcoxon/Mann-Whitney (tie-adj.)		0.095769	0.9237
Med. Chi-square	1	0.051423	0.8206
Adj. Med. Chi-square	1	0.012856	0.9097
Kruskal-Wallis	1	0.009246	0.9234
Kruskal-Wallis (tie-adj.)	1	0.009246	0.9234
van der Waerden	1	0.008033	0.9286

#### Category Statistics

TOTM	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	410	0.001009	206	253.8024	0.001909
1	96	0.000212	47	252.2083	-0.008155
All	506	0.000861	253	253.5000	-2.85E-18

### 3<sup>RD</sup> SUB SAMPLE FTSE100

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 13:07

Sample: 12/31/2010 1/02/2013

Included observations: 509

Convergence achieved after 25 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.000294	0.000483	-0.608168	0.5431
TOTM	0.002608	0.000885	2.945695	0.0032

#### Variance Equation

C	4.15E-06	1.78E-06	2.328622	0.0199
RESID(-1)^2	0.101527	0.029793	3.407751	0.0007
GARCH(-1)	0.863569	0.037400	23.08982	0.0000

R-squared	0.009220	Mean dependent var	3.84E-05
Adjusted R-squared	0.007266	S.D. dependent var	0.011168
S.E. of regression	0.011127	Akaike info criterion	-6.347112
Sum squared resid	0.062776	Schwarz criterion	-6.305536
Log likelihood	1620.340	Hannan-Quinn criter.	-6.330810
Durbin-Watson stat	1.917641		

Test for Equality of Medians of RETURNS

Categorized by values of TOTM

Date: 07/30/19 Time: 18:05

Sample: 12/31/2010 1/02/2013

Included observations: 509

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		1.720852	0.0853
Wilcoxon/Mann-Whitney (tie-adj.)		1.720859	0.0853
Med. Chi-square	1	1.104448	0.2933
Adj. Med. Chi-square	1	0.880785	0.3480
Kruskal-Wallis	1	2.962647	0.0852
Kruskal-Wallis (tie-adj.)	1	2.962669	0.0852
van der Waerden	1	4.218943	0.0400

#### Category Statistics

TOTM	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	411	0.000000	198	249.5207	-0.044030
1	98	0.000871	53	277.9796	0.184655
All	509	0.000000	251	255.0000	1.44E-08

## 4<sup>TH</sup> SUB SAMPLE FTSE100



Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 13:08

Sample: 12/31/2012 1/02/2015

Included observations: 509

Convergence achieved after 20 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000274	0.000326	0.842300	0.3996
TOTM	0.000192	0.000762	0.252441	0.8007

#### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	4.15E-06	1.30E-06	3.197891	0.0014
RESID(-1)^2	0.126022	0.031144	4.046484	0.0001
GARCH(-1)	0.799952	0.036403	21.97463	0.0000

R-squared	-0.000179	Mean dependent var	0.000192
Adjusted R-squared	-0.002152	S.D. dependent var	0.007395
S.E. of regression	0.007403	Akaike info criterion	-7.052764
Sum squared resid	0.027786	Schwarz criterion	-7.011188
Log likelihood	1799.928	Hannan-Quinn criter.	-7.036462
Durbin-Watson stat	2.006720		

Test for Equality of Medians of RETURNS

Categorized by values of TOTM

Date: 07/30/19 Time: 18:11

Sample: 12/31/2012 1/02/2015

Included observations: 509

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.047005	0.9625
Wilcoxon/Mann-Whitney (tie-adj.)		0.047005	0.9625
Med. Chi-square	1	0.000468	0.9827
Adj. Med. Chi-square	1	0.008239	0.9277
Kruskal-Wallis	1	0.002246	0.9622
Kruskal-Wallis (tie-adj.)	1	0.002246	0.9622
van der Waerden	1	0.012164	0.9122

#### Category Statistics

TOTM	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	411	0.000630	205	255.1509	-0.002364
1	98	0.000622	49	254.3673	0.009915
All	509	0.000630	254	255.0000	5.20E-09

## 5<sup>TH</sup> SUB SAMPLE FTSE100

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 13:09

Sample: 12/31/2014 1/03/2017

Included observations: 509

Convergence achieved after 24 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000281	0.000442	0.634799	0.5256
TOTM	-0.000268	0.001148	-0.233044	0.8157

#### Variance Equation

C	1.04E-05	3.26E-06	3.174958	0.0015
RESID(-1)^2	0.186093	0.041706	4.462057	0.0000
GARCH(-1)	0.719677	0.059080	12.18146	0.0000

R-squared	-0.000782	Mean dependent var	0.000138
Adjusted R-squared	-0.002756	S.D. dependent var	0.010679
S.E. of regression	0.010693	Akaike info criterion	-6.409002
Sum squared resid	0.057973	Schwarz criterion	-6.367426
Log likelihood	1636.091	Hannan-Quinn criter.	-6.392700
Durbin-Watson stat	1.948622		

Test for Equality of Medians of RETURNS

Categorized by values of TOTM

Date: 07/30/19 Time: 18:17

Sample: 12/31/2014 1/03/2017

Included observations: 509

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.005350	0.9957
Wilcoxon/Mann-Whitney (tie-adj.)		0.005350	0.9957
Med. Chi-square	1	0.770321	0.3801
Adj. Med. Chi-square	1	0.585629	0.4441
Kruskal-Wallis	1	3.29E-05	0.9954
Kruskal-Wallis (tie-adj.)	1	3.29E-05	0.9954
van der Waerden	1	0.176451	0.6744

#### Category Statistics

TOTM	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	411	0.000742	209	254.9818	-0.009004
1	98	0.000144	45	255.0765	0.037763
All	509	0.000518	254	255.0000	7.91E-09

## 1<sup>ST</sup> SUB SAMPLE FTSE 250

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 13:44

Sample: 12/29/2006 1/02/2009

Included observations: 509

Convergence achieved after 24 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.000670	0.000666	-1.005744	0.3145
TOTM	0.002380	0.001615	1.473110	0.1407

#### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	4.53E-06	1.80E-06	2.517866	0.0118
RESID(-1)^2	0.096306	0.028848	3.338390	0.0008
GARCH(-1)	0.891171	0.033058	26.95751	0.0000

R-squared	0.007313	Mean dependent var	-0.001027
Adjusted R-squared	0.005355	S.D. dependent var	0.016825
S.E. of regression	0.016780	Akaike info criterion	-5.595938
Sum squared resid	0.142757	Schwarz criterion	-5.554362
Log likelihood	1429.166	Hannan-Quinn criter.	-5.579636
Durbin-Watson stat	1.899223		

Test for Equality of Medians of RETURNS

Categorized by values of TOTM

Date: 07/30/19 Time: 19:36

Sample: 12/29/2006 1/02/2009

Included observations: 509

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		2.898659	0.0037
Wilcoxon/Mann-Whitney (tie-adj.)		2.898659	0.0037
Med. Chi-square	1	8.669751	0.0032
Adj. Med. Chi-square	1	8.020386	0.0046
Kruskal-Wallis	1	8.404441	0.0037
Kruskal-Wallis (tie-adj.)	1	8.404441	0.0037
van der Waerden	1	7.529400	0.0061

#### Category Statistics

TOTM	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	411	-0.001495	192	245.7713	-0.058820
1	98	0.002657	62	293.7041	0.246683
All	509	-0.000178	254	255.0000	0.000000

## 2<sup>ND</sup> SUB SAMPLE FTSE 250

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 13:45

Sample: 12/31/2008 1/04/2011

Included observations: 508

Convergence achieved after 26 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.001347	0.000552	2.440020	0.0147
TOTM	0.000656	0.001050	0.624876	0.5321

#### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	3.04E-06	1.85E-06	1.642126	0.1006
RESID(-1)^2	0.106207	0.024090	4.408758	0.0000
GARCH(-1)	0.875258	0.025846	33.86384	0.0000

R-squared	0.000335	Mean dependent var	0.001203
Adjusted R-squared	-0.001641	S.D. dependent var	0.013239
S.E. of regression	0.013250	Akaike info criterion	-5.964086
Sum squared resid	0.088830	Schwarz criterion	-5.922447
Log likelihood	1519.878	Hannan-Quinn criter.	-5.947758
Durbin-Watson stat	1.808960		

Test for Equality of Medians of RETURNS

Categorized by values of TOTM

Date: 07/30/19 Time: 19:46

Sample: 12/31/2008 1/04/2011

Included observations: 508

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.701270	0.4831
Wilcoxon/Mann-Whitney (tie-adj.)		0.701270	0.4831
Med. Chi-square	1	0.000000	1.0000
Adj. Med. Chi-square	1	0.012643	0.9105
Kruskal-Wallis	1	0.492317	0.4829
Kruskal-Wallis (tie-adj.)	1	0.492317	0.4829
van der Waerden	1	0.669206	0.4133

#### Category Statistics

TOTM	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	410	0.001751	205	252.2659	-0.017574
1	98	0.001473	49	263.8469	0.073524
All	508	0.001751	254	254.5000	1.57E-17

### 3<sup>RD</sup> SUB SAMPLE FTSE 250

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 13:45

Sample: 12/31/2010 1/02/2013

Included observations: 506

Convergence achieved after 24 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.000145	0.000489	-0.297161	0.7663
TOTM	0.003387	0.000965	3.510832	0.0004

#### Variance Equation

C	1.65E-06	1.06E-06	1.559282	0.1189
RESID(-1)^2	0.072795	0.017231	4.224547	0.0000
GARCH(-1)	0.914116	0.021286	42.94441	0.0000

R-squared	0.008911	Mean dependent var	0.000124
Adjusted R-squared	0.006945	S.D. dependent var	0.011166
S.E. of regression	0.011127	Akaike info criterion	-6.322411
Sum squared resid	0.062402	Schwarz criterion	-6.280647
Log likelihood	1604.570	Hannan-Quinn criter.	-6.306031
Durbin-Watson stat	1.772739		

Test for Equality of Medians of RETURNS

Categorized by values of TOTM

Date: 07/30/19 Time: 19:59

Sample: 12/31/2010 1/02/2013

Included observations: 506

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		2.010017	0.0444
Wilcoxon/Mann-Whitney (tie-adj.)		2.010018	0.0444
Med. Chi-square	1	2.480392	0.1153
Adj. Med. Chi-square	1	2.138705	0.1436
Kruskal-Wallis	1	4.041717	0.0444
Kruskal-Wallis (tie-adj.)	1	4.041717	0.0444
van der Waerden	1	4.941059	0.0262

#### Category Statistics

TOTM	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	408	0.000259	197	247.0956	-0.047963
1	98	0.002063	56	280.1633	0.199683
All	506	0.000510	253	253.5000	4.22E-09

#### 4<sup>TH</sup> SUB SAMPLE FTSE 250

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 13:46

Sample: 12/31/2012 1/02/2015

Included observations: 512

Convergence achieved after 22 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000488	0.000374	1.307361	0.1911
TOTM	0.000449	0.000808	0.555832	0.5783

#### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	1.04E-05	5.31E-06	1.962545	0.0497
RESID(-1)^2	0.071778	0.036460	1.968712	0.0490
GARCH(-1)	0.743598	0.114137	6.514958	0.0000

R-squared	0.001047	Mean dependent var	0.000486
Adjusted R-squared	-0.000911	S.D. dependent var	0.007550
S.E. of regression	0.007553	Akaike info criterion	-6.938218
Sum squared resid	0.029097	Schwarz criterion	-6.896828
Log likelihood	1781.184	Hannan-Quinn criter.	-6.921993
Durbin-Watson stat	1.802108		

#### Test for Equality of Medians of RETURNS

Categorized by values of TOTM

Date: 07/30/19 Time: 20:14

Sample: 12/31/2012 1/02/2015

Included observations: 512

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.477985	0.6327
Wilcoxon/Mann-Whitney (tie-adj.)		0.477987	0.6327
Med. Chi-square	1	0.454303	0.5003
Adj. Med. Chi-square	1	0.315489	0.5743
Kruskal-Wallis	1	0.228833	0.6324
Kruskal-Wallis (tie-adj.)	1	0.228834	0.6324
van der Waerden	1	0.477436	0.4896

#### Category Statistics

TOTM	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	414	0.000518	204	254.9783	-0.014715
1	98	0.001245	52	262.9286	0.062164
All	512	0.000706	256	256.5000	1.63E-07

## 5<sup>TH</sup> SUB SAMPLE FTSE 250

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 13:47

Sample: 12/31/2014 1/03/2017

Included observations: 516

Convergence achieved after 17 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000384	0.000371	1.037327	0.2996
TOTM	0.000155	0.000965	0.160998	0.8721

### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	8.56E-06	2.19E-06	3.918111	0.0001
RESID(-1)^2	0.205998	0.042669	4.827862	0.0000
GARCH(-1)	0.691080	0.058378	11.83802	0.0000

R-squared	0.000393	Mean dependent var	0.000208
Adjusted R-squared	-0.001552	S.D. dependent var	0.009862
S.E. of regression	0.009870	Akaike info criterion	-6.761938
Sum squared resid	0.050072	Schwarz criterion	-6.720793
Log likelihood	1749.580	Hannan-Quinn criter.	-6.745815
Durbin-Watson stat	1.756508		

Test for Equality of Medians of RETURNS

Categorized by values of TOTM

Date: 07/30/19 Time: 20:22

Sample: 12/31/2014 1/03/2017

Included observations: 516

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.873921	0.3822
Wilcoxon/Mann-Whitney (tie-adj.)		0.873934	0.3822
Med. Chi-square	1	0.312477	0.5762
Adj. Med. Chi-square	1	0.199985	0.6547
Kruskal-Wallis	1	0.764393	0.3820
Kruskal-Wallis (tie-adj.)	1	0.764415	0.3820
van der Waerden	1	1.626753	0.2022

### Category Statistics

TOTM	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	417	0.000454	211	255.7038	-0.027097
1	99	0.000000	47	270.2778	0.114141
All	516	0.000309	258	258.5000	6.82E-07

## Appendix F (cont'd)

### (iv) HALLOWEEN EFFECT

#### 1<sup>ST</sup> SUB SAMPLE FTSE100

Dependent Variable: RETURNS  
 Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)  
 Date: 08/03/19 Time: 13:51  
 Sample (adjusted): 1/02/2007 1/02/2009  
 Included observations: 508 after adjustments  
 Convergence achieved after 21 iterations  
 Coefficient covariance computed using outer product of gradients  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	1.17E-05	0.000632	0.018557	0.9852
HALLOWEEN	0.000374	0.000960	0.389003	0.6973

Variance Equation				
	Coefficient	Std. Error	z-Statistic	Prob.
C	3.59E-06	1.63E-06	2.197122	0.0280
RESID(-1)^2	0.159565	0.032887	4.851943	0.0000
GARCH(-1)	0.841876	0.030608	27.50546	0.0000

R-squared	-0.001348	Mean dependent var	-0.000611
Adjusted R-squared	-0.003327	S.D. dependent var	0.018440
S.E. of regression	0.018471	Akaike info criterion	-5.661684
Sum squared resid	0.172630	Schwarz criterion	-5.620045
Log likelihood	1443.068	Hannan-Quinn criter.	-5.645356
Durbin-Watson stat	2.177484		

Test for Equality of Medians of RETURNS  
 Categorized by values of HALLOWEEN  
 Date: 07/30/19 Time: 20:35  
 Sample (adjusted): 1/02/2007 1/02/2009  
 Included observations: 508 after adjustments

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.537403	0.5910
Wilcoxon/Mann-Whitney (tie-adj.)		0.537403	0.5910
Med. Chi-square	1	0.125984	0.7226
Adj. Med. Chi-square	1	0.070866	0.7901
Kruskal-Wallis	1	0.289127	0.5908
Kruskal-Wallis (tie-adj.)	1	0.289127	0.5908
van der Waerden	1	0.427759	0.5131

#### Category Statistics

HALLOWEEN	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	254	-0.000273	125	250.9980	-0.028739
1	254	1.64E-05	129	258.0020	0.028739
All	508	-0.000129	254	254.5000	-2.35E-10



## 2<sup>ND</sup> SUB SAMPLE FTSE100

Dependent Variable: RETURNS  
 Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)  
 Date: 08/03/19 Time: 13:52  
 Sample (adjusted): 1/02/2009 12/31/2010  
 Included observations: 506 after adjustments  
 Convergence achieved after 25 iterations  
 Coefficient covariance computed using outer product of gradients  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.001304	0.000705	1.848859	0.0645
HALLOWEEN	-0.000564	0.001009	-0.559066	0.5761

Variance Equation				
C	2.92E-06	1.46E-06	2.003876	0.0451
RESID(-1)^2	0.073128	0.018542	3.943874	0.0001
GARCH(-1)	0.905894	0.020984	43.17017	0.0000

R-squared	-0.000783	Mean dependent var	0.000564
Adjusted R-squared	-0.002769	S.D. dependent var	0.012994
S.E. of regression	0.013012	Akaike info criterion	-5.978703
Sum squared resid	0.085334	Schwarz criterion	-5.936939
Log likelihood	1517.612	Hannan-Quinn criter.	-5.962323
Durbin-Watson stat	2.017995		

Test for Equality of Medians of RETURNS  
 Categorized by values of HALLOWEEN  
 Date: 07/30/19 Time: 20:38  
 Sample (adjusted): 1/02/2009 12/31/2010  
 Included observations: 506 after adjustments

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.425661	0.6704
Wilcoxon/Mann-Whitney (tie-adj.)		0.425661	0.6704
Med. Chi-square	1	0.197628	0.6566
Adj. Med. Chi-square	1	0.126482	0.7221
Kruskal-Wallis	1	0.181446	0.6701
Kruskal-Wallis (tie-adj.)	1	0.181446	0.6701
van der Waerden	1	0.251769	0.6158

### Category Statistics

HALLOWEEN	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	253	0.000592	124	256.2688	0.022091
1	253	0.001290	129	250.7312	-0.022091
All	506	0.000861	253	253.5000	5.27E-18

### 3<sup>RD</sup> SUB SAMPLE FTSE100

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 13:53

Sample: 12/31/2010 1/02/2013

Included observations: 509

Convergence achieved after 27 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.000215	0.000636	-0.337850	0.7355
HALLOWEEN	0.000791	0.000842	0.939555	0.3474

#### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	4.39E-06	1.71E-06	2.574541	0.0100
RESID(-1)^2	0.100867	0.028272	3.567704	0.0004
GARCH(-1)	0.862622	0.036162	23.85451	0.0000

R-squared	0.000407	Mean dependent var	3.84E-05
Adjusted R-squared	-0.001564	S.D. dependent var	0.011168
S.E. of regression	0.011177	Akaike info criterion	-6.334953
Sum squared resid	0.063335	Schwarz criterion	-6.293376
Log likelihood	1617.245	Hannan-Quinn criter.	-6.318651
Durbin-Watson stat	1.910036		

Test for Equality of Medians of RETURNS

Categorized by values of HALLOWEEN

Date: 07/30/19 Time: 20:41

Sample: 12/31/2010 1/02/2013

Included observations: 509

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.229035	0.8188
Wilcoxon/Mann-Whitney (tie-adj.)		0.229036	0.8188
Med. Chi-square	1	0.237173	0.6263
Adj. Med. Chi-square	1	0.158680	0.6904
Kruskal-Wallis	1	0.052595	0.8186
Kruskal-Wallis (tie-adj.)	1	0.052596	0.8186
van der Waerden	1	0.110864	0.7392

#### Category Statistics

HALLOWEEN	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	254	5.94E-05	128	253.5020	-0.014645
1	255	0.000000	123	256.4922	0.014588
All	509	0.000000	251	255.0000	1.44E-08

#### 4<sup>TH</sup> SUB SAMPLE FTSE100

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 13:54

Sample: 12/31/2012 1/02/2015

Included observations: 509

Convergence achieved after 20 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	3.84E-05	0.000403	0.095225	0.9241
HALLOWEEN	0.000603	0.000567	1.063775	0.2874

#### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	4.29E-06	1.34E-06	3.204149	0.0014
RESID(-1)^2	0.130250	0.031804	4.095334	0.0000
GARCH(-1)	0.793262	0.037420	21.19867	0.0000

R-squared	0.000475	Mean dependent var	0.000192
Adjusted R-squared	-0.001496	S.D. dependent var	0.007395
S.E. of regression	0.007401	Akaike info criterion	-7.054687
Sum squared resid	0.027768	Schwarz criterion	-7.013110
Log likelihood	1800.418	Hannan-Quinn criter.	-7.038385
Durbin-Watson stat	2.008797		

Test for Equality of Medians of RETURNS

Categorized by values of HALLOWEEN

Date: 07/30/19 Time: 20:45

Sample: 12/31/2012 1/02/2015

Included observations: 509

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.613875	0.5393
Wilcoxon/Mann-Whitney (tie-adj.)		0.613875	0.5393
Med. Chi-square	1	0.331926	0.5645
Adj. Med. Chi-square	1	0.237638	0.6259
Kruskal-Wallis	1	0.377212	0.5391
Kruskal-Wallis (tie-adj.)	1	0.377212	0.5391
van der Waerden	1	0.451537	0.5016

#### Category Statistics

HALLOWEEN	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	255	0.000565	124	251.0039	-0.029441
1	254	0.000830	130	259.0118	0.029556
All	509	0.000630	254	255.0000	5.20E-09

## 5<sup>TH</sup> SUB SAMPLE FTSE100

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 13:54

Sample: 12/31/2014 1/03/2017

Included observations: 509

Convergence achieved after 54 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000303	0.000529	0.573043	0.5666
HALLOWEEN	-0.000150	0.000784	-0.190997	0.8485

### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	1.04E-05	3.31E-06	3.129121	0.0018
RESID(-1)^2	0.186676	0.041946	4.450366	0.0000
GARCH(-1)	0.719107	0.059433	12.09941	0.0000

R-squared	-0.000119	Mean dependent var	0.000138
Adjusted R-squared	-0.002092	S.D. dependent var	0.010679
S.E. of regression	0.010690	Akaike info criterion	-6.408940
Sum squared resid	0.057935	Schwarz criterion	-6.367364
Log likelihood	1636.075	Hannan-Quinn criter.	-6.392638
Durbin-Watson stat	1.949312		

Test for Equality of Medians of RETURNS

Categorized by values of HALLOWEEN

Date: 07/30/19 Time: 20:48

Sample: 12/31/2014 1/03/2017

Included observations: 509

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.128386	0.8978
Wilcoxon/Mann-Whitney (tie-adj.)		0.128386	0.8978
Med. Chi-square	1	0.001926	0.9650
Adj. Med. Chi-square	1	0.002004	0.9643
Kruskal-Wallis	1	0.016560	0.8976
Kruskal-Wallis (tie-adj.)	1	0.016560	0.8976
van der Waerden	1	0.000585	0.9807

### Category Statistics

HALLOWEEN	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	252	0.000550	126	254.1528	-0.001072
1	257	0.000394	128	255.8307	0.001051
All	509	0.000518	254	255.0000	7.91E-09

## 1<sup>ST</sup> SUB SAMPLE FTSE250

Dependent Variable: RETURNS  
 Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)  
 Date: 08/03/19 Time: 14:13  
 Sample: 12/29/2006 1/02/2009  
 Included observations: 509  
 Convergence achieved after 25 iterations  
 Coefficient covariance computed using outer product of gradients  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.000506	0.000798	-0.633815	0.5262
HALLOWEEN	0.000553	0.001172	0.471678	0.6372

### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	4.44E-06	1.72E-06	2.574860	0.0100
RESID(-1)^2	0.099228	0.028898	3.433718	0.0006
GARCH(-1)	0.888898	0.032543	27.31425	0.0000

R-squared	-0.000545	Mean dependent var	-0.001027
Adjusted R-squared	-0.002519	S.D. dependent var	0.016825
S.E. of regression	0.016846	Akaike info criterion	-5.591071
Sum squared resid	0.143887	Schwarz criterion	-5.549495
Log likelihood	1427.928	Hannan-Quinn criter.	-5.574769
Durbin-Watson stat	1.885183		

### Test for Equality of Medians of RETURNS

Categorized by values of HALLOWEEN  
 Date: 07/30/19 Time: 21:51  
 Sample: 12/29/2006 1/02/2009  
 Included observations: 509

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		1.087616	0.2768
Wilcoxon/Mann-Whitney (tie-adj.)		1.087616	0.2768
Med. Chi-square	1	0.709386	0.3996
Adj. Med. Chi-square	1	0.567916	0.4511
Kruskal-Wallis	1	1.183564	0.2766
Kruskal-Wallis (tie-adj.)	1	1.183564	0.2766
van der Waerden	1	1.505937	0.2198

### Category Statistics

HALLOWEEN	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	254	-0.000825	122	247.8937	-0.053977
1	255	0.000313	132	262.0784	0.053765
All	509	-0.000178	254	255.0000	-1.74E-17

## 2<sup>ND</sup> SUB SAMPLE FTSE250

Dependent Variable: RETURNS  
 Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)  
 Date: 08/03/19 Time: 14:14  
 Sample: 12/31/2008 1/04/2011  
 Included observations: 508  
 Convergence achieved after 22 iterations  
 Coefficient covariance computed using outer product of gradients  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.001231	0.000730	1.686135	0.0918
HALLOWEEN	0.000478	0.000979	0.487860	0.6256

Variance Equation				
C	3.07E-06	1.84E-06	1.665268	0.0959
RESID(-1)^2	0.106813	0.024483	4.362804	0.0000
GARCH(-1)	0.874505	0.026359	33.17720	0.0000

R-squared	0.000329	Mean dependent var	0.001203
Adjusted R-squared	-0.001647	S.D. dependent var	0.013239
S.E. of regression	0.013250	Akaike info criterion	-5.963986
Sum squared resid	0.088830	Schwarz criterion	-5.922348
Log likelihood	1519.852	Hannan-Quinn criter.	-5.947658
Durbin-Watson stat	1.810292		

Test for Equality of Medians of RETURNS  
 Categorized by values of HALLOWEEN  
 Date: 07/30/19 Time: 21:53  
 Sample: 12/31/2008 1/04/2011  
 Included observations: 508

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.304067	0.7611
Wilcoxon/Mann-Whitney (tie-adj.)		0.304067	0.7611
Med. Chi-square	1	0.385833	0.5345
Adj. Med. Chi-square	1	0.283469	0.5944
Kruskal-Wallis	1	0.092641	0.7608
Kruskal-Wallis (tie-adj.)	1	0.092641	0.7608
van der Waerden	1	0.398952	0.5276

### Category Statistics

HALLOWEEN	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	253	0.002082	130	252.5099	-0.027864
1	255	0.001560	124	256.4745	0.027645
All	508	0.001751	254	254.5000	1.05E-17

### 3<sup>RD</sup> SUB SAMPLE FTSE250

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 14:15

Sample: 12/31/2010 1/02/2013

Included observations: 506

Convergence achieved after 26 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	1.59E-05	0.000667	0.023798	0.9810
HALLOWEEN	0.000913	0.000881	1.036246	0.3001

#### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	1.72E-06	9.55E-07	1.806910	0.0708
RESID(-1)^2	0.067374	0.015831	4.255938	0.0000
GARCH(-1)	0.918649	0.020452	44.91793	0.0000

R-squared	0.001017	Mean dependent var	0.000124
Adjusted R-squared	-0.000965	S.D. dependent var	0.011166
S.E. of regression	0.011171	Akaike info criterion	-6.303243
Sum squared resid	0.062899	Schwarz criterion	-6.261479
Log likelihood	1599.721	Hannan-Quinn criter.	-6.286863
Durbin-Watson stat	1.760769		

Test for Equality of Medians of RETURNS

Categorized by values of HALLOWEEN

Date: 07/30/19 Time: 21:57

Sample: 12/31/2010 1/02/2013

Included observations: 506

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		1.028276	0.3038
Wilcoxon/Mann-Whitney (tie-adj.)		1.028276	0.3038
Med. Chi-square	1	1.778656	0.1823
Adj. Med. Chi-square	1	1.549407	0.2132
Kruskal-Wallis	1	1.057977	0.3037
Kruskal-Wallis (tie-adj.)	1	1.057977	0.3037
van der Waerden	1	0.717167	0.3971

#### Category Statistics

HALLOWEEN	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	253	0.000000	119	246.8142	-0.037284
1	253	0.001295	134	260.1858	0.037284
All	506	0.000510	253	253.5000	4.22E-09

#### 4<sup>TH</sup> SUB SAMPLE FTSE250

Dependent Variable: RETURNS

Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)

Date: 08/03/19 Time: 14:17

Sample: 12/31/2012 1/02/2015

Included observations: 512

Convergence achieved after 21 iterations

Coefficient covariance computed using outer product of gradients

Presample variance: backcast (parameter = 0.7)

GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000245	0.000449	0.545186	0.5856
HALLOWEEN	0.000637	0.000665	0.958630	0.3377

#### Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	1.05E-05	5.26E-06	1.994907	0.0461
RESID(-1)^2	0.075192	0.037894	1.984288	0.0472
GARCH(-1)	0.738694	0.114852	6.431682	0.0000

R-squared	0.001051	Mean dependent var	0.000486
Adjusted R-squared	-0.000908	S.D. dependent var	0.007550
S.E. of regression	0.007553	Akaike info criterion	-6.939468
Sum squared resid	0.029096	Schwarz criterion	-6.898078
Log likelihood	1781.504	Hannan-Quinn criter.	-6.923243
Durbin-Watson stat	1.802901		

Test for Equality of Medians of RETURNS

Categorized by values of HALLOWEEN

Date: 07/30/19 Time: 21:59

Sample: 12/31/2012 1/02/2015

Included observations: 512

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.628821	0.5295
Wilcoxon/Mann-Whitney (tie-adj.)		0.628823	0.5295
Med. Chi-square	1	0.500031	0.4795
Adj. Med. Chi-square	1	0.382836	0.5361
Kruskal-Wallis	1	0.395792	0.5293
Kruskal-Wallis (tie-adj.)	1	0.395794	0.5293
van der Waerden	1	0.516993	0.4721

#### Category Statistics

HALLOWEEN	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	258	0.000290	125	252.4186	-0.031228
1	254	0.001144	131	260.6457	0.031720
All	512	0.000706	256	256.5000	1.63E-07



## 5<sup>TH</sup> SUB SAMPLE FTSE250

Dependent Variable: RETURNS  
 Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)  
 Date: 08/03/19 Time: 14:18  
 Sample: 12/31/2014 1/03/2017  
 Included observations: 516  
 Convergence achieved after 19 iterations  
 Coefficient covariance computed using outer product of gradients  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(3) + C(4)\*RESID(-1)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000313	0.000473	0.662143	0.5079
HALLOWEEN	0.000191	0.000691	0.275985	0.7826

Variance Equation				
C	8.56E-06	2.22E-06	3.850961	0.0001
RESID(-1)^2	0.206195	0.042595	4.840874	0.0000
GARCH(-1)	0.690860	0.058619	11.78563	0.0000

R-squared	-0.000403	Mean dependent var	0.000208
Adjusted R-squared	-0.002349	S.D. dependent var	0.009862
S.E. of regression	0.009874	Akaike info criterion	-6.762038
Sum squared resid	0.050112	Schwarz criterion	-6.720893
Log likelihood	1749.606	Hannan-Quinn criter.	-6.745915
Durbin-Watson stat	1.756011		

Test for Equality of Medians of RETURNS  
 Categorized by values of HALLOWEEN  
 Date: 07/30/19 Time: 22:02  
 Sample: 12/31/2014 1/03/2017  
 Included observations: 516

Method	df	Value	Probability
Wilcoxon/Mann-Whitney		0.104232	0.9170
Wilcoxon/Mann-Whitney (tie-adj.)		0.104233	0.9170
Med. Chi-square	1	0.007753	0.9298
Adj. Med. Chi-square	1	0.000000	1.0000
Kruskal-Wallis	1	0.010926	0.9168
Kruskal-Wallis (tie-adj.)	1	0.010926	0.9167
van der Waerden	1	0.003635	0.9519

### Category Statistics

HALLOWEEN	Count	Median	> Overall		
			Median	Mean Rank	Mean Score
0	255	0.000171	127	257.8059	0.002660
1	261	0.000454	131	259.1782	-0.002598
All	516	0.000309	258	258.5000	6.82E-07



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