

**ANALISIS RESIKO INVESTASI**  
**DENGAN *VALUE AT RISK* (VaR) - *GENERALIZED AUTOREGRESSIVE***  
***CONDITIONAL HETEROSCEDASTICITY* (GARCH)**  
**(Studi Kasus : Indeks Harga Saham Syariah *Jakarta Islamic Index* (JII)**  
**Periode Januari 2011- Juli 2013)**

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untuk memenuhi sebagian persyaratan  
mencapai derajat Sarjana S-1  
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*Assalamu'alaikum wr. wb.*

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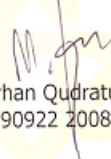
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Dengan ini saya menyatakan bahwa skripsi ini tidak terdapat karya yang pernah diajukan untuk memperoleh gelar kesarjanaan di suatu Perguruan Tinggi, dan sepanjang pengetahuan saya juga tidak terdapat karya atau pendapat yang pernah ditulis atau diterbitkan orang lain, kecuali yang secara tertulis diacu dalam naskah ini dan disebutkan dalam daftar pustaka.

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## MOTTO

إِنَّ اللَّهَ لَا يُغَيِّرُ مَا بِقَوْمٍ حَتَّىٰ يُغَيِّرُوا مَا بِأَنْفُسِهِمْ ۗ وَإِذَا أَرَادَ اللَّهُ بِقَوْمٍ سُوءًا  
فَلَا مَرَدَّ لَهُ ۗ وَمَا لَهُمْ مِّنْ دُونِهِ مِنِّ وَالٍ ﴿١١﴾

*“Sesungguhnya Allah SWT tidak akan merubah seseorang atau suatu kaum apabila seseorang atau kaum itu tidak mau merubah sendiri, dan sesekali tidak ada perlindungan bagi mereka selain DIA”*

*(Q.S. Arra'du 11)*

*“... Pintu kebahagiaan terbesar adalah doa kedua orang tua maka berusahalah mendapatkan doa itu dengan berbakti kepada mereka agar doa mereka menjadi benteng yang kuat untuk menjagamu dari semua hal yang tidak kita sukai...”*

*(DR. 'Aidh Al-Qarni)*

*“Jangan takut jatuh, karena yang tak pernah memanjatlah yang tak pernah jatuh. Jangan takut gagal, karena yang tak pernah gagal hanya orang yang tak pernah mencoba melangkah. Jangan takut salah, karena dengan kesalahan pertama, kita dapat menambah pengetahuan untuk mencari yang benar pada langkah kedua”.*

*(Hamka)*

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**ANALISIS RESIKO INVESTASI DENGAN  
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**ABSTRAK**

Kegiatan dalam berinvestasi perlu mempertimbangkan dua hal yaitu besarnya resiko dan *return* yang akan diperoleh. Untuk mengukur besarnya resiko diperlukan suatu alat atau metode agar dapat secara tepat mengukur resiko salah satunya yaitu *Value at Risk* (VaR) dengan pendekatan *Generalized Autoregressive Conditional Heteroscedasticity* (GARCH). VaR dikenal sebagai alternatif ukuran resiko yang dapat digunakan untuk mengukur resiko pada data yang berdistribusi normal.

Penelitian ini membahas tentang analisis resiko investasi dengan VaR-GARCH. Dalam analisis VaR-GARCH pada saham syariah langkah-langkah utama adalah menentukan nilai *return*, menguji kestasioneran data, menguji kenormalan data, menentukan model yang sesuai untuk persamaan *mean*, menguji ada tidaknya efek ARCH, menentukan model yang sesuai untuk persamaan variansi, menghitung nilai VaR-GARCH, dan menguji validasi VaR-GARCH. Adapun data yang digunakan data indeks saham syariah harian *Jakarta Islamic Index* (JII) periode Januari 2011 – Juli 2013.

Hasil dari penelitian ini menunjukkan bahwa model VaR-GARCH (1,1) adalah model terbaik yang memenuhi asumsi-asumsi pada pemeriksaan diagnosa. Dengan menggunakan model VaR-GARCH (1,1), hasil kemungkinan kerugian yang didapat investor pada tingkat kepercayaan 95% dengan dana yang diinvestasikan sebesar Rp.100.000.000,- pada saham *Jakarta Islamic Index* (JII) adalah dalam 1 hari ke depan sebesar Rp. 502.229,890, dalam 5 hari ke depan sebesar Rp. 1.123.020,175 dan dalam 20 hari ke depan sebesar Rp. 2.246.040,350.

**Kata Kunci** : GARCH, *Jakarta Islamic Index* (JII), *Return*, *Risk*, *Time Series*, *Value at Risk* (VaR)

# BAB I

## PENDAHULUAN

### 1.1 Latar Belakang Masalah

Kegiatan dalam berinvestasi, seorang investor dihadapkan pada dua hal yaitu tingkat pengembalian dan juga resiko yang mungkin timbul akibat adanya ketidakpastian (Tandelilin, 2010 : 183). Resiko-resiko tidak dapat dihindari namun dapat dikelola dan diperkirakan dengan menerapkan manajemen resiko. Tujuan manajemen resiko untuk mengidentifikasi resiko dengan cara mengenal dan memahami seluruh resiko yang sudah ada, sehingga mempermudah penilaian terhadap kemungkinan kerugian yang dihadapi oleh investor.

Peramalan (*forecasting*) dan analisa data ini bertujuan untuk memperkecil resiko dan faktor-faktor ketidakpastian. Seperti halnya, dalam masalah saham apabila tidak diketahui prediksi berapa saham yang akan dibeli pada waktu yang akan datang, maka juga tidak akan diketahui pula berapa saham yang terjual untuk periode berikutnya, sehingga data yang ada sekarang sangatlah penting sebagai alat untuk mengukur prediksi masa depan. Berdasarkan keterangan di atas, peneliti ingin menggunakan data harga saham *Jakarta Islamic Index* (JII) yang diambil dari [finance.yahoo.com](http://finance.yahoo.com). Saham yang masuk JII berjumlah 30 (tiga puluh) saham merupakan saham yang tidak bertentangan dengan syariah seperti tidak menerapkan sistem riba,

tidak menjalankan usaha perjudian, dan tidak memproduksi minuman/makanan yang haram.

Salah satu ilmu yang digunakan untuk peramalan masa yang akan datang adalah *time series*. Model runtun waktu (*time series*) adalah pendugaan masa depan yang dilakukan berdasarkan nilai masa lalu dari suatu variabel atau kesalahan masa lalu. Langkah penting dalam memilih suatu metode runtun waktu (*time series*) yang tepat adalah dengan mempertimbangkan jenis pola data, sehingga metode yang paling tepat dengan pola tersebut dapat diuji. Pola data dapat dibedakan menjadi empat jenis yaitu pola horisontal, pola musiman, pola siklis, dan pola trend. Nilai data berfluktuasi di sekitar nilai rata-rata yang konstan disebut pola horisontal. Sebagai contoh penjualan tiap bulan suatu produk tidak meningkat atau menurun secara konsisten pada suatu waktu dapat dipertimbangkan untuk pola horisontal. Suatu deret dipengaruhi oleh faktor musiman disebut pola musiman yang ditandai dengan adanya pola perubahan yang berulang secara otomatis dari tahun ke tahun. Data dipengaruhi oleh fluktuasi ekonomi jangka panjang seperti yang berhubungan dengan siklus bisnis yang dinamakan pola siklis. Terdapat kenaikan atau penurunan sekuler jangka panjang dalam data disebut pola trend (Makridakis, 1999 : 9-10).

Sebagian besar data runtun waktu ekonomi dan keuangan seperti pergerakan kurs valuta asing, harga saham, *Gross Domestic Product* (GDP), *Gross National Product* (GNP), inflasi dan sebagainya merupakan data runtun waktu yang tidak stasioner terhadap rata-rata dan ragam (heteroskedastisitas).



Model umum runtun waktu *Autoregressive* (AR), *Moving Average* (MA) dan *Autoregressive Moving Average* (ARMA) sering digunakan untuk memodelkan data ekonomi dan keuangan dengan asumsi stasioneritas terhadap ragam (homoskedastisitas). Oleh karena itu, dibutuhkan suatu model runtun waktu lain yang dapat memodelkan sebagian dasar data ekonomi dan keuangan dengan tetap mempertahankan heteroskedastisitas data.

Salah satu metode yang dapat digunakan untuk mengatasi masalah heteroskedastisitas adalah metode *Autoregressive Conditional Heteroscedasticity* (ARCH) yang diperkenalkan Engle pada tahun 1982. Dalam perkembangan data runtun waktu, muncul variansi dari model ARCH, yang dikenal dengan nama GARCH (*Generalized Autoregressive Conditional Heteroscedasticity*). GARCH dimaksudkan untuk memperbaiki ARCH dan dikembangkan oleh Tim Bollerslev (1986 dan 1994) (Winarno, 2007:8.1). Model GARCH merupakan model yang lebih sederhana dengan banyaknya parameter yang lebih sedikit dibandingkan model ARCH berderajat tinggi. Dalam analisis data runtun waktu ekonomi dan keuangan, yang menjadi pusat perhatian adalah fluktuasi harga yang menunjukkan naik turunnya harga. Model ARCH dan GARCH sangat berguna untuk mengevaluasi dan memprediksi fluktuasi harga.

Model GARCH dapat digunakan investor dalam memilih periode yang tepat saat ingin berinvestasi dan menjual saham. Karakteristik model GARCH dilihat dari nilai volatilitas (tingkat perubahan dalam harga saham), jika diprediksi nilai volatilitas tinggi maka menunjukkan tingkat resiko yang

tinggi sehingga investor akan meninggalkan pasar atau menjual aset guna meminimalkan resiko. Bagi orang awam nilai volatilitas berguna untuk mengetahui dan memahami gambaran umum tentang resiko dalam berinvestasi saham sehingga dapat menjadi pertimbangan dalam pengambilan keputusan dan kebijakan para pemegang saham.

Harga saham di bursa efek setiap detik dapat berubah-ubah. Perubahan harga saham yang lebih tinggi akan memberikan dampak positif ke berbagai pihak (investor) dan memberikan dampak negatif bila mengalami penurunan. Dalam pasar modal tersedia berbagai *financial assets* yang menawarkan tingkat keuntungan dan resiko yang berbeda. Oleh karena itu, diperlukan alat ukur untuk mengukur resiko pasar tersebut, agar dapat diketahui sejauh mana investor dapat dengan aman berinvestasi. Pengukuran resiko merupakan hal yang sangat penting dalam analisis keuangan mengingat hal ini masih berhubungan dengan investasi dana yang cukup besar.

Salah satu cara yang sangat penting dalam menganalisis resiko keuangan adalah perhitungan VaR (*Value at Risk*). Peneliti ingin mencoba memberikan estimasi model GARCH untuk memperoleh hasil yang lebih baik pada perhitungan VaR dengan data sampel yang lebih panjang terutama pada harga saham JII.

Dari latar belakang di atas maka peneliti mengambil judul tentang **“Analisis Resiko Investasi dengan *Value at Risk* (VaR) – *Generalized Autoregressive Conditional Heteroscedasticity* (GARCH)”**.

## 1.2 Batasan Masalah

Pada penelitian ini terdapat beberapa batasan-batasan yang akan diteliti, batasan-batasan ini digunakan untuk mempermudah peneliti dalam melakukan suatu penelitian, yaitu:

1. Estimasi parameter menggunakan metode *Maximum Likelihood*.
2. Menggunakan bantuan *software* E-Views 7.1 dan MATLAB 7.1.

## 1.3 Rumusan Masalah

Berdasarkan uraian di atas, maka masalah yang akan dikaji dalam penelitian ini adalah

1. Bagaimana langkah-langkah analisis resiko investasi dengan menggunakan VaR-GARCH?
2. Bagaimana bentuk model VaR-GARCH untuk mengukur besar resiko investasi pada indeks harga saham syariah JII?
3. Berapa besar resiko investasi pada indeks harga saham syariah JII.

## 1.4 Tujuan Penelitian

Berdasarkan rumusan masalah di atas, maka tujuan dari skripsi ini adalah

1. Mengetahui langkah-langkah analisis resiko investasi dengan menggunakan VaR-GARCH.
2. Mengetahui bentuk model VaR-GARCH untuk mengukur besar resiko investasi pada indeks harga saham syariah JII.
3. Mengetahui besar resiko investasi pada indeks harga saham syariah JII.

## 1.5 Manfaat Penelitian

1. Bagi Penulis
  - a. Menambah pengetahuan tentang aplikasi matematika khususnya statistika.
  - b. Menambah wawasan mengenai analisis resiko investasi dengan VaR-GARCH.
2. Bagi Investor

Dapat memberikan informasi atau masukan kepada para investor yang akan berinvestasi dalam pengambilan keputusan, sehingga dapat meminimalisir terjadinya resiko.

## 1.6 Tinjauan Pustaka

Tinjauan pustaka yang digunakan oleh peneliti adalah beberapa penelitian yang relevan dengan tema yang diambil peneliti, antara lain:

1. Skripsi Siti Nurhasanah (2011) yang berjudul *Model Autoregressive Conditional Heteroscedasticity (ARCH) (Aplikasi : Peramalan Indeks Harga Saham Syariah Jakarta Islamic Index)*. Dari penelitian tersebut didapatkan model ARCH (3) dengan hasil prediksi indeks harga saham syariah *Jakarta Islamic Index (JII)* untuk 2 bulan ke depan yaitu sampai 30 Desember 2010 yang menunjukkan adanya peningkatan dan penurunan *Jakarta Islamic Index (JII)*.
2. Jurnal Ahmed A. E. dan Suliman Z. S. (2011) yang berjudul *Modeling Stock Market Volatility using GARCH Models Evidence From Sudan*.

Pada penelitian ini diaplikasikan pada indeks *Khartoum Stock Exchange* (KSE). Hasil penelitian bahwa data KSE menunjukkan perubahan yang signifikan dari normalitas dan adanya heteroskedastisitas bersyarat dalam seri residual. Estimasi parameter model GARCH (1,1) menunjukkan tingkat tinggi terus-menerus dalam volatilitas bersyarat pengembalian saham di Bursa Efek Khartoum yang berarti volatilitas peledak.

Pada penelitian yang sekarang memiliki persamaan dan perbedaan baik itu dari model yang akan digunakan maupun objek yang diteliti. Penelitian dari Siti Nurchasanah, objek yang diteliti sebelumnya sama menggunakan saham JII tetapi model yang digunakan berbeda pada penelitian sebelumnya dengan model ARCH, pada penelitian sekarang yaitu dengan model GARCH. Sedangkan pada penelitian dari Ahmed dan Suliman, objek yang diteliti berbeda dengan objek yang diteliti peneliti sebelumnya. Jika pada penelitian sebelumnya objek yang diteliti adalah saham KSE, pada penelitian yang sekarang objek yang diteliti adalah saham *Jakarta Islamic Index* (JII) tetapi model yang digunakan sama yaitu GARCH.



**Tabel 1.1** Kajian pustaka

No.	Nama Peneliti	Judul	Metode	Objek
1	Siti Nurchasanah (UIN)	Model <i>Autoregressive Conditional Heteroscedasticity</i> (ARCH)	ARCH	JII
2	Ahmed A.E. dan Suliman Z.S.	<i>Modeling Stock Market Volatility using GARCH Models Evidence from Sudan</i>	GARCH	KSE
3	Dian Harry Hanggara (UIN)	Analisis Resiko Investasi dengan <i>Value at Risk</i> (VaR) – <i>Generalized Autoregressive Conditional Heteroscedasticity</i> (GARCH)	VaR- GARCH	JII

### 1.7 Sistematika Penulisan

Untuk memberikan gambaran menyeluruh dan memudahkan dalam penelitian mengenai analisis resiko investasi dengan VaR-GARCH, secara garis besar sistematika penulisannya yaitu

#### BAB I : PENDAHULUAN

Berisi latar belakang masalah, batasan masalah, rumusan masalah, tujuan penelitian, manfaat penelitian, tinjauan pustaka, dan sistematika penulisan.

## BAB II : LANDASAN TEORI

Berisi tentang teori penunjang yang digunakan dalam pembahasan yaitu analisis resiko investasi dengan VaR-GARCH.

## BAB III : METODE PENELITIAN

Berisi berbagai penjelasan mengenai proses pelaksanaan penelitian ini, mulai jenis dan sumber data, metode pengumpulan data, variabel penelitian, metodologi penelitian, metode analisis data, dan sampai pada alat pengolahan data.

## BAB IV : ANALISIS RESIKO INVESTASI DENGAN VAR-GARCH

Berisi tentang pembahasan mengenai model analisis resiko investasi dengan VaR-GARCH.

## BAB V : STUDI KASUS

Berisi tentang penerapan dan aplikasi analisis resiko investasi dengan VaR-GARCH pada data indeks saham syariah JII dan memberikan interpretasi terhadap hasil yang diperoleh.

## BAB VI : KESIMPULAN DAN SARAN

Berisi tentang kesimpulan yang dapat diambil dari pembahasan permasalahan yang ada dan pemecahan masalah dan saran-saran yang berkaitan dengan penelitian sejenis untuk penelitian berikutnya.

## BAB VI

### PENUTUP

#### 6.1 Kesimpulan

Berdasarkan pada permasalahan yang dikemukakan dalam penelitian ini, dapat diambil kesimpulan sebagai berikut :

1. Ada beberapa langkah-langkah dalam analisis resiko investasi dengan menggunakan VaR-GARCH yaitu menentukan nilai *return*, menguji kestasioneran data, menguji kenormalan data, menentukan model yang sesuai untuk persamaan *mean*, menguji ada tidaknya efek ARCH, menentukan model yang sesuai untuk persamaan variansi, menghitung nilai VaR-GARCH dan menguji validasi VaR-GARCH.
2. Berdasarkan pemeriksaan diagnosa yang memenuhi asumsi adalah model VaR-GARCH (1,1) dan VaR-GARCH (3,0). Dari model tersebut dibandingkan dan diperoleh model VAR-GARCH (1,1) menunjukkan tingkat keakuratan resiko yang cukup baik. Jadi bentuk model untuk mengukur besar resiko investasi pada indeks harga saham syariah JII yaitu model VaR-GARCH (1,1), dengan persamaan sebagai berikut :

➤ Persamaan *mean*:

$$\log X_t = 0.000552$$

$$\hat{X}_t = e^{0.000552}$$

➤ Persamaan variansi:

$$\hat{\sigma}_t^2 = (3.16E - 06) + 0.119191\varepsilon_{t-1}^2 + 0.872709\sigma_{t-1}^2$$

3. Untuk pengukuran besar resiko investasi dengan menggunakan VaR-GARCH (1,1), dimana nilai investasi awal diasumsikan sebesar Rp.100.000.000,- menghasilkan beberapa besaran nilai resiko untuk indeks harga saham JII dengan tingkat kepercayaan 95%, sebagai berikut :
  - a. Dalam 1 hari ke depan sebesar Rp. 502.229,890
  - b. Dalam 5 hari ke depan sebesar Rp. 1.123.020,175
  - c. Dalam 20 hari ke depan sebesar Rp. 2.246.040,350

## 6.2 Saran

Berdasarkan pengalaman dan pertimbangan dalam studi literatur, saran-saran yang dapat disampaikan peneliti adalah :

1. Model yang didapat pada pembahasan penelitian ini, diharapkan dapat menjadi bahan pertimbangan bagi para investor.
2. Dengan adanya hasil penelitian ini, disarankan untuk para analis dan investor di pasar saham Indonesia untuk mengukur resiko harga dari saham dengan menggunakan *Value at Risk* agar dapat mengantisipasi lebih awal kerugian terburuk yang mungkin akan dialami.
3. Melanjutkan pembahasan tentang *Value at Risk* dengan metode lain seperti GARCH-M, T-GARCH, E-GARCH, PARCH dll.

Demikian saran dari peneliti semoga dapat menjadi masukan para peneliti pada bidang statistik khususnya analisis resiko investasi dengan VaR-GARCH, untuk melanjutkan dan mengembangkan penelitian ini.

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**Lampiran 1**

**Data Penutupan harian JII, Return, GARCH(1,1), GARCH(3,0),**

**Volatilitas dari 3 Januari 2011-1 Juli 2013**

No	Tanggal	JII	Return	GARCH(1,1)	GARCH(3,0)
1	03/01/2011	537,662	0	0	0
2	04/01/2011	538,26	0,001112	0,000321811	0,000307293
3	05/01/2011	539,31	0,001949	0,00028404	0,000243689
4	06/01/2011	530,515	-0,01644	0,000251272	0,000200802
5	07/01/2011	512,922	-0,03372	0,000256866	0,000129776
6	10/01/2011	493,702	-0,03819	0,00036736	0,000344754
7	11/01/2011	488,292	-0,01102	0,000502669	0,000642234
8	12/01/2011	503,535	0,03074	0,000457796	0,000767831
9	13/01/2011	504,194	0,001308	0,000511295	0,000870594
10	14/01/2011	504,751	0,001104	0,000449435	0,000249791
11	17/01/2011	500,923	-0,00761	0,000395418	0,000440556
12	18/01/2011	502,255	0,002656	0,000356186	8,58E-05
13	19/01/2011	500,275	-0,00395	0,000314529	8,24E-05
14	20/01/2011	484,754	-0,03152	0,000280064	0,000102855
15	21/01/2011	470,862	-0,02908	0,000370144	0,000280681
16	24/01/2011	464,703	-0,01317	0,000430816	0,0003923
17	25/01/2011	479,077	0,030463	0,000401564	0,000635881
18	26/01/2011	490,487	0,023537	0,000460238	0,000626011
19	27/01/2011	492,947	0,005003	0,00046778	0,000375492
20	28/01/2011	490,514	-0,00495	0,000413752	0,000510348
21	31/01/2011	477,514	-0,02686	0,000367846	0,000294933
22	01/02/2011	484,295	0,014101	0,000413743	0,00023337
23	02/02/2011	489,44	0,010568	0,000386112	0,000222412
24	04/02/2011	493,951	0,009174	0,000352075	0,000416424
25	07/02/2011	494,52	0,001151	0,000319275	0,0001766
26	08/02/2011	489,03	-0,01116	0,000281832	0,000124171
27	09/02/2011	484,747	-0,0088	0,000265473	0,000130013
28	10/02/2011	478,357	-0,01327	0,000245254	0,000107906
29	11/02/2011	479,758	0,002924	0,000239961	0,000175225
30	14/02/2011	483,622	0,008022	0,000213242	0,000133239
31	16/02/2011	483,764	0,000294	0,000195904	0,000159937
32	17/02/2011	489,187	0,011148	0,000174131	8,28E-05
33	18/02/2011	499,85	0,021563	0,000168501	0,000118545
34	21/02/2011	499,659	-0,00038	0,000202827	0,000177273
35	22/02/2011	492,835	-0,01375	0,000180268	0,000179291

No	Tanggal	JII	Return	GARCH(1,1)	GARCH(3,0)
36	23/02/2011	498	-0,01375	0,000184862	0,000291551
37	24/02/2011	490,422	0,010277	0,000175758	0,000119402
38	25/02/2011	490,684	-0,01519	0,00018606	0,000214746
39	28/02/2011	496,87	0,000534	0,000165532	0,000144424
40	01/03/2011	502,794	0,012528	0,000164711	0,000199275
41	02/03/2011	497,968	0,011852	0,00016212	0,000118439
42	03/03/2011	499,214	-0,00964	0,000157031	0,00016909
43	04/03/2011	505,071	0,002499	0,00014065	0,000139387
44	07/03/2011	506,75	0,011664	0,000140619	0,000138879
45	08/03/2011	509,187	0,003319	0,000126787	9,30E-05
46	09/03/2011	513,303	0,004798	0,000115951	0,000128014
47	10/03/2011	511,038	0,008051	0,00011105	9,00E-05
48	11/03/2011	502,821	-0,00442	0,000103019	9,27E-05
49	14/03/2011	506,314	-0,01621	0,000126548	0,000154185
50	15/03/2011	500,34	0,006923	0,000118432	0,000127883
51	16/03/2011	499,933	-0,01187	0,000124902	0,000219157
52	17/03/2011	489,754	-0,00081	0,000112381	0,000110218
53	18/03/2011	489,946	-0,02057	0,000154411	0,000221178
54	21/03/2011	496,122	0,000392	0,000137915	0,000132939
55	22/03/2011	494,963	0,012527	0,000140605	0,000278184
56	23/03/2011	504,766	-0,00234	0,000126859	9,39E-05
57	24/03/2011	515,651	0,019612	0,000157165	0,00020562
58	25/03/2011	514,539	0,021335	0,000191798	0,000212768
59	28/03/2011	509,3	-0,00216	0,000171415	0,000280532
60	29/03/2011	502,421	-0,01023	0,000166617	0,0002711
61	30/03/2011	510,857	-0,0136	0,000172432	0,000129836
62	31/03/2011	514,921	0,016651	0,00018453	0,000197209
63	01/04/2011	521,049	0,007924	0,000170673	0,000198176
64	04/04/2011	518,819	0,011831	0,000167265	0,000211482
65	05/04/2011	518,251	-0,00429	0,000151922	0,000117096
66	06/04/2011	521,694	-0,0011	0,000136063	0,000128048
67	07/04/2011	519,152	0,006622	0,000126289	8,94E-05
68	08/04/2011	519,728	-0,00488	0,000116892	8,43E-05
69	11/04/2011	523,229	0,001109	0,000105205	9,18E-05
70	12/04/2011	518,207	0,006714	9,95E-05	9,17E-05



No	Tanggal	JII	Return	GARCH(1,1)	GARCH(3,0)
71	13/04/2011	518,973	0,001477	0,000102376	9,83E-05
72	14/04/2011	515,072	-0,00755	9,26E-05	0,000102309
73	15/04/2011	517,768	0,005221	9,18E-05	0,000125912
74	18/04/2011	516,737	-0,00199	8,59E-05	8,62E-05
75	19/04/2011	518,532	0,003468	7,89E-05	0,000102214
76	20/04/2011	527,529	0,017202	7,30E-05	8,43E-05
77	21/04/2011	529,19	0,003144	9,99E-05	0,000132263
78	25/04/2011	525,29	-0,0074	9,11E-05	0,000115878
79	26/04/2011	521,352	-0,00753	9,02E-05	0,000198381
80	27/04/2011	527,432	0,011595	8,97E-05	9,64E-05
81	28/04/2011	528,152	0,001364	9,59E-05	0,000130463
82	29/04/2011	528,763	0,001156	8,70E-05	0,000114905
83	02/05/2011	532,131	0,006349	7,91E-05	0,000122664
84	03/05/2011	528,195	-0,00742	7,62E-05	7,99E-05
85	04/05/2011	527,207	-0,00187	7,72E-05	8,98E-05
86	05/05/2011	526,817	-0,00074	7,13E-05	9,60E-05
87	06/05/2011	523,666	-0,006	6,55E-05	9,81E-05
88	09/05/2011	523,56	-0,0002	6,55E-05	8,30E-05
89	10/05/2011	524,314	0,001439	6,04E-05	7,87E-05
90	11/05/2011	533,093	0,016605	5,59E-05	8,93E-05
91	12/05/2011	527,961	-0,00967	8,27E-05	0,000125037
92	13/05/2011	528,483	0,000988	8,78E-05	0,000128789
93	16/05/2011	524,931	-0,00674	7,98E-05	0,000191197
94	18/05/2011	531,304	0,012068	7,91E-05	0,000123619
95	19/05/2011	533,263	0,00368	8,80E-05	0,000106648
96	20/05/2011	537,511	0,007934	8,11E-05	0,00011358
97	23/05/2011	524,395	-0,0247	8,05E-05	0,000139448
98	24/05/2011	525,422	0,001957	0,000149394	0,000210404
99	25/05/2011	524,395	-0,00196	0,000133768	0,000181238
100	26/05/2011	530,342	0,011277	0,000120646	0,000326722
101	27/05/2011	531,448	0,002083	0,000122153	9,77E-05
102	30/05/2011	529,412	-0,00384	0,000110039	9,13E-05
103	31/05/2011	531,377	0,003705	0,000101485	0,000123638
104	01/06/2011	532,499	0,002109	9,29E-05	7,82E-05
105	03/06/2011	532,222	-0,00052	8,45E-05	8,18E-05

No	Tanggal	JII	Return	GARCH(1,1)	GARCH(3,0)
106	06/06/2011	531,455	-0,00144	7,71E-05	7,74E-05
107	07/06/2011	531,11	-0,00065	7,09E-05	7,45E-05
108	08/06/2011	528,546	-0,00484	6,52E-05	7,63E-05
109	09/06/2011	525,595	-0,0056	6,35E-05	7,96E-05
110	10/06/2011	520,533	-0,00968	6,31E-05	8,40E-05
111	13/06/2011	515,966	-0,00881	7,07E-05	0,000108884
112	14/06/2011	519,317	0,006474	7,53E-05	0,000117903
113	15/06/2011	521,818	0,004804	7,30E-05	0,000132235
114	16/06/2011	515,458	-0,01226	6,91E-05	0,000115448
115	17/06/2011	510,964	-0,00876	8,30E-05	0,000121871
116	20/06/2011	512,294	0,0026	8,59E-05	0,000118846
117	21/06/2011	520,766	0,016402	7,86E-05	0,000149325
118	22/06/2011	524,096	0,006374	0,000101723	0,000157825
119	23/06/2011	524,698	0,001148	9,60E-05	0,000116096
120	24/06/2011	529,82	0,009714	8,70E-05	0,000179587
121	27/06/2011	525,077	-0,00899	8,90E-05	0,000103956
122	28/06/2011	527,221	0,004075	9,17E-05	0,000102116
123	30/06/2011	536,036	0,016582	8,47E-05	0,000121735
124	01/07/2011	540,918	0,009066	0,000107683	0,000161897
125	04/07/2011	548,477	0,013878	0,000105771	0,000128157
126	05/07/2011	541,928	-0,01201	0,000116627	0,000223235
127	06/07/2011	539,648	-0,00422	0,000123753	0,000157817
128	07/07/2011	542,836	0,00589	0,000113865	0,000170231
129	08/07/2011	552,521	0,017684	0,000105923	0,000143301
130	11/07/2011	550,281	-0,00406	0,000130578	0,000144616
131	12/07/2011	541,597	-0,01591	0,00011965	0,000128898
132	13/07/2011	548,309	0,012317	0,000139864	0,000247697
133	14/07/2011	549,807	0,002728	0,000141712	0,000144977
134	15/07/2011	553,874	0,00737	0,000127393	0,00019952
135	18/07/2011	557,538	0,006593	0,000119873	0,00013945
136	19/07/2011	555,781	-0,00316	0,000112119	8,88E-05
137	20/07/2011	560,523	0,008496	0,000102642	9,95E-05
138	21/07/2011	560,826	0,00054	0,000100253	0,000102468
139	22/07/2011	568,118	0,012918	9,06E-05	8,65E-05
140	25/07/2011	564,358	-0,00664	0,000100491	0,000129722

No	Tanggal	JII	Return	GARCH(1,1)	GARCH(3,0)
141	26/07/2011	572,055	0,013546	9,70E-05	0,000103648
142	27/07/2011	578,742	0,011622	0,000107951	0,000176109
143	28/07/2011	572,237	-0,0113	0,00011197	0,000140863
144	29/07/2011	567,119	-0,00898	0,000117626	0,00018588
145	01/08/2011	574,748	0,013363	0,000116647	0,000159016
146	02/08/2011	570,063	-0,00818	0,000124514	0,000172978
147	03/08/2011	565,338	-0,00832	0,000120918	0,000145445
148	04/08/2011	566,986	0,002911	0,00011807	0,000164831
149	05/08/2011	537,971	-0,05253	0,000106859	0,000113791
150	08/08/2011	530,008	-0,01491	0,000432257	0,000663562
151	09/08/2011	510,248	-0,038	0,000408895	0,000502485
152	10/08/2011	532,199	0,042121	0,000537107	0,001521505
153	11/08/2011	535,723	0,0066	0,000677847	0,000713917
154	12/08/2011	536,382	0,001229	0,000599078	0,000906927
155	15/08/2011	548,387	0,022135	0,000526031	0,000773721
156	16/08/2011	546,323	-0,00377	0,000517747	0,000181898
157	18/08/2011	559,97	0,024673	0,000457225	0,000140232
158	19/08/2011	529,631	-0,0557	0,000471526	0,000380876
159	22/08/2011	533,146	0,006615	0,000791851	0,000787992
160	23/08/2011	537,698	0,008502	0,000698592	0,000743037
161	24/08/2011	532,393	-0,00992	0,000620356	0,001351772
162	25/08/2011	529,612	-0,00524	0,000557604	0,000118023
163	26/08/2011	529,157	-0,00086	0,000493777	0,000119519
164	05/09/2011	534,944	0,010877	0,000434316	0,000119978
165	06/09/2011	540,616	0,010547	0,000394893	0,000107355
166	07/09/2011	557,8	0,031291	0,000359689	0,000108429
167	08/09/2011	555,019	-0,005	0,000429682	0,000320249
168	09/09/2011	552,583	-0,0044	0,000381814	0,000248676
169	12/09/2011	538,737	-0,02538	0,000339289	0,000462502
170	13/09/2011	535,354	-0,0063	0,000379385	0,000220271
171	14/09/2011	526,483	-0,01671	0,000339843	0,00018118
172	15/09/2011	520,072	-0,01225	0,000335253	0,000403696
173	16/09/2011	526,795	0,012844	0,000315273	0,000162509
174	19/09/2011	516,898	-0,01897	0,000296306	0,000242604
175	20/09/2011	517,057	0,000308	0,000307151	0,000232791

<b>No</b>	<b>Tanggal</b>	<b>JII</b>	<b>Return</b>	<b>GARCH(1,1)</b>	<b>GARCH(3,0)</b>
176	21/09/2011	509,415	-0,01489	0,000271216	0,00018527
177	22/09/2011	461,372	-0,09906	0,00026827	0,00026982
178	23/09/2011	468,25	0,014798	0,001419916	0,002079292
179	26/09/2011	451,461	-0,03651	0,001266517	0,001550753
180	27/09/2011	474,481	0,049733	0,001272207	0,004334505
181	28/09/2011	482,54	0,016842	0,00140171	0,000825518
182	29/09/2011	489,026	0,013352	0,00125807	0,001002411
183	30/09/2011	492,298	0,006669	0,001120612	0,00111563
184	03/10/2011	461,966	-0,06359	0,000985583	0,000210844
185	04/10/2011	452,46	-0,02079	0,001353703	0,000962503
186	05/10/2011	454,126	0,003675	0,001238844	0,000734124
187	06/10/2011	474,509	0,043906	0,001085469	0,001776227
188	07/10/2011	472,208	-0,00486	0,001174479	0,000631398
189	10/10/2011	473,667	0,003085	0,001031626	0,000338879
190	11/10/2011	487,036	0,027833	0,00090423	0,000834492
191	12/10/2011	502,495	0,031248	0,000880995	0,000234551
192	13/10/2011	509,573	0,013987	0,000884311	0,000366861
193	14/10/2011	506,827	-0,0054	0,000796417	0,000538845
194	17/10/2011	517,637	0,021105	0,000702423	0,000484532
195	18/10/2011	505,357	-0,02401	0,000666512	0,000236074
196	19/10/2011	515,291	0,019467	0,000656729	0,000263271
197	20/10/2011	505,374	-0,01943	0,00061893	0,000397058
198	21/10/2011	503,45	-0,00381	0,000590907	0,000439385
199	24/10/2011	516,473	0,025539	0,000521118	0,000274742
200	25/10/2011	519,017	0,004914	0,000532353	0,000358646
201	26/10/2011	522,265	0,006238	0,000470012	0,000169305
202	27/10/2011	532,614	0,019622	0,000417193	0,000334438
203	28/10/2011	537,507	0,009145	0,000410588	0,000158688
204	31/10/2011	530,103	-0,01387	0,000370279	0,000151211
205	01/11/2011	513,572	-0,03168	0,000351094	0,000271113
206	02/11/2011	527,043	0,025892	0,000433395	0,000336368
207	03/11/2011	515,914	-0,02134	0,000457916	0,000423618
208	04/11/2011	526,532	0,020372	0,000459918	0,000667691
209	07/11/2011	525,449	-0,00206	0,000451351	0,000475813
210	09/11/2011	538,084	0,023762	0,000397866	0,000317389

<b>No</b>	<b>Tanggal</b>	<b>JII</b>	<b>Return</b>	<b>GARCH(1,1)</b>	<b>GARCH(3,0)</b>
211	10/11/2011	525,775	-0,02314	0,000414582	0,00034128
212	11/11/2011	524,994	-0,00149	0,000431876	0,000259702
213	14/11/2011	535,913	0,020585	0,000380553	0,000366596
214	15/11/2011	531,94	-0,00744	0,0003831	0,00037641
215	16/11/2011	533,046	0,002077	0,000345106	0,000141465
216	17/11/2011	529,983	-0,00576	0,000304609	0,000244129
217	18/11/2011	524,297	-0,01079	0,000273744	0,000105278
218	21/11/2011	513,653	-0,02051	0,000257378	0,000103871
219	22/11/2011	522,921	0,017882	0,000280648	0,000192346
220	23/11/2011	517,499	-0,01042	0,000283877	0,000243113
221	24/11/2011	519,054	0,003	0,000265254	0,000312786
222	25/11/2011	510,14	-0,01732	0,000235359	0,000211786
223	28/11/2011	511,332	0,002334	0,000246638	0,000183359
224	29/11/2011	518,514	0,013948	0,000218777	0,000118627
225	30/11/2011	520,493	0,003809	0,000215472	0,00023557
226	01/12/2011	527,311	0,013014	0,000192464	0,00010106
227	02/12/2011	528,195	0,001675	0,000189631	0,000178879
228	05/12/2011	529,434	0,002343	0,000168798	9,89E-05
229	06/12/2011	527,769	-0,00315	0,000150849	0,000136884
230	07/12/2011	532,714	0,009326	0,000136436	7,62E-05
231	08/12/2011	529,642	-0,00578	0,0001314	9,15E-05
232	09/12/2011	525,071	-0,00867	0,000122613	9,61E-05
233	12/12/2011	531,013	0,011253	0,000120293	0,000125942
234	13/12/2011	527,726	-0,00621	0,000121784	0,000122544
235	14/12/2011	524,185	-0,00673	0,000114886	0,000130289
236	15/12/2011	514,404	-0,01884	0,000109743	0,000135627
237	16/12/2011	522,495	0,015606	0,000143731	0,000171099
238	19/12/2011	525,287	0,005329	0,000155603	0,000189344
239	20/12/2011	521,146	-0,00791	0,000141672	0,000257076
240	21/12/2011	530,03	0,016903	0,000135337	0,000181899
241	22/12/2011	533,499	0,006524	0,000153133	0,00014575
242	23/12/2011	532,766	-0,00137	0,000141046	0,000144611
243	27/12/2011	532,558	-0,00039	0,00012669	0,000186886
244	28/12/2011	529,182	-0,00636	0,000113824	8,80E-05
245	29/12/2011	534,171	0,009384	0,000108184	8,31E-05

No	Tanggal	JII	Return	GARCH(1,1)	GARCH(3,0)
246	30/12/2011	537,031	0,00534	0,000106865	9,50E-05
247	02/01/2012	533,451	-0,00669	9,91E-05	0,000106635
248	03/01/2012	542,176	0,016223	9,59E-05	0,000118
249	04/01/2012	553,077	0,019907	0,000116148	0,000138841
250	05/01/2012	555,232	0,003889	0,000149167	0,000202363
251	06/01/2012	547,611	-0,01382	0,000134662	0,000226308
252	09/01/2012	550,083	0,004504	0,000145298	0,000266548
253	10/01/2012	559,147	0,016343	0,00013182	0,000108163
254	11/01/2012	553,016	-0,01103	0,000147917	0,000206558
255	12/01/2012	552,395	-0,00112	0,00014822	0,00013971
256	13/01/2012	557,344	0,008919	0,000132843	0,0001922
257	16/01/2012	553,793	-0,00639	0,000127433	0,000139706
258	17/01/2012	560,986	0,012905	0,000120114	9,25E-05
259	18/01/2012	565,712	0,008389	0,000126167	0,000138766
260	19/01/2012	568,704	0,005275	0,000120583	0,000124893
261	20/01/2012	568,282	-0,00074	0,000111048	0,000148145
262	24/01/2012	570,54	0,003966	0,000100267	0,000101352
263	25/01/2012	564,631	-0,01041	9,20E-05	8,46E-05
264	26/01/2012	567,45	0,00498	9,78E-05	9,82E-05
265	27/01/2012	570,754	0,005806	9,09E-05	9,76E-05
266	30/01/2012	557,351	-0,02376	8,57E-05	0,000128093
267	31/01/2012	562,535	0,009258	0,000148445	0,000201484
268	01/02/2012	562,364	-0,0003	0,000141738	0,000179058
269	02/02/2012	571,086	0,01539	0,000126939	0,000317392
270	03/02/2012	571,418	0,000581	0,000140179	0,000148495
271	06/02/2012	565,338	-0,0107	0,000125491	0,00010311
272	07/02/2012	564,689	-0,00115	0,000127755	0,000186838
273	08/02/2012	570,415	0,010089	0,000114993	8,98E-05
274	09/02/2012	568,872	-0,00271	0,000114352	0,000140989
275	10/02/2012	560,346	-0,0151	0,000104218	8,81E-05
276	13/02/2012	568,495	0,014438	0,000123312	0,000159319
277	14/02/2012	570,738	0,003938	0,000133753	0,000148329
278	15/02/2012	570,467	-0,00047	0,000121248	0,000198104
279	16/02/2012	562,505	-0,01406	0,000109096	0,000152938
280	17/02/2012	572,046	0,016819	0,000123796	0,000119389

No	Tanggal	JII	Return	GARCH(1,1)	GARCH(3,0)
281	20/02/2012	573,689	0,002868	0,000142734	0,000154913
282	21/02/2012	573,639	-8,7E-05	0,00012836	1,94E-05
283	22/02/2012	570,748	-0,00505	0,000115225	0,000180949
284	23/02/2012	562,08	-0,0153	0,000107457	8,09E-05
285	24/02/2012	550,402	-0,021	0,000126899	0,000126042
286	27/02/2012	545,996	-0,00804	0,00016924	0,000209643
287	28/02/2012	553,259	0,013215	0,000159646	0,000248086
288	29/02/2012	566,754	0,024099	0,000161591	0,000298525
289	01/03/2012	561,822	-0,00874	0,000210263	0,000235203
290	02/03/2012	570,052	0,014543	0,000196946	0,0002308
291	05/03/2012	565,599	-0,00784	0,000198361	0,000348019
292	06/03/2012	561,577	-0,00714	0,000184665	0,000146811
293	07/03/2012	559,098	-0,00442	0,00017136	0,000172963
294	08/03/2012	563,531	0,007898	0,000155654	0,000112309
295	09/03/2012	567,169	0,006435	0,000145427	0,000109719
296	12/03/2012	564,593	-0,00455	0,000134196	9,67E-05
297	13/03/2012	568,199	0,006367	0,000123375	0,000104695
298	14/03/2012	575,711	0,013134	0,000114855	9,74E-05
299	15/03/2012	571,966	-0,00653	0,000122259	0,000119437
300	16/03/2012	566,907	-0,00888	0,000115823	0,000118192
301	19/03/2012	566,905	-3,5E-06	0,000114849	1,61E-05
302	20/03/2012	566,16	-0,00132	0,000103422	0,000103638
303	21/03/2012	570,903	0,008343	9,38E-05	0,000107818
304	22/03/2012	570,791	-0,0002	9,23E-05	8,55E-05
305	26/03/2012	569,017	-0,00311	8,37E-05	8,23E-05
306	27/03/2012	576,621	0,013275	7,78E-05	0,000100141
307	28/03/2012	577,592	0,001683	9,04E-05	0,000107301
308	29/03/2012	579,334	0,003011	8,22E-05	0,000100232
309	30/03/2012	584,06	0,008125	7,56E-05	0,000140143
310	02/04/2012	588,1	0,006893	7,60E-05	8,59E-05
311	03/04/2012	593,074	0,008422	7,42E-05	9,16E-05
312	04/04/2012	576,96	-0,02755	7,53E-05	0,000114668
313	05/04/2012	581,009	0,006993	0,000163002	0,000254053
314	09/04/2012	579,4	-0,00277	0,000150353	0,000212888
315	10/04/2012	577,941	-0,00252	0,000135688	0,000393582



No	Tanggal	JII	Return	GARCH(1,1)	GARCH(3,0)
316	11/04/2012	572,811	-0,00892	0,000122697	9,29E-05
317	12/04/2012	572,685	-0,00022	0,000120919	9,52E-05
318	13/04/2012	575,589	0,005058	0,000108753	8,79E-05
319	16/04/2012	570,615	-0,00868	0,000100485	0,000111765
320	17/04/2012	571,614	0,001749	0,000101007	9,21E-05
321	18/04/2012	574,26	0,004618	9,15E-05	9,27E-05
322	19/04/2012	571,724	-0,00443	8,50E-05	0,000109424
323	20/04/2012	574,032	0,004029	8,03E-05	8,03E-05
324	23/04/2012	570,083	-0,0069	7,46E-05	8,53E-05
325	24/04/2012	571,792	0,002993	7,49E-05	9,44E-05
326	25/04/2012	569,491	-0,00403	6,92E-05	8,63E-05
327	26/04/2012	570,546	0,001851	6,61E-05	9,89E-05
328	27/04/2012	572,787	0,00392	6,10E-05	7,82E-05
329	30/04/2012	575,088	0,004009	5,78E-05	8,32E-05
330	01/05/2012	577,299	0,003837	5,50E-05	7,75E-05
331	02/05/2012	582,692	0,009298	5,24E-05	8,15E-05
332	03/05/2012	583,334	0,001101	5,80E-05	9,49E-05
333	04/05/2012	580,754	-0,00443	5,38E-05	8,79E-05
334	07/05/2012	572,372	-0,01454	5,31E-05	0,000108787
335	08/05/2012	575,194	0,004918	7,66E-05	0,000120562
336	09/05/2012	564,783	-0,01827	7,23E-05	0,000116358
337	10/05/2012	567,406	0,004634	0,00010847	0,000234576
338	11/05/2012	562,133	-0,00934	9,98E-05	0,000131525
339	14/05/2012	555,611	-0,01167	0,00010191	0,000233759
340	15/05/2012	554,611	-0,0018	0,000109898	0,000121713
341	16/05/2012	548,334	-0,01138	9,97E-05	0,000131485
342	21/05/2012	540,184	-0,01497	0,000107162	0,000159551
343	22/05/2012	550,239	0,018443	0,000125411	0,000140727
344	23/05/2012	545,446	-0,00875	0,000150753	0,000225273
345	24/05/2012	544,454	-0,00182	0,00014503	0,000228282
346	25/05/2012	531,239	-0,02457	0,000130395	0,000214879
347	28/05/2012	533,03	0,003366	0,000192185	0,000231557
348	29/05/2012	534,052	0,001916	0,00017182	0,000161038
349	30/05/2012	536,681	0,004911	0,000153326	0,000324229
350	31/05/2012	525,052	-0,02191	0,000139228	8,03E-05



No	Tanggal	JII	Return	GARCH(1,1)	GARCH(3,0)
351	01/06/2012	519,836	-0,00998	0,00018478	0,000175635
352	04/06/2012	498,03	-0,04285	0,000177646	0,000169853
353	05/06/2012	510,315	0,024368	0,000382745	0,00066059
354	06/06/2012	527,915	0,033907	0,000404784	0,000484453
355	07/06/2012	528,793	0,001662	0,00048902	0,001123754
356	08/06/2012	526,869	-0,00365	0,000430074	0,000454416
357	11/06/2012	530,559	0,006979	0,000380585	0,000524761
358	12/06/2012	530,869	0,000584	0,000340218	8,39E-05
359	13/06/2012	532,742	0,003522	0,000300067	8,50E-05
360	14/06/2012	521,985	-0,0204	0,000266078	9,16E-05
361	15/06/2012	525,682	0,007058	0,000287679	0,000160339
362	18/06/2012	531,667	0,011321	0,00025926	0,000143963
363	19/06/2012	535,401	0,006999	0,000243236	0,000275733
364	20/06/2012	545,996	0,019596	0,000220383	0,000114842
365	21/06/2012	538,139	-0,01449	0,00023871	0,000199223
366	22/06/2012	536,224	-0,00356	0,000238466	0,000184092
367	25/06/2012	529,903	-0,01186	0,000213287	0,000252997
368	26/06/2012	536,11	0,011645	0,000207649	0,000193872
369	27/06/2012	541,618	0,010222	0,00019904	0,000124469
370	28/06/2012	533,777	-0,01458	0,000188004	0,000169129
371	29/06/2012	544,19	0,01932	0,00019453	0,000180864
372	02/07/2012	552,122	0,014471	0,000214908	0,000212729
373	03/07/2012	562,704	0,018985	0,000213797	0,000250479
374	04/07/2012	569,656	0,012279	0,000230234	0,000310926
375	05/07/2012	567,403	-0,00396	0,000220474	0,000226254
376	06/07/2012	563,918	-0,00616	0,000197994	0,000233295
377	09/07/2012	551,524	-0,02222	0,000181318	0,000140014
378	10/07/2012	557,358	0,010522	0,000223221	0,000188453
379	11/07/2012	560,168	0,005029	0,00020981	0,000179821
380	12/07/2012	551,736	-0,01517	0,000188647	0,000295898
381	13/07/2012	557,98	0,011253	0,000197241	0,000164701
382	16/07/2012	561,122	0,005615	0,000188939	0,000137375
383	17/07/2012	566,363	0,009297	0,000171099	0,000191104
384	18/07/2012	565,576	-0,00139	0,000161589	0,000138796
385	19/07/2012	566,322	0,001318	0,000144626	9,46E-05

No	Tanggal	JII	Return	GARCH(1,1)	GARCH(3,0)
386	20/07/2012	561,332	-0,00885	0,000129441	0,000104611
387	23/07/2012	551,113	-0,01837	0,000126657	9,11E-05
388	24/07/2012	547,297	-0,00695	0,000156378	0,000155005
389	25/07/2012	548,252	0,001743	0,000146333	0,00016574
390	26/07/2012	550,705	0,004464	0,00013103	0,000221669
391	27/07/2012	563,878	0,023639	0,000119331	9,78E-05
392	30/07/2012	565,824	0,003445	0,000170823	0,000182941
393	31/07/2012	573,731	0,013878	0,000153232	0,00015398
394	01/08/2012	574,507	0,001352	0,000158046	0,000325556
395	02/08/2012	567,417	-0,01242	0,00014116	0,00010088
396	03/08/2012	569,883	0,004337	0,000146397	0,00017797
397	06/08/2012	572,202	0,004061	0,000132624	9,83E-05
398	07/08/2012	568,351	-0,00675	0,000120365	0,000143237
399	08/08/2012	569,352	0,00176	0,000114559	9,07E-05
400	09/08/2012	575,658	0,011015	0,000103306	8,51E-05
401	10/08/2012	578,382	0,004721	0,000106359	0,000115743
402	13/08/2012	571,891	-0,01129	9,80E-05	9,21E-05
403	14/08/2012	576,209	0,007522	0,000105425	0,000147262
404	15/08/2012	582,471	0,010809	0,000100951	0,000108549
405	16/08/2012	585,225	0,004717	0,000103795	0,000155751
406	23/08/2012	583,529	-0,0029	9,58E-05	0,000110969
407	24/08/2012	580,192	-0,00574	8,82E-05	0,000120369
408	27/08/2012	579,491	-0,00121	8,48E-05	8,89E-05
409	28/08/2012	579,98	0,000843	7,76E-05	8,26E-05
410	29/08/2012	575,869	-0,00711	7,08E-05	8,81E-05
411	30/08/2012	566,449	-0,01649	7,20E-05	8,49E-05
412	31/08/2012	569,935	0,006135	0,000100611	0,000137397
413	03/09/2012	577,898	0,013875	9,47E-05	0,000140597
414	04/09/2012	577,271	-0,00109	0,000106935	0,000227597
415	05/09/2012	569,997	-0,01268	9,68E-05	0,000110556
416	06/09/2012	574,104	0,007179	0,000108503	0,000179497
417	07/09/2012	580,863	0,011704	0,000103082	0,000105826
418	10/09/2012	587,635	0,011591	0,00010794	0,000172832
419	11/09/2012	585,911	-0,00294	0,00011188	0,000132906
420	12/09/2012	590,608	0,007985	0,000102245	0,000142602

No	Tanggal	JII	Return	GARCH(1,1)	GARCH(3,0)
421	13/09/2012	590,091	-0,00088	9,90E-05	0,000135345
422	14/09/2012	604,785	0,024596	8,98E-05	8,51E-05
423	17/09/2012	605,76	0,001611	0,000150405	0,000212191
424	18/09/2012	601,662	-0,00679	0,000134549	0,000152746
425	19/09/2012	605,385	0,006169	0,000126999	0,000316942
426	20/09/2012	598,158	-0,01201	0,000117748	8,67E-05
427	21/09/2012	602,629	0,007447	0,000124723	0,000128657
428	24/09/2012	592,697	-0,01662	0,000117668	0,000116527
429	25/09/2012	596,991	0,007219	0,000140986	0,00019905
430	26/09/2012	585,855	-0,01883	0,000131493	0,000140867
431	27/09/2012	593,241	0,012528	0,000162685	0,000269023
432	28/09/2012	600,84	0,012728	0,000162227	0,000170521
433	01/10/2012	594,641	-0,01037	0,000162402	0,000270991
434	02/10/2012	599,459	0,00807	0,000159106	0,000174937
435	03/10/2012	599,187	-0,00045	0,000148744	0,000160566
436	04/10/2012	605,746	0,010887	0,000133086	0,000127238
437	05/10/2012	616,807	0,018095	0,000132032	0,000117838
438	08/10/2012	610,242	-0,0107	0,000155063	0,00014997
439	09/10/2012	610,053	-0,00031	0,000153573	0,000183387
440	10/10/2012	610,65	0,000978	0,000137268	0,000214393
441	11/10/2012	612,06	0,002306	0,000122972	0,000122181
442	12/10/2012	613,325	0,002065	0,000110841	7,35E-05
443	15/10/2012	612,143	-0,00193	0,00010016	7,36E-05
444	16/10/2012	616,872	0,007696	9,13E-05	7,54E-05
445	17/10/2012	617,794	0,001494	8,89E-05	8,49E-05
446	18/10/2012	621,647	0,006217	8,09E-05	8,21E-05
447	19/10/2012	616,778	-0,00786	7,75E-05	0,000100508
448	22/10/2012	617,314	0,000869	7,93E-05	9,12E-05
449	23/10/2012	613,67	-0,00592	7,23E-05	9,53E-05
450	24/10/2012	616,32	0,004309	7,13E-05	0,000108058
451	25/10/2012	615,449	-0,00141	6,71E-05	8,11E-05
452	29/10/2012	614,068	-0,00225	6,21E-05	9,13E-05
453	30/10/2012	618,899	0,007836	5,83E-05	8,04E-05
454	31/10/2012	619,27	0,000599	6,04E-05	8,58E-05
455	01/11/2012	616,945	-0,00376	5,58E-05	8,28E-05

No	Tanggal	JII	Return	GARCH(1,1)	GARCH(3,0)
456	02/11/2012	616,415	-0,00086	5,41E-05	9,80E-05
457	05/11/2012	610,622	-0,00944	5,06E-05	7,52E-05
458	06/11/2012	611,361	0,00121	5,92E-05	9,92E-05
459	07/11/2012	617,871	0,010592	5,49E-05	8,65E-05
460	08/11/2012	614,927	-0,00478	6,31E-05	0,000132184
461	09/11/2012	612,369	-0,00417	6,16E-05	9,22E-05
462	12/11/2012	608,276	-0,00671	5,96E-05	0,000121758
463	13/11/2012	608,939	0,001089	6,14E-05	9,63E-05
464	14/11/2012	611,056	0,003471	5,68E-05	8,79E-05
465	19/11/2012	605,513	-0,00911	5,37E-05	9,48E-05
466	20/11/2012	604,552	-0,00159	6,12E-05	9,21E-05
467	21/11/2012	604,313	-0,0004	5,71E-05	8,94E-05
468	22/11/2012	607,073	0,004557	5,31E-05	0,000109596
469	23/11/2012	607,736	0,001092	5,14E-05	7,76E-05
470	26/11/2012	611,687	0,00648	4,80E-05	7,52E-05
471	27/11/2012	604,113	-0,01246	4,93E-05	8,67E-05
472	28/11/2012	595,57	-0,01424	6,63E-05	0,000110779
473	29/11/2012	597,274	0,002857	8,71E-05	0,000152634
474	30/11/2012	588,776	-0,01433	7,98E-05	0,000169327
475	03/12/2012	588,448	-0,00056	9,92E-05	0,000202863
476	04/12/2012	587,274	-0,002	8,99E-05	0,000104605
477	05/12/2012	588,994	0,002925	8,24E-05	0,00016095
478	06/12/2012	589,861	0,001471	7,57E-05	7,49E-05
479	07/12/2012	590,644	0,001327	6,93E-05	7,59E-05
480	10/12/2012	591,79	0,001938	6,37E-05	7,53E-05
481	11/12/2012	595,461	0,006184	5,90E-05	7,35E-05
482	12/12/2012	597,488	0,003398	5,84E-05	7,89E-05
483	13/12/2012	593,832	-0,00614	5,51E-05	7,97E-05
484	14/12/2012	593,721	-0,00019	5,66E-05	9,56E-05
485	17/12/2012	594,437	0,001205	5,26E-05	8,20E-05
486	18/12/2012	593,16	-0,00215	4,91E-05	8,99E-05
487	19/12/2012	590,926	-0,00377	4,69E-05	7,41E-05
488	20/12/2012	584,286	-0,0113	4,63E-05	7,72E-05
489	21/12/2012	586,093	0,003088	6,03E-05	0,00010498
490	26/12/2012	587,401	0,002229	5,66E-05	9,96E-05

No	Tanggal	JII	Return	GARCH(1,1)	GARCH(3,0)
491	27/12/2012	590,455	0,005186	5,28E-05	0,000129143
492	28/12/2012	594,789	0,007313	5,18E-05	8,03E-05
493	02/01/2013	602,073	0,012172	5,38E-05	8,63E-05
494	03/01/2013	612,339	0,016907	6,62E-05	0,000115546
495	04/01/2013	611,797	-0,00089	9,28E-05	0,00016443
496	07/01/2013	607,12	-0,00767	8,44E-05	0,000164946
497	08/01/2013	606,579	-0,00089	8,49E-05	0,000194567
498	09/01/2013	600,603	-0,0099	7,75E-05	8,24E-05
499	10/01/2013	592,112	-0,01424	8,38E-05	0,000120268
500	11/01/2013	590,345	-0,00299	0,000102371	0,000130569
501	14/01/2013	602,804	0,020885	9,40E-05	0,000146685
502	15/01/2013	606,274	0,00574	0,000134457	0,000243683
503	16/01/2013	607,899	0,002677	0,000123705	0,00013961
504	17/01/2013	602,804	-0,00842	0,000111652	0,00024491
505	18/01/2013	615,444	0,020752	0,000110182	0,000100094
506	21/01/2013	610,287	-0,00841	0,000147946	0,000167588
507	22/01/2013	609,291	-0,00163	0,000141852	0,000175458
508	23/01/2013	608,162	-0,00185	0,00012752	0,000249341
509	25/01/2013	608,625	0,000761	0,000115133	0,000105389
510	28/01/2013	604,901	-0,00614	0,000103638	7,49E-05
511	29/01/2013	608,602	0,0061	9,89E-05	8,32E-05
512	30/01/2013	608,935	0,000547	9,32E-05	8,48E-05
513	31/01/2013	604,61	-0,00713	8,45E-05	9,41E-05
514	01/02/2013	606,257	0,00272	8,39E-05	9,68E-05
515	04/02/2013	608,689	0,004003	7,69E-05	8,13E-05
516	05/02/2013	609,587	0,001474	7,17E-05	9,86E-05
517	06/02/2013	612,28	0,004408	6,58E-05	7,66E-05
518	07/02/2013	611,407	-0,00143	6,24E-05	8,09E-05
519	08/02/2013	611,504	0,000159	5,81E-05	7,58E-05
520	11/02/2013	612,914	0,002303	5,39E-05	7,93E-05
521	12/02/2013	621,24	0,013493	5,05E-05	7,46E-05
522	13/02/2013	624,342	0,004981	6,72E-05	0,000107082
523	14/02/2013	624,019	-0,00052	6,41E-05	0,000101227
524	15/02/2013	626,243	0,003558	5,93E-05	0,000143849
525	18/02/2013	624,444	-0,00288	5,60E-05	8,29E-05

No	Tanggal	JII	Return	GARCH(1,1)	GARCH(3,0)
526	19/02/2013	620,352	-0,00657	5,34E-05	7,64E-05
527	20/02/2013	624,614	0,006847	5,58E-05	8,77E-05
528	21/02/2013	624,72	0,00017	5,66E-05	9,17E-05
529	22/02/2013	625,492	0,001235	5,25E-05	9,77E-05
530	25/02/2013	630,496	0,007968	4,91E-05	8,91E-05
531	26/02/2013	626,807	-0,00587	5,25E-05	8,40E-05
532	27/02/2013	635,858	0,014337	5,39E-05	8,84E-05
533	28/02/2013	645,219	0,014615	7,29E-05	0,000139269
534	01/03/2013	652,114	0,01063	9,03E-05	0,000154794
535	04/03/2013	646,859	-0,00809	9,41E-05	0,000198072
536	05/03/2013	648,65	0,002765	9,42E-05	0,000181698
537	06/03/2013	661,117	0,019038	8,59E-05	0,000125117
538	07/03/2013	662,956	0,002778	0,000118858	0,000171402
539	08/03/2013	668,46	0,008268	0,000107474	0,000122808
540	11/03/2013	660,306	-0,01227	0,000104045	0,000224196
541	13/03/2013	656,211	-0,00622	0,000113561	0,000115238
542	14/03/2013	645,376	-0,01665	0,000107729	0,000127818
543	15/03/2013	648,639	0,005043	0,000132439	0,000201214
544	18/03/2013	650,993	0,003623	0,00012114	0,000134
545	19/03/2013	650,019	-0,0015	0,000109999	0,000194132
546	20/03/2013	651,142	0,001726	9,97E-05	8,32E-05
547	21/03/2013	646,12	-0,00774	9,03E-05	7,74E-05
548	22/03/2013	630,614	-0,02429	9,02E-05	8,75E-05
549	25/03/2013	640,857	0,016112	0,000155394	0,000204135
550	26/03/2013	649,876	0,013975	0,000167628	0,000231216
551	27/03/2013	660,333	0,015963	0,000170921	0,000387074
552	28/03/2013	660,337	6,06E-06	0,000180626	2,44E-05
553	01/04/2013	658,055	-0,00346	0,000160824	0,000178793
554	02/04/2013	662,145	0,006196	0,000145428	0,000172175
555	03/04/2013	669,778	0,011462	0,000133869	8,13E-05
556	04/04/2013	659,339	-0,01571	0,00013417	0,000107372
557	05/04/2013	656,545	-0,00425	0,000151761	0,000154302
558	08/04/2013	655,311	-0,00188	0,000138343	0,000160937
559	09/04/2013	656,951	0,0025	0,000124594	0,000180714
560	10/04/2013	653,381	-0,00545	0,000112342	8,28E-05

No	Tanggal	JII	Return	GARCH(1,1)	GARCH(3,0)
561	11/04/2013	660,087	0,010211	0,00010549	8,21E-05
562	12/04/2013	660,704	0,000934	0,000106337	9,80E-05
563	15/04/2013	655,728	-0,00756	9,60E-05	9,94E-05
564	16/04/2013	667,887	0,018373	9,48E-05	0,000123592
565	17/04/2013	673,003	0,007631	0,000123702	0,000145536
566	18/04/2013	674,024	0,001516	0,000117084	0,000152098
567	19/04/2013	672,388	-0,00243	0,000105446	0,000208727
568	22/04/2013	674,375	0,002951	9,62E-05	9,51E-05
569	23/04/2013	673,488	-0,00132	8,78E-05	7,54E-05
570	24/04/2013	678,951	0,008079	8,02E-05	7,72E-05
571	25/04/2013	671,849	-0,01052	7,99E-05	8,72E-05
572	26/04/2013	664,636	-0,01079	8,75E-05	0,000105546
573	29/04/2013	670,939	0,009439	9,49E-05	0,000137308
574	30/04/2013	682,691	0,017364	9,54E-05	0,000153705
575	01/05/2013	682,846	0,000227	0,000120059	0,000191167
576	02/05/2013	674,963	-0,01161	0,000107945	0,000143968
577	03/05/2013	665,406	-0,01426	0,000114994	0,000216271
578	06/05/2013	673,554	0,012171	0,000129664	0,000135212
579	07/05/2013	677,039	0,005161	0,000132404	0,000187291
580	08/05/2013	683,669	0,009745	0,000121237	0,000182026
581	10/05/2013	684,845	0,001719	0,000119032	0,0001481
582	13/05/2013	679,324	-0,00809	0,000107198	9,36E-05
583	14/05/2013	682,213	0,004244	0,000105619	0,000121979
584	15/05/2013	681,707	-0,00074	9,70E-05	8,59E-05
585	16/05/2013	681,489	-0,00032	8,80E-05	0,000103802
586	17/05/2013	696,581	0,021904	8,00E-05	7,86E-05
587	20/05/2013	709,461	0,018321	0,000127325	0,000165181
588	21/05/2013	703,323	-0,00869	0,000151907	0,000199243
589	22/05/2013	708,1	0,006769	0,000145905	0,000317215
590	23/05/2013	694,792	-0,01897	0,000135095	0,00022001
591	24/05/2013	701,254	0,009258	0,000166492	0,0001863
592	27/05/2013	685,35	-0,02294	0,000157487	0,000155242
593	28/05/2013	701,962	0,02395	0,000206377	0,000342652
594	29/05/2013	705,97	0,005693	0,000248513	0,000288252
595	30/05/2013	689,999	-0,02288	0,000223185	0,000371681



No	Tanggal	JII	Return	GARCH(1,1)	GARCH(3,0)
596	31/05/2013	676,583	-0,01964	0,000263389	0,000406196
597	03/06/2013	665,625	-0,01633	0,00028159	0,000237635
598	04/06/2013	677,35	0,017462	0,000282866	0,00040058
599	05/06/2013	674,404	-0,00436	0,000284096	0,000329591
600	07/06/2013	647,278	-0,04105	0,000253963	0,000228813
601	10/06/2013	634,293	-0,02026	0,000431113	0,000535111
602	11/06/2013	608,881	-0,04089	0,000431042	0,000400571
603	12/06/2013	635,103	0,042164	0,000584016	0,001159878
604	13/06/2013	618,565	-0,02638	0,000719219	0,000823139
605	14/06/2013	640,218	0,034406	0,000717309	0,00113558
606	17/06/2013	642,789	0,004008	0,000765764	0,001097855
607	18/06/2013	649,351	0,010157	0,000672868	0,000519493
608	19/06/2013	642,421	-0,01073	0,000601369	0,000555374
609	20/06/2013	618,389	-0,03813	0,000543146	0,000115319
610	21/06/2013	596,67	-0,03575	0,000655474	0,000423869
611	24/06/2013	585,773	-0,01843	0,000732298	0,000585192
612	25/06/2013	583,403	-0,00405	0,000685194	0,000916004
613	26/06/2013	616,886	0,055806	0,00060366	0,0006487
614	27/06/2013	634,272	0,027794	0,000893863	0,000829596
615	28/06/2013	660,165	0,040012	0,000871689	0,00064624
616	01/07/2013	648,254	-0,01821	0,000949475	0,001714599



## Lampiran 2

### Uji Stasioneritas ADF untuk Data *Return JII*

Null Hypothesis: RETURN\_JII has a unit root  
 Exogenous: Constant  
 Lag Length: 6 (Automatic - based on SIC, maxlag=18)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-10.46650	0.0000
Test critical values: 1% level	-3.440876	
5% level	-2.866075	
10% level	-2.569244	

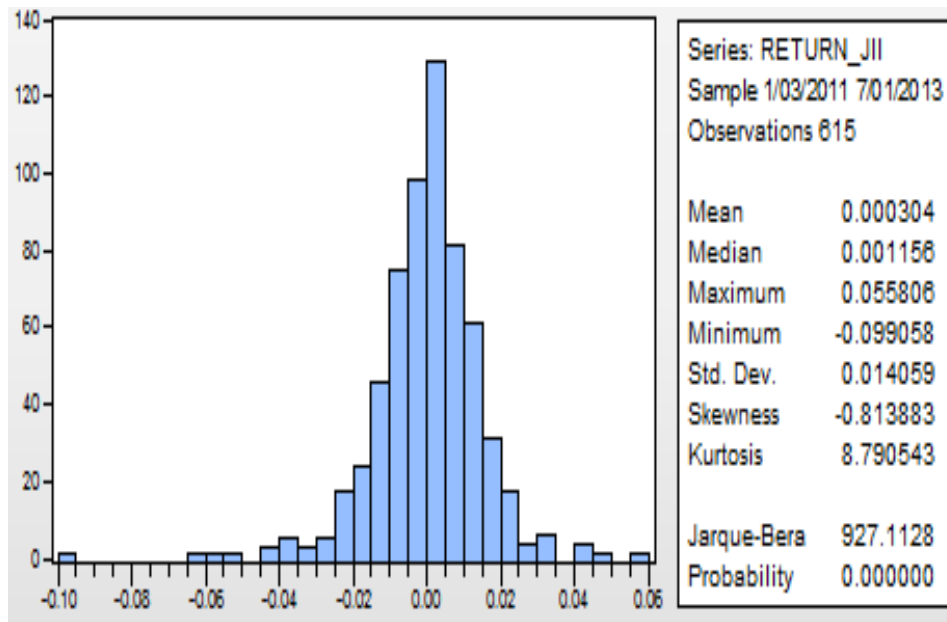
\*Mackinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(RETURN\_JII)  
 Method: Least Squares  
 Date: 07/27/13 Time: 11:26  
 Sample (adjusted): 1/13/2011 7/01/2013  
 Included observations: 608 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RETURN_JII(-1)	-1.297275	0.123945	-10.46650	0.0000
D(RETURN_JII(-1))	0.298839	0.110492	2.704613	0.0070
D(RETURN_JII(-2))	0.334343	0.098624	3.390094	0.0007
D(RETURN_JII(-3))	0.116070	0.085156	1.363040	0.1734
D(RETURN_JII(-4))	0.031709	0.070407	0.450368	0.6526
D(RETURN_JII(-5))	0.050755	0.058095	0.873659	0.3827
D(RETURN_JII(-6))	-0.103434	0.041044	-2.520114	0.0120
C	0.000479	0.000543	0.882079	0.3781
R-squared	0.547653	Mean dependent var		-8.05E-05
Adjusted R-squared	0.542376	S.D. dependent var		0.019762
S.E. of regression	0.013369	Akaike info criterion		-5.778744
Sum squared resid	0.107232	Schwarz criterion		-5.720716
Log likelihood	1764.738	Hannan-Quinn criter.		-5.756168
F-statistic	103.7738	Durbin-Watson stat		2.000619

### Lampiran 3

#### Pengujian Normalitas Jarque-Bera RETURN\_JII



## Lampiran 4

### Model Kondisional *Mean* (*Mean Bersyarat*)

#### 1. ARIMA (1,0,0)

##### a. Dengan konstanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 11:29  
 Sample (adjusted): 1/05/2011 7/01/2013  
 Included observations: 614 after adjustments  
 Convergence achieved after 2 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000303	0.000573	0.527651	0.5979
AR(1)	0.008944	0.040478	0.220956	0.8252
R-squared	0.000080	Mean dependent var		0.000303
Adjusted R-squared	-0.001554	S.D. dependent var		0.014070
S.E. of regression	0.014081	Akaike info criterion		-5.684731
Sum squared resid	0.121344	Schwarz criterion		-5.670333
Log likelihood	1747.212	Hannan-Quinn criter.		-5.679132
F-statistic	0.048821	Durbin-Watson stat		1.997885
Prob(F-statistic)	0.825201			
Inverted AR Roots	.01			

##### b. Tanpa konstanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 11:27  
 Sample (adjusted): 1/05/2011 7/01/2013  
 Included observations: 614 after adjustments  
 Convergence achieved after 2 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	0.009452	0.040443	0.233717	NA
R-squared	-0.000375	Mean dependent var		0.000303
Adjusted R-squared	-0.000375	S.D. dependent var		0.014070
S.E. of regression	0.014073	Akaike info criterion		-5.687533
Sum squared resid	0.121399	Schwarz criterion		-5.680335
Log likelihood	1747.073	Hannan-Quinn criter.		-5.684734
Durbin-Watson stat	1.998031			
Inverted AR Roots	.01			

## 2. ARIMA (0,0,1)

### a. Dengan konstanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 11:30  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 6 iterations  
 MA Backcast: 1/03/2011

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000304	0.000572	0.531349	0.5954
MA(1)	0.008156	0.040450	0.201629	0.8403
R-squared	0.000073	Mean dependent var		0.000304
Adjusted R-squared	-0.001558	S.D. dependent var		0.014059
S.E. of regression	0.014070	Akaike info criterion		-5.686356
Sum squared resid	0.121345	Schwarz criterion		-5.671977
Log likelihood	1750.555	Hannan-Quinn criter.		-5.680765
F-statistic	0.044654	Durbin-Watson stat		1.996272
Prob(F-statistic)	0.832712			
Inverted MA Roots	-0.1			

### b. Tanpa konstanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 11:28  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 6 iterations  
 MA Backcast: 1/03/2011

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MA(1)	0.008612	0.040415	0.213083	0.8313
R-squared	-0.000387	Mean dependent var		0.000304
Adjusted R-squared	-0.000387	S.D. dependent var		0.014059
S.E. of regression	0.014061	Akaike info criterion		-5.689148
Sum squared resid	0.121401	Schwarz criterion		-5.681958
Log likelihood	1750.413	Hannan-Quinn criter.		-5.686352
Durbin-Watson stat	1.996302			
Inverted MA Roots	-0.1			

### 3. ARIMA (1,0,1)

#### a. Dengan konstanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 11:29  
 Sample (adjusted): 1/05/2011 7/01/2013  
 Included observations: 614 after adjustments  
 Convergence achieved after 18 iterations  
 MA Backcast: 1/04/2011

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000302	0.000576	0.525083	0.5997
AR(1)	0.111529	3.529409	0.031600	0.9748
MA(1)	-0.100235	3.533910	-0.028364	0.9774
R-squared	0.000128	Mean dependent var		0.000303
Adjusted R-squared	-0.003145	S.D. dependent var		0.014070
S.E. of regression	0.014092	Akaike info criterion		-5.681522
Sum squared resid	0.121338	Schwarz criterion		-5.659926
Log likelihood	1747.227	Hannan-Quinn criter.		-5.673124
F-statistic	0.039219	Durbin-Watson stat		2.002263
Prob(F-statistic)	0.961542			
Inverted AR Roots	.11			
Inverted MA Roots	.10			

#### b. Tanpa konstanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 11:28  
 Sample (adjusted): 1/05/2011 7/01/2013  
 Included observations: 614 after adjustments  
 Convergence achieved after 16 iterations  
 MA Backcast: 1/04/2011

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	0.112021	3.320959	0.033731	0.9731
MA(1)	-0.100184	3.325412	-0.030127	0.9760
R-squared	-0.000323	Mean dependent var		0.000303
Adjusted R-squared	-0.001957	S.D. dependent var		0.014070
S.E. of regression	0.014084	Akaike info criterion		-5.684328
Sum squared resid	0.121393	Schwarz criterion		-5.669931
Log likelihood	1747.089	Hannan-Quinn criter.		-5.678730
Durbin-Watson stat	2.002453			
Inverted AR Roots	.11			
Inverted MA Roots	.10			

#### 4. ARIMA (2,0,0)

##### a. Dengan Konsanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 12:36  
 Sample (adjusted): 1/06/2011 7/01/2013  
 Included observations: 613 after adjustments  
 Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000302	0.000596	0.505781	0.6132
AR(2)	0.046603	0.040735	1.144051	0.2531
R-squared	0.002138	Mean dependent var		0.000300
Adjusted R-squared	0.000504	S.D. dependent var		0.014081
S.E. of regression	0.014078	Akaike info criterion		-5.685172
Sum squared resid	0.121091	Schwarz criterion		-5.670757
Log likelihood	1744.505	Hannan-Quinn criter.		-5.679566
F-statistic	1.308852	Durbin-Watson stat		1.958968
Prob(F-statistic)	0.253051			
Inverted AR Roots	.22	-.22		

##### b. Tanpa Konstanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 12:36  
 Sample (adjusted): 1/06/2011 7/01/2013  
 Included observations: 613 after adjustments  
 Convergence achieved after 2 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(2)	0.047001	0.040703	1.154733	0.2487
R-squared	0.001720	Mean dependent var		0.000300
Adjusted R-squared	0.001720	S.D. dependent var		0.014081
S.E. of regression	0.014069	Akaike info criterion		-5.688017
Sum squared resid	0.121142	Schwarz criterion		-5.680809
Log likelihood	1744.377	Hannan-Quinn criter.		-5.685213
Durbin-Watson stat	1.957999			
Inverted AR Roots	.22	-.22		

## 5. ARIMA (0,0,2)

### a. Dengan Konstanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 12:38  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 6 iterations  
 MA Backcast: 12/31/2010 1/03/2011

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000306	0.000599	0.510839	0.6096
MA(2)	0.057902	0.040586	1.426671	0.1542
R-squared	0.002680	Mean dependent var		0.000304
Adjusted R-squared	0.001053	S.D. dependent var		0.014059
S.E. of regression	0.014051	Akaike info criterion		-5.688967
Sum squared resid	0.121029	Schwarz criterion		-5.674588
Log likelihood	1751.357	Hannan-Quinn criter.		-5.683376
F-statistic	1.647333	Durbin-Watson stat		1.958617
Prob(F-statistic)	0.199807			

### b. Tanpa konstanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 12:37  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 6 iterations  
 MA Backcast: 12/31/2010 1/03/2011

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MA(2)	0.058341	0.040552	1.438673	0.1508
R-squared	0.002256	Mean dependent var		0.000304
Adjusted R-squared	0.002256	S.D. dependent var		0.014059
S.E. of regression	0.014043	Akaike info criterion		-5.691794
Sum squared resid	0.121080	Schwarz criterion		-5.684604
Log likelihood	1751.227	Hannan-Quinn criter.		-5.688998
Durbin-Watson stat	1.957641			



## 6. ARIMA (2,0,2)

### a. Dengan konstanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 12:39  
 Sample (adjusted): 1/06/2011 7/01/2013  
 Included observations: 613 after adjustments  
 Convergence achieved after 9 iterations  
 MA Backcast: 1/04/2011 1/05/2011

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000300	0.000589	0.509470	0.6106
AR(2)	-0.514313	0.293062	-1.754960	0.0798
MA(2)	0.571216	0.280059	2.039623	0.0418
R-squared	0.006968	Mean dependent var		0.000300
Adjusted R-squared	0.003712	S.D. dependent var		0.014081
S.E. of regression	0.014055	Akaike info criterion		-5.686762
Sum squared resid	0.120505	Schwarz criterion		-5.665139
Log likelihood	1745.993	Hannan-Quinn criter.		-5.678353
F-statistic	2.140057	Durbin-Watson stat		1.971240
Prob(F-statistic)	0.118531			

### b. Tanpa Konstanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 12:39  
 Sample (adjusted): 1/06/2011 7/01/2013  
 Included observations: 613 after adjustments  
 Convergence achieved after 9 iterations  
 MA Backcast: 1/04/2011 1/05/2011

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(2)	-0.510322	0.294556	-1.732510	0.0837
MA(2)	0.567711	0.281531	2.016515	0.0442
R-squared	0.006545	Mean dependent var		0.000300
Adjusted R-squared	0.004919	S.D. dependent var		0.014081
S.E. of regression	0.014047	Akaike info criterion		-5.689599
Sum squared resid	0.120557	Schwarz criterion		-5.675184
Log likelihood	1745.862	Hannan-Quinn criter.		-5.683993
Durbin-Watson stat	1.970359			



## 7. ARIMA (3,0,0)

### a. Dengan Konstanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 12:41  
 Sample (adjusted): 1/07/2011 7/01/2013  
 Included observations: 612 after adjustments  
 Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000310	0.000464	0.668733	0.5039
AR(3)	-0.202884	0.040062	-5.064281	0.0000
R-squared	0.040348	Mean dependent var		0.000328
Adjusted R-squared	0.038775	S.D. dependent var		0.014077
S.E. of regression	0.013801	Akaike info criterion		-5.724890
Sum squared resid	0.116185	Schwarz criterion		-5.710456
Log likelihood	1753.816	Hannan-Quinn criter.		-5.719276
F-statistic	25.64694	Durbin-Watson stat		2.004464
Prob(F-statistic)	0.000001			
Inverted AR Roots	.29-.51i	.29+.51i		-.59

### b. Tanpa Konstanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 12:40  
 Sample (adjusted): 1/07/2011 7/01/2013  
 Included observations: 612 after adjustments  
 Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(3)	-0.202452	0.040038	-5.056443	0.0000
R-squared	0.039644	Mean dependent var		0.000328
Adjusted R-squared	0.039644	S.D. dependent var		0.014077
S.E. of regression	0.013795	Akaike info criterion		-5.727425
Sum squared resid	0.116270	Schwarz criterion		-5.720208
Log likelihood	1753.592	Hannan-Quinn criter.		-5.724618
Durbin-Watson stat	2.002941			
Inverted AR Roots	.29-.51i	.29+.51i		-.59

## 8. ARIMA (0,0,3)

### a. Dengan Konstanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 12:42  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 6 iterations  
 MA Backcast: 12/30/2010 1/03/2011

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000300	0.000406	0.738941	0.4602
MA(3)	-0.266493	0.039098	-6.815932	0.0000
R-squared	0.054068	Mean dependent var		0.000304
Adjusted R-squared	0.052525	S.D. dependent var		0.014059
S.E. of regression	0.013684	Akaike info criterion		-5.741868
Sum squared resid	0.114793	Schwarz criterion		-5.727489
Log likelihood	1767.624	Hannan-Quinn criter.		-5.736276
F-statistic	35.03800	Durbin-Watson stat		1.990939
Prob(F-statistic)	0.000000			
Inverted MA Roots	.64	-.32+.56i	-.32-.56i	

### b. Tanpa Konstanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 12:42  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 6 iterations  
 MA Backcast: 12/30/2010 1/03/2011

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MA(3)	-0.265056	0.039095	-6.779773	0.0000
R-squared	0.053227	Mean dependent var		0.000304
Adjusted R-squared	0.053227	S.D. dependent var		0.014059
S.E. of regression	0.013679	Akaike info criterion		-5.744231
Sum squared resid	0.114895	Schwarz criterion		-5.737042
Log likelihood	1767.351	Hannan-Quinn criter.		-5.741436
Durbin-Watson stat	1.989221			
Inverted MA Roots	.64	-.32+.56i	-.32-.56i	

## 9. ARIMA (3,0,3)

### a. Dengan Konstanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 12:43  
 Sample (adjusted): 1/07/2011 7/01/2013  
 Included observations: 612 after adjustments  
 Convergence achieved after 9 iterations  
 MA Backcast: 1/04/2011 1/06/2011

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000421	0.000352	1.197627	0.2315
AR(3)	0.344652	0.115631	2.980612	0.0030
MA(3)	-0.584667	0.099590	-5.870729	0.0000
R-squared	0.068943	Mean dependent var		0.000328
Adjusted R-squared	0.065885	S.D. dependent var		0.014077
S.E. of regression	0.013605	Akaike info criterion		-5.751872
Sum squared resid	0.112723	Schwarz criterion		-5.730222
Log likelihood	1763.073	Hannan-Quinn criter.		-5.743452
F-statistic	22.54761	Durbin-Watson stat		1.979807
Prob(F-statistic)	0.000000			
Inverted AR Roots	.70	-.35+.61i	-.35-.61i	
Inverted MA Roots	.84	-.42+.72i	-.42-.72i	

### b. Tanpa Konstanta

Dependent Variable: RETURN\_JII  
 Method: Least Squares  
 Date: 07/27/13 Time: 12:43  
 Sample (adjusted): 1/07/2011 7/01/2013  
 Included observations: 612 after adjustments  
 Convergence achieved after 9 iterations  
 MA Backcast: 1/04/2011 1/06/2011

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(3)	0.326931	0.119478	2.736332	0.0064
MA(3)	-0.566996	0.103780	-5.463429	0.0000
R-squared	0.066803	Mean dependent var		0.000328
Adjusted R-squared	0.065273	S.D. dependent var		0.014077
S.E. of regression	0.013609	Akaike info criterion		-5.752845
Sum squared resid	0.112982	Schwarz criterion		-5.738411
Log likelihood	1762.371	Hannan-Quinn criter.		-5.747231
Durbin-Watson stat	1.975949			
Inverted AR Roots	.69	-.34+.60i	-.34-.60i	
Inverted MA Roots	.83	-.41+.72i	-.41-.72i	

## Lampiran 5

### Uji ARCH-LM untuk Model ARIMA

#### a. ARIMA (3,0,0)

Heteroskedasticity Test: ARCH

F-statistic	9.753405	Prob. F(3,605)	0.0000
Obs*R-squared	28.09489	Prob. Chi-Square(3)	0.0000

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 09/15/13 Time: 06:37

Sample (adjusted): 1/12/2011 7/01/2013

Included observations: 609 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000126	2.45E-05	5.159523	0.0000
RESID^2(-1)	0.044956	0.040266	1.116468	0.2647
RESID^2(-2)	0.137335	0.039961	3.436702	0.0006
RESID^2(-3)	0.138797	0.040228	3.450289	0.0006

R-squared	0.046133	Mean dependent var	0.000186
Adjusted R-squared	0.041403	S.D. dependent var	0.000542
S.E. of regression	0.000531	Akaike info criterion	-12.23654
Sum squared resid	0.000171	Schwarz criterion	-12.20757
Log likelihood	3730.028	Hannan-Quinn criter.	-12.22527
F-statistic	9.753405	Durbin-Watson stat	2.007798
Prob(F-statistic)	0.000003		

#### b. ARIMA (0,0,3)

Heteroskedasticity Test: ARCH

F-statistic	7.218574	Prob. F(3,608)	0.0001
Obs*R-squared	21.04849	Prob. Chi-Square(3)	0.0001

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 09/15/13 Time: 06:43

Sample (adjusted): 1/07/2011 7/01/2013

Included observations: 612 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000135	2.50E-05	5.413820	0.0000
RESID^2(-1)	0.041757	0.040351	1.034836	0.3012
RESID^2(-2)	0.136289	0.040144	3.395009	0.0007
RESID^2(-3)	0.102359	0.040493	2.527801	0.0117

R-squared	0.034393	Mean dependent var	0.000187
Adjusted R-squared	0.029628	S.D. dependent var	0.000553
S.E. of regression	0.000545	Akaike info criterion	-12.18574
Sum squared resid	0.000180	Schwarz criterion	-12.15687
Log likelihood	3732.836	Hannan-Quinn criter.	-12.17451
F-statistic	7.218574	Durbin-Watson stat	1.999490
Prob(F-statistic)	0.000091		

**c. ARIMA (3,0,3)**

Heteroskedasticity Test: ARCH

F-statistic	6.813370	Prob. F(3,605)	0.0002
Obs*R-squared	19.90283	Prob. Chi-Square(3)	0.0002

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 07/27/13 Time: 14:14

Sample (adjusted): 1/12/2011 7/01/2013

Included observations: 609 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000133	2.51E-05	5.311210	0.0000
RESID^2(-1)	0.037547	0.040423	0.928861	0.3533
RESID^2(-2)	0.129883	0.040186	3.232093	0.0013
RESID^2(-3)	0.105678	0.040469	2.611328	0.0092
R-squared	0.032681	Mean dependent var	0.000183	
Adjusted R-squared	0.027885	S.D. dependent var	0.000555	
S.E. of regression	0.000547	Akaike info criterion	-12.17762	
Sum squared resid	0.000181	Schwarz criterion	-12.14865	
Log likelihood	3712.087	Hannan-Quinn criter.	-12.16635	
F-statistic	6.813370	Durbin-Watson stat	2.001871	
Prob(F-statistic)	0.000160			



## Lampiran 6

### Estimasi Parameter Model GARCH

#### 1. Model GARCH (0,1)

Dependent Variable: RETURN\_JII  
 Method: ML - ARCH (Marquardt) - Normal distribution  
 Date: 07/29/13 Time: 10:43  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 24 iterations  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(2) + C(3)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000304	0.000591	0.513387	0.6077
Variance Equation				
C	0.000292	0.000203	1.434533	0.1514
GARCH(-1)	-0.479950	1.029134	-0.466363	0.6410
R-squared	-0.000000	Mean dependent var		0.000304
Adjusted R-squared	-0.000000	S.D. dependent var		0.014059
S.E. of regression	0.014059	Akaike info criterion		-5.683379
Sum squared resid	0.121354	Schwarz criterion		-5.661810
Log likelihood	1750.639	Hannan-Quinn criter.		-5.674992
Durbin-Watson stat	1.979334			

#### 2. Model GARCH (0,2)

Dependent Variable: RETURN\_JII  
 Method: ML - ARCH (Marquardt) - Normal distribution  
 Date: 07/29/13 Time: 10:44  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 15 iterations  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(2) + C(3)\*GARCH(-1) + C(4)\*GARCH(-2)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000267	0.000605	0.441306	0.6590
Variance Equation				
C	0.000342	1.16E-05	29.50057	0.0000
GARCH(-1)	0.272917	0.003570	76.44300	0.0000
GARCH(-2)	-0.980881	0.006088	-161.1176	0.0000
R-squared	-0.000007	Mean dependent var		0.000304
Adjusted R-squared	-0.000007	S.D. dependent var		0.014059
S.E. of regression	0.014059	Akaike info criterion		-5.688296
Sum squared resid	0.121355	Schwarz criterion		-5.659537
Log likelihood	1753.151	Hannan-Quinn criter.		-5.677113
Durbin-Watson stat	1.979320			



### 3. Model GARCH (0,3)

Dependent Variable: RETURN\_JII  
 Method: ML - ARCH (Marquardt) - Normal distribution  
 Date: 07/29/13 Time: 10:45  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 55 iterations  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(2) + C(3)\*GARCH(-1) + C(4)\*GARCH(-2) + C(5)\*GARCH(-3)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000370	0.000588	0.629058	0.5293
Variance Equation				
C	2.58E-05	0.000512	0.050507	0.9597
GARCH(-1)	0.278040	36.72197	0.007571	0.9940
GARCH(-2)	0.282154	40.93953	0.006892	0.9945
GARCH(-3)	0.305531	19.03149	0.016054	0.9872
R-squared	-0.000022	Mean dependent var		0.000304
Adjusted R-squared	-0.000022	S.D. dependent var		0.014059
S.E. of regression	0.014059	Akaike info criterion		-5.682444
Sum squared resid	0.121357	Schwarz criterion		-5.646496
Log likelihood	1752.351	Hannan-Quinn criter.		-5.668465
Durbin-Watson stat	1.979291			

### 4. Model GARCH (1,0)

Dependent Variable: RETURN\_JII  
 Method: ML - ARCH (Marquardt) - Normal distribution  
 Date: 07/29/13 Time: 10:18  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 12 iterations  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(2) + C(3)\*RESID(-1)<sup>2</sup>

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000652	0.000479	1.362083	0.1732
Variance Equation				
C	0.000137	6.68E-06	20.44923	0.0000
RESID(-1) <sup>2</sup>	0.358526	0.048141	7.447374	0.0000
R-squared	-0.000613	Mean dependent var		0.000304
Adjusted R-squared	-0.000613	S.D. dependent var		0.014059
S.E. of regression	0.014063	Akaike info criterion		-5.762341
Sum squared resid	0.121428	Schwarz criterion		-5.740772
Log likelihood	1774.920	Hannan-Quinn criter.		-5.753954
Durbin-Watson stat	1.978122			

## 5. Model GARCH (1,1)

Dependent Variable: RETURN\_JII  
 Method: ML - ARCH (Marquardt) - Normal distribution  
 Date: 07/29/13 Time: 10:22  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 15 iterations  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(2) + C(3)\*RESID(-1)^2 + C(4)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000552	0.000439	1.259012	0.2080
Variance Equation				
C	3.16E-06	1.14E-06	2.757773	0.0058
RESID(-1)^2	0.119191	0.027048	4.406590	0.0000
GARCH(-1)	0.872709	0.021958	39.74495	0.0000
R-squared	-0.000312	Mean dependent var		0.000304
Adjusted R-squared	-0.000312	S.D. dependent var		0.014059
S.E. of regression	0.014061	Akaike info criterion		-5.969479
Sum squared resid	0.121392	Schwarz criterion		-5.940721
Log likelihood	1839.615	Hannan-Quinn criter.		-5.958296
Durbin-Watson stat	1.978718			

## 6. Model GARCH (1,2)

Dependent Variable: RETURN\_JII  
 Method: ML - ARCH (Marquardt) - Normal distribution  
 Date: 07/29/13 Time: 10:23  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 22 iterations  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(2) + C(3)\*RESID(-1)^2 + C(4)\*GARCH(-1) + C(5)\*GARCH(-2)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000571	0.000436	1.308311	0.1908
Variance Equation				
C	2.11E-06	1.25E-06	1.693742	0.0903
RESID(-1)^2	0.077063	0.040779	1.889775	0.0588
GARCH(-1)	1.308598	0.317595	4.120343	0.0000
GARCH(-2)	-0.391164	0.278089	-1.406616	0.1595
R-squared	-0.000361	Mean dependent var		0.000304
Adjusted R-squared	-0.000361	S.D. dependent var		0.014059
S.E. of regression	0.014061	Akaike info criterion		-5.968263
Sum squared resid	0.121398	Schwarz criterion		-5.932315
Log likelihood	1840.241	Hannan-Quinn criter.		-5.954284
Durbin-Watson stat	1.978621			



## 7. Model GARCH (1,3)

Dependent Variable: RETURN\_JII  
 Method: ML - ARCH (Marquardt) - Normal distribution  
 Date: 07/29/13 Time: 10:24  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 15 iterations  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(2) + C(3)\*RESID(-1)^2 + C(4)\*GARCH(-1) + C(5)\*GARCH(-2) + C(6)\*GARCH(-3)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000577	0.000438	1.317268	0.1877
Variance Equation				
C	1.84E-06	1.30E-06	1.419074	0.1559
RESID(-1)^2	0.068331	0.044907	1.521612	0.1281
GARCH(-1)	1.540676	0.847591	1.817711	0.0691
GARCH(-2)	-0.773562	1.348509	-0.573643	0.5662
GARCH(-3)	0.159914	0.554278	0.288508	0.7730
R-squared	-0.000376	Mean dependent var		0.000304
Adjusted R-squared	-0.000376	S.D. dependent var		0.014059
S.E. of regression	0.014061	Akaike info criterion		-5.965363
Sum squared resid	0.121400	Schwarz criterion		-5.922225
Log likelihood	1840.349	Hannan-Quinn criter.		-5.948589
Durbin-Watson stat	1.978590			

## 8. Model GARCH (2,0)

Dependent Variable: RETURN\_JII  
 Method: ML - ARCH (Marquardt) - Normal distribution  
 Date: 07/29/13 Time: 10:20  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 10 iterations  
 Presample variance: backcast (parameter = 0.7)  
 GARCH = C(2) + C(3)\*RESID(-1)^2 + C(4)\*RESID(-2)^2

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000698	0.000426	1.639773	0.1011
Variance Equation				
C	0.000105	9.06E-06	11.60146	0.0000
RESID(-1)^2	0.335198	0.046778	7.165662	0.0000
RESID(-2)^2	0.225746	0.051543	4.379768	0.0000
R-squared	-0.000786	Mean dependent var		0.000304
Adjusted R-squared	-0.000786	S.D. dependent var		0.014059
S.E. of regression	0.014064	Akaike info criterion		-5.793631
Sum squared resid	0.121450	Schwarz criterion		-5.764872
Log likelihood	1785.541	Hannan-Quinn criter.		-5.782448
Durbin-Watson stat	1.977780			

## 9. Model GARCH (2,1)

Dependent Variable: RETURN\_JII  
Method: ML - ARCH (Marquardt) - Normal distribution  
Date: 07/29/13 Time: 10:26  
Sample (adjusted): 1/04/2011 7/01/2013  
Included observations: 615 after adjustments  
Convergence achieved after 18 iterations  
Presample variance: backcast (parameter = 0.7)  
GARCH = C(2) + C(3)\*RESID(-1)^2 + C(4)\*RESID(-2)^2 + C(5)\*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000589	0.000438	1.346696	0.1781

Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	3.46E-06	1.21E-06	2.860520	0.0042
RESID(-1)^2	0.057107	0.055645	1.026267	0.3048
RESID(-2)^2	0.072421	0.053809	1.345892	0.1783
GARCH(-1)	0.861461	0.022273	38.67760	0.0000

R-squared	-0.000413	Mean dependent var	0.000304
Adjusted R-squared	-0.000413	S.D. dependent var	0.014059
S.E. of regression	0.014062	Akaike info criterion	-5.968458
Sum squared resid	0.121404	Schwarz criterion	-5.932509
Log likelihood	1840.301	Hannan-Quinn criter.	-5.954479
Durbin-Watson stat	1.978518		

## 10. Model GARCH(2,2)

Dependent Variable: RETURN\_JII  
Method: ML - ARCH (Marquardt) - Normal distribution  
Date: 07/29/13 Time: 10:27  
Sample (adjusted): 1/04/2011 7/01/2013  
Included observations: 615 after adjustments  
Convergence achieved after 24 iterations  
Presample variance: backcast (parameter = 0.7)  
GARCH = C(2) + C(3)\*RESID(-1)^2 + C(4)\*RESID(-2)^2 + C(5)\*GARCH(-1) + C(6)\*GARCH(-2)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000586	0.000437	1.343422	0.1791

Variance Equation

	Coefficient	Std. Error	z-Statistic	Prob.
C	2.89E-06	2.44E-06	1.183325	0.2367
RESID(-1)^2	0.054406	0.055716	0.976498	0.3288
RESID(-2)^2	0.051872	0.115676	0.448423	0.6538
GARCH(-1)	1.083884	0.733294	1.478103	0.1394
GARCH(-2)	-0.197624	0.641180	-0.308219	0.7579

R-squared	-0.000404	Mean dependent var	0.000304
Adjusted R-squared	-0.000404	S.D. dependent var	0.014059
S.E. of regression	0.014061	Akaike info criterion	-5.965493
Sum squared resid	0.121403	Schwarz criterion	-5.922355
Log likelihood	1840.389	Hannan-Quinn criter.	-5.948719
Durbin-Watson stat	1.978535		

## 11. Model GARCH (2,3)

Dependent Variable: RETURN\_JII  
 Method: ML - ARCH (Marquardt) - Normal distribution  
 Date: 07/29/13 Time: 10:29  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 25 iterations  
 Presample variance: backcast (parameter = 0.7)  
 $GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*RESID(-2)^2 + C(5)*GARCH(-1) + C(6)*GARCH(-2) + C(7)*GARCH(-3)$

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000584	0.000433	1.349317	0.1772
Variance Equation				
C	4.13E-06	2.32E-06	1.780272	0.0750
RESID(-1) <sup>2</sup>	0.067555	0.046346	1.457630	0.1449
RESID(-2) <sup>2</sup>	0.100859	0.050708	1.989014	0.0467
GARCH(-1)	0.280948	0.348653	0.805811	0.4204
GARCH(-2)	0.842758	0.126940	6.639011	0.0000
GARCH(-3)	-0.300460	0.317434	-0.946527	0.3439
R-squared	-0.000397	Mean dependent var		0.000304
Adjusted R-squared	-0.000397	S.D. dependent var		0.014059
S.E. of regression	0.014061	Akaike info criterion		-5.963309
Sum squared resid	0.121402	Schwarz criterion		-5.912982
Log likelihood	1840.718	Hannan-Quinn criter.		-5.943740
Durbin-Watson stat	1.978549			

## 12. Model GARCH (3,0)

Dependent Variable: RETURN\_JII  
 Method: ML - ARCH (Marquardt) - Normal distribution  
 Date: 07/29/13 Time: 10:21  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 15 iterations  
 Presample variance: backcast (parameter = 0.7)  
 $GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*RESID(-2)^2 + C(5)*RESID(-3)^2$

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000425	0.000389	1.092066	0.2748
Variance Equation				
C	7.25E-05	7.58E-06	9.562290	0.0000
RESID(-1) <sup>2</sup>	0.199552	0.053904	3.701987	0.0002
RESID(-2) <sup>2</sup>	0.135713	0.047103	2.881164	0.0040
RESID(-3) <sup>2</sup>	0.400295	0.045741	8.751371	0.0000
R-squared	-0.000074	Mean dependent var		0.000304
Adjusted R-squared	-0.000074	S.D. dependent var		0.014059
S.E. of regression	0.014059	Akaike info criterion		-5.877633
Sum squared resid	0.121363	Schwarz criterion		-5.841685
Log likelihood	1812.372	Hannan-Quinn criter.		-5.863654
Durbin-Watson stat	1.979188			

### 13. Model GARCH (3,1)

Dependent Variable: RETURN\_JII  
 Method: ML - ARCH (Marquardt) - Normal distribution  
 Date: 07/29/13 Time: 10:30  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 11 iterations  
 Presample variance: backcast (parameter = 0.7)  
 $GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*RESID(-2)^2 + C(5)*RESID(-3)^2 + C(6)*GARCH(-1)$

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000577	0.000434	1.329381	0.1837
Variance Equation				
C	4.11E-06	1.70E-06	2.420053	0.0155
RESID(-1) <sup>2</sup>	0.056015	0.056397	0.993227	0.3206
RESID(-2) <sup>2</sup>	0.049032	0.067341	0.728119	0.4665
RESID(-3) <sup>2</sup>	0.043655	0.059953	0.728144	0.4665
GARCH(-1)	0.841051	0.037732	22.28987	0.0000
R-squared	-0.000377	Mean dependent var		0.000304
Adjusted R-squared	-0.000377	S.D. dependent var		0.014059
S.E. of regression	0.014061	Akaike info criterion		-5.965947
Sum squared resid	0.121400	Schwarz criterion		-5.922809
Log likelihood	1840.529	Hannan-Quinn criter.		-5.949173
Durbin-Watson stat	1.978589			

### 14. Model GARCH (3,2)

Dependent Variable: RETURN\_JII  
 Method: ML - ARCH (Marquardt) - Normal distribution  
 Date: 07/29/13 Time: 10:31  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 15 iterations  
 Presample variance: backcast (parameter = 0.7)  
 $GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*RESID(-2)^2 + C(5)*RESID(-3)^2 + C(6)*GARCH(-1) + C(7)*GARCH(-2)$

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000574	0.000433	1.326420	0.1847
Variance Equation				
C	5.33E-06	5.91E-06	0.902330	0.3669
RESID(-1) <sup>2</sup>	0.052763	0.057099	0.924067	0.3555
RESID(-2) <sup>2</sup>	0.063401	0.102917	0.616038	0.5379
RESID(-3) <sup>2</sup>	0.073067	0.120963	0.604044	0.5458
GARCH(-1)	0.574060	1.220577	0.470318	0.6381
GARCH(-2)	0.222854	1.026420	0.217118	0.8281
R-squared	-0.000368	Mean dependent var		0.000304
Adjusted R-squared	-0.000368	S.D. dependent var		0.014059
S.E. of regression	0.014061	Akaike info criterion		-5.963083
Sum squared resid	0.121399	Schwarz criterion		-5.912756
Log likelihood	1840.648	Hannan-Quinn criter.		-5.943513
Durbin-Watson stat	1.978605			

### 15. Model GARCH (3,3)

Dependent Variable: RETURN\_JII  
 Method: ML - ARCH (Marquardt) - Normal distribution  
 Date: 07/29/13 Time: 10:32  
 Sample (adjusted): 1/04/2011 7/01/2013  
 Included observations: 615 after adjustments  
 Convergence achieved after 31 iterations  
 Presample variance: backcast (parameter = 0.7)  

$$\text{GARCH} = C(2) + C(3)*\text{RESID}(-1)^2 + C(4)*\text{RESID}(-2)^2 + C(5)*\text{RESID}(-3)^2 + C(6)*\text{GARCH}(-1) + C(7)*\text{GARCH}(-2) + C(8)*\text{GARCH}(-3)$$

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000344	0.000418	0.823475	0.4102
Variance Equation				
C	7.35E-06	3.13E-06	2.345589	0.0190
RESID(-1) <sup>2</sup>	0.024669	0.029553	0.834738	0.4039
RESID(-2) <sup>2</sup>	0.116348	0.032894	3.537102	0.0004
RESID(-3) <sup>2</sup>	0.045457	0.038314	1.186445	0.2354
GARCH(-1)	0.943641	0.036371	25.94470	0.0000
GARCH(-2)	-0.980883	0.029931	-32.77165	0.0000
GARCH(-3)	0.815775	0.035911	22.71644	0.0000
R-squared	-0.000008	Mean dependent var	0.000304	
Adjusted R-squared	-0.000008	S.D. dependent var	0.014059	
S.E. of regression	0.014059	Akaike info criterion	-5.994542	
Sum squared resid	0.121355	Schwarz criterion	-5.937025	
Log likelihood	1851.322	Hannan-Quinn criter.	-5.972177	
Durbin-Watson stat	1.979318			

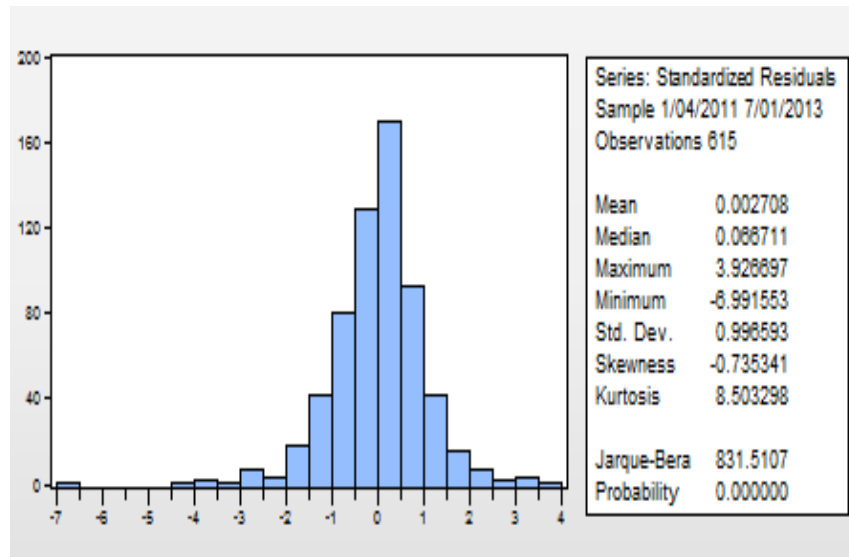


## Lampiran 7

### Pemeriksaan Diagnosa

#### 1. GARCH (0,2)

##### a. Uji Normalitas



##### b. Uji ARCH-LM

###### Heteroskedasticity Test: ARCH

F-statistic	18.91971	Prob. F(3,608)	0.0000
Obs*R-squared	52.25441	Prob. Chi-Square(3)	0.0000

###### Test Equation:

Dependent Variable: WGT\_RESID^2

Method: Least Squares

Date: 08/26/13 Time: 06:27

Sample (adjusted): 1/07/2011 7/01/2013

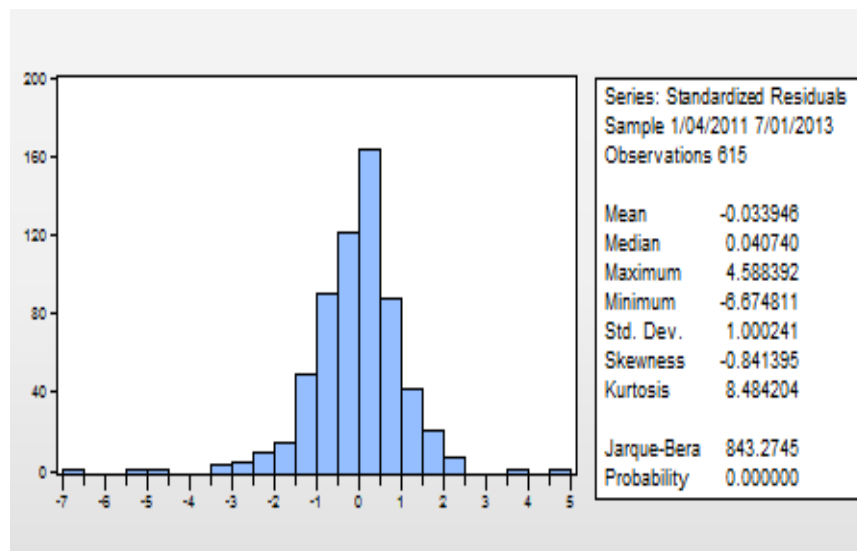
Included observations: 612 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.582520	0.120999	4.814250	0.0000
WGT_RESID^2(-1)	0.065160	0.039458	1.651383	0.0992
WGT_RESID^2(-2)	0.123177	0.039425	3.124313	0.0019
WGT_RESID^2(-3)	0.232320	0.039677	5.855227	0.0000
R-squared	0.085383	Mean dependent var	0.994498	
Adjusted R-squared	0.080870	S.D. dependent var	2.723018	
S.E. of regression	2.610591	Akaike info criterion	4.763545	
Sum squared resid	4143.634	Schwarz criterion	4.792413	
Log likelihood	-1453.645	Hannan-Quinn criter.	4.774773	
F-statistic	18.91971	Durbin-Watson stat	2.015268	
Prob(F-statistic)	0.000000			



## 2. GARCH (1,0)

### a. Uji Normalitas



### b. Uji ARCH-LM

#### Heteroskedasticity Test: ARCH

F-statistic	7.039994	Prob. F(3,608)	0.0001
Obs*R-squared	20.54525	Prob. Chi-Square(3)	0.0001

#### Test Equation:

Dependent Variable: WGT\_RESID^2

Method: Least Squares

Date: 08/26/13 Time: 06:30

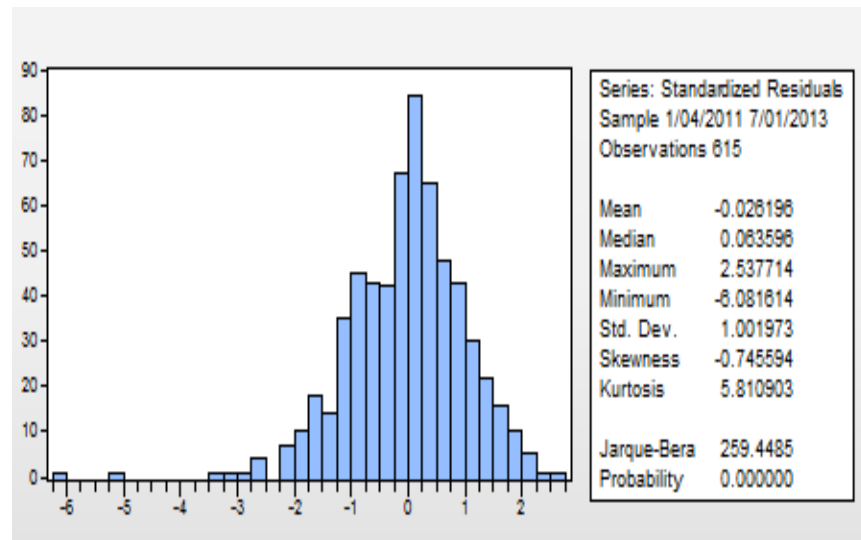
Sample (adjusted): 1/07/2011 7/01/2013

Included observations: 612 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.782156	0.129326	6.047923	0.0000
WGT_RESID^2(-1)	-0.033477	0.040049	-0.835922	0.4035
WGT_RESID^2(-2)	0.096770	0.039911	2.424662	0.0156
WGT_RESID^2(-3)	0.156819	0.040076	3.913069	0.0001
R-squared	0.033571	Mean dependent var	1.001407	
Adjusted R-squared	0.028802	S.D. dependent var	2.762260	
S.E. of regression	2.722190	Akaike info criterion	4.847265	
Sum squared resid	4505.474	Schwarz criterion	4.876132	
Log likelihood	-1479.263	Hannan-Quinn criter.	4.858493	
F-statistic	7.039994	Durbin-Watson stat	2.012154	
Prob(F-statistic)	0.000117			

### 3. GARCH (1,1)

#### a. Uji Normalitas



#### b. Uji ARCH-LM

##### Heteroskedasticity Test: ARCH

F-statistic	0.410044	Prob. F(3,608)	0.7458
Obs*R-squared	1.235725	Prob. Chi-Square(3)	0.7444

##### Test Equation:

Dependent Variable: WGT\_RESID^2

Method: Least Squares

Date: 07/29/13 Time: 11:47

Sample (adjusted): 1/07/2011 7/01/2013

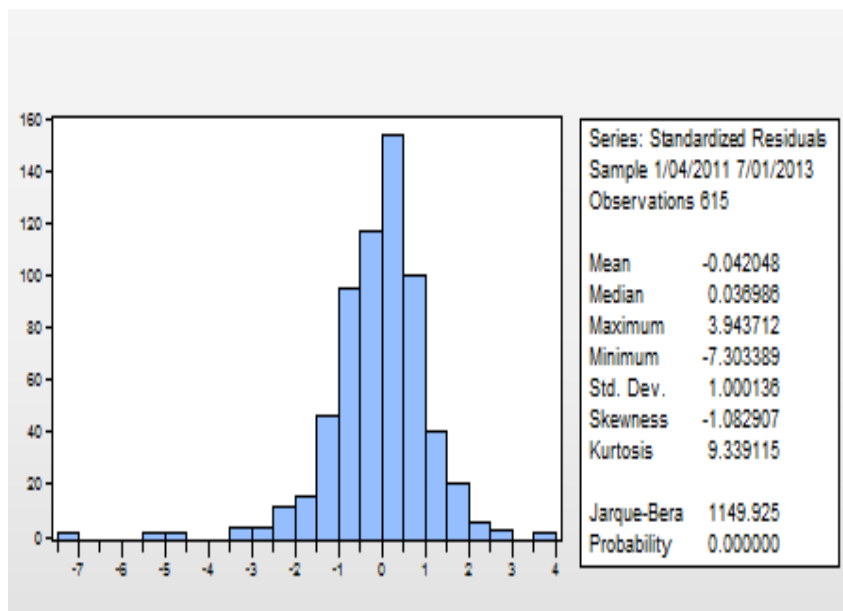
Included observations: 612 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.984288	0.114895	8.566879	0.0000
WGT_RESID^2(-1)	-0.027141	0.040537	-0.669534	0.5034
WGT_RESID^2(-2)	0.016732	0.040543	0.412691	0.6800
WGT_RESID^2(-3)	0.032177	0.040527	0.793955	0.4275
R-squared	0.002019	Mean dependent var		1.006029
Adjusted R-squared	-0.002905	S.D. dependent var		2.223338
S.E. of regression	2.226566	Akaike info criterion		4.445312
Sum squared resid	3014.217	Schwarz criterion		4.474180
Log likelihood	-1356.266	Hannan-Quinn criter.		4.456540
F-statistic	0.410044	Durbin-Watson stat		1.994782
Prob(F-statistic)	0.745842			



#### 4. GARCH (2,0)

##### a. Uji Normalitas



##### b. Uji ARCH-LM

###### Heteroskedasticity Test: ARCH

F-statistic	2.758067	Prob. F(3,608)	0.0416
Obs*R-squared	8.216815	Prob. Chi-Square(3)	0.0417

###### Test Equation:

Dependent Variable: WGT\_RESID^2

Method: Least Squares

Date: 08/26/13 Time: 06:32

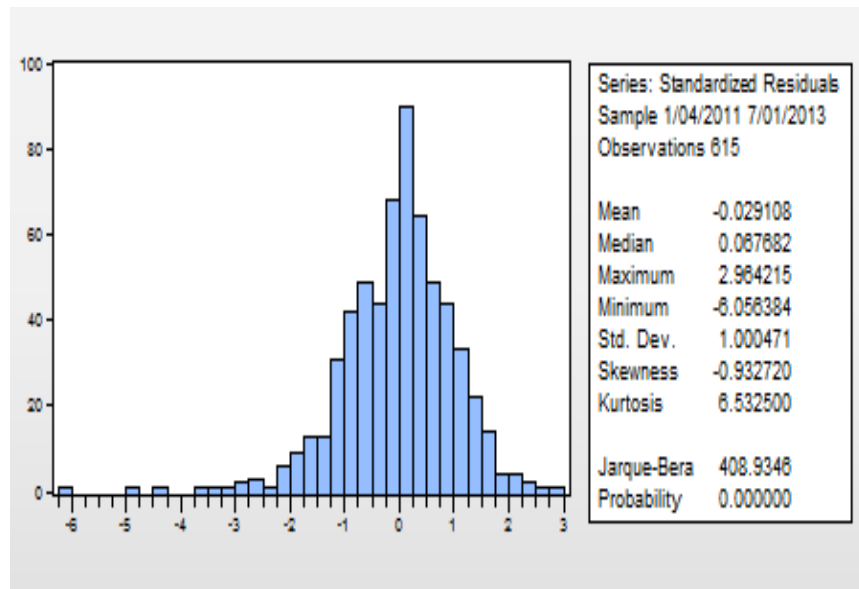
Sample (adjusted): 1/07/2011 7/01/2013

Included observations: 612 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.938676	0.137896	6.807129	0.0000
WGT_RESID^2(-1)	-0.023386	0.040300	-0.580295	0.5619
WGT_RESID^2(-2)	-0.024205	0.040296	-0.600685	0.5483
WGT_RESID^2(-3)	0.109714	0.040293	2.722881	0.0067
R-squared	0.013426	Mean dependent var		1.000759
Adjusted R-squared	0.008558	S.D. dependent var		2.924488
S.E. of regression	2.911947	Akaike info criterion		4.982036
Sum squared resid	5155.498	Schwarz criterion		5.010903
Log likelihood	-1520.503	Hannan-Quinn criter.		4.993263
F-statistic	2.758067	Durbin-Watson stat		2.006187
Prob(F-statistic)	0.041581			

## 5. GARCH (3,0)

### a. Uji Normalitas



### b. Uji ARCH-LM

#### Heteroskedasticity Test: ARCH

F-statistic	0.328509	Prob. F(3,608)	0.8048
Obs*R-squared	0.990405	Prob. Chi-Square(3)	0.8036

#### Test Equation:

Dependent Variable: WGT\_RESID^2

Method: Least Squares

Date: 08/26/13 Time: 06:34

Sample (adjusted): 1/07/2011 7/01/2013

Included observations: 612 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.057042	0.119661	8.833617	0.0000
WGT_RESID^2(-1)	-0.009890	0.040528	-0.244028	0.8073
WGT_RESID^2(-2)	-0.005701	0.040535	-0.140634	0.8882
WGT_RESID^2(-3)	-0.038697	0.040528	-0.954824	0.3400
R-squared	0.001618	Mean dependent var		1.002731
Adjusted R-squared	-0.003308	S.D. dependent var		2.381209
S.E. of regression	2.385144	Akaike info criterion		4.582911
Sum squared resid	3458.860	Schwarz criterion		4.611778
Log likelihood	-1398.371	Hannan-Quinn criter.		4.594138
F-statistic	0.328509	Durbin-Watson stat		1.983147
Prob(F-statistic)	0.804751			

## Lampiran 8

### Program Mencari Nilai VaR-GARCH Menggunakan *Software* MATLAB 7.1

```
clc;
Po=input('Nilai investasi awal=')
t1=input('periode waktu=')
t2=input('periode waktu=')
t3=input('periode waktu=')
Z=input('nilai Z alpha=')
s=-0.813883%nilai skewness
Zkoreksi=Z*(1/6)*((Z^2)-1)*s%karena data tdk berdistribusi normal
dg pendekatan Cornish Fisher Expansion
v=input('nilai GARCH (1,1)=');
v2=input('nilai GARCH (3,0)=');
vol=sqrt(v);%nilai volatilitas atau standar deviasi
vol2=sqrt(v2);
clc;
fprintf('#####\n')
fprintf('## Analisis Resiko Investasi ##\n')
fprintf('## dengan VaR-GARCH ##\n')
fprintf('#####\n')
fprintf('Value at Risk(t)=Po*Zkoreksi*vol*c \n')
fprintf('Investasi awal:%8.0f\n',Po)
fprintf('nilai Z koreksi:%8.3f\n',Zkoreksi)
fprintf('periode waktu=%8.0f\n',t1)
fprintf('periode waktu=%8.0f\n',t2)
fprintf('periode waktu=%8.0f\n',t3)
fprintf('#####\n')
c1=sqrt(t1);
c2=sqrt(t2);
c3=sqrt(t3);
VaR1=Po*Zkoreksi*vol*c1;%VaR-GARCH(1,1) selama 1 hari
VaR5=Po*Zkoreksi*vol*c2;%VaR-GARCH(1,1) selama 5 hari
VaR20=Po*Zkoreksi*vol*c3;%VaR-GARCH(1,1) selama 20 hari
Var1=Po*Zkoreksi*vol2*c1;%VaR-GARCH(3,0) selama 1 hari
Var5=Po*Zkoreksi*vol2*c2;%VaR-GARCH(3,0) selama 5 hari
Var20=Po*Zkoreksi*vol2*c3;%VaR-GARCH(3,0) selama 20 hari
VaR=[VaR1 VaR5 VaR20 Var1 Var5 Var20]
fprintf('#####\n')
x=mean(VaR1);
y=mean(VaR5);
z=mean(VaR20);
p=mean(Var1);
q=mean(Var5);
r=mean(Var20);
fprintf('Dengan nilai rata-rata VaR1 adalah %8.3f\n',x)
fprintf('Dengan nilai rata-rata VaR5 adalah %8.3f\n',y)
fprintf('Dengan nilai rata-rata VaR20 adalah %8.3f\n',z)
fprintf('Dengan nilai rata-rata VaR(1) adalah %8.3f\n',p)
fprintf('Dengan nilai rata-rata VaR(5) adalah %8.3f\n',q)
fprintf('Dengan nilai rata-rata VaR(20) adalah %8.3f\n',r)
fprintf('#####\n')
```

## Lampiran 9

### **Output Perhitungan VaR-GARCH Menggunakan Software MATLAB 7.1 dari 3 Januari 2011 sampai 1 Juli 2013**

```
#####
##                               Analisis Resiko Investasi           ##
##                               dengan VaR-GARCH                   ##
#####
Value at Risk(t)=Po*Zkoreksi*vol*c
Investasi awal:100000000
nilai Z koreksi: -0.386
periode waktu= 1
periode waktu= 5
periode waktu= 20
#####
```

VaR =  
1.0e+006 \*

0	0	0	0	0	0
-0.6916	-1.5465	-3.0929	-0.6758	-1.5112	-0.3022
-0.6497	-1.4529	-2.9058	-0.6018	-1.3457	-0.2691
-0.6111	-1.3665	-2.7330	-0.5463	-1.2216	-0.2443
-0.6179	-1.3816	-2.7633	-0.4392	-0.9821	-0.1964
-0.7389	-1.6523	-3.3046	-0.7158	-1.6006	-0.3201
-0.8644	-1.9328	-3.8655	-0.9770	-2.1847	-0.4369
-0.8249	-1.8445	-3.6890	-1.0683	-2.3888	-0.4778
-0.8717	-1.9493	-3.8986	-1.1375	-2.5436	-0.5087
-0.8173	-1.8276	-3.6551	-0.6093	-1.3625	-0.2725
-0.7666	-1.7142	-3.4284	-0.8092	-1.8094	-0.3619
-0.7276	-1.6270	-3.2539	-0.3571	-0.7985	-0.1597
-0.6837	-1.5289	-3.0577	-0.3500	-0.7825	-0.1565
-0.6452	-1.4427	-2.8853	-0.3910	-0.8743	-0.1749
-0.7417	-1.6585	-3.3171	-0.6459	-1.4443	-0.2889
-0.8002	-1.7893	-3.5786	-0.7636	-1.7075	-0.3415
-0.7726	-1.7275	-3.4550	-0.9722	-2.1738	-0.4348
-0.8271	-1.8494	-3.6988	-0.9646	-2.1569	-0.4314
-0.8338	-1.8645	-3.7290	-0.7471	-1.6705	-0.3341
-0.7842	-1.7535	-3.5070	-0.8709	-1.9475	-0.3895
-0.7394	-1.6534	-3.3068	-0.6621	-1.4805	-0.2961
-0.7842	-1.7535	-3.5070	-0.5889	-1.3169	-0.2634
-0.7575	-1.6939	-3.3879	-0.5750	-1.2856	-0.2571
-0.7234	-1.6175	-3.2351	-0.7867	-1.7592	-0.3518
-0.6889	-1.5404	-3.0807	-0.5123	-1.1456	-0.2291
-0.6472	-1.4472	-2.8944	-0.4296	-0.9606	-0.1921
-0.6282	-1.4046	-2.8092	-0.4396	-0.9830	-0.1966

-0.6038	-1.3500	-2.7001	-0.4005	-0.8955	-0.1791
-0.5972	-1.3354	-2.6708	-0.5103	-1.1411	-0.2282
-0.5630	-1.2589	-2.5177	-0.4450	-0.9951	-0.1990
-0.5396	-1.2066	-2.4132	-0.4876	-1.0902	-0.2180
-0.5087	-1.1376	-2.2751	-0.3508	-0.7844	-0.1569
-0.5004	-1.1190	-2.2381	-0.4198	-0.9386	-0.1877
-0.5491	-1.2277	-2.4555	-0.5133	-1.1478	-0.2296
-0.5176	-1.1574	-2.3149	-0.5162	-1.1543	-0.2309
-0.5242	-1.1721	-2.3442	-0.6583	-1.4720	-0.2944
-0.5111	-1.1429	-2.2857	-0.4213	-0.9420	-0.1884
-0.5259	-1.1759	-2.3518	-0.5650	-1.2633	-0.2527
-0.4960	-1.1091	-2.2182	-0.4633	-1.0360	-0.2072
-0.4948	-1.1064	-2.2127	-0.5442	-1.2169	-0.2434
-0.4909	-1.0976	-2.1953	-0.4196	-0.9382	-0.1876
-0.4831	-1.0803	-2.1605	-0.5013	-1.1210	-0.2242
-0.4572	-1.0224	-2.0447	-0.4552	-1.0178	-0.2036
-0.4572	-1.0223	-2.0445	-0.4543	-1.0159	-0.2032
-0.4341	-0.9707	-1.9414	-0.3718	-0.8313	-0.1663
-0.4151	-0.9283	-1.8565	-0.4362	-0.9754	-0.1951
-0.4063	-0.9084	-1.8169	-0.3657	-0.8178	-0.1636
-0.3913	-0.8750	-1.7500	-0.3712	-0.8300	-0.1660
-0.4337	-0.9698	-1.9395	-0.4787	-1.0704	-0.2141
-0.4196	-0.9382	-1.8763	-0.4360	-0.9749	-0.1950
-0.4309	-0.9634	-1.9269	-0.5707	-1.2762	-0.2552
-0.4087	-0.9139	-1.8277	-0.4047	-0.9050	-0.1810
-0.4791	-1.0712	-2.1424	-0.5734	-1.2821	-0.2564
-0.4528	-1.0124	-2.0248	-0.4445	-0.9940	-0.1988
-0.4571	-1.0222	-2.0444	-0.6430	-1.4378	-0.2876
-0.4342	-0.9710	-1.9419	-0.3736	-0.8354	-0.1671
-0.4833	-1.0807	-2.1615	-0.5528	-1.2362	-0.2472
-0.5339	-1.1939	-2.3878	-0.5624	-1.2575	-0.2515
-0.5048	-1.1287	-2.2573	-0.6457	-1.4439	-0.2888
-0.4976	-1.1128	-2.2255	-0.6348	-1.4194	-0.2839
-0.5062	-1.1320	-2.2640	-0.4393	-0.9823	-0.1965
-0.5237	-1.1710	-2.3421	-0.5414	-1.2106	-0.2421
-0.5037	-1.1262	-2.2524	-0.5427	-1.2136	-0.2427
-0.4986	-1.1149	-2.2298	-0.5606	-1.2536	-0.2507
-0.4752	-1.0625	-2.1251	-0.4172	-0.9328	-0.1866
-0.4497	-1.0056	-2.0111	-0.4363	-0.9755	-0.1951
-0.4332	-0.9688	-1.9375	-0.3645	-0.8151	-0.1630
-0.4168	-0.9320	-1.8641	-0.3540	-0.7915	-0.1583
-0.3954	-0.8842	-1.7684	-0.3694	-0.8260	-0.1652
-0.3846	-0.8599	-1.7198	-0.3692	-0.8255	-0.1651
-0.3901	-0.8722	-1.7445	-0.3822	-0.8547	-0.1709
-0.3710	-0.8296	-1.6591	-0.3900	-0.8720	-0.1744
-0.3694	-0.8260	-1.6519	-0.4326	-0.9673	-0.1935
-0.3573	-0.7990	-1.5980	-0.3579	-0.8004	-0.1601
-0.3424	-0.7657	-1.5315	-0.3898	-0.8716	-0.1743
-0.3294	-0.7365	-1.4731	-0.3540	-0.7915	-0.1583
-0.3853	-0.8616	-1.7233	-0.4434	-0.9914	-0.1983
-0.3680	-0.8228	-1.6456	-0.4150	-0.9280	-0.1856
-0.3661	-0.8187	-1.6375	-0.5430	-1.2142	-0.2428
-0.3651	-0.8165	-1.6329	-0.3785	-0.8464	-0.1693
-0.3775	-0.8442	-1.6884	-0.4403	-0.9847	-0.1969
-0.3596	-0.8041	-1.6082	-0.4133	-0.9241	-0.1848

-0.3429	-0.7667	-1.5334	-0.4270	-0.9548	-0.1910
-0.3365	-0.7525	-1.5050	-0.3446	-0.7706	-0.1541
-0.3387	-0.7574	-1.5149	-0.3653	-0.8169	-0.1634
-0.3255	-0.7279	-1.4558	-0.3777	-0.8446	-0.1689
-0.3120	-0.6977	-1.3954	-0.3818	-0.8538	-0.1708
-0.3120	-0.6977	-1.3954	-0.3512	-0.7854	-0.1571
-0.2996	-0.6700	-1.3399	-0.3420	-0.7648	-0.1530
-0.2882	-0.6445	-1.2891	-0.3643	-0.8146	-0.1629
-0.3506	-0.7840	-1.5679	-0.4311	-0.9640	-0.1928
-0.3612	-0.8078	-1.6155	-0.4375	-0.9783	-0.1957
-0.3444	-0.7701	-1.5402	-0.5331	-1.1920	-0.2384
-0.3429	-0.7667	-1.5334	-0.4286	-0.9585	-0.1917
-0.3617	-0.8087	-1.6174	-0.3981	-0.8903	-0.1781
-0.3472	-0.7763	-1.5527	-0.4109	-0.9187	-0.1837
-0.3459	-0.7735	-1.5469	-0.4553	-1.0180	-0.2036
-0.4712	-1.0537	-2.1073	-0.5592	-1.2504	-0.2501
-0.4459	-0.9970	-1.9941	-0.5190	-1.1605	-0.2321
-0.4235	-0.9469	-1.8938	-0.6969	-1.5582	-0.3116
-0.4261	-0.9528	-1.9056	-0.3811	-0.8521	-0.1704
-0.4044	-0.9043	-1.8086	-0.3684	-0.8237	-0.1647
-0.3884	-0.8684	-1.7369	-0.4287	-0.9586	-0.1917
-0.3716	-0.8309	-1.6618	-0.3409	-0.7623	-0.1525
-0.3544	-0.7924	-1.5849	-0.3487	-0.7797	-0.1559
-0.3385	-0.7569	-1.5139	-0.3392	-0.7584	-0.1517
-0.3246	-0.7259	-1.4518	-0.3328	-0.7441	-0.1488
-0.3113	-0.6961	-1.3922	-0.3368	-0.7530	-0.1506
-0.3072	-0.6870	-1.3739	-0.3440	-0.7691	-0.1538
-0.3062	-0.6848	-1.3696	-0.3533	-0.7901	-0.1580
-0.3242	-0.7249	-1.4497	-0.4023	-0.8995	-0.1799
-0.3345	-0.7481	-1.4961	-0.4186	-0.9361	-0.1872
-0.3294	-0.7365	-1.4731	-0.4433	-0.9913	-0.1983
-0.3205	-0.7166	-1.4332	-0.4142	-0.9263	-0.1853
-0.3512	-0.7854	-1.5708	-0.4256	-0.9517	-0.1903
-0.3573	-0.7990	-1.5980	-0.4203	-0.9398	-0.1880
-0.3418	-0.7643	-1.5286	-0.4711	-1.0534	-0.2107
-0.3888	-0.8695	-1.7389	-0.4843	-1.0830	-0.2166
-0.3777	-0.8446	-1.6893	-0.4154	-0.9289	-0.1858
-0.3596	-0.8041	-1.6082	-0.5166	-1.1553	-0.2311
-0.3637	-0.8133	-1.6265	-0.3931	-0.8789	-0.1758
-0.3692	-0.8255	-1.6510	-0.3896	-0.8711	-0.1742
-0.3548	-0.7934	-1.5868	-0.4254	-0.9511	-0.1902
-0.4001	-0.8946	-1.7891	-0.4905	-1.0969	-0.2194
-0.3965	-0.8866	-1.7732	-0.4364	-0.9759	-0.1952
-0.4163	-0.9310	-1.8620	-0.5760	-1.2880	-0.2576
-0.4289	-0.9590	-1.9180	-0.4843	-1.0830	-0.2166
-0.4114	-0.9199	-1.8398	-0.5030	-1.1248	-0.2250
-0.3968	-0.8872	-1.7745	-0.4615	-1.0320	-0.2064
-0.4405	-0.9851	-1.9702	-0.4636	-1.0367	-0.2073
-0.4217	-0.9430	-1.8859	-0.4377	-0.9787	-0.1957
-0.4559	-1.0195	-2.0390	-0.6068	-1.3567	-0.2713
-0.4589	-1.0262	-2.0524	-0.4642	-1.0380	-0.2076
-0.4351	-0.9730	-1.9460	-0.5446	-1.2177	-0.2435
-0.4221	-0.9438	-1.8877	-0.4553	-1.0180	-0.2036
-0.4082	-0.9128	-1.8256	-0.3633	-0.8124	-0.1625
-0.3906	-0.8734	-1.7468	-0.3846	-0.8599	-0.1720

-0.3860	-0.8632	-1.7263	-0.3903	-0.8726	-0.1745
-0.3670	-0.8205	-1.6411	-0.3586	-0.8018	-0.1604
-0.3865	-0.8642	-1.7284	-0.4391	-0.9819	-0.1964
-0.3797	-0.8490	-1.6981	-0.3925	-0.8776	-0.1755
-0.4006	-0.8957	-1.7914	-0.5116	-1.1440	-0.2288
-0.4079	-0.9122	-1.8244	-0.4576	-1.0231	-0.2046
-0.4181	-0.9350	-1.8699	-0.5256	-1.1753	-0.2351
-0.4164	-0.9311	-1.8621	-0.4862	-1.0871	-0.2174
-0.4302	-0.9619	-1.9239	-0.5070	-1.1338	-0.2268
-0.4239	-0.9479	-1.8959	-0.4649	-1.0397	-0.2079
-0.4189	-0.9367	-1.8734	-0.4950	-1.1068	-0.2214
-0.3985	-0.8911	-1.7823	-0.4113	-0.9196	-0.1839
-0.8015	-1.7923	-3.5846	-0.9931	-2.2206	-0.4441
-0.7796	-1.7432	-3.4864	-0.8642	-1.9324	-0.3865
-0.8935	-1.9979	-3.9958	-1.5038	-3.3626	-0.6725
-1.0037	-2.2444	-4.4888	-1.0301	-2.3034	-0.4607
-0.9436	-2.1100	-4.2200	-1.1610	-2.5961	-0.5192
-0.8842	-1.9772	-3.9543	-1.0724	-2.3979	-0.4796
-0.8772	-1.9615	-3.9231	-0.5200	-1.1627	-0.2325
-0.8244	-1.8433	-3.6867	-0.4565	-1.0209	-0.2042
-0.8372	-1.8719	-3.7439	-0.7524	-1.6824	-0.3365
-1.0849	-2.4258	-4.8517	-1.0822	-2.4199	-0.4840
-1.0190	-2.2785	-4.5570	-1.0509	-2.3499	-0.4700
-0.9602	-2.1471	-4.2943	-1.4174	-3.1695	-0.6339
-0.9104	-2.0356	-4.0713	-0.4188	-0.9365	-0.1873
-0.8567	-1.9156	-3.8312	-0.4215	-0.9424	-0.1885
-0.8034	-1.7966	-3.5931	-0.4223	-0.9443	-0.1889
-0.7661	-1.7131	-3.4262	-0.3995	-0.8932	-0.1786
-0.7312	-1.6349	-3.2699	-0.4014	-0.8977	-0.1795
-0.7991	-1.7870	-3.5739	-0.6899	-1.5427	-0.3085
-0.7533	-1.6845	-3.3690	-0.6080	-1.3594	-0.2719
-0.7101	-1.5879	-3.1758	-0.8291	-1.8539	-0.3708
-0.7509	-1.6791	-3.3582	-0.5722	-1.2794	-0.2559
-0.7107	-1.5892	-3.1784	-0.5189	-1.1604	-0.2321
-0.7059	-1.5784	-3.1569	-0.7746	-1.7321	-0.3464
-0.6845	-1.5307	-3.0613	-0.4915	-1.0989	-0.2198
-0.6636	-1.4839	-2.9678	-0.6005	-1.3427	-0.2685
-0.6757	-1.5108	-3.0217	-0.5882	-1.3153	-0.2631
-0.6349	-1.4197	-2.8394	-0.5248	-1.1734	-0.2347
-0.6315	-1.4120	-2.8239	-0.6333	-1.4160	-0.2832
-1.4527	-3.2484	-6.4968	-1.7580	-3.9309	-0.7862
-1.3720	-3.0679	-6.1358	-1.5182	-3.3948	-0.6790
-1.3751	-3.0748	-6.1496	-2.5382	-5.6756	-1.1351
-1.4434	-3.2275	-6.4550	-1.1077	-2.4769	-0.4954
-1.3674	-3.0577	-6.1153	-1.2206	-2.7294	-0.5459
-1.2906	-2.8858	-5.7716	-1.2877	-2.8794	-0.5759
-1.2103	-2.7064	-5.4127	-0.5598	-1.2518	-0.2504
-1.4185	-3.1718	-6.3435	-1.1961	-2.6745	-0.5349
-1.3569	-3.0342	-6.0684	-1.0446	-2.3357	-0.4671
-1.2702	-2.8402	-5.6804	-1.6248	-3.6332	-0.7266
-1.3212	-2.9543	-5.9087	-0.9687	-2.1662	-0.4332
-1.2383	-2.7689	-5.5377	-0.7097	-1.5869	-0.3174
-1.1593	-2.5923	-5.1845	-1.1137	-2.4903	-0.4981
-1.1443	-2.5587	-5.1175	-0.5904	-1.3203	-0.2641
-1.1465	-2.5635	-5.1271	-0.7384	-1.6512	-0.3302



-1.0880	-2.4328	-4.8656	-0.8949	-2.0011	-0.4002
-1.0218	-2.2847	-4.5695	-0.8486	-1.8976	-0.3795
-0.9953	-2.2256	-4.4512	-0.5923	-1.3245	-0.2649
-0.9880	-2.2092	-4.4184	-0.6255	-1.3988	-0.2798
-0.9591	-2.1447	-4.2893	-0.7682	-1.7178	-0.3436
-0.9372	-2.0956	-4.1911	-0.8081	-1.8070	-0.3614
-0.8801	-1.9679	-3.9358	-0.6390	-1.4289	-0.2858
-0.8895	-1.9890	-3.9780	-0.7301	-1.6326	-0.3265
-0.8358	-1.8689	-3.7379	-0.5016	-1.1217	-0.2243
-0.7874	-1.7608	-3.5216	-0.7050	-1.5765	-0.3153
-0.7812	-1.7468	-3.4936	-0.4857	-1.0860	-0.2172
-0.7419	-1.6588	-3.3177	-0.4741	-1.0601	-0.2120
-0.7224	-1.6153	-3.2306	-0.6348	-1.4194	-0.2839
-0.8026	-1.7947	-3.5893	-0.7071	-1.5811	-0.3162
-0.8250	-1.8447	-3.6895	-0.7935	-1.7743	-0.3549
-0.8268	-1.8488	-3.6975	-0.9962	-2.2275	-0.4455
-0.8191	-1.8315	-3.6629	-0.8410	-1.8804	-0.3761
-0.7690	-1.7195	-3.4390	-0.6868	-1.5358	-0.3072
-0.7850	-1.7553	-3.5105	-0.7122	-1.5926	-0.3185
-0.8012	-1.7915	-3.5830	-0.6213	-1.3892	-0.2778
-0.7521	-1.6817	-3.3634	-0.7382	-1.6506	-0.3301
-0.7546	-1.6873	-3.3746	-0.7480	-1.6725	-0.3345
-0.7162	-1.6015	-3.2029	-0.4585	-1.0253	-0.2051
-0.6729	-1.5046	-3.0091	-0.6024	-1.3469	-0.2694
-0.6379	-1.4263	-2.8526	-0.3956	-0.8845	-0.1769
-0.6185	-1.3830	-2.7660	-0.3929	-0.8786	-0.1757
-0.6459	-1.4442	-2.8884	-0.5347	-1.1956	-0.2391
-0.6496	-1.4525	-2.9049	-0.6011	-1.3441	-0.2688
-0.6279	-1.4040	-2.8080	-0.6818	-1.5246	-0.3049
-0.5915	-1.3225	-2.6451	-0.5611	-1.2545	-0.2509
-0.6055	-1.3538	-2.7077	-0.5220	-1.1673	-0.2335
-0.5702	-1.2751	-2.5502	-0.4199	-0.9389	-0.1878
-0.5659	-1.2654	-2.5308	-0.5917	-1.3231	-0.2646
-0.5348	-1.1960	-2.3919	-0.3876	-0.8666	-0.1733
-0.5309	-1.1871	-2.3742	-0.5156	-1.1530	-0.2306
-0.5009	-1.1200	-2.2400	-0.3834	-0.8573	-0.1715
-0.4735	-1.0588	-2.1176	-0.4511	-1.0086	-0.2017
-0.4503	-1.0069	-2.0139	-0.3365	-0.7525	-0.1505
-0.4419	-0.9882	-1.9764	-0.3688	-0.8246	-0.1649
-0.4269	-0.9546	-1.9091	-0.3779	-0.8451	-0.1690
-0.4228	-0.9455	-1.8910	-0.4327	-0.9674	-0.1935
-0.4255	-0.9513	-1.9027	-0.4268	-0.9543	-0.1909
-0.4132	-0.9240	-1.8480	-0.4401	-0.9840	-0.1968
-0.4039	-0.9031	-1.8062	-0.4490	-1.0039	-0.2008
-0.4622	-1.0335	-2.0670	-0.5043	-1.1276	-0.2255
-0.4809	-1.0753	-2.1507	-0.5305	-1.1862	-0.2372
-0.4589	-1.0261	-2.0522	-0.6181	-1.3822	-0.2764
-0.4485	-1.0029	-2.0058	-0.5200	-1.1627	-0.2325
-0.4771	-1.0668	-2.1336	-0.4654	-1.0407	-0.2081
-0.4579	-1.0238	-2.0476	-0.4636	-1.0367	-0.2073
-0.4339	-0.9703	-1.9406	-0.5270	-1.1785	-0.2357
-0.4113	-0.9197	-1.8394	-0.3617	-0.8087	-0.1617
-0.4010	-0.8966	-1.7933	-0.3514	-0.7858	-0.1572
-0.3985	-0.8912	-1.7823	-0.3758	-0.8402	-0.1680
-0.3838	-0.8582	-1.7163	-0.3981	-0.8902	-0.1780



-0.3775	-0.8442	-1.6884	-0.4188	-0.9364	-0.1873
-0.4155	-0.9291	-1.8581	-0.4543	-1.0158	-0.2032
-0.4709	-1.0529	-2.1057	-0.5484	-1.2263	-0.2453
-0.4474	-1.0004	-2.0007	-0.5800	-1.2968	-0.2594
-0.4647	-1.0391	-2.0783	-0.6294	-1.4074	-0.2815
-0.4426	-0.9898	-1.9795	-0.4010	-0.8966	-0.1793
-0.4689	-1.0485	-2.0969	-0.5541	-1.2390	-0.2478
-0.4694	-1.0495	-2.0990	-0.4557	-1.0189	-0.2038
-0.4443	-0.9936	-1.9872	-0.5345	-1.1951	-0.2390
-0.4352	-0.9732	-1.9463	-0.4557	-1.0189	-0.2038
-0.4225	-0.9448	-1.8896	-0.3708	-0.8291	-0.1658
-0.4330	-0.9683	-1.9366	-0.4541	-1.0155	-0.2031
-0.4233	-0.9466	-1.8933	-0.4308	-0.9634	-0.1927
-0.4063	-0.9084	-1.8169	-0.4692	-1.0493	-0.2099
-0.3860	-0.8632	-1.7264	-0.3881	-0.8679	-0.1736
-0.3698	-0.8269	-1.6537	-0.3546	-0.7929	-0.1586
-0.3813	-0.8525	-1.7051	-0.3820	-0.8543	-0.1709
-0.3676	-0.8219	-1.6438	-0.3809	-0.8517	-0.1703
-0.3569	-0.7980	-1.5961	-0.4363	-0.9757	-0.1951
-0.4697	-1.0503	-2.1006	-0.5472	-1.2237	-0.2447
-0.4590	-1.0263	-2.0526	-0.5159	-1.1535	-0.2307
-0.4344	-0.9713	-1.9425	-0.6868	-1.5358	-0.3072
-0.4565	-1.0207	-2.0413	-0.4698	-1.0505	-0.2101
-0.4319	-0.9657	-1.9314	-0.3915	-0.8754	-0.1751
-0.4358	-0.9744	-1.9488	-0.5270	-1.1783	-0.2357
-0.4134	-0.9244	-1.8489	-0.3653	-0.8169	-0.1634
-0.4123	-0.9219	-1.8437	-0.4578	-1.0236	-0.2047
-0.3936	-0.8801	-1.7601	-0.3619	-0.8091	-0.1618
-0.4281	-0.9573	-1.9146	-0.4866	-1.0881	-0.2176
-0.4459	-0.9970	-1.9940	-0.4695	-1.0499	-0.2100
-0.4245	-0.9492	-1.8985	-0.5426	-1.2133	-0.2427
-0.4027	-0.9004	-1.8008	-0.4768	-1.0661	-0.2132
-0.4290	-0.9592	-1.9183	-0.4212	-0.9419	-0.1884
-0.4606	-1.0299	-2.0598	-0.4798	-1.0730	-0.2146
-0.4368	-0.9767	-1.9534	-0.1698	-0.3797	-0.0759
-0.4138	-0.9254	-1.8507	-0.5186	-1.1596	-0.2319
-0.3996	-0.8936	-1.7873	-0.3468	-0.7754	-0.1551
-0.4343	-0.9711	-1.9422	-0.4328	-0.9678	-0.1936
-0.5015	-1.1215	-2.2430	-0.5582	-1.2482	-0.2496
-0.4871	-1.0892	-2.1785	-0.6072	-1.3578	-0.2716
-0.4901	-1.0958	-2.1917	-0.6661	-1.4895	-0.2979
-0.5590	-1.2500	-2.5001	-0.5913	-1.3221	-0.2644
-0.5410	-1.2098	-2.4196	-0.5857	-1.3097	-0.2619
-0.5430	-1.2141	-2.4283	-0.7192	-1.6082	-0.3216
-0.5239	-1.1715	-2.3429	-0.4671	-1.0445	-0.2089
-0.5047	-1.1285	-2.2570	-0.5070	-1.1337	-0.2267
-0.4810	-1.0755	-2.1510	-0.4086	-0.9136	-0.1827
-0.4649	-1.0396	-2.0792	-0.4038	-0.9030	-0.1806
-0.4466	-0.9986	-1.9973	-0.3791	-0.8477	-0.1695
-0.4282	-0.9575	-1.9151	-0.3945	-0.8821	-0.1764
-0.4132	-0.9239	-1.8478	-0.3805	-0.8508	-0.1702
-0.4263	-0.9532	-1.9064	-0.4213	-0.9421	-0.1884
-0.4149	-0.9278	-1.8555	-0.4191	-0.9372	-0.1874
-0.4132	-0.9239	-1.8477	-0.1547	-0.3459	-0.0692
-0.3921	-0.8767	-1.7534	-0.3925	-0.8776	-0.1755

-0.3734	-0.8349	-1.6698	-0.4003	-0.8951	-0.1790
-0.3704	-0.8282	-1.6564	-0.3565	-0.7971	-0.1594
-0.3527	-0.7887	-1.5774	-0.3497	-0.7821	-0.1564
-0.3401	-0.7604	-1.5208	-0.3858	-0.8627	-0.1725
-0.3666	-0.8196	-1.6393	-0.3994	-0.8930	-0.1786
-0.3495	-0.7816	-1.5632	-0.3860	-0.8631	-0.1726
-0.3352	-0.7495	-1.4991	-0.4564	-1.0205	-0.2041
-0.3361	-0.7515	-1.5031	-0.3573	-0.7990	-0.1598
-0.3321	-0.7426	-1.4852	-0.3690	-0.8251	-0.1650
-0.3345	-0.7481	-1.4961	-0.4128	-0.9231	-0.1846
-0.4922	-1.1006	-2.2012	-0.6145	-1.3740	-0.2748
-0.4727	-1.0570	-2.1141	-0.5625	-1.2578	-0.2516
-0.4491	-1.0042	-2.0084	-0.7648	-1.7102	-0.3420
-0.4270	-0.9549	-1.9098	-0.3716	-0.8309	-0.1662
-0.4239	-0.9480	-1.8959	-0.3762	-0.8411	-0.1682
-0.4020	-0.8990	-1.7980	-0.3615	-0.8082	-0.1616
-0.3865	-0.8642	-1.7283	-0.4076	-0.9114	-0.1823
-0.3875	-0.8664	-1.7328	-0.3700	-0.8273	-0.1655
-0.3688	-0.8246	-1.6492	-0.3712	-0.8300	-0.1660
-0.3554	-0.7948	-1.5896	-0.4033	-0.9018	-0.1804
-0.3455	-0.7725	-1.5450	-0.3455	-0.7725	-0.1545
-0.3330	-0.7446	-1.4891	-0.3561	-0.7962	-0.1592
-0.3337	-0.7461	-1.4921	-0.3746	-0.8376	-0.1675
-0.3207	-0.7171	-1.4342	-0.3581	-0.8008	-0.1602
-0.3134	-0.7009	-1.4017	-0.3834	-0.8573	-0.1715
-0.3011	-0.6733	-1.3466	-0.3409	-0.7623	-0.1525
-0.2931	-0.6554	-1.3108	-0.3517	-0.7863	-0.1573
-0.2859	-0.6393	-1.2786	-0.3394	-0.7589	-0.1518
-0.2791	-0.6240	-1.2481	-0.3480	-0.7782	-0.1556
-0.2936	-0.6565	-1.3131	-0.3756	-0.8398	-0.1680
-0.2828	-0.6323	-1.2646	-0.3615	-0.8082	-0.1616
-0.2809	-0.6282	-1.2564	-0.4021	-0.8991	-0.1798
-0.3374	-0.7545	-1.5090	-0.4233	-0.9466	-0.1893
-0.3278	-0.7330	-1.4660	-0.4159	-0.9299	-0.1860
-0.4015	-0.8978	-1.7957	-0.5905	-1.3203	-0.2641
-0.3851	-0.8612	-1.7224	-0.4421	-0.9887	-0.1977
-0.3892	-0.8703	-1.7405	-0.5894	-1.3180	-0.2636
-0.4042	-0.9037	-1.8074	-0.4253	-0.9511	-0.1902
-0.3849	-0.8608	-1.7215	-0.4421	-0.9885	-0.1977
-0.3991	-0.8924	-1.7848	-0.4870	-1.0889	-0.2178
-0.4317	-0.9654	-1.9308	-0.4573	-1.0227	-0.2045
-0.4734	-1.0585	-2.1169	-0.5786	-1.2939	-0.2588
-0.4643	-1.0382	-2.0763	-0.5825	-1.3025	-0.2605
-0.4402	-0.9844	-1.9688	-0.5651	-1.2637	-0.2527
-0.5345	-1.1951	-2.3902	-0.5867	-1.3118	-0.2624
-0.5053	-1.1300	-2.2600	-0.4892	-1.0940	-0.2188
-0.4774	-1.0674	-2.1349	-0.6942	-1.5523	-0.3105
-0.4549	-1.0172	-2.0344	-0.3455	-0.7725	-0.1545
-0.5241	-1.1718	-2.3437	-0.5109	-1.1425	-0.2285
-0.5138	-1.1490	-2.2980	-0.5024	-1.1235	-0.2247
-0.7542	-1.6865	-3.3731	-0.9909	-2.2157	-0.4431
-0.7756	-1.7344	-3.4688	-0.8486	-1.8974	-0.3795
-0.8525	-1.9063	-3.8127	-1.2924	-2.8898	-0.5780
-0.7995	-1.7878	-3.5755	-0.8218	-1.8377	-0.3675
-0.7521	-1.6818	-3.3635	-0.8832	-1.9748	-0.3950

-0.7111	-1.5901	-3.1801	-0.3531	-0.7896	-0.1579
-0.6678	-1.4933	-2.9866	-0.3554	-0.7948	-0.1590
-0.6289	-1.4062	-2.8124	-0.3690	-0.8251	-0.1650
-0.6539	-1.4622	-2.9243	-0.4882	-1.0916	-0.2183
-0.6208	-1.3881	-2.7761	-0.4626	-1.0343	-0.2069
-0.6013	-1.3445	-2.6890	-0.6402	-1.4315	-0.2863
-0.5723	-1.2798	-2.5595	-0.4131	-0.9238	-0.1848
-0.5956	-1.3319	-2.6638	-0.5442	-1.2168	-0.2434
-0.5953	-1.3312	-2.6625	-0.5231	-1.1697	-0.2339
-0.5630	-1.2590	-2.5180	-0.6132	-1.3712	-0.2742
-0.5555	-1.2422	-2.4845	-0.5368	-1.2003	-0.2401
-0.5439	-1.2162	-2.4324	-0.4301	-0.9618	-0.1924
-0.5286	-1.1820	-2.3640	-0.5014	-1.1211	-0.2242
-0.5377	-1.2024	-2.4047	-0.5185	-1.1594	-0.2319
-0.5652	-1.2638	-2.5275	-0.5623	-1.2573	-0.2515
-0.5637	-1.2605	-2.5210	-0.6102	-1.3643	-0.2729
-0.5850	-1.3080	-2.6161	-0.6798	-1.5201	-0.3040
-0.5724	-1.2800	-2.5600	-0.5799	-1.2967	-0.2593
-0.5425	-1.2130	-2.4260	-0.5889	-1.3167	-0.2633
-0.5191	-1.1608	-2.3216	-0.4562	-1.0201	-0.2040
-0.5760	-1.2880	-2.5759	-0.5292	-1.1834	-0.2367
-0.5584	-1.2487	-2.4974	-0.5170	-1.1560	-0.2312
-0.5295	-1.1840	-2.3681	-0.6632	-1.4829	-0.2966
-0.5414	-1.2107	-2.4214	-0.4948	-1.1063	-0.2213
-0.5299	-1.1849	-2.3699	-0.4519	-1.0104	-0.2021
-0.5043	-1.1276	-2.2552	-0.5330	-1.1917	-0.2383
-0.4901	-1.0958	-2.1917	-0.4542	-1.0156	-0.2031
-0.4636	-1.0367	-2.0734	-0.3750	-0.8385	-0.1677
-0.4386	-0.9808	-1.9616	-0.3943	-0.8817	-0.1763
-0.4339	-0.9702	-1.9404	-0.3680	-0.8228	-0.1646
-0.4821	-1.0780	-2.1560	-0.4800	-1.0733	-0.2147
-0.4664	-1.0428	-2.0856	-0.4963	-1.1098	-0.2220
-0.4413	-0.9868	-1.9736	-0.5740	-1.2835	-0.2567
-0.4211	-0.9417	-1.8834	-0.3813	-0.8525	-0.1705
-0.5039	-1.1267	-2.2534	-0.5214	-1.1660	-0.2332
-0.4772	-1.0671	-2.1342	-0.4784	-1.0697	-0.2139
-0.4847	-1.0838	-2.1675	-0.6956	-1.5554	-0.3111
-0.4580	-1.0242	-2.0484	-0.3872	-0.8658	-0.1732
-0.4665	-1.0430	-2.0861	-0.5143	-1.1500	-0.2300
-0.4440	-0.9928	-1.9855	-0.3822	-0.8547	-0.1709
-0.4230	-0.9458	-1.8916	-0.4614	-1.0317	-0.2063
-0.4126	-0.9227	-1.8454	-0.3672	-0.8210	-0.1642
-0.3918	-0.8762	-1.7524	-0.3556	-0.7953	-0.1591
-0.3976	-0.8890	-1.7781	-0.4148	-0.9274	-0.1855
-0.3817	-0.8534	-1.7068	-0.3700	-0.8273	-0.1655
-0.3958	-0.8851	-1.7703	-0.4678	-1.0461	-0.2092
-0.3874	-0.8662	-1.7323	-0.4017	-0.8982	-0.1796
-0.3928	-0.8783	-1.7565	-0.4811	-1.0759	-0.2152
-0.3773	-0.8438	-1.6875	-0.4061	-0.9081	-0.1816
-0.3621	-0.8096	-1.6192	-0.4230	-0.9458	-0.1892
-0.3550	-0.7938	-1.5877	-0.3635	-0.8128	-0.1626
-0.3396	-0.7594	-1.5188	-0.3504	-0.7835	-0.1567
-0.3244	-0.7254	-1.4507	-0.3619	-0.8091	-0.1618
-0.3271	-0.7315	-1.4630	-0.3552	-0.7943	-0.1589
-0.3867	-0.8647	-1.7294	-0.4519	-1.0105	-0.2021

-0.3752	-0.8389	-1.6778	-0.4571	-1.0222	-0.2044
-0.3987	-0.8915	-1.7829	-0.5816	-1.3005	-0.2601
-0.3793	-0.8482	-1.6963	-0.4054	-0.9064	-0.1813
-0.4016	-0.8980	-1.7959	-0.5165	-1.1550	-0.2310
-0.3914	-0.8752	-1.7505	-0.3966	-0.8868	-0.1774
-0.4005	-0.8956	-1.7913	-0.5068	-1.1333	-0.2267
-0.4078	-0.9118	-1.8237	-0.4445	-0.9938	-0.1988
-0.3898	-0.8717	-1.7434	-0.4604	-1.0294	-0.2059
-0.3836	-0.8577	-1.7155	-0.4485	-1.0029	-0.2006
-0.3653	-0.8169	-1.6338	-0.3556	-0.7953	-0.1591
-0.4728	-1.0572	-2.1145	-0.5616	-1.2557	-0.2511
-0.4472	-1.0000	-1.9999	-0.4765	-1.0654	-0.2131
-0.4345	-0.9715	-1.9430	-0.6863	-1.5347	-0.3069
-0.4183	-0.9354	-1.8709	-0.3590	-0.8027	-0.1605
-0.4306	-0.9627	-1.9255	-0.4373	-0.9778	-0.1956
-0.4182	-0.9351	-1.8702	-0.4162	-0.9306	-0.1861
-0.4578	-1.0236	-2.0472	-0.5439	-1.2162	-0.2432
-0.4421	-0.9885	-1.9771	-0.4576	-1.0232	-0.2046
-0.4917	-1.0995	-2.1991	-0.6323	-1.4139	-0.2828
-0.4910	-1.0980	-2.1960	-0.5034	-1.1257	-0.2251
-0.4913	-1.0986	-2.1972	-0.6346	-1.4191	-0.2838
-0.4863	-1.0874	-2.1748	-0.5099	-1.1402	-0.2280
-0.4702	-1.0514	-2.1028	-0.4885	-1.0924	-0.2185
-0.4448	-0.9945	-1.9890	-0.4349	-0.9724	-0.1945
-0.4430	-0.9906	-1.9811	-0.4185	-0.9358	-0.1872
-0.4801	-1.0735	-2.1470	-0.4721	-1.0557	-0.2111
-0.4778	-1.0683	-2.1366	-0.5221	-1.1674	-0.2335
-0.4517	-1.0100	-2.0200	-0.5645	-1.2622	-0.2524
-0.4275	-0.9560	-1.9119	-0.4261	-0.9529	-0.1906
-0.4059	-0.9076	-1.8152	-0.3305	-0.7391	-0.1478
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-0.3684	-0.8237	-1.6474	-0.3348	-0.7486	-0.1497
-0.3635	-0.8128	-1.6256	-0.3552	-0.7943	-0.1589
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-0.3278	-0.7330	-1.4660	-0.3764	-0.8416	-0.1683
-0.3255	-0.7279	-1.4558	-0.4008	-0.8961	-0.1792
-0.3158	-0.7062	-1.4123	-0.3472	-0.7763	-0.1553
-0.3038	-0.6793	-1.3587	-0.3684	-0.8237	-0.1647
-0.2944	-0.6582	-1.3164	-0.3457	-0.7730	-0.1546
-0.2996	-0.6700	-1.3399	-0.3571	-0.7985	-0.1597
-0.2880	-0.6440	-1.2879	-0.3508	-0.7844	-0.1569
-0.2836	-0.6341	-1.2681	-0.3817	-0.8534	-0.1707
-0.2742	-0.6132	-1.2264	-0.3343	-0.7476	-0.1495
-0.2966	-0.6633	-1.3266	-0.3840	-0.8586	-0.1717
-0.2857	-0.6387	-1.2775	-0.3586	-0.8018	-0.1604
-0.3062	-0.6848	-1.3696	-0.4432	-0.9911	-0.1982
-0.3026	-0.6766	-1.3532	-0.3702	-0.8278	-0.1656
-0.2976	-0.6655	-1.3310	-0.4254	-0.9512	-0.1902
-0.3021	-0.6755	-1.3510	-0.3783	-0.8460	-0.1692
-0.2906	-0.6497	-1.2994	-0.3615	-0.8082	-0.1616
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-0.3016	-0.6744	-1.3488	-0.3700	-0.8273	-0.1655
-0.2913	-0.6514	-1.3028	-0.3645	-0.8151	-0.1630

-0.2809	-0.6282	-1.2564	-0.4036	-0.9025	-0.1805
-0.2764	-0.6180	-1.2361	-0.3396	-0.7594	-0.1519
-0.2671	-0.5973	-1.1945	-0.3343	-0.7476	-0.1495
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-0.3139	-0.7019	-1.4039	-0.4058	-0.9073	-0.1815
-0.3598	-0.8045	-1.6091	-0.4763	-1.0650	-0.2130
-0.3444	-0.7701	-1.5402	-0.5017	-1.1218	-0.2244
-0.3840	-0.8586	-1.7172	-0.5491	-1.2278	-0.2456
-0.3655	-0.8174	-1.6347	-0.3943	-0.8817	-0.1763
-0.3500	-0.7825	-1.5651	-0.4891	-1.0937	-0.2187
-0.3354	-0.7500	-1.5001	-0.3337	-0.7461	-0.1492
-0.3209	-0.7176	-1.4353	-0.3359	-0.7510	-0.1502
-0.3077	-0.6880	-1.3761	-0.3345	-0.7481	-0.1496
-0.2961	-0.6622	-1.3243	-0.3305	-0.7391	-0.1478
-0.2946	-0.6588	-1.3176	-0.3424	-0.7657	-0.1531
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-0.2900	-0.6486	-1.2971	-0.3769	-0.8429	-0.1686
-0.2796	-0.6252	-1.2504	-0.3491	-0.7806	-0.1561
-0.2701	-0.6041	-1.2081	-0.3655	-0.8174	-0.1635
-0.2640	-0.5904	-1.1807	-0.3319	-0.7421	-0.1484
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-0.2828	-0.6323	-1.2646	-0.3581	-0.8008	-0.1602
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-0.3714	-0.8304	-1.6609	-0.4944	-1.1054	-0.2211
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-0.3738	-0.8358	-1.6716	-0.4669	-1.0441	-0.2088
-0.4470	-0.9996	-1.9992	-0.6018	-1.3457	-0.2691
-0.4288	-0.9588	-1.9176	-0.4555	-1.0186	-0.2037
-0.4074	-0.9109	-1.8218	-0.6033	-1.3491	-0.2698
-0.4047	-0.9049	-1.8098	-0.3857	-0.8625	-0.1725
-0.4689	-1.0486	-2.0971	-0.4991	-1.1160	-0.2232
-0.4592	-1.0267	-2.0535	-0.5107	-1.1419	-0.2284
-0.4354	-0.9735	-1.9470	-0.6088	-1.3612	-0.2722
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-0.3381	-0.7560	-1.5119	-0.3476	-0.7773	-0.1555
-0.3264	-0.7300	-1.4599	-0.3828	-0.8560	-0.1712
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-0.3160	-0.7067	-1.4134	-0.3989	-0.8921	-0.1784

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-0.3292	-0.7360	-1.4721	-0.4550	-1.0173	-0.2035
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-0.3573	-0.7990	-1.5980	-0.4312	-0.9643	-0.1929
-0.4203	-0.9398	-1.8797	-0.5047	-1.1286	-0.2257
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-0.4108	-0.9187	-1.8373	-0.4139	-0.9254	-0.1851
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-0.4437	-0.9921	-1.9842	-0.5469	-1.2228	-0.2446
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-0.4043	-0.9041	-1.8083	-0.5372	-1.2011	-0.2402
-0.3849	-0.8608	-1.7215	-0.3517	-0.7863	-0.1573
-0.3664	-0.8192	-1.6384	-0.3392	-0.7584	-0.1517
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-0.4806	-1.0746	-2.1492	-0.5508	-1.2317	-0.2463
-0.4991	-1.1161	-2.2322	-0.5862	-1.3108	-0.2622
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-0.5181	-1.1586	-2.3172	-0.1904	-0.4258	-0.0852
-0.4889	-1.0932	-2.1865	-0.5155	-1.1527	-0.2305
-0.4649	-1.0396	-2.0792	-0.5059	-1.1312	-0.2262
-0.4461	-0.9974	-1.9948	-0.3476	-0.7773	-0.1555
-0.4466	-0.9985	-1.9971	-0.3995	-0.8933	-0.1787
-0.4749	-1.0620	-2.1240	-0.4789	-1.0708	-0.2142
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-0.4303	-0.9622	-1.9245	-0.5183	-1.1589	-0.2318
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-0.3976	-0.8890	-1.7779	-0.3817	-0.8534	-0.1707
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-0.4288	-0.9588	-1.9176	-0.4651	-1.0400	-0.2080
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-0.3781	-0.8455	-1.6910	-0.3760	-0.8407	-0.1681
-0.3612	-0.8078	-1.6155	-0.3348	-0.7486	-0.1497
-0.3453	-0.7720	-1.5440	-0.3387	-0.7574	-0.1515
-0.3446	-0.7706	-1.5411	-0.3600	-0.8050	-0.1610
-0.3606	-0.8064	-1.6128	-0.3961	-0.8856	-0.1771
-0.3756	-0.8398	-1.6796	-0.4518	-1.0102	-0.2020
-0.3766	-0.8420	-1.6840	-0.4780	-1.0688	-0.2138
-0.4224	-0.9446	-1.8891	-0.5330	-1.1919	-0.2384
-0.4005	-0.8957	-1.7913	-0.4626	-1.0344	-0.2069
-0.4134	-0.9244	-1.8489	-0.5670	-1.2678	-0.2536



-0.4390	-0.9816	-1.9633	-0.4483	-1.0024	-0.2005
-0.4436	-0.9919	-1.9839	-0.5276	-1.1798	-0.2360
-0.4245	-0.9492	-1.8984	-0.5201	-1.1631	-0.2326
-0.4206	-0.9405	-1.8811	-0.4692	-1.0491	-0.2098
-0.3992	-0.8925	-1.7851	-0.3730	-0.8340	-0.1668
-0.3962	-0.8860	-1.7719	-0.4258	-0.9521	-0.1904
-0.3797	-0.8490	-1.6981	-0.3573	-0.7990	-0.1598
-0.3617	-0.8087	-1.6174	-0.3928	-0.8783	-0.1757
-0.3448	-0.7711	-1.5421	-0.3418	-0.7643	-0.1529
-0.4350	-0.9727	-1.9455	-0.4955	-1.1079	-0.2216
-0.4752	-1.0625	-2.1250	-0.5442	-1.2168	-0.2434
-0.4657	-1.0413	-2.0826	-0.6866	-1.5354	-0.3071
-0.4481	-1.0020	-2.0040	-0.5718	-1.2787	-0.2557
-0.4975	-1.1123	-2.2247	-0.5262	-1.1766	-0.2353
-0.4838	-1.0818	-2.1637	-0.4804	-1.0741	-0.2148
-0.5538	-1.2384	-2.4768	-0.7136	-1.5958	-0.3192
-0.6078	-1.3590	-2.7180	-0.6545	-1.4636	-0.2927
-0.5760	-1.2879	-2.5757	-0.7433	-1.6620	-0.3324
-0.6257	-1.3991	-2.7981	-0.7770	-1.7374	-0.3475
-0.6469	-1.4466	-2.8932	-0.5943	-1.3289	-0.2658
-0.6484	-1.4499	-2.8997	-0.7716	-1.7254	-0.3451
-0.6498	-1.4530	-2.9060	-0.6999	-1.5650	-0.3130
-0.6144	-1.3738	-2.7476	-0.5832	-1.3040	-0.2608
-0.8005	-1.7899	-3.5798	-0.8918	-1.9942	-0.3988
-0.8004	-1.7898	-3.5796	-0.7716	-1.7254	-0.3451
-0.9317	-2.0833	-4.1666	-1.3130	-2.9359	-0.5872
-1.0339	-2.3119	-4.6238	-1.1061	-2.4733	-0.4947
-1.0325	-2.3088	-4.6177	-1.2992	-2.9050	-0.5810
-1.0668	-2.3855	-4.7711	-1.2774	-2.8563	-0.5713
-1.0000	-2.2362	-4.4723	-0.8787	-1.9648	-0.3930
-0.9454	-2.1140	-4.2280	-0.9085	-2.0316	-0.4063
-0.8985	-2.0091	-4.0182	-0.4140	-0.9257	-0.1851
-0.9870	-2.2071	-4.4141	-0.7937	-1.7748	-0.3550
-1.0433	-2.3328	-4.6657	-0.9326	-2.0854	-0.4171
-1.0092	-2.2566	-4.5131	-1.1668	-2.6091	-0.5218
-0.9472	-2.1180	-4.2361	-0.9819	-2.1956	-0.4391
-1.1526	-2.5774	-5.1547	-1.1104	-2.4830	-0.4966
-1.1382	-2.5452	-5.0904	-0.9801	-2.1915	-0.4383
-1.1879	-2.6563	-5.3126	-1.5964	-3.5696	-0.7139

#####

Dengan nilai rata-rata VaR1 adalah -502229.890

Dengan nilai rata-rata VaR5 adalah -1123020.175

Dengan nilai rata-rata VaR20 adalah -2246040.350

Dengan nilai rata-rata VaR(1) adalah -518165.958

Dengan nilai rata-rata VaR(5) adalah -1158654.307

Dengan nilai rata-rata VaR(20) adalah -2317308.613

#####

>>

## Lampiran 10

### Program Uji Kupiec dengan Menghitung *Likelihood Ratio* Menggunakan *Software* MATLAB 7.1

```
clc;
fprintf('#####
#\n')
fprintf('##
#\n')
fprintf('##
#\n')
fprintf('#####
#\n')
p=input('probabilitas terjadinya failures(p)=')
n=input('jumlah data(n)=')
fprintf('#####
#\n')
fprintf('VaR-GARCH(1,1) selama 1 hari\n')
a1=VaR1;%data VaR-GARCH(1,1) selama 1 hari
b1=sort(a1);
c1=mean(b1);%nilai rata2 dari VaR-GARCH(1,1) selama 1 hari
d1=(b1>=c1);
e1=imhist(d1);
x1=e1(1)%nilai failures
Lr1=-2*log(((p)^x1)*(1-p)^(n-x1))+2*log(((x1/n)^x1)*(1-(x1/n))^(n-x1))
fprintf('Jadi nilai Likelihood Ratio dengan VaR 1 hari
adalah%8.3f\n',Lr1)
fprintf('#####
#\n')
fprintf('VaR-GARCH(1,1) selama 5 hari\n')
a2=VaR5;%data VaR-GARCH(1,1) selama 5 hari
b2=sort(a2);
c2=mean(b2);%nilai rata2 dari VaR-GARCH(1,1) selama 5 hari
d2=(b2>=c2);
e2=imhist(d2);
x2=e2(1)%nilai failures
Lr2=-2*log(((p)^x2)*(1-p)^(n-x2))+2*log(((x2/n)^x2)*(1-(x2/n))^(n-x2))
fprintf('Jadi nilai Likelihood Ratio dengan VaR 5 hari
adalah%8.3f\n',Lr2)
fprintf('#####
#\n')
fprintf('VaR-GARCH(1,1) selama 20 hari\n')
a3=VaR20;%data VaR-GARCH(1,1) selama 20 hari
b3=sort(a3);
c3=mean(b3);%nilai rata2 dari VaR-GARCH(1,1) selama 20 hari
d3=(b3>=c3);
```



```

e3=imhist(d3);
x3=e3(1)%nilai failures
Lr3=-2*log((p)^x3*(1-p)^(n-x3))+2*log(((x3/n)^x3)*(1-(x3/n))^(n-x3))
fprintf('Jadi nilai Likelihood Ratio dengan VaR 20 hari
adalah%8.3f\n',Lr3)
fprintf('#####
##\n')
fprintf('VaR-GARCH(3,0) selama 1 hari\n')
a4=Var1;%data VaR-GARCH(3,0) selama 1 hari
b4=sort(a4);
c4=mean(b4);%nilai rata2 dari VaR-GARCH(3,0) selama 1 hari
d4=(b4>=c4);
e4=imhist(d4);
x4=e4(1)%nilai failures
Lr4=-2*log((p)^x4*(1-p)^(n-x4))+2*log(((x4/n)^x4)*(1-(x4/n))^(n-x4))
fprintf('Jadi nilai Likelihood Ratio dengan VaR 1 hari
adalah%8.3f\n',Lr4)
fprintf('#####
#\n')
fprintf('VaR-GARCH(3,0) selama 5 hari\n')
a5=Var5;%data VaR-GARCH(3,0) selama 5 hari
b5=sort(a5);
c5=mean(b5);%nilai rata2 dari VaR-GARCH(3,0) selama 5 hari
d5=(b5>=c5);
e5=imhist(d5);
x5=e5(1)%nilai failures
Lr5=-2*log((p)^x5*(1-p)^(n-x5))+2*log(((x5/n)^x5)*(1-(x5/n))^(n-x5))
fprintf('Jadi nilai Likelihood Ratio dengan VaR 5 hari
adalah%8.3f\n',Lr5)
fprintf('#####
#\n')
fprintf('VaR-GARCH (3,0) selama 20 hari\n')
a6=Var20;%data VaR-GARCH(3,0) selama 20 hari
b6=sort(a6);
c6=mean(b6);%nilai rata2 dari VaR-GARCH(3,0) selama 20 hari
d6=(b6>=c6);
e6=imhist(d6);
x6=e6(1)%nilai failures
Lr6=-2*log((p)^x6*(1-p)^(n-x6))+2*log(((x6/n)^x6)*(1-(x6/n))^(n-x6))
fprintf('Jadi nilai Likelihood Ratio dengan VaR 20 hari
adalah%8.3f\n',Lr6)
fprintf('#####\n'

```

**Lampiran 11**

***Output Perhitungan Likelihood Ratio  
Menggunakan Software MATLAB 7.1***

```
#####  
##                               Uji Kupiec dengan                               ##  
##                               Menghitung Nilai Likelihood Ratio                               ##  
#####  
probabilitas terjadinya failures(p)=0.05  
p =  
    0.0500  
jumlah data(n)=616  
n =  
    616  
#####  
VaR-GARCH(1,1) selama 1 hari  
x1 =  
    186  
Lr1 =  
    403.9174  
Jadi nilai Likelihood Ratio dengan VaR 1 hari adalah 403.917  
#####
```

VaR-GARCH(1,1) selama 5 hari

x2 =

186

Lr2 =

403.9174

Jadi nilai Likelihood Ratio dengan VaR 5 hari adalah 403.917

#####

VaR-GARCH(1,1) selama 20 hari

x3 =

186

Lr3 =

403.9174

Jadi nilai Likelihood Ratio dengan VaR 20 hari adalah 403.917

#####

VaR-GARCH(3,0) selama 1 hari

x4 =

209

Lr4 =

554.5202

Jadi nilai Likelihood Ratio dengan VaR 1 hari adalah 554.520

#####

VaR-GARCH(3,0) selama 5 hari

x5 =

209

Lr5 =

504.7982

Jadi nilai Likelihood Ratio dengan VaR 5 hari adalah 504.798

#####

VaR-GARCH (3,0) selama 20 hari

x6 =

209

Lr6 =

504.7982

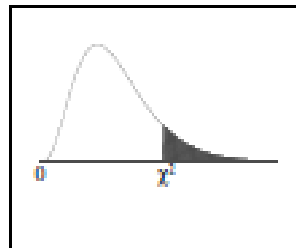
Jadi nilai Likelihood Ratio dengan VaR 20 hari adalah 504.798

#####

>

Lampiran 12

Chi-Square Distribution Table



The shaded area is equal to  $\alpha$  for  $\chi^2 = \chi^2_0$ .

$df$	$\chi^2_{0.95}$	$\chi^2_{0.90}$	$\chi^2_{0.85}$	$\chi^2_{0.80}$	$\chi^2_{0.75}$	$\chi^2_{0.70}$	$\chi^2_{0.65}$	$\chi^2_{0.60}$	$\chi^2_{0.55}$	$\chi^2_{0.50}$
1	0.000	0.000	0.001	0.004	0.016	2.706	3.841	5.024	6.635	7.879
2	0.010	0.020	0.061	0.103	0.211	4.605	5.991	7.378	9.210	10.597
3	0.072	0.116	0.216	0.352	0.584	6.251	7.815	9.348	11.345	12.838
4	0.207	0.297	0.484	0.711	1.064	7.779	9.488	11.143	13.277	14.860
5	0.412	0.554	0.831	1.145	1.610	9.236	11.070	12.833	15.086	16.750
6	0.676	0.872	1.237	1.635	2.204	10.595	12.592	14.449	16.812	18.548
7	0.989	1.239	1.690	2.167	2.833	12.017	14.067	16.013	18.475	20.278
8	1.344	1.646	2.180	2.733	3.490	13.362	15.507	17.535	20.090	21.955
9	1.735	2.088	2.700	3.325	4.168	14.684	16.919	19.023	21.666	23.589
10	2.156	2.558	3.247	3.940	4.865	15.987	18.307	20.483	23.209	25.188
11	2.603	3.053	3.816	4.575	5.578	17.275	19.675	21.920	24.726	26.757
12	3.074	3.571	4.404	5.226	6.304	18.549	21.026	23.337	26.217	28.300
13	3.565	4.107	5.009	5.892	7.042	19.812	22.362	24.736	27.688	29.819
14	4.075	4.660	5.629	6.571	7.790	21.064	23.685	26.119	29.141	31.319
15	4.601	5.229	6.262	7.261	8.547	22.307	24.996	27.488	30.578	32.801
16	5.142	5.812	6.908	7.962	9.312	23.542	26.296	28.845	32.000	34.267
17	5.697	6.408	7.564	8.672	10.085	24.769	27.587	30.191	33.409	35.718
18	6.266	7.016	8.231	9.390	10.865	25.989	28.869	31.526	34.805	37.156
19	6.844	7.633	8.907	10.117	11.651	27.204	30.144	32.852	36.191	38.582
20	7.434	8.260	9.591	10.851	12.443	28.412	31.410	34.170	37.566	39.997
21	8.034	8.897	10.283	11.591	13.240	29.615	32.671	35.479	38.932	41.401
22	8.643	9.542	10.982	12.338	14.041	30.813	33.924	36.781	40.289	42.796
23	9.260	10.196	11.689	13.091	14.848	32.007	35.172	38.076	41.638	44.181
24	9.886	10.856	12.401	13.848	15.659	33.196	36.415	39.364	42.980	45.559
25	10.520	11.524	13.120	14.611	16.473	34.382	37.652	40.646	44.314	46.928
26	11.160	12.198	13.844	15.379	17.292	35.563	38.885	41.923	45.642	48.290
27	11.808	12.879	14.573	16.151	18.114	36.741	40.113	43.196	46.963	49.645
28	12.461	13.565	15.308	16.928	18.939	37.916	41.337	44.461	48.278	50.993
29	13.121	14.256	16.047	17.708	19.768	39.087	42.557	45.722	49.588	52.336
30	13.787	14.953	16.791	18.493	20.599	40.256	43.773	46.979	50.892	53.672
40	20.707	22.164	24.433	26.509	29.051	51.805	55.758	59.342	63.691	66.766
50	27.991	29.707	32.357	34.764	37.689	63.167	67.505	71.420	76.154	79.490
60	35.534	37.485	40.482	43.188	46.459	74.397	79.082	83.298	88.379	91.952
70	43.275	45.442	48.758	51.739	55.329	85.527	90.531	95.023	100.425	104.215
80	51.172	53.540	57.153	60.391	64.278	96.578	101.879	106.629	112.329	116.321
90	59.196	61.754	65.647	69.126	73.291	107.565	113.145	118.136	124.116	128.299
100	67.328	70.065	74.222	77.929	82.358	118.498	124.342	129.561	135.807	140.169