ภาคผนวก

ภาคผนวก ก

ค่าสถิติเบื้องต้นและการทดสอบการแจกแจง

	T	mean	med	min	max	var	skew	kurt	J-B
SET	3914	-0.032	0.000	-16.063	11.350	2.867	0.111	10.148	8345.071
JSX	3914	0.021	0.000	-12.732	13.128	2.692	-0.154	11.401	11529.24
PSE	3914	-0.011	0.000	-13.089	16.178	2.279	0.308	14.237	20661.74
SLSE	4193	0.010	0.023	-24.153	20.817	2.288	0.426	45.029	308817.6
Straits	2365	0.009	-0.028	-8.696	7.531	1.783	-0.347	7.433	1985.452

ที่มา: คำนวณโดยใช้โปรแกรม GAUSS 6.0

ภาคผนวก ข
ผลการประมาณค่าจากแบบจำลอง GARCH
คำนวณจากโปรแกรม GAUSS 6.0

1) ผลการประมาณค่าจากแบบจำลอง GARCH ของอัตราผลตอบแทนดัชนีราคา หลักทรัพย์ในตลาดหลักทรัพย์ไทย

1.1) GARCH-normal

Maximum log-likelihood: -5382.140

Parameters	MU	MA	OMEGA	ALPHA	BETA
Estimates	0.0119	0.0907	0.0412	0.0764	0.9112
Std.err.	0.0291	0.0194	0.0077	0.0062	0.0065
T-stat	0.4102	4.6770	5.3702	12.3688	141.1528

Skewness of standarized residuals, m3: 0.092

Kurtosis of standardized residuals, m4: 4.774

Ljung-Box test of standardized residuals, Q(10): 46.42

Ljung-Box test of squared stand. residuals,Q2(10): 12.95

Ljung-Box test of absolute stand. residuals,Q3(10): 9.54

AIC:10774.280   SIC:10804.08

Wald Test for alpha+beta=1 (12.753)

1.2) GARCH-student's t

Maximum log-likelihood: -5313.727

Parameters	MU	MA	OMEGA	ALPHA	BETA	NU
Estimates	-0.0263	0.0901	0.0645	0.0918	0.8920	5.0809
Std.err.	0.0255	0.0194	0.0172	0.0131	0.0139	0.5733
T-stat	-1.0333	4.6770	3.7477	6.9998	64.2554	8.8622

Skewness of standarized residuals, m3:   0.148

Kurtosis of standardized residuals, m4:   4.826

Ljung-Box test of standardized residuals, Q(10): 93.46860

Ljung-Box test of squared stand. residuals,Q2(10): 13.28554

Ljung-Box test of absolute stand. residuals,Q3(10): 6.09633

AIC:10637.454   SIC:10667.262

Wald Test for testing alpha +beta=1 (4.046)

1.3) GARCH-NIG (b=0)

Maximum log-likelihood: -5309.5

Parameters	MU	MA	OMEGA	ALPHA	BETA	BARA
Estimates	-0.0411	-0.0327	0.2877	0.1570	0.7095	26.2060
Std.err.	0.1280	0.0252	0.1740	0.0938	0.0426	0.2749
T-stat	-0.3212	-1.2979	1.654	1.674	16.6388	95.3297

Skewness of standarized residuals, m3:   0.248

Kurtosis of standardized residuals, m4:   5.253

Ljung-Box test of standardized residuals, Q(10): 91.74089

Ljung-Box test of squared stand. residuals,Q2(10): 17.13434

Ljung-Box test of absolute stand. residuals,Q3(10): 19.41620

AIC:-58279.703

SIC:-58249.895

Wald Test for alpha+beta=1 (1.908)

1.4) GARCH-NIG (b ≠ 0)

Maximum log-likelihood: -5306.849

Parameters	MU	MA	OMEGA	ALPHA	BETA	BARA	BARB
Estimates	-0.0210	-0.0327	0.0612	0.0914	0.8918	1.1884	-0.0087
Std.err.	0.0452	0.0252	0.0172	0.0133	0.0144	0.1763	0.0373
T-stat	-0.4649	-1.2979	3.5519	6.8846	61.9156	6.7416	-0.2319

Skewness of standarized residuals, m3:   -0.020

Kurtosis of standardized residuals, m4:   5.525

Ljung-Box test of standardized residuals, Q(10): 93.57943

Ljung-Box test of squared stand. residuals,Q2(10): 12.98397

Ljung-Box test of absolute stand. residuals,Q3(10): 5.87837

AIC:10625.698

SIC:10661.468

Wald Test for alpha+beta=1 (4.632)

2) ผลการประมาณค่าจากแบบจำลอง GARCH ของอัตราผลตอบแทนดัชนีราคาหลักทรัพย์ในตลาดหลักทรัพย์อินโดนีเซีย

2.1) GARCH-normal

Maximum log-likelihood: -4903.360

Parameters	MU	MA	OMEGA	ALPHA	BETA
Estimates	0.0544	0.1978	0.0263	0.0867	0.9061
Std.err.	0.0275	0.0179	0.0025	0.0051	0.0042
T-stat	1.9788	11.0528	10.5332	17.1094	214.0150

Skewness of standarized residuals, m3:   -0.188

Kurtosis of standardized residuals, m4:   7.081

Ljung-Box test of standardized residuals, Q(10): 22.56639

Ljung-Box test of squared stand. residuals,Q2(10): 9.63691

Ljung-Box test of absolute stand. residuals,Q3(10): 45.59494

AIC:9816.720 SIC:9846.529

Wald Test for alpha+beta=1 (9.040)

2.2) GARCH-student's t

Maximum log-likelihood: -4765.899

Parameters	MU	MA	OMEGA	ALPHA	BETA	NU
Estimates	0.0499	0.1963	0.0589	0.1486	0.8504	3.6847
Std.err.	0.0192	0.0179	0.0135	0.0158	0.0158	0.2112
T-stat	2.4832	2.3662	4.3472	9.4325	53.9955	17.4435

Skewness of standardized residuals, m3: -0.249

Kurtosis of standardized residuals, m4:   7.229

Ljung-Box test of standardized residuals, Q(10): 145.65060

Ljung-Box test of squared stand. residuals,Q2(10): 9.77063

Ljung-Box test of absolute stand. residuals,Q3(10): 34.30441

AIC:9541.798

SIC:9571.607

Wald Test for testing alpha +beta=1 (+INF)

2.3) GARCH-NIG (b=0)

Maximum log-likelihood: -4758.005

Parameters	MU	MA	OMEGA	ALPHA	BETA	BARA
Estimates	0.0438	0.1963	0.0550	0.1388	0.8503	0.7227
Std.err.	0.0186	0.0179	0.0127	0.0187	0.0163	0.0894
T-stat	2.5863	8.8220	4.3499	7.4366	52.1452	8.3817

Skewness of standardized residuals, m3: -0.249

Kurtosis of standardized residuals, m4:   7.199

AIC:9528.013

SIC:9558.783

Wald Test for testing alpha +beta=1 (+INF)

2.4) GARCH-NIG (b ≠ 0)

Maximum log-likelihood: -4758.006

Parameters	MU	MA	OMEGA	ALPHA	BETA	BARA	BARB
Estimates	0.0681	0.1965	0.0550	0.1388	0.8503	0.7217	-0.0333
Std.err.	0.0263	0.0179	0.0127	0.0187	0.0163	0.0861	0.0229
T-stat	2.5863	8.8220	4.3499	7.4366	52.1452	8.3817	-1.4555

Skewness of standarized residuals, m3:   -0.183

Kurtosis of standardized residuals, m4:   7.209

Ljung-Box test of standardized residuals, Q(10): 144.75344

Ljung-Box test of squared stand. residuals,Q2(10): 9.95675

Ljung-Box test of absolute stand. residuals,Q3(10): 34.74167

AIC:9528.013

SIC:9563.783

Wald Test for phi+beta=1 (1.117)

**3) ผลการประมาณค่าจากแบบจำลอง GARCH ของอัตราผลตอบแทนดัชนีราคา
หลักทรัพย์ในตลาดหลักทรัพย์ฟิลิปปินส์**

3.1) GARCH-normal

Maximum log-likelihood: -4910.743

Parameters	MU	MA	OMEGA	ALPHA	BETA
Estimates	0.0005	0.1729	0.1778	0.1355	0.7850
Std.err.	0.0305	0.0211	0.0195	0.0093	0.0171
T-stat	0.0180	8.2095	9.1083	14.5065	45.8928

Skewness of standarized residuals, m3: 1.252

Kurtosis of standardized residuals, m4: 25.341

Ljung-Box test of standardized residuals, Q(10): 18.48059

Ljung-Box test of squared stand. residuals,Q2(10): 0.58129

Ljung-Box test of absolute stand. residuals,Q3(10): 8.68251

AIC:9831.486

SIC:9861.294

Wald Test for alpha+beta=1 (66.705)

3.2) GARCH-student's t

Maximum log-likelihood: -4717.570

Parameters	MU	MA	OMEGA	ALPHA	BETA	NU
Estimates	-0.0182	0.1708	0.1394	0.1823	0.7688	4.4359
Std.err.	0.0202	0.0211	0.0268	0.0246	0.0255	0.3688
T-stat	-0.9046	-0.8243	5.2058	7.4243	30.1013	12.0293

Skewness of standarized residuals, m3: 1.611

Kurtosis of standardized residuals, m4: 32.613

Ljung-Box test of standardized residuals, Q(10): 108.61655

Ljung-Box test of squared stand. residuals,Q2(10): 0.76056

Ljung-Box test of absolute stand. residuals,Q3(10): 11.76451

AIC:9445.139

SIC:9474.948

Wald Test for testing phi+beta=1 (8.028)

3.3) GARCH-NIG (b=0)

Maximum log-likelihood: -4716.941

Parameters	MU	MA	OMEGA	ALPHA	BETA	BARA
Estimates	-0.0181	0.1706	0.1262	0.1756	0.7690	1.1619
Std.err.	0.0200	0.0211	0.0248	0.0221	0.0254	0.1576
T-stat	-0.9046	-0.8243	5.0986	7.9380	30.3110	7.3712

Skewness of standarized residuals, m3:   1.664

Kurtosis of standarized residuals, m4:   33.775

Ljung-Box test of standardized residuals, Q(10): 108.30740

 Ljung-Box test of squared stand. residuals,Q2(10): 0.76661

 Ljung-Box test of absolute stand. residuals,Q3(10): 12.60685

AIC:9443.881

SIC:9473.690

Wald Test for phi+beta=1 (12.720)

3.4) GARCH-NIG (b ≠ 0)

Maximum log-likelihood: -4716.880

Parameters	MU	MA	OMEGA	ALPHA	BETA	BARA	BARB
Estimates	-0.0084	0.1729	0.1259	0.1754	0.7693	1.1657	-0.0122
Std.err.	0.0307	0.0211	0.0247	0.0221	0.0253	0.1610	0.0296
T-stat	-0.2727	-0.8243	5.0911	7.9333	30.3764	7.2383	-0.4120

Skewness of standarized residuals, m3:   1.683

Kurtosis of standardized residuals, m4:   33.830

Ljung-Box test of standardized residuals, Q(10): 108.30740

Ljung-Box test of squared stand. residuals,Q2(10): 0.76661

Ljung-Box test of absolute stand. residuals,Q3(10): 12.60685

AIC:9445.760

SIC:9481.530

Wald Test for phi+beta=1 (12.755)

4) ผลการประมาณค่าจากแบบจำลอง GARCH ของอัตราผลตอบแทนดัชนีราคา หลักทรัพย์ในตลาดหลักทรัพย์มาเลเซีย

4.1) GARCH-normal

Maximum log-likelihood: -4966.393

Parameters	MU	MA	OMEGA	ALPHA	BETA
Estimates	0.0535	0.1867	0.0259	0.1248	0.8666
Std.err.	0.0202	0.0182	0.0031	0.0079	0.0070
T-stat	2.6489	10.2819	8.3526	15.7432	123.8342

Skewness of standarized residuals, m3:   -0.087

Kurtosis of standardized residuals, m4:   5.484

Ljung-Box test of standardized residuals, Q(10): 18.70655

Ljung-Box test of squared stand. residuals,Q2(10): 8.28606

Ljung-Box test of absolute stand. residuals,Q3(10): 13.76875

AIC:9942.786

SIC:9973.150

Wald Test for alpha+beta=1 (5.649)

4.2) GARCH-student's t

Maximum log-likelihood: -4899.214

Parameters	MU	MA	OMEGA	ALPHA	BETA	NU
Estimates	0.0290	0.1907	0.0317	0.1404	0.8519	5.1983
Std.err.	0.0159	0.0182	0.0067	0.0157	0.0133	0.5016
T-stat	1.8194	10.2819	4.7536	8.9494	63.8790	10.3630

Skewness of standarized residuals, m3: -0.057

Kurtosis of standardized residuals, m4: 5.658

Ljung-Box test of standardized residuals, Q(10): 136.91740

Ljung-Box test of squared stand. residuals,Q2(10): 10.95893

Ljung-Box test of absolute stand. residuals,Q3(10): 17.37635

AIC:9808.429

SIC:9838.793

Wald Test for testing phi+beta=1 (0.771)

4.3) GARCH-NIG (b=0)

Maximum log-likelihood: -4899.750

Parameters	MU	MA	OMEGA	ALPHA	BETA	BARA
Estimates	0.0278	0.1905	0.0301	0.1344	0.8554	1.3903
Std.err.	0.0158	0.0182	0.0064	0.0149	0.0133	0.1804
T-stat	1.7599	10.2819	4.6723	9.0171	64.2490	7.7075

Skewness of standarized residuals, m3: -0.055

Kurtosis of standardized residuals, m4: 5.645

Ljung-Box test of standardized residuals, Q(10): 137.08229

Ljung-Box test of squared stand. residuals,Q2(10): 11.01635

Ljung-Box test of absolute stand. residuals,Q3(10): 17.81173

AIC:9809.500

SIC:9839.864

Wald Test for phi+beta=1 (1.765)

4.4) GARCH-NIG (b ≠ 0)

Maximum log-likelihood: -4898.878

Parameters	MU	MA	OMEGA	ALPHA	BETA	BARA	BARB
Estimates	0.0573	0.1857	0.0300	0.1342	0.8553	1.4293	-0.0487
Std.err.	0.0257	0.0182	0.0064	0.0149	0.0133	0.1867	0.0345
T-stat	2.2314	10.2819	4.6956	9.0341	64.3894	7.6562	-1.4104

Skewness of standarized residuals, m3:   -0.085

Kurtosis of standardized residuals, m4:   5.110

Ljung-Box test of standardized residuals, Q(10): 136.89183

Ljung-Box test of squared stand. residuals,Q2(10): 11.46799

Ljung-Box test of absolute stand. residuals,Q3(10): 18.80989

AIC:9809.756

SIC:9846.193

Wald Test for phi+beta=1 (1.912)

5) ผลการประมาณค่าจากแบบจำลอง GARCH ของอัตราผลตอบแทนดัชนีราคา
หลักทรัพย์ในตลาดหลักทรัพย์สิงคโปร์

5.1) GARCH-normal

Maximum log-likelihood: -2397.040

Parameters	MU	MA	OMEGA	ALPHA	BETA
Estimates	0.0327	0.0263	0.0150	0.0871	0.9067
Std.err.	0.0262	0.0260	0.0045	0.0093	0.0087
T-stat	1.2473	1.0120	3.3124	9.3465	104.3906

Skewness of standardized residuals, m3: -0.336

Kurtosis of standardized residuals, m4: 4.953

Ljung-Box test of standardized residuals, Q(10): 14.13558

Ljung-Box test of squared stand. residuals,Q2(10): 7.60886

Ljung-Box test of absolute stand. residuals,Q3(10): 15.18774

AIC:4804.080

SIC:4830.915

Wald Test for alpha+beta=1 (1.872)

5.2) GARCH-student's t

Maximum log-likelihood: -2364.393

Parameters	MU	MA	OMEGA	ALPHA	BETA	NU
Estimates	0.0325	0.0252	0.0172	0.0782	0.9120	7.0420
Std.err.	0.0238	0.0260	0.0073	0.0142	0.0149	1.1299
T-stat	1.3631	1.0120	2.3722	5.4902	61.1479	6.2326

Skewness of standardized residuals, m3: -0.353

Kurtosis of standardized residuals, m4: 5.002

Ljung-Box test of standardized residuals, Q(10): 15.98469

Ljung-Box test of squared stand. residuals,Q2(10): 8.55672

Ljung-Box test of absolute stand. residuals,Q3(10): 15.67469

AIC:4738.786

SIC:4765.621

Wald Test for testing alpha +beta=1 (1.805)

5.3) GARCH-NIG (b=0)

Maximum log-likelihood: -2364.393

Parameters	MU	MA	OMEGA	ALPHA	BETA	BARA
Estimates	0.0378	0.0251	0.0004	0.0169	0.9515	15.5454
Std.err.	0.0607	0.0260	0.0015	0.0055	0.0127	0.0745
T-stat	0.6237	1.0120	0.2855	3.0809	74.8235	208.6029

Skewness of standarized residuals, m3:   -0.465

Kurtosis of standardized residuals, m4:   5.190

Ljung-Box test of standardized residuals, Q(10): 15.94458

Ljung-Box test of squared stand. residuals,Q2(10): 20.22413

Ljung-Box test of absolute stand. residuals,Q3(10): 23.50206

AIC:-864.594

SIC:-837.759

Wald Test for alpha+beta=1 (12.706)

5.4) GARCH-NIG (b ≠ 0)

Maximum log-likelihood: -2361.742

Parameters	MU	MA	OMEGA	ALPHA	BETA	BARA	BARB
Estimates	0.1467	0.0243	0.0150	0.0761	0.9141	2.3336	-0.2126
Std.err.	0.0510	0.0260	0.0054	0.0065	0.0005	0.5003	0.0915
T-stat	2.8755	1.0120	2.7656	11.7904	2019.5192	4.6647	-2.3232

Skewness of standarized residuals, m3:   -0.179

Kurtosis of standardized residuals, m4:   4.334

Ljung-Box test of standardized residuals, Q(10): 15.54990

Ljung-Box test of squared stand. residuals,Q2(10): 8.37669

Ljung-Box test of absolute stand. residuals,Q3(10): 14.10115

AIC:4735.484

SIC:4767.687

Wald Test for alpha+beta=1 (2.287)

ภาคผนวก ค
ผลการประมาณค่าจากแบบจำลอง FIGARCH
คำนวณจากโปรแกรม GAUSS 6.0

**1) ผลการประมาณค่าจากแบบจำลอง FIGARCH ของอัตราผลตอบแทนดัชนี
ราคาหลักทรัพย์ในตลาดหลักทรัพย์ไทย**

1.1) FIGARCH-normal

Maximum log-likelihood: -5361.502

Parameters	MU	MA	D2	OMEGA	BETA	PHI
Estimates	0.0063	0.0921	0.3233	0.1464	0.4305	0.2088
Std.err.	0.0296	0.0210	0.0342	0.0414	0.0812	0.0691
T-stat	0.2131	4.3800	9.4481	3.5389	5.3028	3.0212

Skewness of standarized residuals, m3: 0.092

Kurtosis of standardized residuals, m4: 4.561

Ljung-Box test of standardized residuals, Q(10): 46.20451

Ljung-Box test of squared stand. residuals,Q2(10): 11.43262

Ljung-Box test of absolute stand. residuals,Q3(10): 8.68416

AIC:10735.004

SIC:10770.775

Wald Test for d=1 vs d<1= 391.012

Wald Test for alpha+beta=1 (6.070)

1.2) FIGARCH-student's t

Maximum log-likelihood: -5302.686

Parameters	MU	MA	D2	OMEGA	BETA	PHI	NU
Estimates	-0.0294	0.0915	0.2976	0.2387	0.3132	0.1391	5.5064
Std.err.	0.0257	0.0210	0.0539	0.1038	0.1820	0.1621	0.6317
T-stat	-1.1436	4.3800	5.5230	2.3004	1.7206	0.8584	8.7166

Skewness of standarized residuals, m3:   0.149

Kurtosis of standardized residuals, m4:   4.615

Ljung-Box test of standardized residuals, Q(10): 89.97148

Ljung-Box test of squared stand. residuals,Q2(10): 13.36842

Ljung-Box test of absolute stand. residuals,Q3(10): 8.96924

AIC:10617.371

SIC:10653.142

Wald Test for d=1 vs d<1 = 169.913

Wald Test for testing alpha +beta=1 (2.593)

1.3) FIGARCH-NIG (b=0)

Maximum log-likelihood: -5296.447

Parameters	MU	MA	D2	OMEGA	BETA	PHI	BARA
Estimates	-0.0326	-0.0327	0.3048	0.2033	0.3553	0.1725	1.3204
Std.err.	0.0252	0.0252	0.0560	0.0928	0.1730	0.1532	0.1998
T-stat	-1.2979	-1.2979	5.4430	2.1922	2.0536	1.1261	6.6084

Skewness of standarized residuals, m3:   0.153

Kurtosis of standardized residuals, m4:   4.602

Ljung-Box test of standardized residuals, Q(10): 46.20451

Ljung-Box test of squared stand. residuals,Q2(10): 11.43262

Ljung-Box test of absolute stand. residuals,Q3(10): 8.68416

AIC:10604.895

SIC:10640.665

Wald Test for d=1 vs d<1

154.064

Wald Test for alpha +beta=1 (2.159)

1.4) FIGARCH-NIG (b ≠ 0)

Maximum log-likelihood: -5296.447

Parameters	MU	D2	OMEGA	BETA	PHI	BARA	BARB
Estimates	-0.0312	0.3050	0.2030	0.3557	0.1727	1.3212	-0.0015
Std.err.	0.0472	0.0561	0.0927	0.1734	0.1534	0.2001	0.0404
T-stat	-0.6611	5.4343	2.1901	2.0507	1.1256	6.6036	-0.0372

Skewness of standarized residuals, m3:   -0.003

Kurtosis of standardized residuals, m4:   5.271

Ljung-Box test of standardized residuals, Q(10): 90.15273

Ljung-Box test of squared stand. residuals,Q2(10): 13.02194

Ljung-Box test of absolute stand. residuals,Q3(10): 8.61601

AIC:10606.894

SIC:10648.626

Wald Test for d=1 vs d<1 (153.321)

Wald Test for alpha +beta=1 (2.144)

2) ผลการประมาณค่าจากแบบจำลอง FIGARCH ของอัตราผลตอบแทนดัชนี
 ราคาหลักทรัพย์ในตลาดหลักทรัพย์อินโดนีเซีย

2.1) FIGARCH-normal

Maximum log-likelihood: -4867.897

Parameters	MU	MA	D2	OMEGA	BETA	PHI
Estimates	0.0616	0.1848	0.3586	0.0645	0.5485	0.4015
Std.err.	0.0269	0.0209	0.0284	0.0083	0.0140	0.0140
T-stat	2.2907	8.8220	12.6378	7.7959	39.1385	28.6508

Skewness of standarized residuals, m3:   -0.263

Kurtosis of standardized residuals, m4:   7.100

Ljung-Box test of standardized residuals, Q(10): 26.77865

Ljung-Box test of squared stand. residuals,Q2(10): 2.14517

Ljung-Box test of absolute stand. residuals,Q3(10): 5.80891

AIC:9747.795

SIC:9783.565

Wald Test (511.109)

Wald Test for alpha +beta=1 (+INF)

2.2) FIGARCH-student's t

Maximum log-likelihood: -4744.216

Parameters	MU	MA	D2	OMEGA	BETA	PHI	NU
Estimates	0.0477	0.1749	0.3847	0.0944	0.5316	0.4184	4.2307
Std.err.	0.0192	0.0209	0.0790	0.0280	0.0386	0.0386	0.3194
T-stat	2.4832	8.8220	4.8690	3.3724	13.7621	10.8309	13.2452

Skewness of standardized residuals, m3: -0.251

Kurtosis of standardized residuals, m4: 6.794

Ljung-Box test of standardized residuals, Q(10): 130.33011

Ljung-Box test of squared stand. residuals,Q2(10): 3.14450

Ljung-Box test of absolute stand. residuals,Q3(10): 4.41150

AIC:9500.432

SIC:9536.203

Wald Test for d=1

60.664

Wald Test for testing alpha +beta=1

+INF

2.3) FIGARCH-NIG (b=0)

Maximum log-likelihood: -4736.991

Parameters	MU	MA	D2	OMEGA	BETA	PHI	BARA
Estimates	0.0426	0.1731	0.3695	0.0840	0.5251	0.4249	0.8427
Std.err.	0.0186	0.0209	0.0754	0.0251	0.0369	0.0369	0.0990
T-stat	2.2929	8.8220	4.9016	3.3431	14.2278	11.5142	8.5100

Skewness of standardized residuals, m3: -0.239

Kurtosis of standardized residuals, m4: 6.786

Ljung-Box test of standardized residuals, Q(10): 130.81788

Ljung-Box test of squared stand. residuals,Q2(10): 3.19772

Ljung-Box test of absolute stand. residuals,Q3(10): 4.36205

AIC:9485.982

SIC:9521.752

Wald Test for d=1 vs d<1

69.959

Wald Test for alpha +beta=1

+INF

2.4) FIGARCH-NIG (b ≠ 0)

Maximum log-likelihood: -4735.777

Parameters	MU	MA	D2	OMEGA	BETA	PHI	BARA	BARB
Estimates	0.0751	0.1728	0.3662	0.0842	0.5225	0.4275	0.8648	-0.0408
Std.err.	0.0268	0.0209	0.0748	0.0250	0.0365	0.0365	0.1020	0.0251
T-stat	2.8050	8.8220	4.8968	3.3608	14.3236	11.7191	8.4756	-1.6247

Skewness of standarized residuals, m3: -0.152

Kurtosis of standardized residuals, m4: 6.504

Ljung-Box test of standardized residuals, Q(10): 129.12596

Ljung-Box test of squared stand. residuals,Q2(10): 3.44530

Ljung-Box test of absolute stand. residuals,Q3(10): 4.64192

AIC:9485.554

SIC:9527.287

Wald Test for d=1 vs d<1   (71.858)

Wald Test for alpha +beta=1   (+INF)

3) ผลการประมาณค่าจากแบบจำลอง FIGARCH ของอัตราผลตอบแทนดัชนี ราคาหลักทรัพย์ในตลาดหลักทรัพย์ฟิลิปปินส์

3.1) FIGARCH-normal

Maximum log-likelihood: -4898.154

Parameters	MU	MA	D2	OMEGA	BETA	PHI
Estimates	0.0221	0.1716	0.2724	0.2476	0.2174	0.0406
Std.err.	0.0295	0.0206	0.0166	0.0521	0.1246	0.1174
T-stat	0.7477	8.3122	16.3878	4.7496	1.7452	0.3460

Skewness of standarized residuals, m3: 1.145

Kurtosis of standardized residuals, m4: 23.455

Ljung-Box test of standardized residuals, Q(10): 16.72289

Ljung-Box test of squared stand. residuals,Q2(10): 0.58238

Ljung-Box test of absolute stand. residuals,Q3(10): 11.91538

AIC:9808.308

SIC:9844.078

Wald Test　(1915.442)

Wald Test for alpha +beta=1　(9.454)

3.2) FIGARCH-student's t

Maximum log-likelihood:　-4714.427

Parameters	MU	MA	D2	OMEGA	BETA	PHI	NU
Estimates	-0.0182	0.1688	0.4979	0.1560	0.4782	0.1788	4.2561
Std.err.	0.0202	0.0206	0.0951	0.0527	0.1382	0.1014	0.3197
T-stat	-0.9023	8.3122	5.2382	2.9620	3.4605	1.7632	13.3119

Skewness of standarized residuals, m3:　1.617

Kurtosis of standardized residuals, m4:　32.624

Ljung-Box test of standardized residuals, Q(10): 105.79331

Ljung-Box test of squared stand. residuals,Q2(10): 0.77435

Ljung-Box test of absolute stand. residuals,Q3(10): 11.60971

AIC:9440.854

SIC:9476.625

Wald Test for d=1　(27.892)

Wald Test for testing alpha +beta=1　(2.338)

3.3) FIGARCH-NIG (b=0)

Maximum log-likelihood:　-4714.980

Parameters	MU	MA	D2	OMEGA	BETA	PHI	BARA
Estimates	-0.0200	0.1688	0.4691	0.1122	0.4409	0.1593	1.1046
Std.err.	0.0199	0.0206	0.0834	0.0422	0.1445	0.1089	0.1510

Skewness of standarized residuals, m3: 1.691

Kurtosis of standardized residuals, m4: 34.225

Ljung-Box test of standardized residuals, Q(10): 105.87809

Ljung-Box test of squared stand. residuals,Q2(10): 0.77233

Ljung-Box test of absolute stand. residuals,Q3(10): 12.38684

AIC:9441.960

SIC:9477.731

Wald Test for d=1 vs d<1 (40.499)

Wald Test for alpha +beta=1 (2.716)

3.4) FIGARCH-NIG (b ≠ 0)

Maximum log-likelihood: -4714.970

Parameters	MU	D2	OMEGA	BETA	PHI	BARA	BARB
Estimates	-0.0162	0.4701	0.1121	0.4418	0.1591	1.1062	-0.0048
Std.err.	0.0304	0.0836	0.0422	0.1441	0.1084	0.1537	0.0293
T-stat	-0.5318	5.6258	2.6572	3.0660	1.4676	7.1949	-0.1625

Skewness of standarized residuals, m3: 1.698

Kurtosis of standardized residuals, m4: 34.258

Ljung-Box test of standardized residuals, Q(10): 105.91416

Ljung-Box test of squared stand. residuals,Q2(10): 0.77426

Ljung-Box test of absolute stand. residuals,Q3(10): 12.45029

AIC:9443.940

SIC:9485.672

Wald Test for d=1 vs d<1 (40.212)

Wald Test for alpha +beta=1 (2.729)

**4) ผลการประมาณค่าจากแบบจำลอง FIGARCH ของอัตราผลตอบแทนดัชนี
ราคาหลักทรัพย์ในตลาดหลักทรัพย์มาเลเซีย**

4.1) FIGARCH-normal

Maximum log-likelihood: -4943.933

Parameters	MU	MA	D2	OMEGA	BETA	PHI
Estimates	0.0468	0.1829	0.4339	0.0508	0.3381	0.0783
Std.err.	0.0199	0.0204	0.0276	0.0113	0.0723	0.0654
T-stat	2.3519	8.9607	15.7426	4.4973	4.6751	1.1970

Skewness of standarized residuals, m3: -0.016

Kurtosis of standardized residuals, m4: 5.463

Ljung-Box test of standardized residuals, Q(10): 17.80251

Ljung-Box test of squared stand. residuals,Q2(10): 4.60237

Ljung-Box test of absolute stand. residuals,Q3(10): 6.54574

AIC:9899.866

SIC:9936.302

Wald Test (421.842)

Wald Test for alpha +beta=1 (18.968)

4.2) FIGARCH-student's t

Maximum log-likelihood: -4878.915

Parameters	MU	MA	D2	OMEGA	BETA	PHI	NU
Estimates	0.0267	0.1834	0.4193	0.0619	0.3761	0.1786	5.2462
Std.err.	0.0159	0.0204	0.0624	0.0266	0.1735	0.1481	0.4618
T-stat	1.6865	8.9607	6.7182	2.3237	2.1680	1.2062	11.3594

Skewness of standarized residuals, m3: 0.015

Kurtosis of standardized residuals, m4: 5.533

Ljung-Box test of standardized residuals, Q(10): 122.04229

Ljung-Box test of squared stand. residuals,Q2(10): 5.31860

Ljung-Box test of absolute stand. residuals,Q3(10): 7.80892

AIC:9769.829

SIC:9806.266

Wald Test for d=1 (86.541)

Wald Test for testing alpha +beta=1 (1.987)

4.3) FIGARCH-NIG (b=0)

Maximum log-likelihood: -4880.179

Parameters	MU	MA	D2	OMEGA	BETA	PHI	BARA
Estimates	0.0255	0.1837	0.4140	0.0515	0.3811	0.1860	1.4329
Std.err.	0.0157	0.0204	0.0602	0.0233	0.1706	0.1481	0.1868
T-stat	1.6239	8.9607	6.8734	2.2098	2.2333	1.2561	7.6728

Skewness of standarized residuals, m3: 0.016

Kurtosis of standardized residuals, m4: 5.514

Ljung-Box test of standardized residuals, Q(10): 122.02196

Ljung-Box test of squared stand. residuals,Q2(10): 5.35517

Ljung-Box test of absolute stand. residuals,Q3(10): 7.77477

AIC:9772.358

SIC:9808.794

Wald Test for d=1 vs d<1 (94.617)

Wald Test for alpha +beta=1 (1.912)

4.4) FIGARCH-NIG (b ≠ 0)

Maximum log-likelihood: -4879.609

Parameters	MU	MA	D2	OMEGA	BETA	PHI	BARA	BARB
Estimates	0.0493	0.1829	0.4161	0.0508	0.3862	0.1888	1.4566	-0.0399
Std.err.	0.0254	0.0204	0.0607	0.0230	0.1685	0.1456	0.1902	0.0349
T-stat	1.9425	8.9607	6.8601	2.2150	2.2921	1.2964	7.6569	-1.1450

Skewness of standarized residuals, m3:   0.080

Kurtosis of standardized residuals, m4: 5.512

Ljung-Box test of standardized residuals, Q(10): 121.65566

Ljung-Box test of squared stand. residuals,Q2(10): 5.70111

Ljung-Box test of absolute stand. residuals,Q3(10): 8.17532

AIC:9773.217

SIC:9815.727

Wald Test for d=1 vs d<1 (92.681)

Wald Test for alpha +beta=1 (1.899)

5) ผลการประมาณค่าจากแบบจำลอง FIGARCH ของอัตราผลตอบแทนดัชนี ราคาหลักทรัพย์ในตลาดหลักทรัพย์สิงคโปร์

5.1) FIGARCH-normal

Maximum log-likelihood: -2391.981

Parameters	MU	MA	D2	OMEGA	BETA	PHI
Estimates	0.0338	0.0260	0.4417	0.0284	0.5672	0.1748
Std.err.	0.0258	0.0259	0.0591	0.0122	0.0576	0.0505
T-stat	1.3078	1.0069	7.4784	2.3339	9.8516	3.4627

Skewness of standarized residuals, m3:   -0.349

Kurtosis of standardized residuals, m4: 4.991

Ljung-Box test of standardized residuals, Q(10): 13.15023

Ljung-Box test of squared stand. residuals,Q2(10): 8.10762

Ljung-Box test of absolute stand. residuals,Q3(10): 17.46307

AIC:4795.963

SIC:4828.165

Wald Test (89.333)

Wald Test for alpha +beta=1 (7.843)

5.2) FIGARCH-student's t

Maximum log-likelihood: -2359.333

Parameters	MU	MA	D2	OMEGA	BETA	PHI	NU
Estimates	0.0360	0.0252	0.3409	0.0524	0.3766	0.0806	7.4842
Std.err.	0.0236	0.0259	0.0703	0.0332	0.1449	0.1158	1.1806
T-stat	1.5258	1.0069	4.8500	1.5795	2.5993	0.6957	6.3392

Skewness of standarized residuals, m3:   -0.363

Kurtosis of standardized residuals, m4:   5.117

Ljung-Box test of standardized residuals, Q(10): 14.81411

Ljung-Box test of squared stand. residuals,Q2(10): 7.33161

Ljung-Box test of absolute stand. residuals,Q3(10): 17.36031

AIC:4730.666

SIC:4762.868

Wald Test for d=1 (87.936)

Wald Test for testing alpha +beta=1 (4.650)

5.3) FIGARCH-NIG (b=0)

Maximum log-likelihood: -2360.123

Parameters	MU	MA	D2	OMEGA	BETA	PHI	BARA
Estimates	0.0353	0.0252	0.3455	0.0491	0.3912	0.0887	2.3148
Std.err.	0.0236	0.0259	0.0712	0.0318	0.1399	0.1115	0.4735
T-stat	1.4997	1.0069	4.8526	1.5426	2.7964	0.7953	4.8886

Skewness of standardized residuals, m3: -0.362

Kurtosis of standardized residuals, m4: 5.104

Ljung-Box test of standardized residuals, Q(10): 14.79892

Ljung-Box test of squared stand. residuals,Q2(10): 7.38135

AIC:4732.246

SIC:4764.449

Wald Test for d=1 vs d<1 (84.507)

Wald Test for alpha +beta=1 (4.620)

5.4) FIGARCH-NIG (b $\neq$ 0)

Maximum log-likelihood: -2356.432

Parameters	MU	D2	OMEGA	BETA	PHI	BARA	BARB
Estimates	0.1604	0.3384	0.0397	0.3706	0.0730	2.5625	-0.2419
Std.err.	0.0527	0.0683	0.0312	0.1408	0.1148	0.5437	0.0995
T-stat	3.0450	4.9569	1.2692	2.6327	0.6362	4.7130	-2.4300

Skewness of standardized residuals, m3: -0.177

Kurtosis of standardized residuals, m4: 4.218

Ljung-Box test of standardized residuals, Q(10): 14.54082

Ljung-Box test of squared stand. residuals,Q2(10): 8.25259

AIC:4726.864

SIC:4764.434

Wald Test for d=1 vs d<1   (93.905)

Wald Test for alpha +beta=1 (5.077)

ผลการพยากรณ์มูลค่าความเสี่ยงของค่าควอไทล์
คำนวณจากโปรแกรม GAUSS 6.0

1) ผลการพยากรณ์มูลค่าความเสี่ยงของค่าควอนไทล์ จากแบบจำลอง FIGARCH
ของอัตราผลตอบแทนดัชนีราคาหลักทรัพย์ในตลาดหลักทรัพย์ไทย

1.1) FIGARCH-normal	**1.2) FIGARCH-student's t**
Forecast Period is: 01/2/2005, 2009	Forecast Period is: 01/2/2005, 2009
Empirical VaRs	Empirical VaRs
Quantile Predictions	Quantile Predictions
0.01000 0.05000 0.10000 0.90000 0.95000 0.99000	0.01000 0.05000 0.10000 0.90000 0.95000 0.99000
0.06264 0.22983 0.30238 0.70887 0.80032 0.91050	0.03968 0.11711 0.21398 0.77994 0.85926 0.96669
0.06116 0.18635 0.25226 0.63596 0.69699 0.88579	0.00343 0.18196 0.26753 0.87440 0.92378 0.97945

1.2) FIGARCH-NIG (b=0)	**1.5) FIGARCH-NIG (b $\neq$ 0)**
Forecast Period is: 01/2/2005, 2009	Forecast Period is: 01/2/2000, 2002
Empirical VaRs	Empirical VaRs
Quantile Predictions	Quantile Predictions
0.01000 0.05000 0.10000 0.90000 0.95000 0.99000	0.01000 0.05000 0.10000 0.90000 0.95000 0.99000
0.00939 0.04693 0.09387 0.90613 0.95307 0.99061	0.00939 0.04693 0.09387 0.90613 0.95307 0.99061
0.00952 0.04760 0.09519 0.90481 0.95240 0.99048	0.00952 0.04760 0.09519 0.90481 0.95240 0.99048

2) ผลการพยากรณ์มูลค่าความเสี่ยงของค่าควอนไทล์ จากแบบจำลอง FIGARCH

ของอัตราผลตอบแทนดัชนีราคาหลักทรัพย์ในตลาดหลักทรัพย์อินโดนีเซีย

2.1) FIGARCH-normal	**2.2) FIGARCH-student's t**
Forecast Period is: 01/2/2005, 2009	Forecast Period is: 01/2/2000, 2002
Empirical VaRs	Empirical VaRs
Quantile Predictions	Quantile Predictions
0.01000 0.05000 0.10000 0.90000 0.95000 0.99000	0.01000 0.05000 0.10000 0.90000 0.95000 0.99000
0.00000 0.02554 0.07634 0.94159 0.99385 1.00000	0.00115 0.01278 0.04816 0.93816 0.97187 0.99823
0.373788 0.22287 0.73774 0.82060 0.97751	0.1895 207 0.21016 0.81497 0.90404 0.98750

2.3) FIGARCH-NIG (b=0)	**2.4) FIGARCH-NIG (b $\neq$ 0)**
Forecast Period is: 01/2/2005, 2009	Forecast Period is: 01/2/2005, 2009
Empirical VaRs	Empirical VaRs
Quantile Predictions	Quantile Predictions
0.01000 0.05000 0.10000 0.90000 0.95000 0.99000	0.01000 0.05000 0.10000 0.90000 0.95000 0.99000
0.00930 0.04650 0.09301 0.90699 0.95350 0.99070	0.00930 0.04650 0.09301 0.90699 0.95350 0.99070
0.00885 0.04423 0.08846 0.91154 0.95577 0.99115	0.00885 0.04423 0.08846 0.91154 0.95577 0.99115

3) ผลการพยากรณ์มูลค่าความเสี่ยงของค่าควอนไทล์ จากแบบจำลอง FIGARCH

ของอัตราผลตอบแทนดัชนีราคาหลักทรัพย์ในตลาดหลักทรัพย์ฟิลิปปินส์

3.1) FIGARCH-normal	**3.2) FIGARCH-student's t**
Forecast Period is: 01/2/2005, 2009 Empirical VaRs Quantile Predictions 0.01000 0.05000 0.10000 0.90000 0.95000 0.99000 0.00002 0.01407 0.06409 0.94300 0.99433 0.99999 0.00000 0.00910 0.05011 0.97210 0.99786 1.00000	Forecast Period is: 01/2/2005, 2009 Empirical VaRs Quantile Predictions 0.01000 0.05000 0.10000 0.90000 0.95000 0.99000 0.01157 0.06227 0.14967 0.85172 0.91981 0.98243 0.02145 0.08921 0.16905 0.79946 0.86422 0.98165

3.3) FIGARCH-NIG (b=0)	**3.4) FIGARCH-NIG (b ≠ 0)**
Forecast Period is: 01/2/2005, 2009 Empirical VaRs Quantile Predictions 0.01000 0.05000 0.10000 0.90000 0.95000 0.99000 0.00942 0.04708 0.09416 0.90584 0.95292 0.99058 0.00938 0.04688 0.09375 0.90625 0.95312 0.99062	Forecast Period is: 01/2/2005, 2009 Empirical VaRs Quantile Predictions 0.01000 0.05000 0.10000 0.90000 0.95000 0.99000 0.00942 0.04708 0.09416 0.90584 0.95292 0.99058 0.00938 0.04688 0.09375 0.90625 0.95312 0.99062

4) ผลการพยากรณ์มูลค่าความเสี่ยงของค่าควอนไทล์ จากแบบจำลอง FIGARCH ของอัตราผลตอบแทนดัชนีราคาหลักทรัพย์ในตลาดหลักทรัพย์มาเลเซีย

4.1) FIGARCH-normal	**4.2) FIGARCH-student's t**
Forecast Period is: 01/2/2006, 2009	Forecast Period is: 01/2/2006, 2009
Empirical VaRs	Empirical VaRs
Quantile Predictions	Quantile Predictions
0.01000 0.05000 0.10000 0.90000 0.95000 0.99000	0.01000 0.05000 0.10000 0.90000 0.95000 0.99000
0.00686 0.07413 0.18190 0.85578 0.93763 0.99960	0.00662 0.07871 0.15175 0.81944 0.90889 0.97684
0.00139 0.06840 0.15386 0.87877 0.96380 0.99990	0.00247 0.07193 0.16884 0.80886 0.86978 0.97023

4.3) FIGARCH-NIG (b=0)	**4.4) FIGARCH-NIG (b $\neq$ 0)**
Forecast Period is: 01/2/2006, 2009	Forecast Period is: 01/2/2006, 2009
Empirical VaRs	Empirical VaRs
Quantile Predictions	Quantile Predictions
0.01000 0.05000 0.10000 0.90000 0.95000 0.99000	0.01000 0.05000 0.10000 0.90000 0.95000 0.99000
0.01000 0.05000 0.10000 0.90000 0.95000 0.99000	0.01000 0.05000 0.10000 0.90000 0.95000 0.99000
0.01000 0.05000 0.10000 0.90000 0.95000 0.99000	0.01000 0.05000 0.10000 0.90000 0.95000 0.99000

5) ผลการพยากรณ์มูลค่าความเสี่ยงของค่าควอนไทล์ จากแบบจำลอง FIGARCH

ของอัตราผลตอบแทนดัชนีราคาหลักทรัพย์ในตลาดหลักทรัพย์สิงคโปร์

5.1) FIGARCH-normal	**5.2) FIGARCH-student's t**
Forecast Period is: 01/2/2006, 2009	Forecast Period is: 01/2/2006, 2009
Empirical VaRs	Empirical VaRs
Quantile Predictions	Quantile Predictions
0.01000 0.05000 0.10000 0.90000 0.95000 0.99000	0.01000 0.05000 0.10000 0.90000 0.95000
0.00000 0.00830 0.04929 0.97500 0.99924 1.00000	0.99000
0.00413 0.06176 0.15677 0.89412 0.97864 0.99908	0.00001 0.00016 0.00264 0.99351 0.99907
	0.99999
	0.00000 0.00049 0.00627 0.97544 0.99681
	0.99980

5.3) FIGARCH-NIG (b=0)	**5.4) FIGARCH-NIG (b ≠ 0)**
Forecast Period is: 01/2/2006, 2009	Forecast Period is: 01/2/2006, 2009
Empirical VaRs	Empirical VaRs
Quantile Predictions	Quantile Predictions
0.01000 0.05000 0.10000 0.90000 0.95000 0.99000	0.01000 0.05000 0.10000 0.90000 0.95000 0.99000
0.01000 0.05000 0.10000 0.90000 0.95000 0.99000	0.01000 0.05000 0.10000 0.90000 0.95000 0.99000
0.01000 0.05000 0.10000 0.90000 0.95000 0.99000	0.01000 0.05000 0.10000 0.90000 0.95000 0.99000

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