

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

This chapter explores all the analysis of the research study, the implicated result of this research from the managerial perspective, and gives the implications of this study and the development for further research. The purpose of this research is to investigate forecasting stock price index using by Bayesian Combinations applies in Indonesia Stock Exchange (IDX) from July 1st, 1997 until February 29th, 2012.

A. Conclusions

The purpose of this research wants to forecast stock price index in IDX index, which we use Bayesian combinations to predict future of stock price. The helped approach to mitigate concerns about JKSE data that taken into account model

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stock price index are generally statistically indistinguishable from the forecasts obtained from a direct autoregression. Furthermore, the provided maps in the BMA are determined forecast. BMA is designed to produce probabilistic forecasts. Forecasts can be conjoined that using linear regression to make generally combination approach with several predictive densities. In this fashion, we also make some improvements with GARCH models in BMA to allow for focus variables on theoretical and other grounds. The estimated GARCH models from Bayesian viewpoint is moderately current and can be reflected very hopeful due to advantage of Bayesian approach compared to classical technique. Consequently, the specific Bayesian framework makes possible sample results, robust estimation, and probabilistic statements on nonlinear functions of models parameters and model discrimination.

This research estimates that BMA additionally presents developments to forecast when we calculate GARCH effects. It also shows the existed methods for the Bayesian estimation of GARCH models. In this manner, the estimation process is a primary importance for automated trading systems for case in point, where models are approximated frequency and for numerous dataset. We have exemplified six estimated GARCH models that can be implied and combined in order to forecast the next-day ahead log-returns distribution. Indeed, the significant coefficients of GARCH models do necessarily imply the capability of GARCH specifications in modeling volatility. The result indicates the capability of GARCH models to pick up unevenness and let down narrowing feature in residual distribution in addition to the squared return autocorrelation in JKSE data. These analyzed models give us more information about specific of transaction in stock price had increased. Thus, GARCH models can summarize the non-normality feature of return to some extent, the surplus skewness and kurtosis statistics are statically available.

From the result of this research study on forecasting stock price index using by Bayesian Combination applies in IDX, the conclusion that can be pointed out is following:

1. Data of Jakarta Composite Index (JCI) in the period July 1st, 1997 through February 29th, 2012 is data time series, but they are not stationary. The result of stationary shows the different ways of analyzing on JKSE and $D\log(JKSE)$, $D\log(JKSE)$ is more effective for the Bayesian estimation of GARCH models. It has significant which we can use to considerate in determination of forecasting models. Thus, the processed stationary in both mean and variance is good transformation, which carried out difference and log transformation in GARCH models to achieve future forecasting JKSE data.
2. This research uses diagnostic test to find and select the best model from the Bayesian estimation of GARCH models. It has inferred in

autocorrelogram test, homoskedasticity test, normality test and ARCH LM-test. As the result, we can get GARCH(2,1) as the best model in this test. It can be fulfilled and more efficient in this research.

3. The result of this research from GARCH(2,1), we can get 1.914% in forecasting JKSE data. It means that this forecasting has little error in this data. Moreover, we can take more detail from RMSE, MAE and MAPE which has employed various error statistics to forecast the Bayesian estimation of GARCH(2,1) model.

As the result above, we can conclude that the paradigmatic Bayesian estimation of GARCH models performs importance sampling with an adaptive mixture of Student- t distribution as the significant distribution. Therefore, this research is not high assurance in investment performance.

B. Managerial Implications

From the results in this research, investor can take some points in decision-making when they have to deal with stock investment, especially related to forecasting stock price index.

1. Investors who invest their money in stock price index can use GARCH models in forecasting in IDX index for short term especially for own understanding stock.
2. Investors need more time in observation for historical information of IDX index because its data can be effective in forecasting future value of stock shares. Because of global financial crisis, it could be affect criteria stock price index. As experience in 1998 and 2008, IDX index were more volatile which means higher risk, although Indonesia's economic fundamentals were considered more powerful.

3. Investors can find how to forecast their patient IDX index value for this research, as undervalued stocks often remain undervalued for significant periods of time.
4. As the result our research, investors can compare stock prices in IDX index to other factors to assess value. To get a sense of whether a stock is over- or undervalued, investors compare its price to revenue, earnings, cash flow, and other fundamental criteria. Comparing a company's performance expectations to those of its industry is also common – firms operating in slow-growth industries are judged differently than those whose sectors are more robust.
5. As the result our research, investors can make decisions on fundamental analysis of the markets, technical analysis of individual companies, personal intuition, or all of the above, the ultimate reason for their success involves making the right trades at the right time. In most cases, those decisions involve extended periods of time and are based on buy-and-hold investment strategies.

C. Limitations and Further Research

In this research study, the GARCH technique is used to analyze correspond stock price index volatility for the Indonesia stock exchange (IDX). The variable is used only one, JKSE. If we use difference data and period, it may be different result. Thus, it cannot recognize. Moreover, we have plan to investigate the performance of the Bayesian model averaging approach when forecasting standard measures such as Vector Autoregressive that used for estimation and forecasting of daily stock return data. It may be useful to average over include specifications with nonlinear terms and fat-tailed innovations in next research. Therefore, we can modify of other variables to be analyzed in the same roof. Another wider research is also possible to be conducted by using this research as a benchmark.

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APPENDICES

Appendix 1: Sequential Monte Carlo (SMC)

As an example of the filtering procedure applied in our analysis, we give in the following the pseudo-code of a simple sequential Monte Carlo procedure adapted to the basic time-varying weights (TVW) model. Let \mathbf{x}_t be the vector of transformed weights and assume, to simplify the exposition, that the parameters are known. Then at time t with $t = 1, 2, \dots, T$, the SMC algorithm performs the following steps:

Given $\{\Xi_j^i\}_{j=1}^M$, with $\Xi_j^i = \{\mathbf{x}_t^{i,j}, \omega_t^{i,j}\}_{i=1}^N$ and for $j = 1, 2, \dots, M$

- Generate $\tilde{\mathbf{y}}_{t+1}^j$ from $p(\tilde{\mathbf{y}}_{t+1}^j | \mathbf{y}_{1:t})$
- For $i = 1, 2, \dots, N$
 - 1) Generate $\mathbf{x}_{t+1}^{i,j}$ from $\mathcal{N}_K(\mathbf{x}_t^{i,j}, \sigma_\eta I_K)$
 - 2) Generate $\mathbf{y}_{t+1}^{i,j}$ from $p(\mathbf{y}_{t+1} | \mathbf{x}_{t+1}^{i,j}, \tilde{\mathbf{y}}_{t+1}^1, \dots, \tilde{\mathbf{y}}_{t+1}^M)$
 - 3) Update the weights

$$\omega_{t+1}^{i,j} \propto \omega_t^{i,j} \exp \left\{ -0.5 \sigma^{-2} \left(\mathbf{y}_{t+1} - \sum_{k=1}^K \omega_{k,t}^{i,j} \mathbf{y}_{k,t}^j \right)^2 \right\}$$

Where $\omega_{k,t}^{i,j} = \exp(x_{k,t}^{i,j}) / \sum_{k=1}^K \exp\{x_{k,t}^{i,j}\}$

- Evaluate the Effective Sample Size (ESS_t^j)
- Normalize the weights $\omega_{k,t}^{i,j} = \bar{\omega}_{k,t}^{i,j} / \sum_{i=1}^N \bar{\omega}_{k,t}^{i,j}$ for $i = 1, 2, \dots, N$
- If $ESS_t^j \leq k$ then resample from Ξ_t^j

We notice that for the application in the present paper we use a regularized version of the SMC algorithm given above. More specifically, we include the unknown parameters of the weighting scheme into the state vector and consider the regularized particle filter proposed in Liu and West (2001).

2: Daily Stock Price Index In JKSE Index data from July 1st, 1997 to February 17th,

Date	JKSE				
7/1/1997	731.62	8/25/1997	540.93	10/17/1997	520.68
7/2/1997	730.16	8/26/1997	554.24	10/20/1997	514.17
7/3/1997	735.49	8/27/1997	555.46	10/21/1997	514.97
7/4/1997	736.60	8/28/1997	530.37	10/22/1997	505.23
7/7/1997	738.01	8/29/1997	493.96	10/23/1997	494.14
7/8/1997	740.83	9/1/1997	485.97	10/24/1997	490.40
7/9/1997	738.14	9/2/1997	479.01	10/27/1997	490.12
7/10/1997	729.15	9/3/1997	512.39	10/28/1997	448.00
7/11/1997	723.42	9/4/1997	533.87	10/29/1997	472.05
7/14/1997	722.50	9/5/1997	594.11	10/30/1997	502.87
7/15/1997	722.21	9/8/1997	600.31	10/31/1997	500.42
7/16/1997	723.50	9/9/1997	598.00	11/3/1997	501.71
7/18/1997	724.00	9/10/1997	575.02	11/4/1997	494.85
7/21/1997	712.40	9/11/1997	556.14	11/5/1997	490.85
7/22/1997	711.44	9/12/1997	546.64	11/6/1997	478.92
7/23/1997	718.19	9/15/1997	550.76	11/7/1997	466.12
7/24/1997	712.05	9/16/1997	534.83	11/10/1997	462.69
7/25/1997	710.06	9/17/1997	526.74	11/11/1997	448.15
7/28/1997	710.82	9/18/1997	524.27	11/12/1997	449.64
7/29/1997	716.35	9/19/1997	531.08	11/13/1997	437.95
7/30/1997	721.98	9/22/1997	535.60	11/14/1997	436.84
7/31/1997	721.27	9/23/1997	539.48	11/17/1997	439.54
8/1/1997	721.77	9/24/1997	553.65	11/18/1997	434.21
8/4/1997	718.71	9/25/1997	559.22	11/19/1997	415.65
8/5/1997	713.88	9/26/1997	549.92	11/20/1997	396.13
8/6/1997	699.86	9/29/1997	546.24	11/21/1997	391.26
8/7/1997	677.84	9/30/1997	546.69	11/24/1997	410.21
8/8/1997	675.44	10/1/1997	536.99	11/25/1997	395.68
8/11/1997	658.17	10/2/1997	536.92	11/26/1997	398.54
8/12/1997	662.95	10/3/1997	515.48	11/27/1997	401.71
8/13/1997	658.60	10/6/1997	512.89	11/28/1997	401.71
8/14/1997	643.01	10/7/1997	513.95	12/2/1997	394.28
8/15/1997	617.71	10/8/1997	518.94	12/3/1997	389.68
8/18/1997	599.64	10/9/1997	521.11	12/4/1997	401.93
8/19/1997	590.53	10/10/1997	534.75	12/5/1997	414.78
8/20/1997	593.17	10/13/1997	534.83	12/8/1997	423.61
8/21/1997	603.06	10/14/1997	528.92	12/9/1997	425.50
8/22/1997	574.40	10/15/1997	518.91	12/10/1997	415.94
		10/16/1997	517.09	12/11/1997	396.11

12/12/1997	365.85
12/15/1997	339.54
12/16/1997	356.39
12/17/1997	368.68
12/18/1997	378.39
12/19/1997	378.80
12/22/1997	385.85
12/23/1997	397.03
12/24/1997	396.53
12/29/1997	398.01
12/30/1997	401.71
1/2/1998	410.01
1/5/1998	410.83
1/6/1998	402.27
1/7/1998	394.24
1/8/1998	347.11
1/9/1998	342.97
1/12/1998	350.24
1/13/1998	382.14
1/14/1998	403.98
1/15/1998	387.24
1/16/1998	413.92
1/19/1998	439.03
1/20/1998	448.04
1/21/1998	466.00
1/22/1998	443.53
1/23/1998	450.98
1/26/1998	473.69
1/27/1998	476.31
1/28/1998	485.94
2/2/1998	554.11
2/3/1998	536.79
2/4/1998	519.93
2/5/1998	513.49
2/6/1998	535.43
2/9/1998	529.26
2/10/1998	517.70
2/11/1998	487.61

2/12/1998	442.29
2/13/1998	448.16
2/16/1998	457.71
2/17/1998	472.21
2/18/1998	472.68
2/19/1998	496.25
2/20/1998	495.23
2/23/1998	505.04
2/24/1998	494.89
2/25/1998	483.41
2/26/1998	483.81
2/27/1998	482.38
3/2/1998	496.73
3/3/1998	518.69
3/4/1998	502.91
3/5/1998	516.49
3/6/1998	512.23
3/9/1998	495.81
3/10/1998	490.48
3/11/1998	491.87
3/12/1998	498.18
3/13/1998	506.73
3/16/1998	510.79
3/17/1998	512.14
3/18/1998	504.00
3/19/1998	504.15
3/20/1998	516.73
3/23/1998	516.32
3/24/1998	501.66
3/25/1998	504.10
3/26/1998	532.81
3/27/1998	542.10
3/30/1998	541.42
4/1/1998	523.95
4/2/1998	516.40
4/3/1998	533.30
4/6/1998	526.14
4/8/1998	530.04

4/9/1998	527.59
4/13/1998	524.06
4/14/1998	516.10
4/15/1998	513.45
4/16/1998	510.07
4/17/1998	507.90
4/20/1998	508.16
4/21/1998	497.71
4/22/1998	500.64
4/23/1998	491.86
4/24/1998	490.48
4/27/1998	485.64
4/28/1998	485.64
4/29/1998	465.25
4/30/1998	460.14
5/1/1998	448.52
5/4/1998	445.99
5/5/1998	435.16
5/6/1998	414.62
5/7/1998	436.78
5/8/1998	434.65
5/12/1998	430.53
5/13/1998	402.06
5/14/1998	403.70
5/15/1998	405.94
5/18/1998	388.92
5/19/1998	413.82
5/20/1998	424.01
5/22/1998	445.14
5/25/1998	439.55
5/26/1998	434.06
5/27/1998	416.97
5/28/1998	414.22
5/29/1998	420.46
6/1/1998	414.08
6/2/1998	399.60
6/3/1998	392.61
6/4/1998	406.33

6/5/1998	409.52
6/8/1998	409.42
6/9/1998	411.07
6/10/1998	408.08
6/11/1998	411.54
6/12/1998	408.37
6/15/1998	406.50
6/16/1998	399.51
6/17/1998	419.44
6/18/1998	440.09
6/19/1998	425.45
6/22/1998	420.66
6/23/1998	423.08
6/24/1998	430.96
6/25/1998	428.81
6/26/1998	430.87
6/29/1998	431.23
6/30/1998	445.92
7/1/1998	456.54
7/2/1998	466.37
7/3/1998	470.55
7/7/1998	483.95
7/8/1998	472.98
7/9/1998	470.32
7/10/1998	463.58
7/13/1998	459.67
7/14/1998	463.87
7/15/1998	467.34
7/16/1998	473.77
7/17/1998	486.23
7/20/1998	486.23
7/21/1998	488.24
7/22/1998	483.05
7/23/1998	473.80
7/24/1998	479.56
7/27/1998	482.98
7/28/1998	483.53
7/29/1998	485.10

7/30/1998	482.69
7/31/1998	481.72
8/3/1998	475.26
8/4/1998	461.35
8/5/1998	441.78
8/6/1998	433.83
8/7/1998	423.61
8/10/1998	421.17
8/11/1998	407.06
8/12/1998	408.64
8/13/1998	402.94
8/14/1998	414.63
8/17/1998	414.63
8/18/1998	403.86
8/19/1998	405.89
8/20/1998	399.33
8/21/1998	388.35
8/24/1998	370.55
8/25/1998	367.14
8/26/1998	360.93
8/27/1998	354.95
8/28/1998	339.02
8/31/1998	342.44
9/1/1998	325.85
9/2/1998	329.62
9/3/1998	334.79
9/4/1998	325.56
9/7/1998	335.81
9/8/1998	330.41
9/9/1998	325.76
9/10/1998	327.27
9/11/1998	324.04
9/14/1998	320.60
9/15/1998	292.15
9/16/1998	290.92
9/17/1998	285.48
9/18/1998	271.67
9/21/1998	256.83

9/22/1998	260.88
9/23/1998	262.25
9/24/1998	282.16
9/25/1998	275.22
9/28/1998	275.00
9/29/1998	274.01
9/30/1998	276.15
10/1/1998	273.87
10/2/1998	263.23
10/5/1998	261.31
10/6/1998	258.11
10/7/1998	266.17
10/8/1998	288.55
10/9/1998	304.84
10/12/1998	307.42
10/13/1998	313.99
10/14/1998	303.19
10/15/1998	304.85
10/16/1998	337.59
10/19/1998	336.42
10/20/1998	336.58
10/21/1998	322.32
10/22/1998	316.80
10/23/1998	313.42
10/26/1998	315.31
10/27/1998	318.10
10/28/1998	312.29
10/29/1998	309.41
10/30/1998	300.77
11/2/1998	307.20
11/3/1998	317.18
11/4/1998	330.46
11/5/1998	355.53
11/6/1998	353.98
11/9/1998	364.39
11/10/1998	357.30
11/11/1998	363.01
11/12/1998	357.98

11/13/1998	355.54
11/16/1998	356.23
11/18/1998	369.99
11/19/1998	379.12
11/20/1998	403.65
11/23/1998	424.99
11/24/1998	420.08
11/25/1998	387.38
11/26/1998	394.68
11/27/1998	392.32
11/30/1998	386.27
12/1/1998	387.73
12/2/1998	396.96
12/3/1998	393.80
12/4/1998	390.39
12/7/1998	399.46
12/8/1998	398.90
12/9/1998	398.78
12/10/1998	403.67
12/11/1998	405.60
12/14/1998	404.70
12/15/1998	400.77
12/16/1998	412.69
12/17/1998	405.58
12/18/1998	403.96
12/21/1998	404.50
12/22/1998	406.46
12/23/1998	400.52
12/24/1998	401.86
12/28/1998	400.18
12/29/1998	396.73
12/30/1998	398.04
1/4/1999	394.46
1/5/1999	408.70
1/6/1999	427.08
1/7/1999	457.94
1/8/1999	439.49
1/11/1999	437.30

1/12/1999	436.19
1/13/1999	419.10
1/14/1999	408.55
1/15/1999	402.40
1/25/1999	382.48
1/26/1999	398.15
1/27/1999	410.25
1/28/1999	407.27
1/29/1999	411.93
2/1/1999	409.11
2/2/1999	405.16
2/3/1999	410.56
2/4/1999	409.02
2/5/1999	405.55
2/8/1999	399.69
2/9/1999	402.83
2/10/1999	398.68
2/11/1999	402.65
2/12/1999	400.55
2/15/1999	396.92
2/16/1999	398.85
2/17/1999	397.98
2/18/1999	403.41
2/19/1999	404.02
2/22/1999	398.67
2/23/1999	397.93
2/24/1999	402.00
2/25/1999	397.80
2/26/1999	396.09
3/1/1999	396.33
3/2/1999	394.97
3/3/1999	395.81
3/4/1999	394.15
3/5/1999	388.68
3/8/1999	384.57
3/9/1999	379.42
3/10/1999	373.80
3/11/1999	378.64

3/12/1999	375.94
3/15/1999	372.32
3/16/1999	379.45
3/17/1999	387.88
3/19/1999	394.22
3/22/1999	392.28
3/23/1999	394.81
3/24/1999	391.35
3/25/1999	395.83
3/26/1999	392.95
3/29/1999	392.86
3/30/1999	393.62
4/1/1999	394.43
4/5/1999	395.34
4/6/1999	395.51
4/7/1999	395.91
4/8/1999	400.00
4/9/1999	421.21
4/12/1999	421.15
4/13/1999	432.52
4/14/1999	435.56
4/15/1999	447.48
4/16/1999	479.53
4/19/1999	508.15
4/20/1999	485.97
4/21/1999	480.62
4/22/1999	479.24
4/23/1999	473.59
4/26/1999	470.41
4/27/1999	469.20
4/28/1999	481.34
4/29/1999	490.99
4/30/1999	495.22
5/3/1999	523.36
5/4/1999	548.24
5/5/1999	563.84
5/6/1999	580.91
5/7/1999	575.12

5/10/1999	574.35
5/11/1999	573.23
5/12/1999	576.50
5/14/1999	591.63
5/17/1999	590.80
5/18/1999	577.89
5/19/1999	593.60
5/20/1999	594.05
5/21/1999	591.66
5/24/1999	613.64
5/25/1999	619.88
5/26/1999	605.79
5/27/1999	603.12
5/28/1999	583.65
5/31/1999	585.24
6/1/1999	583.26
6/2/1999	574.32
6/3/1999	587.57
6/4/1999	612.38
6/7/1999	612.38
6/8/1999	686.95
6/9/1999	678.97
6/10/1999	664.57
6/11/1999	668.28
6/14/1999	679.45
6/15/1999	670.16
6/16/1999	661.85
6/17/1999	681.04
6/18/1999	707.88
6/21/1999	716.46
6/22/1999	710.68
6/23/1999	700.67
6/24/1999	682.12
6/25/1999	673.16
6/28/1999	672.13
6/29/1999	680.56
6/30/1999	662.03
7/1/1999	673.04

7/2/1999	670.54
7/5/1999	665.14
7/6/1999	681.59
7/7/1999	665.77
7/8/1999	660.25
7/9/1999	656.64
7/12/1999	663.12
7/13/1999	656.19
7/14/1999	664.88
7/15/1999	660.54
7/16/1999	662.37
7/19/1999	658.27
7/20/1999	649.86
7/21/1999	641.11
7/22/1999	642.66
7/23/1999	625.83
7/26/1999	592.72
7/27/1999	573.22
7/28/1999	599.26
7/29/1999	616.43
7/30/1999	597.87
8/2/1999	596.51
8/3/1999	618.99
8/4/1999	614.40
8/5/1999	606.27
8/6/1999	607.84
8/9/1999	594.11
8/10/1999	576.34
8/11/1999	554.26
8/12/1999	565.22
8/13/1999	557.71
8/16/1999	560.48
8/18/1999	561.36
8/19/1999	581.75
8/20/1999	576.17
8/23/1999	584.80
8/24/1999	586.24
8/25/1999	585.26

8/26/1999	581.51
8/27/1999	572.67
8/30/1999	566.67
8/31/1999	567.03
9/1/1999	571.78
9/2/1999	571.11
9/3/1999	565.20
9/6/1999	540.43
9/7/1999	545.35
9/8/1999	520.62
9/9/1999	538.02
9/10/1999	562.78
9/13/1999	569.65
9/14/1999	562.06
9/15/1999	548.61
9/16/1999	548.76
9/17/1999	547.02
9/20/1999	543.33
9/21/1999	547.26
9/22/1999	545.45
9/23/1999	528.17
9/24/1999	517.54
9/27/1999	515.07
9/28/1999	529.22
9/29/1999	526.47
9/30/1999	547.94
10/1/1999	566.04
10/4/1999	555.30
10/5/1999	566.25
10/6/1999	588.75
10/7/1999	585.34
10/8/1999	588.24
10/11/1999	584.06
10/12/1999	571.38
10/13/1999	571.95
10/14/1999	567.78
10/15/1999	567.92
10/18/1999	553.21

10/19/1999	583.65
10/20/1999	584.42
10/21/1999	616.49
10/22/1999	604.18
10/25/1999	597.07
10/26/1999	594.25
10/27/1999	576.52
10/28/1999	577.93
10/29/1999	593.87
11/1/1999	595.08
11/2/1999	594.41
11/3/1999	603.59
11/4/1999	618.51
11/5/1999	626.04
11/8/1999	628.31
11/9/1999	638.82
11/10/1999	638.91
11/11/1999	638.49
11/12/1999	635.23
11/15/1999	635.80
11/16/1999	641.73
11/17/1999	641.47
11/18/1999	636.62
11/19/1999	633.31
11/22/1999	630.17
11/23/1999	618.45
11/24/1999	599.72
11/25/1999	588.66
11/26/1999	596.35
11/29/1999	582.82
11/30/1999	583.80
12/1/1999	597.54
12/2/1999	598.41
12/3/1999	613.48
12/6/1999	624.39
12/7/1999	621.65
12/8/1999	620.98
12/9/1999	631.55

12/10/1999	633.84
12/13/1999	630.55
12/14/1999	648.39
12/15/1999	652.38
12/16/1999	646.51
12/17/1999	638.82
12/20/1999	646.06
12/21/1999	656.89
12/22/1999	661.05
12/23/1999	666.13
12/27/1999	681.38
12/28/1999	677.22
12/29/1999	674.88
12/30/1999	676.92
1/4/2000	700.22
1/5/2000	678.09
1/6/2000	688.52
1/11/2000	696.00
1/12/2000	690.16
1/13/2000	691.61
1/14/2000	690.89
1/17/2000	703.48
1/18/2000	685.72
1/19/2000	655.99
1/20/2000	670.15
1/21/2000	664.69
1/24/2000	656.72
1/25/2000	649.86
1/26/2000	643.39
1/27/2000	644.65
1/28/2000	634.67
1/31/2000	636.37
2/1/2000	616.86
2/2/2000	603.58
2/3/2000	614.31
2/4/2000	635.00
2/7/2000	636.43
2/8/2000	629.90

2/9/2000	632.45
2/10/2000	639.25
2/11/2000	635.08
2/14/2000	633.72
2/15/2000	636.90
2/16/2000	621.90
2/17/2000	600.17
2/18/2000	599.57
2/21/2000	592.99
2/22/2000	583.42
2/23/2000	584.43
2/24/2000	573.49
2/25/2000	568.55
2/28/2000	576.54
3/1/2000	565.48
3/2/2000	546.53
3/3/2000	548.55
3/6/2000	566.71
3/7/2000	562.76
3/8/2000	570.05
3/9/2000	585.18
3/10/2000	596.18
3/13/2000	587.58
3/14/2000	585.92
3/15/2000	586.87
3/17/2000	590.85
3/20/2000	584.88
3/21/2000	578.97
3/22/2000	586.86
3/23/2000	586.01
3/24/2000	581.47
3/27/2000	585.24
3/28/2000	588.73
3/29/2000	591.68
3/30/2000	583.28
4/3/2000	570.90
4/5/2000	564.18
4/7/2000	570.82

4/10/2000	569.62
4/11/2000	569.74
4/12/2000	564.74
4/13/2000	565.11
4/14/2000	556.79
4/17/2000	529.26
4/18/2000	528.26
4/19/2000	526.30
4/20/2000	526.40
4/24/2000	530.85
4/25/2000	519.04
4/26/2000	524.08
4/27/2000	521.62
4/28/2000	526.74
5/1/2000	524.61
5/2/2000	531.25
5/3/2000	535.31
5/4/2000	538.97
5/5/2000	545.61
5/8/2000	550.33
5/9/2000	547.67
5/10/2000	548.24
5/11/2000	529.20
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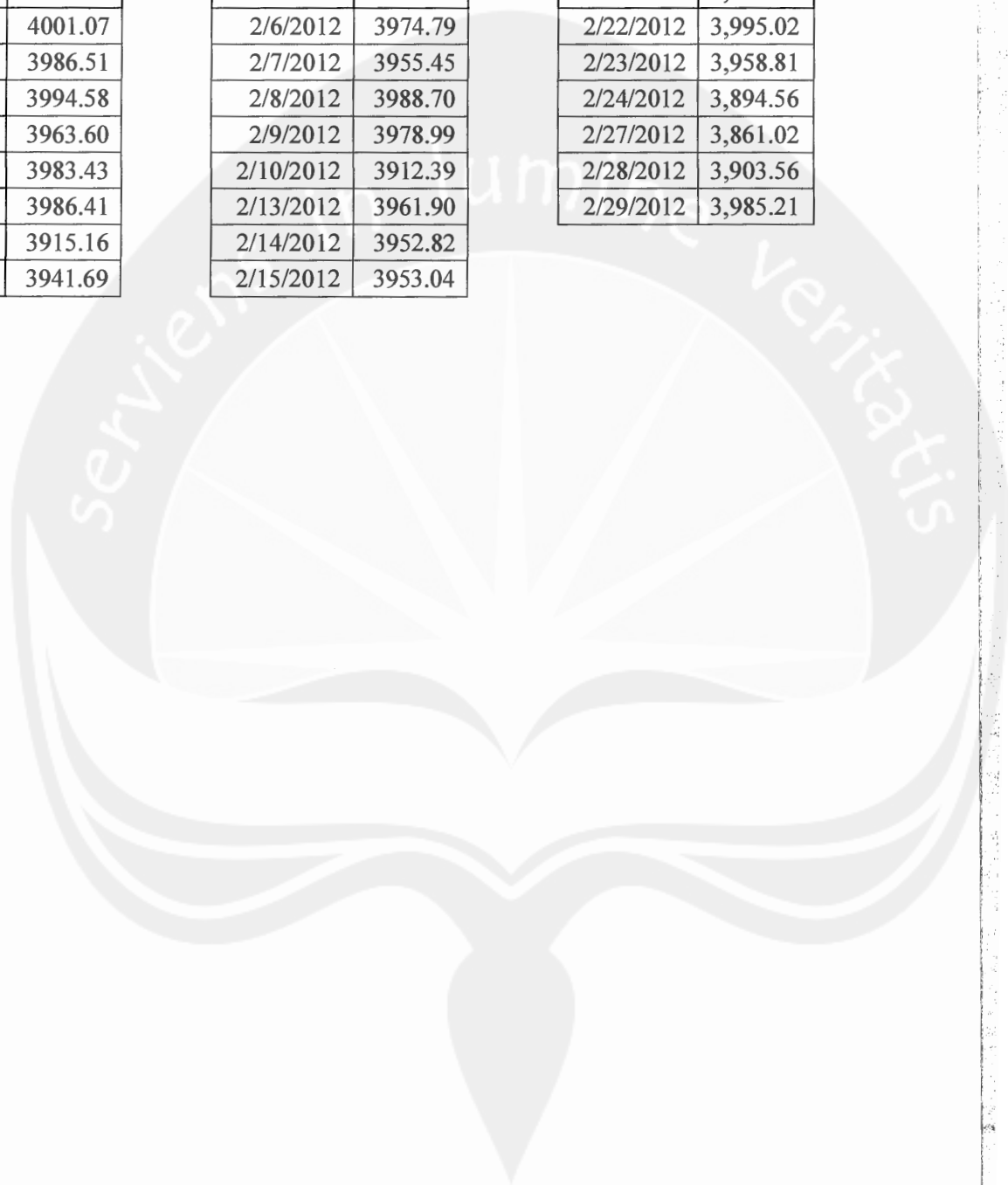
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12/7/2011	3793.24
12/8/2011	3781.76
12/9/2011	3759.61
12/12/2011	3792.15
12/13/2011	3763.58
12/14/2011	3751.60
12/15/2011	3701.54
12/16/2011	3768.35
12/19/2011	3770.29
12/20/2011	3752.34
12/21/2011	3794.27
12/22/2011	3795.44
12/23/2011	3797.15
12/27/2011	3789.43
12/28/2011	3769.21
12/29/2011	3808.77
12/30/2011	3821.99
1/3/2012	3857.88
1/4/2012	3907.42
1/5/2012	3906.26
1/6/2012	3869.42
1/9/2012	3889.07
1/10/2012	3938.84
1/11/2012	3909.64
1/12/2012	3909.50
1/13/2012	3935.33

1/16/2012	3909.69
1/17/2012	3954.75
1/18/2012	3978.13
1/19/2012	4001.07
1/20/2012	3986.51
1/24/2012	3994.58
1/25/2012	3963.60
1/26/2012	3983.43
1/27/2012	3986.41
1/30/2012	3915.16
1/31/2012	3941.69

2/1/2012	3964.98
2/2/2012	4016.90
2/3/2012	4015.95
2/6/2012	3974.79
2/7/2012	3955.45
2/8/2012	3988.70
2/9/2012	3978.99
2/10/2012	3912.39
2/13/2012	3961.90
2/14/2012	3952.82
2/15/2012	3953.04

2/16/2012	3927.61
2/17/2012	3976.54
2/21/2012	4,002.95
2/22/2012	3,995.02
2/23/2012	3,958.81
2/24/2012	3,894.56
2/27/2012	3,861.02
2/28/2012	3,903.56
2/29/2012	3,985.21



Appendix 3: Estimate Parameter of GARCH(p,q)

GARCH(1,0)

Dependent Variable: DLOG(JKSE)

Method: ML - ARCH (Marquardt) - Normal distribution

Included observations: 3566 after adjustments

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.001100	0.000274	4.017561	0.0001
Variance Equation				
C	0.000205	3.35E-06	61.13957	0.0000
RESID(-1)^2	0.423915	0.019894	21.30906	0.0000
R-squared	-0.001223	Mean dependent var		0.000475
Adjusted R-squared	-0.001223	S.D. dependent var		0.017860
S.E. of regression	0.017871	Akaike info criterion		-5.330757
Sum squared resid	1.138603	Schwarz criterion		-5.325559
Log likelihood	9507.741	Hannan-Quinn criter.		-5.328904
Durbin-Watson stat	1.708239			

GARCH(1,1)

Dependent Variable: DLOG(JKSE)

Method: ML - ARCH (Marquardt) - Normal distribution

Included observations: 3566 after adjustments

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.001181	0.000235	5.016941	0.0000
Variance Equation				
C	9.00E-06	8.42E-07	10.68980	0.0000
RESID(-1)^2	0.137180	0.007992	17.16401	0.0000
GARCH(-1)	0.840996	0.007499	112.1410	0.0000
R-squared	-0.001562	Mean dependent var		0.000475
Adjusted R-squared	-0.001562	S.D. dependent var		0.017860
S.E. of regression	0.017874	Akaike info criterion		-5.505214
Sum squared resid	1.138989	Schwarz criterion		-5.498282
Log likelihood	9819.796	Hannan-Quinn criter.		-5.502742
Durbin-Watson stat	1.707661			

GARCH(1,2)

Dependent Variable: DLOG(JKSE)
 Method: ML - ARCH (Marquardt) - Normal distribution
 Included observations: 3566 after adjustments

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.001218	0.000239	5.100662	0.0000
Variance Equation				
C	1.15E-05	1.16E-06	9.933514	0.0000
RESID(-1)^2	0.181413	0.012261	14.79546	0.0000
GARCH(-1)	0.425984	0.070754	6.020600	0.0000
GARCH(-2)	0.364933	0.063263	5.768482	0.0000
R-squared	-0.001729	Mean dependent var		0.000475
Adjusted R-squared	-0.001729	S.D. dependent var		0.017860
S.E. of regression	0.017876	Akaike info criterion		-5.507454
Sum squared resid	1.139179	Schwarz criterion		-5.498790
Log likelihood	9824.791	Hannan-Quinn criter.		-5.504365
Durbin-Watson stat	1.707376			

GARCH(2,0)

Dependent Variable: DLOG(JKSE)
 Method: ML - ARCH (Marquardt) - Normal distribution
 Included observations: 3566 after adjustments

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.001172	0.000236	4.973969	0.0000
Variance Equation				
C	0.000153	3.77E-06	40.61930	0.0000
RESID(-1)^2	0.393740	0.019554	20.13622	0.0000
RESID(-2)^2	0.223903	0.015294	14.63955	0.0000
R-squared	-0.001522	Mean dependent var		0.000475
Adjusted R-squared	-0.001522	S.D. dependent var		0.017860
S.E. of regression	0.017874	Akaike info criterion		-5.386748
Sum squared resid	1.138943	Schwarz criterion		-5.379817
Log likelihood	9608.572	Hannan-Quinn criter.		-5.384277
Durbin-Watson stat	1.707729			

GARCH(2,1)

Dependent Variable: DLOG(JKSE)
 Method: ML - ARCH (Marquardt) - Normal distribution
 Convergence achieved after 20 iterations

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.001247	0.000241	5.171446	0.0000
Variance Equation				
C	6.47E-06	7.31E-07	8.856186	0.0000
RESID(-1)^2	0.224045	0.019082	11.74097	0.0000
RESID(-2)^2	-0.116654	0.020175	-5.782088	0.0000
GARCH(-1)	0.877318	0.007941	110.4727	0.0000
R-squared	-0.001869	Mean dependent var		0.000475
Adjusted R-squared	-0.001869	S.D. dependent var		0.017860
S.E. of regression	0.017877	Akaike info criterion		-5.509584
Sum squared resid	1.139338	Schwarz criterion		-5.500920
Log likelihood	9828.589	Hannan-Quinn criter.		-5.506495
Durbin-Watson stat	1.707138			

GARCH(2,2)

Dependent Variable: DLOG(JKSE)
 Method: ML - ARCH (Marquardt) - Normal distribution
 Included observations: 3566 after adjustments

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.001263	0.000240	5.255591	0.0000
Variance Equation				
C	2.26E-06	4.63E-07	4.891211	0.0000
RESID(-1)^2	0.229013	0.019222	11.91425	0.0000
RESID(-2)^2	-0.189757	0.017082	-11.10888	0.0000
GARCH(-1)	1.386425	0.066559	20.83017	0.0000
GARCH(-2)	-0.431047	0.059693	-7.221104	0.0000
R-squared	-0.001946	Mean dependent var		0.000475
Adjusted R-squared	-0.001946	S.D. dependent var		0.017860
S.E. of regression	0.017878	Akaike info criterion		-5.512817
Sum squared resid	1.139426	Schwarz criterion		-5.502420
Log likelihood	9835.353	Hannan-Quinn criter.		-5.509110
Durbin-Watson stat	1.707006			

Appendix 4: Autocorrelogram Test or

Correlogram of Q -Standardized Residual GARCH(p,q)

GARCH(1,0)

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
		1	0.121	0.121	52.508	0.000
		2	0.034	0.020	56.750	0.000
		3	0.006	-0.001	56.870	0.000
		4	-0.008	-0.010	57.123	0.000
		5	-0.024	-0.022	59.124	0.000
		6	-0.015	-0.009	59.910	0.000
		7	-0.009	-0.005	60.217	0.000
		8	-0.016	-0.013	61.079	0.000
		9	0.013	0.017	61.696	0.000
		10	0.032	0.029	65.256	0.000
		11	0.049	0.041	73.692	0.000
		12	0.032	0.020	77.390	0.000
		13	0.065	0.057	92.452	0.000
		14	0.039	0.024	97.848	0.000
		15	0.004	-0.005	97.893	0.000
		16	0.030	0.032	101.13	0.000
		17	0.033	0.030	104.96	0.000
		18	0.002	-0.002	104.98	0.000
		19	-0.008	-0.007	105.23	0.000
		20	0.022	0.025	107.03	0.000
		21	-0.007	-0.011	107.18	0.000
		22	0.013	0.012	107.79	0.000
		23	-0.003	-0.011	107.82	0.000
		24	0.024	0.020	109.92	0.000
		25	0.034	0.026	114.10	0.000
		26	-0.013	-0.028	114.71	0.000
		27	0.015	0.011	115.50	0.000
		28	0.012	0.007	116.03	0.000
		29	0.005	-0.001	116.14	0.000
		30	-0.020	-0.026	117.60	0.000
		31	0.030	0.032	120.74	0.000
		32	0.015	0.011	121.59	0.000
		33	-0.043	-0.053	128.27	0.000
		34	-0.007	-0.001	128.46	0.000
		35	-0.007	-0.007	128.67	0.000
		36	-0.023	-0.024	130.59	0.000

GARCH(1,1)

			1	0.140	0.140	70.372	0.000
			2	0.030	0.010	73.525	0.000
			3	0.025	0.019	75.682	0.000
			4	0.012	0.006	76.209	0.000
			5	-0.009	-0.013	76.515	0.000
			6	-0.008	-0.006	76.749	0.000
			7	-0.004	-0.002	76.813	0.000
			8	-0.006	-0.004	76.934	0.000
			9	0.021	0.023	78.486	0.000
			10	0.032	0.027	82.148	0.000
			11	0.039	0.031	87.489	0.000
			12	0.016	0.005	88.420	0.000
			13	0.036	0.031	93.072	0.000
			14	0.037	0.026	97.902	0.000
			15	0.014	0.004	98.622	0.000
			16	0.021	0.017	100.15	0.000
			17	0.049	0.044	108.91	0.000
			18	0.014	0.001	109.60	0.000
			19	-0.000	-0.004	109.60	0.000
			20	0.026	0.024	112.07	0.000
			21	-0.004	-0.013	112.13	0.000
			22	0.001	0.002	112.13	0.000
			23	-0.022	-0.026	113.86	0.000
			24	0.004	0.007	113.93	0.000
			25	0.017	0.015	114.99	0.000
			26	-0.021	-0.030	116.65	0.000
			27	0.009	0.011	116.95	0.000
			28	0.017	0.009	117.95	0.000
			29	0.017	0.011	119.04	0.000
			30	-0.009	-0.018	119.36	0.000
			31	0.036	0.035	124.13	0.000
			32	0.011	0.001	124.53	0.000
			33	-0.039	-0.044	130.10	0.000
			34	0.000	0.008	130.10	0.000
			35	0.005	0.004	130.18	0.000
			36	-0.018	-0.017	131.35	0.000

GARCH(1,2)

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
		1	0.137	0.137	66.561	0.000
		2	0.030	0.012	69.819	0.000
		3	0.024	0.019	71.900	0.000
		4	0.012	0.006	72.385	0.000
		5	-0.009	-0.013	72.687	0.000
		6	-0.007	-0.005	72.857	0.000
		7	-0.003	-0.002	72.900	0.000
		8	-0.007	-0.006	73.097	0.000
		9	0.020	0.023	74.514	0.000
		10	0.032	0.027	78.071	0.000
		11	0.039	0.031	83.467	0.000
		12	0.016	0.005	84.358	0.000
		13	0.036	0.031	88.904	0.000
		14	0.036	0.026	93.577	0.000
		15	0.015	0.005	94.338	0.000
		16	0.019	0.015	95.575	0.000
		17	0.049	0.045	104.24	0.000
		18	0.014	0.001	104.90	0.000
		19	-0.000	-0.004	104.90	0.000
		20	0.025	0.023	107.21	0.000
		21	-0.003	-0.012	107.25	0.000
		22	0.001	0.002	107.25	0.000
		23	-0.022	-0.026	109.00	0.000
		24	0.005	0.007	109.08	0.000
		25	0.017	0.015	110.17	0.000
		26	-0.022	-0.031	111.98	0.000
		27	0.009	0.011	112.30	0.000
		28	0.016	0.009	113.24	0.000
		29	0.016	0.010	114.17	0.000
		30	-0.010	-0.019	114.57	0.000
		31	0.037	0.035	119.38	0.000
		32	0.011	0.002	119.83	0.000
		33	-0.040	-0.045	125.65	0.000
		34	-0.000	0.007	125.65	0.000
		35	0.004	0.004	125.72	0.000
		36	-0.017	-0.015	126.74	0.000

GARCH(2,0)

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
		1	0.130	0.130	60.134	0.000
		2	0.030	0.013	63.331	0.000
		3	0.016	0.010	64.204	0.000
		4	-0.006	-0.009	64.316	0.000
		5	-0.027	-0.026	66.851	0.000
		6	-0.024	-0.018	68.989	0.000
		7	-0.011	-0.004	69.402	0.000
		8	-0.011	-0.007	69.798	0.000
		9	0.025	0.028	71.965	0.000
		10	0.035	0.028	76.236	0.000
		11	0.047	0.038	84.043	0.000
		12	0.034	0.021	88.123	0.000
		13	0.060	0.052	101.11	0.000
		14	0.033	0.018	104.91	0.000
		15	0.006	-0.000	105.05	0.000
		16	0.028	0.030	107.94	0.000
		17	0.035	0.033	112.41	0.000
		18	0.001	-0.004	112.41	0.000
		19	-0.015	-0.013	113.18	0.000
		20	0.018	0.021	114.38	0.000
		21	-0.006	-0.011	114.52	0.000
		22	0.005	0.004	114.60	0.000
		23	-0.002	-0.008	114.61	0.000
		24	0.016	0.012	115.56	0.000
		25	0.025	0.017	117.81	0.000
		26	-0.012	-0.025	118.35	0.000
		27	0.019	0.016	119.68	0.000
		28	0.014	0.007	120.38	0.000
		29	0.010	0.004	120.78	0.000
		30	-0.016	-0.022	121.72	0.000
		31	0.030	0.033	124.95	0.000
		32	0.010	0.004	125.28	0.000
		33	-0.036	-0.042	129.90	0.000
		34	0.001	0.007	129.90	0.000
		35	-0.009	-0.009	130.20	0.000
		36	-0.028	-0.027	133.02	0.000

GARCH(2,1)

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
		1	0.134	0.134	63.817	0.000
		2	0.029	0.011	66.787	0.000
		3	0.025	0.020	69.010	0.000
		4	0.011	0.004	69.404	0.000
		5	-0.009	-0.012	69.702	0.000
		6	-0.007	-0.005	69.855	0.000
		7	-0.002	-0.000	69.866	0.000
		8	-0.009	-0.008	70.140	0.000
		9	0.020	0.023	71.559	0.000
		10	0.032	0.027	75.277	0.000
		11	0.039	0.031	80.732	0.000
		12	0.017	0.006	81.728	0.000
		13	0.036	0.030	86.262	0.000
		14	0.034	0.024	90.512	0.000
		15	0.014	0.006	91.242	0.000
		16	0.018	0.015	92.442	0.000
		17	0.048	0.044	100.81	0.000
		18	0.013	0.001	101.42	0.000
		19	-0.001	-0.005	101.42	0.000
		20	0.023	0.021	103.33	0.000
		21	-0.002	-0.010	103.35	0.000
		22	0.002	0.002	103.36	0.000
		23	-0.022	-0.026	105.09	0.000
		24	0.006	0.008	105.21	0.000
		25	0.017	0.015	106.29	0.000
		26	-0.023	-0.031	108.16	0.000
		27	0.009	0.010	108.47	0.000
		28	0.016	0.009	109.37	0.000
		29	0.015	0.009	110.19	0.000
		30	-0.012	-0.020	110.70	0.000
		31	0.036	0.034	115.24	0.000
		32	0.010	0.001	115.63	0.000
		33	-0.040	-0.044	121.35	0.000
		34	0.001	0.008	121.35	0.000
		35	0.004	0.003	121.40	0.000
		36	-0.016	-0.014	122.29	0.000

GARCH(2,2)

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
		1	0.137	0.137	66.919	0.000
		2	0.028	0.010	69.816	0.000
		3	0.025	0.021	72.120	0.000
		4	0.009	0.002	72.391	0.000
		5	-0.010	-0.013	72.759	0.000
		6	-0.008	-0.006	72.989	0.000
		7	-0.002	-0.000	73.005	0.000
		8	-0.010	-0.009	73.331	0.000
		9	0.021	0.025	74.940	0.000
		10	0.033	0.027	78.784	0.000
		11	0.040	0.032	84.488	0.000
		12	0.019	0.007	85.734	0.000
		13	0.037	0.031	90.675	0.000
		14	0.035	0.024	95.063	0.000
		15	0.013	0.004	95.703	0.000
		16	0.019	0.016	97.006	0.000
		17	0.048	0.043	105.11	0.000
		18	0.012	0.000	105.65	0.000
		19	-0.002	-0.005	105.66	0.000
		20	0.022	0.020	107.39	0.000
		21	-0.001	-0.008	107.39	0.000
		22	0.002	0.002	107.41	0.000
		23	-0.022	-0.026	109.12	0.000
		24	0.007	0.009	109.28	0.000
		25	0.020	0.017	110.74	0.000
		26	-0.021	-0.031	112.38	0.000
		27	0.009	0.010	112.67	0.000
		28	0.016	0.009	113.57	0.000
		29	0.015	0.009	114.38	0.000
		30	-0.012	-0.020	114.87	0.000
		31	0.034	0.033	119.15	0.000
		32	0.009	0.000	119.44	0.000
		33	-0.037	-0.040	124.25	0.000
		34	0.004	0.010	124.29	0.000
		35	0.003	0.002	124.33	0.000
		36	-0.016	-0.015	125.29	0.000

**Appendix 5: Homoskedasticity Test on GARCH(p,q) Models or
Correlogram of Standardized Residual Squared on GARCH(p,q) Models**

GARCH(1,0)

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
		1	-0.024	-0.024	2.1251	0.145
		2	0.109	0.108	44.186	0.000
		3	0.132	0.139	106.51	0.000
		4	0.044	0.041	113.38	0.000
		5	0.076	0.051	134.04	0.000
		6	0.048	0.027	142.37	0.000
		7	0.107	0.088	183.05	0.000
		8	0.036	0.019	187.60	0.000
		9	0.064	0.034	202.23	0.000
		10	0.065	0.035	217.38	0.000
		11	0.053	0.032	227.39	0.000
		12	0.080	0.051	250.37	0.000
		13	0.067	0.043	266.30	0.000
		14	0.033	-0.001	270.31	0.000
		15	0.113	0.079	316.12	0.000
		16	0.080	0.059	338.95	0.000
		17	0.096	0.066	371.69	0.000
		18	0.006	-0.041	371.81	0.000
		19	0.049	-0.006	380.50	0.000
		20	0.056	0.017	391.76	0.000
		21	0.013	-0.009	392.34	0.000
		22	0.043	-0.004	398.84	0.000
		23	0.068	0.038	415.60	0.000
		24	0.019	-0.009	416.97	0.000
		25	0.066	0.035	432.44	0.000
		26	0.005	-0.029	432.53	0.000
		27	0.074	0.037	452.32	0.000
		28	0.034	0.006	456.54	0.000
		29	0.023	-0.005	458.48	0.000
		30	0.052	0.009	468.14	0.000
		31	0.035	0.014	472.66	0.000
		32	0.026	-0.017	475.04	0.000
		33	0.037	0.014	479.97	0.000
		34	0.048	0.022	488.21	0.000
		35	0.025	0.006	490.50	0.000
		36	0.057	0.030	502.09	0.000

GARCH(1,1)

	Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
1			0.013	0.013	0.6194	0.431
2			0.010	0.010	0.9921	0.609
3			0.010	0.010	1.3799	0.710
4			-0.020	-0.020	2.7840	0.595
5			0.001	0.002	2.7896	0.732
6			-0.025	-0.025	5.1110	0.530
7			-0.015	-0.014	5.9008	0.551
8			-0.005	-0.005	5.9947	0.648
9			-0.019	-0.018	7.2284	0.613
10			-0.015	-0.015	8.0234	0.627
11			-0.013	-0.012	8.6079	0.858
12			-0.007	-0.007	8.7888	0.721
13			0.001	-0.000	8.7898	0.789
14			-0.008	-0.009	9.0167	0.830
15			0.035	0.034	13.412	0.571
16			0.012	0.010	13.938	0.603
17			0.027	0.025	16.549	0.485
18			-0.018	-0.021	17.651	0.479
19			-0.007	-0.007	17.829	0.534
20			0.019	0.018	19.084	0.516
21			-0.007	-0.005	19.249	0.569
22			-0.023	-0.023	21.140	0.512
23			-0.002	-0.000	21.149	0.572
24			-0.032	-0.030	24.821	0.416
25			-0.001	0.001	24.824	0.472
26			-0.017	-0.015	25.829	0.473
27			-0.001	0.001	25.832	0.528
28			0.004	0.002	25.889	0.579
29			0.034	0.035	29.994	0.414
30			0.009	0.005	30.282	0.451
31			0.010	0.008	30.643	0.484
32			0.001	-0.004	30.644	0.535
33			-0.002	-0.002	30.653	0.584
34			0.027	0.027	33.286	0.502
35			0.002	0.002	33.299	0.550
36			0.021	0.021	34.907	0.520

GARCH(1,2)

	Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
1	-0.003	-0.003	0.0226	0.881		
2	0.027	0.027	2.7015	0.259		
3	0.010	0.010	3.0441	0.385		
4	-0.018	-0.018	4.1733	0.383		
5	0.002	0.001	4.1826	0.523		
6	-0.025	-0.024	6.3974	0.380		
7	-0.013	-0.012	6.9614	0.433		
8	-0.006	-0.005	7.0890	0.527		
9	-0.016	-0.014	7.9573	0.538		
10	-0.014	-0.015	8.6937	0.561		
11	-0.013	-0.013	9.3172	0.593		
12	-0.007	-0.007	9.5182	0.658		
13	-0.001	-0.001	9.5201	0.733		
14	-0.011	-0.011	9.9199	0.768		
15	0.035	0.034	14.262	0.506		
16	0.010	0.010	14.635	0.552		
17	0.026	0.024	17.143	0.445		
18	-0.019	-0.022	18.467	0.425		
19	-0.007	-0.008	18.626	0.481		
20	0.018	0.018	19.768	0.473		
21	-0.008	-0.005	19.991	0.522		
22	-0.025	-0.026	22.170	0.450		
23	0.000	0.001	22.170	0.510		
24	-0.032	-0.030	25.946	0.356		
25	0.001	0.002	25.951	0.410		
26	-0.018	-0.015	27.102	0.404		
27	-0.001	0.001	27.105	0.458		
28	0.002	0.000	27.119	0.512		
29	0.032	0.033	30.861	0.372		
30	0.006	0.003	30.978	0.416		
31	0.009	0.006	31.254	0.453		
32	-0.001	-0.005	31.255	0.504		
33	-0.003	-0.003	31.284	0.553		
34	0.025	0.025	33.594	0.487		
35	0.001	0.002	33.598	0.536		
36	0.023	0.021	35.503	0.492		

GARCH(2,0)

	Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
1	-0.027	-0.027	2.6324	0.105		
2	-0.016	-0.017	3.5839	0.167		
3	0.098	0.097	38.074	0.000		
4	0.037	0.042	42.858	0.000		
5	0.073	0.079	61.737	0.000		
6	0.026	0.022	64.084	0.000		
7	0.114	0.113	110.93	0.000		
8	0.039	0.033	116.48	0.000		
9	0.037	0.036	121.47	0.000		
10	0.042	0.019	127.88	0.000		
11	0.037	0.024	132.65	0.000		
12	0.082	0.061	156.55	0.000		
13	0.055	0.046	167.25	0.000		
14	0.020	0.002	168.64	0.000		
15	0.099	0.078	203.68	0.000		
16	0.058	0.042	215.85	0.000		
17	0.073	0.063	234.85	0.000		
18	0.010	-0.014	235.24	0.000		
19	0.048	0.019	243.38	0.000		
20	0.044	0.005	250.32	0.000		
21	0.010	-0.008	250.68	0.000		
22	0.055	0.016	261.48	0.000		
23	0.044	0.020	268.58	0.000		
24	0.010	-0.020	268.93	0.000		
25	0.031	0.007	272.42	0.000		
26	0.007	-0.021	272.61	0.000		
27	0.038	0.011	277.87	0.000		
28	0.014	-0.014	278.59	0.000		
29	0.024	0.002	280.61	0.000		
30	0.051	0.022	289.91	0.000		
31	0.040	0.029	295.63	0.000		
32	0.015	-0.010	296.42	0.000		
33	0.020	0.006	297.81	0.000		
34	0.044	0.017	304.63	0.000		
35	0.016	0.001	305.61	0.000		
36	0.044	0.029	312.45	0.000		

GARCH(2,1)

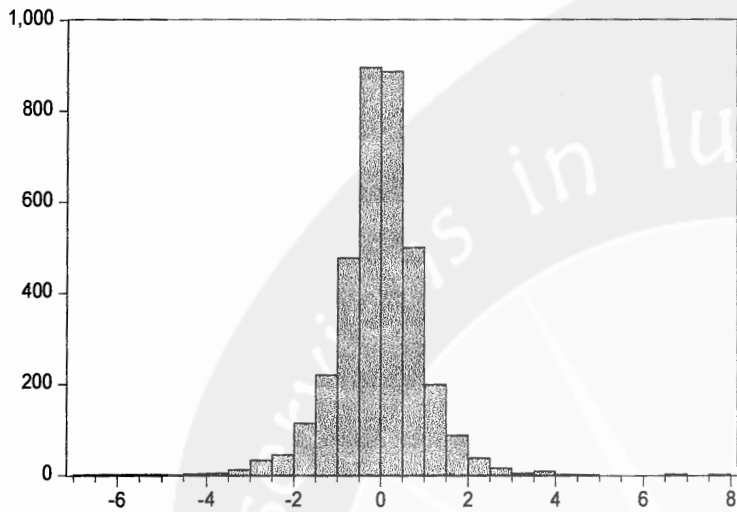
Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
		1 -0.015	-0.015	0.7518	0.386
		2 0.023	0.022	2.5892	0.274
		3 0.022	0.023	4.3345	0.228
		4 -0.016	-0.016	5.2564	0.262
		5 0.008	0.007	5.4975	0.358
		6 -0.022	-0.022	7.2958	0.294
		7 -0.006	-0.006	7.4210	0.386
		8 -0.003	-0.003	7.4536	0.489
		9 -0.012	-0.011	7.9665	0.538
		10 -0.011	-0.012	8.3983	0.590
		11 -0.011	-0.011	8.8566	0.635
		12 -0.005	-0.005	8.9462	0.708
		13 -0.001	-0.001	8.9497	0.777
		14 -0.013	-0.013	9.5389	0.795
		15 0.033	0.032	13.353	0.575
		16 0.007	0.008	13.548	0.632
		17 0.025	0.024	15.835	0.536
		18 -0.020	-0.022	17.250	0.506
		19 -0.006	-0.007	17.363	0.565
		20 0.019	0.017	18.628	0.546
		21 -0.011	-0.008	19.057	0.581
		22 -0.025	-0.027	21.312	0.502
		23 0.000	0.000	21.313	0.562
		24 -0.033	-0.031	25.145	0.398
		25 0.001	0.001	25.153	0.454
		26 -0.019	-0.017	26.454	0.438
		27 -0.002	-0.000	26.469	0.493
		28 0.000	-0.002	26.469	0.547
		29 0.030	0.032	29.664	0.431
		30 0.002	-0.000	29.673	0.482
		31 0.005	0.004	29.778	0.529
		32 -0.002	-0.007	29.789	0.579
		33 -0.006	-0.006	29.909	0.622
		34 0.023	0.022	31.790	0.576
		35 -0.000	0.001	31.791	0.624
		36 0.022	0.020	33.536	0.586

GARCH(2,2)

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
		1	-0.015	-0.015	0.8534	0.356
		2	-0.001	-0.002	0.8594	0.651
		3	0.015	0.015	1.6293	0.653
		4	-0.017	-0.016	2.6287	0.622
		5	0.013	0.012	3.2098	0.668
		6	-0.017	-0.017	4.2844	0.638
		7	0.008	0.008	4.5073	0.720
		8	0.004	0.004	4.5722	0.802
		9	-0.007	-0.006	4.7692	0.854
		10	-0.004	-0.005	4.8294	0.902
		11	-0.005	-0.004	4.9022	0.936
		12	0.001	0.001	4.9046	0.961
		13	0.005	0.006	5.0092	0.975
		14	-0.011	-0.010	5.4192	0.979
		15	0.037	0.036	10.216	0.806
		16	0.010	0.011	10.600	0.833
		17	0.027	0.028	13.214	0.722
		18	-0.015	-0.016	14.043	0.726
		19	-0.004	-0.004	14.114	0.777
		20	0.022	0.020	15.833	0.727
		21	-0.011	-0.008	16.259	0.755
		22	-0.023	-0.024	18.115	0.699
		23	0.002	0.002	18.134	0.750
		24	-0.031	-0.031	21.620	0.602
		25	0.001	0.000	21.624	0.657
		26	-0.020	-0.019	23.049	0.630
		27	-0.001	-0.000	23.050	0.682
		28	-0.001	-0.003	23.051	0.730
		29	0.030	0.033	26.260	0.612
		30	0.002	0.000	26.280	0.661
		31	0.002	0.004	26.302	0.707
		32	-0.006	-0.011	26.454	0.743
		33	-0.011	-0.010	26.858	0.766
		34	0.019	0.019	28.219	0.746
		35	0.000	0.001	28.220	0.785
		36	0.018	0.017	29.358	0.775

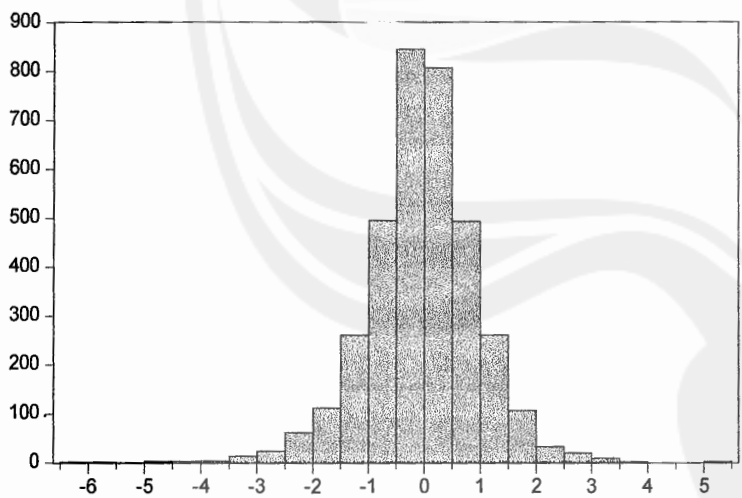
**Appendix 6: Normality Test or
Histogram-Normality Test GARCH(p,q)**

GARCH(1,0)



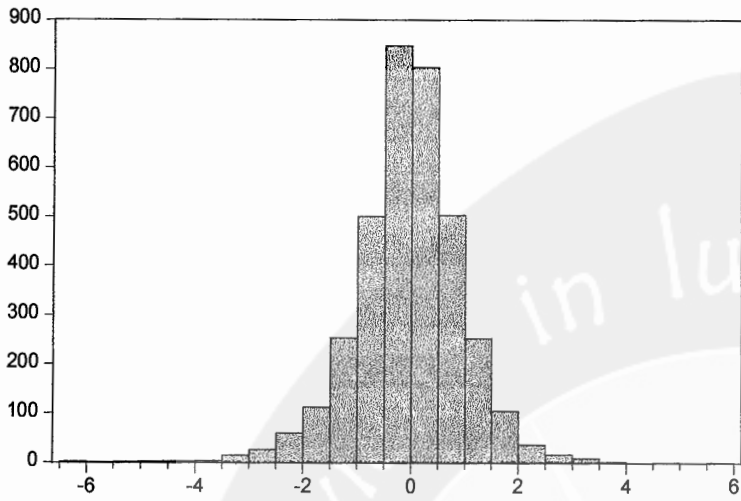
Series: Standardized Residuals	
Sample 7/02/1997 3/02/2011	
Observations 3566	
Mean	-0.040611
Median	-0.013961
Maximum	7.942644
Minimum	-6.960674
Std. Dev.	0.999353
Skewness	-0.193725
Kurtosis	9.326522
Jarque-Bera	5969.335
Probability	0.000000

GARCH(1,1)



Series: Standardized Residuals	
Sample 7/02/1997 3/02/2011	
Observations 3566	
Mean	-0.045954
Median	-0.019303
Maximum	5.257274
Minimum	-6.120630
Std. Dev.	0.998943
Skewness	-0.421398
Kurtosis	6.001051
Jarque-Bera	1443.727
Probability	0.000000

GARCH(1,2)

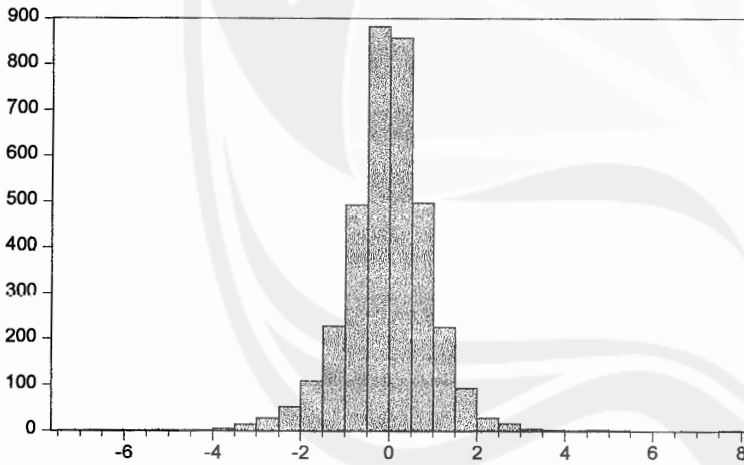


Series: Standardized Residuals
 Sample 7/02/1997 3/02/2011
 Observations 3566

Mean -0.048003
 Median -0.021540
 Maximum 5.615291
 Minimum -6.048383
 Std. Dev. 0.998851
 Skewness -0.400636
 Kurtosis 5.964623

Jarque-Bera 1401.294
 Probability 0.000000

GARCH(2,0)

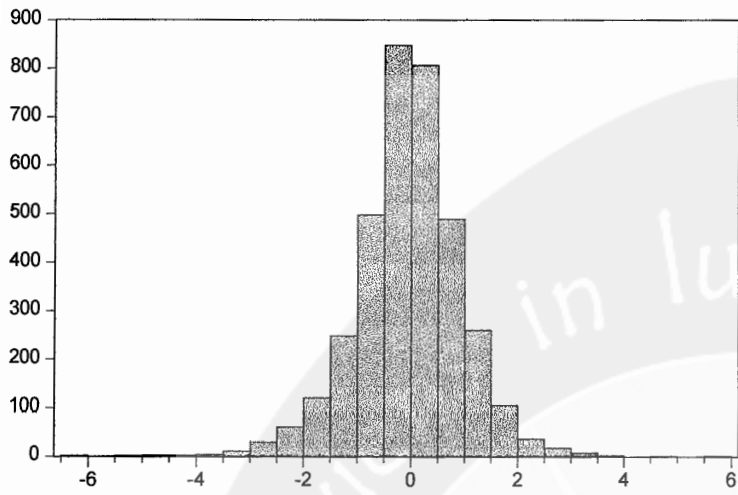


Series: Standardized Residuals
 Sample 7/02/1997 3/02/2011
 Observations 3566

Mean -0.049746
 Median -0.017943
 Maximum 7.547329
 Minimum -7.102841
 Std. Dev. 0.998901
 Skewness -0.358309
 Kurtosis 8.268210

Jarque-Bera 4200.091
 Probability 0.000000

GARCH(2,1)

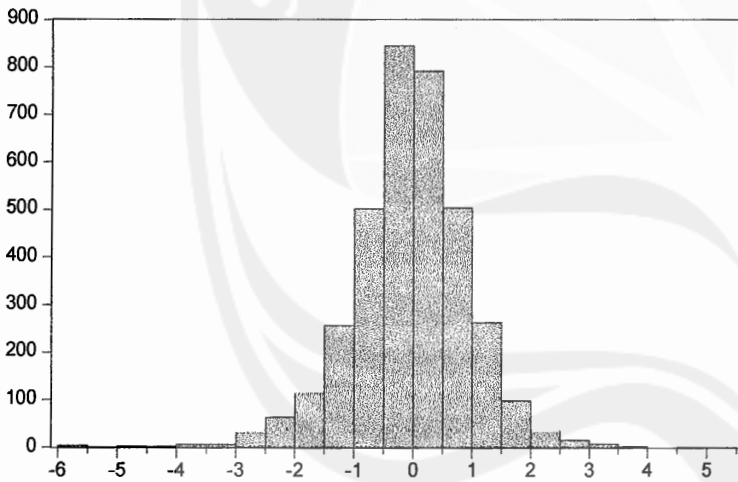


Series: Standardized Residuals
 Sample 7/02/1997 3/02/2011
 Observations 3566

Mean -0.050304
 Median -0.023570
 Maximum 5.638451
 Minimum -6.111472
 Std. Dev. 0.998731
 Skewness -0.404773
 Kurtosis 5.933511

Jarque-Bera 1376.008
 Probability 0.000000

GARCH(2,2)



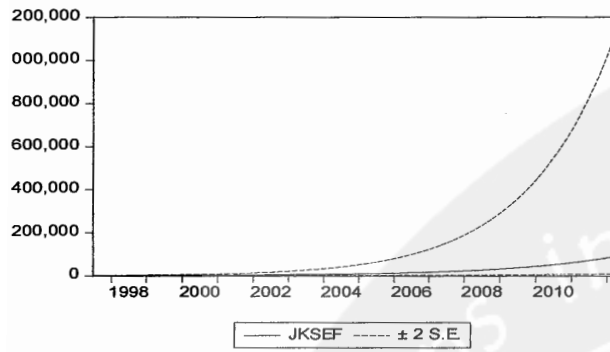
Series: Standardized Residuals
 Sample 7/02/1997 3/02/2011
 Observations 3566

Mean -0.051916
 Median -0.024839
 Maximum 5.196188
 Minimum -5.938597
 Std. Dev. 0.998749
 Skewness -0.419984
 Kurtosis 5.846551

Jarque-Bera 1308.781
 Probability 0.000000

Appendix 8: Forecast on GARCH(p,q)

GARCH(2,1)



Forecast: JKSEF
 Actual: JKSE
 Forecast sample: 7/01/1997 2/29/2012
 Adjusted sample: 7/02/1997 2/29/2012
 Included observations: 3566
 Root Mean Squared Error 19289.30
 Mean Absolute Error 12522.01
 Mean Abs. Percent Error 692.3264
 Theil Inequality Coefficient 0.848417
 Bias Proportion 0.421420
 Variance Proportion 0.573934
 Covariance Proportion 0.004647

