ANALISIS RISIKO INVESTASI SAHAM SYARIAH MENGGUNAKAN METODE *VALUE AT RISK-GENERALIZED AUTOREGRESSIVE CONDITIONAL HETEROKEDASTIC* (VAR-GARCH) DENGAN PENDEKATAN *GENERALIZED PARETO DISTRIBUTION* (GPD)

(Studi kasus : Saham *Jakarta Islamic Index* periode Januari 2014 – Februari 2017)

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untuk memenuhi sebagian
persyaratan guna memperoleh derajat
Sarjana S-1

Program Studi Matematika

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MATEMATIKA FAKULTAS
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2017

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Setelah membaca, meneliti, memberikan petunjuk dan mengoreksi serta mengadakan perbaikan seperlunya, maka kami selaku pembimbing berpendapat bahwa skripsi Saudara:

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sudah dapat diajukan kembali kepada Program Studi MatematikaFakultas Sains dan Teknologi UIN Sunan Kalijaga Yogyakarta sebagai salah satu syarat untuk memperoleh gelar Sarjana Strata Satu dalambidang matematika.

Dengan ini kami mengharap agar skripsi/tugas akhir Saudara tersebut di atas dapat segera dimunaqsyahkan. Atas perhatiannya kami ucapkan terima kasih.

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Yogyakarta, 22 Mei 2017

Yang Menyatakan

Idrookuttafkiroh

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(Q.S Al-Baqarah 153)

“Banyaknya kegagalan dalam hidup ini dikarenakan orang-orang tidak menyadari betapa dekatnya mereka dengan keberhasilan saat mereka menyerah”

(Thomas Alva Edison)

“ Barang siapa bersungguh-sungguh, sesungguhnya kesungguhannya itu adalah untuk dirinya sendiri”

(Al-Ankabut : 6)

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Penulis

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DAFTAR ISI

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DAFTAR LAMPIRAN

DAFTAR LAMBANG

R_t : *log return* pada periode t

r_t : *simple net return* pada periode t

P_t : nilai *asset* pada periode t

P_{t-1} : nilai *asset* pada periode t-1

$\widehat{\emptyset}$: estimasi kuadrat terkecil

$SE(\widehat{\emptyset})$: estimasi standar *error*

r_k : koefisien autokorelasi sampai *lag* k

N : jumlah data

X_t : nilai *X* orde t

$\bar{X}$: nilai rata-rata

$\emptyset$: koefisien parameter *Autoregressive*

Θ : koefisien parameter *Moving Average*

σ_t^2 : varian dari residual pada waktu *t*

α_0 : konstanta model GARCH (p,q)

α : parameter model GARCH (p,q)

β : parameter model GARCH (p,q)

$\hat{u}$: nilai *threshold*

N_u : banyaknya pengamatan diatas nilai *threshold*

ξ : parameter bentuk GPD

β : parameter skala GPD

$\hat{\mu}_t$: *expected return*

$\hat{\sigma}_t$: standar deviasi dari model GARCH

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(Studi kasus : Saham *Jakarta Islamic Index* periode Januari 2014 – Februari 2017)

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ABSTRAK

Terdapat dua hal yang selalu menyertai investasi yaitu *return* dan risiko. *Value at Risk* (VaR) merupakan salah satu alat yang sering digunakan dalam pengukuran risiko. *Return* saham biasanya cenderung tidak berdistribusi normal karena memiliki ekor kiri yang panjang sehingga mengindikasi adanya ekor gemuk, dan terdapat kasus yang memiliki residual dengan variansi tidak *konstan* (*heterogen*). Model yang sesuai untuk kasus tersebut adalah model *Autoregressive Conditional Heterocedasticity* (ARCH)/ *Generalized Autoregressive Conditional Heterocedasticity* (GARCH), dengan pendekatan *Generalized Pareto Distribution* (GPD).

Data saham yang digunakan dalam penelitian ini adalah saham *Jakarta Islamic Index* (JII) dari periode Januari 2014 –Februari 2017. Adapun Langkah-langkah pada analisis risiko dengan model VaR-GARCH dengan pendekatan GPD ini adalah 1) Menguji kestasioneran data; 2) Menguji Normalitas; 3) Mengidentifikasi ekor gemuk; 4) Identifikasi model ARIMA (p,d,q); 5) Mengistimasi model ARIMA (p,d,q); 6) Menguji diagnosa model ARIMA(p,d,q); 7) Menguji efek ARCH; 8) Identifikasi model GARCH (p,q); 9) Mengestimasi model GARCH (p,q); 10) Mendiagnosa model GARCH (p,q); 11) Menguji kesesuaian distribusi; 12) Menghitung VaR-GARCH pendekatan GPD; 13) Menguji Validitas model VaR-GARCH pendekatan GPD.

Adapun model terbaik untuk penelitian ini adalah model GARCH (1,1), sedangkan hasil perhitungan dengan pendekatan GPD diperoleh risiko dengan tingkat kepercayaan 95% sebesar 1,8902% dengan *return* sebesar 0,0278%, sehingga jika dimisalkan seorang investor menginvestasikan dana sebesar Rp. 100.000.000,- maka kemungkinan kerugian maximal pada satu hari ke depan yang dihadapi investor adalah sebesar Rp. 1.890.200,- dengan keuntungan sebesar Rp. 27.800,-.

Kata kunci : ARCH/GARCH, Ekor gemuk, GPD, *Value at Risk* (VaR).

BAB I

PENDAHULUAN

1.1 Latar Belakang Masalah

Investasi menurut Islam merupakan kegiatan muamalah yang sangat dianjurkan, karena dengan berinvestasi, harta atau aset yang dimiliki oleh seseorang menjadi produktif sehingga mampu mendatangkan manfaat bagi dirinya dan orang lain, dengan syarat penerapannya berpedoman pada prinsip-prinsip syariah. Investasi adalah kegiatan mengalokasikan atau menanamkan sumber daya sekarang, dengan harapan mendapatkan manfaat di kemudian hari (masa datang). Salah satu bentuk investasi sektor finansial yang marak seiring makin berkembangnya perdagangan global dan majunya teknologi informasi adalah investasi saham di pasar modal.

Saham adalah surat berharga yang menunjukkan kepemilikan terhadap sebuah perusahaan. Masing-masing lembar saham biasa mewakili suatu suara tentang segala hal dalam pengurusan perusahaan dan dapat menggunakan suara tersebut dalam rapat tahunan perusahaan dan pembagian keuntungan. (Fahmi dan Lavianti Hadi, 2009)

Di Indonesia, PT. Bursa Efek Jakarta (BEJ) bekerjasama dengan PT *Danareksa Investment Management* (DIM) telah menerbitkan daftar reksadana, saham, dan obligasi syariah dalam *Jakarta Islamic Index* (JII). *Jakarta Islamic Index* (JII) merupakan indeks saham yang berisi 30 saham perusahaan yang memenuhi kriteria investasi berdasarkan syariah Islam.

Dunia investasi hampir seluruhnya mengandung unsur ketidakpastian atau risiko. Pengetahuan tentang risiko merupakan suatu hal yang sangat penting dimiliki oleh setiap investor maupun calon investor, untuk meminimalkan risiko yang mungkin akan diperoleh dalam proses investasi. Pada setiap investasi, terdapat dua hal yang mendasar yang selalu menyertainya yaitu tingkat keuntungan (*return*) dan risiko yang akan dihadapi. *Return* dan risiko mempunyai hubungan yang kuat dan linear yaitu jika risiko tinggi maka *return* juga akan tinggi atau sebaliknya, jika risiko rendah maka *return* juga rendah. Untuk mengatasi kendala tersebut investor dapat memperkirakan berapa besar keuntungan yang akan diperoleh dan seberapa jauh kemungkinan hasil yang akan didapatkan. (Husnan, 2009)

Analisis *time series* atau runtun waktu dapat diklasifikasikan menjadi dua yaitu: model univariat dan model multivariat. Model univariat hanya mengamati satu variabel runtun waktu, sedangkan model multivariat lebih dari satu variabel runtun waktu. Model *time series* yang paling populer dan banyak digunakan dalam peramalan data *time serie*s univariat adalah model *Autoregressive Integrated Moving Average* atau dikenal dengan model ARIMA (p,d,q) (Makridakis,1998).

Praktek pemodelan ARIMA pada suatu data ekonomi seringkali memberikan residual dengan variansi yang tidak *konstan* (*heterogen*) atau heterokedastisitas, Engle (1982) memperkenalkan model *Autoregressive Conditional Heteroscedasticity* (ARCH) untuk memodelkan inflasi di Inggris yang mengandung variansi yang tidak *konstan*. Kemudian model ARCH

disempurnakan menjadi *Generalized Autoregressive Conditional Heteroscedasticity* (GARCH) oleh Bolerslev (1986). Kedua model ini memiliki karakteristik respons volatilitas yang simetris terhadap goncangan, baik goncangan positif (*good news*) maupun negatif (*bad news*). (Ariefianto,2012).

Para investor menyadari bahwa dalam berinvestasi mereka harus mengukur sumber-sumber risiko setepat mungkin sehingga risiko dapat terkontrol dan dapat terminimalisir. Alat untuk mengukur risiko yang dapat digunakan antara lain ada yang menggunakan standar deviasi dan ada juga yang menggunakan *Value at Risk* (VaR).

Perubahan harga saham yang setiap detiknya dapat berubah-ubah memberikan informasi yang penting bagi para investor yang berinvestasi. Jika mengalami kenaikan harga saham maka akan berdampak positif bagi para investor, sebaliknya jika mengalami penurunan maka akan berdampak negatif bagi para investor. Pasar modal merupakan salah satu wadah alternatif bagi pemilik modal (investor) untuk melakukan penanaman modal (investasi), disini menawarkan tingkat keuntungan dan risiko yang berbeda. Oleh karena itu diperlukan alat ukur untuk mengukur risiko pasar tersebut, agar mudah mengetahui sejauh mana investor dikatakan aman dalam berinvestasi. Pengukuran risiko ini sangat penting dilakukan mengingat hal ini berkaitan dengan investasi dana yang cukup besar.

Value at Risk (VaR) merupakan ukuran risiko berbasis statistik. Perhitungan VaR berdasarkan pada distribusi probabilitas *return sekuritas*. Salah satu aspek terpenting dalam perhitungan VaR adalah menentukan jenis

metodologi dan asumsi yang sesuai dengan distribusi *return*. Penerapan metodologi dan asumsi yang tepat akan mnghasilkan perhitungan VaR yang akurat untuk digunakan sebagai ukuran risiko.

Pada kenyataannya dalam dunia menejemen risiko, seringkali membuat asumsi yang kurang tepat mengenai distribusi *return sekuritas.* Sebagai contoh, para praktisi seringkali mengasumsikan bahwa *return* finansial berdistribusi normal, padahal asumsi tersebut sangat meragukan karena sebagian besar *return* finansial cenderung memiliki *heavy tail* dibanding normal *tail*, yakni kecenderungan adanya indikasi kejadian ekstrim dibanding dengan pemodelan distribusi normal.

Dalam penelitian ini akan menerapkan metode Analisis Risiko pada Saham Syariah menggunakan metode *Value at Risk- Generalized Autoregressive Conditional Heterokedastic* (VaR-GARCH) dengan Pendekatan *Generalized Pareto Distribution* (GPD) pada saham *Jakarta Islamic Index* (JII) yang diambil dari www.yahoofinance.com.

1.2 Batasan Masalah

Pembatasan masalah perlu dilakukan dengan tujuan agar pokok permasalahan yang diteliti tidak terlalu melebar dari yang sudah ditentukan. Dalam penelitian ini batasan masalahnya adalah Analisis Risiko Investasi Saham Syariah Menggunakan Metode *Value at Risk Generalized Autoregressive Conditional Heterokedastisity* dengan Pendekatan *Generalized Pareto Distribution* (GPD). Saham yang di ambil adalah Saham *Jakarta Islamic Index* dengan menggunakan bantuan *software* E-views, Matlab, Ms.Excell, EasyFit.

1.3 Rumusan Masalah

Berdasarkan latar belakang yang telah diuraikan, maka masalah yang akan dikaji pada penelitian ini adalah

1. Bagaimana langkah-langkah analisis risiko investasi menggunakan metode *Value at Risk Generalized Autoregressive Conditional Heterokedastisity* (VaR-GARCH) dengan pendekatan *Generalized Pareto Distribution* (GPD)?
2. Bagaimana bentuk model terbaik *Value at Risk Generalized Autoregressive Conditional Heterokedastisity* (VaR-GARCH) dengan Pendekatan *Generalized Pareto Distribution* (GPD) untuk mengukur besar risiko investasi pada indeks harga saham *Jakarta Islamic Index* (JII) pada periode Januari 2014 – Februari 2017?
3. Berapa besar risiko dan *return* investasi pada indeks harga saham *Jakarta Islamic Index* (JII) pada periode Januari 2014 - Februari 2017?

1.4 Tujuan Penelitian

Berdasarkan permasalahan dan pertanyaan yang diajukan, maka tujuan dari penelitian ini adalah:

1. Untuk mengetahui langkah-langkah analisis risiko investasi menggunakan metode *Value at Risk Generalized Autoregressive Conditional Heterokedastisity* (VaR-GARCH) dengan pendekatan *Generalized Pareto Distribution* (GPD) pada indeks harga saham *Jakarta Islamic Index* (JII).
2. Untuk mengetahui model terbaik *Value at Risk Generalized Autoregressive Conditional Heterokedastisity* (VaR-GARCH) dengan

Pendekatan *Generalized Pareto Distribution* (GPD) dalam mengukur besar risiko investasi pada indeks harga saham *Jakarta Islamic Index* (JII) pada periode Januari 2014 - Februari 2017.

3. Untuk mengetahui besar risiko dan *return* investasi pada indeks harga saham *Jakarta Islamic Index* (JII) pada periode Januari 2014 - Februari 2017?

1.5 Manfaat Penelitian

Peneliti mengharapkan penelitian ini berguna bagi pihak yang membutuhkan diantaranya:

1. Bagi Investor

   Hasil dari penelitian ini diharapkan dapat dijadikan masukan terhadap investor dalam mengambil keputusan investasi dalam saham-saham JII di pasar modal.

2. Bagi Fakultas

   Hasil dari penelitian ini diharapkan dapat dijadikan sebagai bahan tinjauan pustaka yang berguna bagi setiap pihak yang memerlukan.

3. Bagi Mahasiswa atau Peneliti
   a. Sebagai salah satu syarat kelulusan mencapai derajat sarjana S1.
   b. Sebagai bahan informasi dan pengembangan selanjutnya.
   c. Sebagai salah satu bahan pengetahuan mengenai analisis risiko investasi menggunakan metode *Value at Risk Generalized Autoregressive Conditional Heterokedastisity* (VaR-GARCH) dengan pendekatan *Generalized Pareto Distribution* (GPD).

1.6 Tinjauan Pustaka

Tinjauan pustaka yang digunakan dalam penelitian ini adalah beberapa penelitian yang relevan dengan tema yang diambil oleh peneliti, adapun penelitian-penelitian sebelumnya antara lain sebagai berikut:

1. Jurnal yang berjudul "Penggunaan Metode VaR *(Value at Risk)* dalam Analisis Risiko Investasi Saham dengan Pendekatan *Generalized Pareto Distribution* (GPD)" yang ditulis oleh Ummi Zuhara, M. Sjahid Akbar dan Haryono Jurusan Statistika, Matematika dan Ilmu Pengetahuan Alam, Institut Teknologi Sepuluh November (ITS). Dalam jurnal tersebut metode yang digunakan yaitu VaR dengan pendekatan GPD, sedangkan objek yang diteliti yaitu Saham Semen Gresik.
2. Penelitian yang berjudul "Analisis Risiko pada Portofolio Saham Syariah Menggunakan *Value at Risk* dengan Pendekatan *Generalized Pareto Distribution (GPD)."* oleh Maida Fauziah mahasiswi jurusan Matematika fakultas Sains dan Teknologi UIN Sunan Kalijaga. Dalam penelitian ini metode yang digunakan yaitu VaR dengan pendekatan GPD, sedangkan objek yang diteliti yaitu Indeks Harga Saham JII.
3. Penelitian yang berjudul "Analisis risiko investasi dengan *Value at Risk* (VaR)- *Generalized Autoregressive Conditional Heterokedastic* (GARCH)" oleh Dian Harry Hanggara mahasiswa jurusan Matematika fakultas Sains dan Teknologi UIN Sunan Kalijaga. Dalam penelitian ini metode yang digunakan yaitu VaR-GARCH pada data berdistribusi normal, sedangkan objek yang diteliti yaitu Indeks Harga Saham JII.

Terdapat kesamaan dan perbedaan antara empat penelitian di atas, baik dari segi objek yang diteliti maupun metode dan pendekatan yang digunakan.

Tabel 1.1 : Kajian Pustaka

No	Nama Peneliti	Metode	Pendekatan	Objek
1	Ummi Zuhara, M.Sjahid Akbar dan Haryono	*Value at Risk* (VaR)	*Generalized Pareto Distribution* (GPD)	Saham Semen Gresik
2	Maida Fauziah	*Value at Risk* (VaR)	*Generalized Pareto Distribution* (GPD)	Saham JII
3	Dian Harry Hanggara	*Value at Risk-Generalized Autoregressive Conditional Heterokedastic* (VaR-GARCH)	Distribusi Normal	Saham JII
4	Idrookuttafkiroh	*Value at Risk-Generalized Autoregressive Conditional Heterokedastic* (VaR-GARCH)	*Generalized Pareto Distribution* (GPD)	Saham JII

1.7 Sistematika Penulisan

Secara garis besar gambaran sistematika penulisan pada tugas akhir ini terdiri dari enam bab antara lain:

BAB I PENDAHULUAN

Bab ini berisi latar belakang masalah, batasan masalah, rumusan masalah, tujuan penelitian, manfaat penelitian, tinjauan pustaka, dan sistematika penulisan.

BAB II LANDASAN TEORI

Bab ini membahas tentang teori dasar yang menunjang pembahasan tentang analisis risiko investasi menggunakan metode *Value at Risk Generalized Autoregressive Conditional Heterokedastisity* (VaR-GARCH) dengan pendekatan *Generalized Pareto Distribution* (GPD).

BAB III METODOLOGI PENELITIAN

Pada bab ini berisi berbagai penjelasan mengenai proses pelaksanaan penelitian ini, mulai jenis penelitian, objek penelitian, variabel penelitian, jenis penelitian, dan sumber data penelitian, tehnik pengumpulan data metodologi penelitian, metode analisis data, dan alat pengolahan data.

BAB IV PEMBAHASAN

Bab ini membahas tentang penjelasan mengenai analisis risiko investasi menggunakan metode *Value at Risk Generalized Autoregressive Conditional Heterokedastisity* (VaR-GARCH) dengan pendekatan *Generalized Pareto Distribution* (GPD).

BAB V STUDI KASUS

Bab ini membahas penerapan analisis risiko investasi menggunakan

metode *Value at Risk Generalized Autoregressive Conditional Heterokedastisity* (VaR-GARCH) dengan pendekatan *Generalized Pareto Distribution* (GPD) pada data indeks saham syarian *Jakarta Islamic Index* (JII) dan memberikan interpretasi terhadap hasil yang diperoleh.

BAB VI KESIMPULAN DAN SARAN

Bab ini berisi tentang kesimpulan yang diambil dari pembahasan permasalahan dan pemecahan masalah serta saran 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 risiko investasi dengan menggunakan VaR-GARCH pendekatan GPD yaitu menentukan nilai *return*, menguji kestasioneran data, menguji kenormalan data, menentukan model ARIMA yang sesuai, menguji ada tidaknya efek ARCH, menentukan model GARCH terbaik, menentukan nilai estimasi parameter dengan menggunakan metode GPD, menghitung nilai VaR.
2. Model terbaik dalam penelitian ini adalah model ARIMA (0,0,3) - GARCH (1,1) dan persamaannya sebagai berikut:
   a. Model ARIMA (0,0,3)

      Z_t= 0,105888 e_{t-3}

   b. Model GARCH (1,1)

      σ_t^2 = 1,16E-05 + 0,118531 ε_{t-1}^2 + 0,801911 σ_{t-1}^2
3. Pengukuran besar risiko investasi pada index harga saham *Jakarta Islamic Index* periode Januari 2014 – Februari 2017 menggunakan VaR-GARCH pendekatan GPD dengan tingkat kepercayaan 95% menghasilkan nilai risiko sebesar 1,8902% dan *return* sebesar 0,0278% , sehingga jika seorang investor menginvestasikan dana sebesar Rp. 100.000.000,- maka

kemungkinan kerugian maximal pada satu hari kedepan yang dihadapi investor adalah sebesar Rp. 1.890.200,- dengan keuntungan sebesar Rp. 27.800,-.

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. Untuk peneliti selanjutnya dapat dilakukan dengan model lain seperti GARCH-M, TARCH, VGARCH, IGARCH, APARCH dalam penentuan VaR dengan Pendekatan distribusi pareto maupun yang lain.

Demikian saran dari peneliti semoga dapat menjadi masukan bagi para peneliti selanjutnya khususnya dalam bidang statistik.

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LAMPIRAN 1 : Data *return* indeks saham JII dan Perhitungan *Likelihood Ratio Test*

No	Tanggal	Close	Return	Return*1000000	
1	2-Jan-14	596.2	0	0	TRUE
2	3-Jan-14	585.6	-0.017629791	-17629.79	TRUE
3	6-Jan-14	579.9	-0.009750017	-9750.017	TRUE
4	7-Jan-14	572.3	-0.013174004	-13174	TRUE
5	8-Jan-14	576.4	0.007199147	7199.147	TRUE
6	9-Jan-14	574.3	-0.003695286	-3695.286	TRUE
7	10-Jan-14	582.4	0.014104618	14104.62	TRUE
8	13-Jan-14	601.8	0.033363096	33363.1	TRUE
9	15-Jan-14	609.9	0.013442781	13442.78	TRUE
10	16-Jan-14	606.8	-0.005050008	-5050.008	TRUE
11	17-Jan-14	603.1	-0.006196236	-6196.236	TRUE
12	20-Jan-14	608.3	0.008722184	8722.184	TRUE
13	21-Jan-14	609.1	0.001298659	1298.659	TRUE
14	22-Jan-14	614.4	0.00870122	8701.22	TRUE
15	23-Jan-14	615	0.000911443	911.4435	TRUE
16	24-Jan-14	604.4	-0.017236613	-17236.61	TRUE
17	27-Jan-14	583.9	-0.033903073	-33903.07	**FALSE**
18	28-Jan-14	588.3	0.007518668	7518.668	TRUE
19	29-Jan-14	601.5	0.022557669	22557.67	TRUE
20	30-Jan-14	602.9	0.002210992	2210.992	TRUE
21	3-Feb-14	595.6	-0.01202581	-12025.81	TRUE
22	4-Feb-14	587.5	-0.013649642	-13649.64	TRUE
23	5-Feb-14	594.5	0.011932118	11932.12	TRUE
24	6-Feb-14	601.1	0.011034483	11034.48	TRUE
25	7-Feb-14	606.2	0.008584833	8584.833	TRUE
26	10-Feb-14	603.3	-0.004767246	-4767.246	TRUE
27	11-Feb-14	604.7	0.002270731	2270.731	TRUE
28	12-Feb-14	609.1	0.007243261	7243.261	TRUE
29	13-Feb-14	607.2	-0.003053786	-3053.786	TRUE
30	14-Feb-14	609	0.002881987	2881.987	TRUE
31	17-Feb-14	615.6	0.010903657	10903.66	TRUE
32	18-Feb-14	615.1	-0.000828447	-828.4466	TRUE
33	19-Feb-14	621.7	0.010778735	10778.74	TRUE
34	20-Feb-14	622.2	0.000691619	691.6185	TRUE

35	21-Feb-14	627	0.00773113	7731.13	TRUE
36	24-Feb-14	621.9	-0.008022712	-8022.712	TRUE
37	25-Feb-14	614.5	-0.011994726	-11994.73	TRUE
38	26-Feb-14	606	-0.013751465	-13751.46	TRUE
39	27-Feb-14	612.8	0.011237067	11237.07	TRUE
40	28-Feb-14	626.9	0.022877097	22877.1	TRUE
41	3-Mar-14	619	-0.01257059	-12570.59	TRUE
42	4-Mar-14	620.1	0.00172865	1728.65	TRUE
43	5-Mar-14	628	0.012821547	12821.55	TRUE
44	6-Mar-14	631	0.00477707	4777.07	TRUE
45	7-Mar-14	631.7	0.001172742	1172.742	TRUE
46	10-Mar-14	632.9	0.001852028	1852.028	TRUE
47	11-Mar-14	635.4	0.003855208	3855.208	TRUE
48	12-Mar-14	633.2	-0.00343118	-3431.18	TRUE
49	13-Mar-14	641.3	0.012855947	12855.95	TRUE
50	14-Mar-14	661.7	0.031856668	31856.67	TRUE
51	17-Mar-14	663.9	0.003203675	3203.675	TRUE
52	18-Mar-14	651.3	-0.018889525	-18889.52	TRUE
53	19-Mar-14	655.5	0.006340969	6340.969	TRUE
54	20-Mar-14	634.2	-0.032466245	-32466.24	**FALSE**
55	21-Mar-14	636.6	0.003752937	3752.937	TRUE
56	24-Mar-14	637.8	0.001948001	1948.001	TRUE
57	25-Mar-14	632.4	-0.008388341	-8388.341	TRUE
58	26-Mar-14	636.5	0.006387958	6387.958	TRUE
59	27-Mar-14	635	-0.002293866	-2293.866	TRUE
60	28-Mar-14	640.4	0.008487922	8487.922	TRUE
61	1-Apr-14	657.1	0.026045814	26045.81	TRUE
62	2-Apr-14	655.3	-0.002769788	-2769.788	TRUE
63	3-Apr-14	658.5	0.004975048	4975.048	TRUE
64	4-Apr-14	653.3	-0.007987487	-7987.487	TRUE
65	7-Apr-14	667.2	0.021354111	21354.11	TRUE
66	8-Apr-14	666.5	-0.001049129	-1049.129	TRUE
67	9-Apr-14	666.5	0	0	TRUE
68	10-Apr-14	643.2	-0.035062714	-35062.71	**FALSE**
69	11-Apr-14	653.3	0.015750603	15750.6	TRUE
70	14-Apr-14	659.7	0.00984264	9842.64	TRUE
71	15-Apr-14	659.8	0.000106107	106.1072	TRUE
72	16-Apr-14	657.9	-0.002910061	-2910.061	TRUE
73	17-Apr-14	663.6	0.00871006	8710.06	TRUE

74	21-Apr-14	663.5	-0.000105487	-105.4868	TRUE
75	22-Apr-14	664.1	0.000919339	919.3393	TRUE
76	23-Apr-14	664.1	1.50573E-05	15.05729	TRUE
77	24-Apr-14	663.2	-0.001445478	-1445.478	TRUE
78	25-Apr-14	663.2	4.52366E-05	45.23659	TRUE
79	28-Apr-14	650.3	-0.019435774	-19435.77	**FALSE**
80	29-Apr-14	645.3	-0.007796162	-7796.162	TRUE
81	30-Apr-14	647.7	0.003750484	3750.484	TRUE
82	2-May-14	646.3	-0.002192475	-2192.475	TRUE
83	5-May-14	648.3	0.003094778	3094.778	TRUE
84	6-May-14	647	-0.001866564	-1866.564	TRUE
85	7-May-14	651.7	0.007248393	7248.393	TRUE
86	8-May-14	652.8	0.001641784	1641.784	TRUE
87	9-May-14	656	0.004825368	4825.368	TRUE
88	12-May-14	662.5	0.009939782	9939.782	TRUE
89	13-May-14	661.1	-0.002143493	-2143.493	TRUE
90	14-May-14	672.6	0.017472203	17472.2	TRUE
91	16-May-14	680.6	0.011938745	11938.75	TRUE
92	19-May-14	678.1	-0.003746529	-3746.529	TRUE
93	20-May-14	660.1	-0.02654554	-26545.54	**FALSE**
94	21-May-14	664.8	0.007120349	7120.349	TRUE
95	22-May-14	672.5	0.011627907	11627.91	TRUE
96	23-May-14	672.1	-0.000594787	-594.7867	TRUE
97	26-May-14	671.8	-0.000431477	-431.477	TRUE
98	28-May-14	674	0.003185377	3185.377	TRUE
99	30-May-14	656.8	-0.025416939	-25416.94	**FALSE**
100	2-Jun-14	658.9	0.0031515	3151.5	TRUE
101	3-Jun-14	662.6	0.005630596	5630.596	TRUE
102	4-Jun-14	661.6	-0.001494092	-1494.092	TRUE
103	5-Jun-14	663	0.002131133	2131.133	TRUE
104	6-Jun-14	666.4	0.005082726	5082.726	TRUE
105	9-Jun-14	659	-0.011119448	-11119.45	TRUE
106	10-Jun-14	669.2	0.015463057	15463.06	TRUE
107	11-Jun-14	673	0.005693535	5693.535	TRUE
108	12-Jun-14	666.7	-0.009420645	-9420.645	TRUE
109	13-Jun-14	665.3	-0.002070052	-2070.052	TRUE
110	16-Jun-14	655.9	-0.014084507	-14084.51	TRUE
111	17-Jun-14	661.5	0.008553133	8553.133	TRUE
112	18-Jun-14	658.1	-0.005230458	-5230.458	TRUE

113	19-Jun-14	654.4	-0.005607477	-5607.477	TRUE
114	20-Jun-14	653	-0.002124213	-2124.213	TRUE
115	23-Jun-14	653.4	0.000719788	719.788	TRUE
116	24-Jun-14	654.7	0.001851738	1851.738	TRUE
117	25-Jun-14	651.6	-0.004613152	-4613.152	TRUE
118	26-Jun-14	656.7	0.007765143	7765.143	TRUE
119	27-Jun-14	651.9	-0.007309385	-7309.385	TRUE
120	30-Jun-14	655	0.004770744	4770.744	TRUE
121	1-Jul-14	656.4	0.002061069	2061.069	TRUE
122	2-Jul-14	663.9	0.011442066	11442.07	TRUE
123	3-Jul-14	661.8	-0.003118127	-3118.127	TRUE
124	4-Jul-14	663.6	0.002780338	2780.338	TRUE
125	7-Jul-14	679.4	0.02377831	23778.31	TRUE
126	8-Jul-14	683.3	0.005710837	5710.837	TRUE
127	10-Jul-14	692.9	0.013991131	13991.13	TRUE
128	11-Jul-14	679.9	-0.01876308	-18763.08	TRUE
129	14-Jul-14	679.7	-0.000205928	-205.9278	TRUE
130	15-Jul-14	688.2	0.012490621	12490.62	TRUE
131	16-Jul-14	694.5	0.009139785	9139.785	TRUE
132	17-Jul-14	685.9	-0.012325591	-12325.59	TRUE
133	18-Jul-14	689.8	0.005627396	5627.396	TRUE
134	21-Jul-14	697.1	0.010611925	10611.93	TRUE
135	22-Jul-14	692.3	-0.006856881	-6856.881	TRUE
136	23-Jul-14	692.1	-0.000274436	-274.4356	TRUE
137	24-Jul-14	692.5	0.000462334	462.3342	TRUE
138	25-Jul-14	690.4	-0.002974901	-2974.901	TRUE
139	4-Aug-14	701.2	0.015686559	15686.56	TRUE
140	5-Aug-14	697.2	-0.005818348	-5818.348	TRUE
141	6-Aug-14	687.9	-0.013296995	-13296.99	TRUE
142	7-Aug-14	690.4	0.003648892	3648.892	TRUE
143	8-Aug-14	686.7	-0.005301351	-5301.351	TRUE
144	11-Aug-14	697.4	0.015464593	15464.59	TRUE
145	12-Aug-14	700.2	0.00407256	4072.56	TRUE
146	13-Aug-14	707.4	0.010268641	10268.64	TRUE
147	14-Aug-14	703.8	-0.005046792	-5046.792	TRUE
148	15-Aug-14	701.4	-0.003367386	-3367.386	TRUE
149	18-Aug-14	702.5	0.001468408	1468.408	TRUE
150	19-Aug-14	701.4	-0.001565903	-1565.903	TRUE
151	20-Aug-14	706.2	0.006915038	6915.038	TRUE

152	21-Aug-14	707.4	0.001727507	1727.507	TRUE
153	22-Aug-14	704.2	-0.004565758	-4565.758	TRUE
154	25-Aug-14	701.1	-0.004430497	-4430.497	TRUE
155	26-Aug-14	696	-0.007260124	-7260.124	TRUE
156	27-Aug-14	698.9	0.004181034	4181.034	TRUE
157	28-Aug-14	701.5	0.003734386	3734.386	TRUE
158	29-Aug-14	691.1	-0.014810697	-14810.7	TRUE
159	1-Sep-14	699.5	0.012110601	12110.6	TRUE
160	2-Sep-14	703.1	0.005075054	5075.054	TRUE
161	3-Sep-14	707.2	0.005931299	5931.299	TRUE
162	4-Sep-14	702.2	-0.007055796	-7055.796	TRUE
163	5-Sep-14	702.9	0.000882902	882.9016	TRUE
164	8-Sep-14	708	0.007298855	7298.855	TRUE
165	9-Sep-14	698.2	-0.013799825	-13799.82	TRUE
166	10-Sep-14	688.7	-0.013692156	-13692.16	TRUE
167	11-Sep-14	683.3	-0.007739781	-7739.781	TRUE
168	12-Sep-14	688.7	0.007844055	7844.055	TRUE
169	15-Sep-14	691.6	0.004239995	4239.995	TRUE
170	16-Sep-14	691	-0.000867553	-867.5535	TRUE
171	17-Sep-14	699.1	0.01170767	11707.67	TRUE
172	18-Sep-14	702.7	0.005192464	5192.464	TRUE
173	19-Sep-14	704.7	0.002831853	2831.853	TRUE
174	22-Sep-14	702.4	-0.003249564	-3249.564	TRUE
175	23-Sep-14	696.2	-0.008869337	-8869.337	TRUE
176	24-Sep-14	692.5	-0.005257186	-5257.186	TRUE
177	25-Sep-14	695	0.003566632	3566.632	TRUE
178	26-Sep-14	687.6	-0.010604317	-10604.32	TRUE
179	29-Sep-14	689.5	0.0026904	2690.4	TRUE
180	30-Sep-14	687.6	-0.002697685	-2697.685	TRUE
181	1-Oct-14	682.4	-0.007605945	-7605.945	TRUE
182	2-Oct-14	661.7	-0.030319905	-30319.91	**FALSE**
183	3-Oct-14	659	-0.004095512	-4095.512	TRUE
184	6-Oct-14	665.1	0.009302114	9302.114	TRUE
185	7-Oct-14	671	0.008855545	8855.545	TRUE
186	8-Oct-14	659.4	-0.01737679	-17376.79	TRUE
187	9-Oct-14	662.8	0.005262759	5262.759	TRUE
188	10-Oct-14	656	-0.010304457	-10304.46	TRUE
189	13-Oct-14	647.2	-0.013338618	-13338.62	TRUE
190	14-Oct-14	650.3	0.004789568	4789.568	TRUE

191	15-Oct-14	652.8	0.003736507	3736.507	TRUE
192	16-Oct-14	652	-0.001210227	-1210.227	TRUE
193	17-Oct-14	663.6	0.017776619	17776.62	TRUE
194	20-Oct-14	662.6	-0.00143165	-1431.65	TRUE
195	21-Oct-14	661.9	-0.001116779	-1116.779	TRUE
196	22-Oct-14	668.1	0.009442799	9442.799	TRUE
197	23-Oct-14	671.1	0.004400341	4400.341	TRUE
198	24-Oct-14	666.4	-0.006944134	-6944.134	TRUE
199	27-Oct-14	658.7	-0.011569454	-11569.45	TRUE
200	28-Oct-14	652.6	-0.009230302	-9230.302	TRUE
201	29-Oct-14	667.8	0.02326009	23260.09	TRUE
202	30-Oct-14	666.8	-0.00148248	-1482.48	TRUE
203	31-Oct-14	670.4	0.00544383	5443.83	TRUE
204	3-Nov-14	670.2	-0.000372889	-372.8894	TRUE
205	4-Nov-14	664.5	-0.008564735	-8564.735	TRUE
206	5-Nov-14	665.4	0.001474904	1474.904	TRUE
207	6-Nov-14	662.1	-0.004944171	-4944.171	TRUE
208	7-Nov-14	654	-0.012263268	-12263.27	TRUE
209	10-Nov-14	649.7	-0.006681753	-6681.753	TRUE
210	11-Nov-14	661.7	0.018517663	18517.66	TRUE
211	12-Nov-14	663.9	0.003385322	3385.322	TRUE
212	13-Nov-14	665.7	0.002681046	2681.046	TRUE
213	14-Nov-14	665.8	0.000210305	210.3049	TRUE
214	17-Nov-14	668.5	0.004009972	4009.972	TRUE
215	18-Nov-14	675.8	0.010845014	10845.01	TRUE
216	19-Nov-14	678.6	0.004261868	4261.868	TRUE
217	20-Nov-14	672.6	-0.008914889	-8914.889	TRUE
218	21-Nov-14	677.5	0.007329874	7329.874	TRUE
219	24-Nov-14	686.5	0.013239462	13239.46	TRUE
220	25-Nov-14	680.1	-0.00930822	-9308.22	TRUE
221	26-Nov-14	681.6	0.002205558	2205.558	TRUE
222	27-Nov-14	684.7	0.004562793	4562.793	TRUE
223	28-Nov-14	683	-0.002468198	-2468.198	TRUE
224	1-Dec-14	685.4	0.003484525	3484.525	TRUE
225	2-Dec-14	685.9	0.000758681	758.6811	TRUE
226	3-Dec-14	681.7	-0.006094005	-6094.005	TRUE
227	4-Dec-14	686.7	0.007260833	7260.833	TRUE
228	5-Dec-14	688.3	0.002315455	2315.455	TRUE
229	8-Dec-14	680.8	-0.010911257	-10911.26	TRUE

230	9-Dec-14	678.7	-0.003025985	-3025.985	TRUE
231	10-Dec-14	682.7	0.005908267	5908.267	TRUE
232	11-Dec-14	679.7	-0.004482072	-4482.072	TRUE
233	12-Dec-14	680.4	0.001074066	1074.066	TRUE
234	15-Dec-14	674.3	-0.008980144	-8980.144	TRUE
235	16-Dec-14	663.4	-0.016150561	-16150.56	TRUE
236	17-Dec-14	661.6	-0.002698262	-2698.262	TRUE
237	18-Dec-14	675.5	0.020994559	20994.56	TRUE
238	19-Dec-14	679.2	0.005462701	5462.701	TRUE
239	29-Dec-14	685.8	0.009805942	9805.942	TRUE
240	30-Dec-14	691	0.007581943	7581.943	TRUE
241	2-Jan-15	694.5	0.004963533	4963.533	TRUE
242	5-Jan-15	689.1	-0.007746915	-7746.915	TRUE
243	6-Jan-15	681.1	-0.011638538	-11638.54	TRUE
244	7-Jan-15	687.5	0.009455709	9455.709	TRUE
245	8-Jan-15	688.1	0.00091635	916.3503	TRUE
246	9-Jan-15	689	0.001177086	1177.086	TRUE
247	12-Jan-15	683.8	-0.007504173	-7504.173	TRUE
248	13-Jan-15	692.2	0.012240779	12240.78	TRUE
249	14-Jan-15	681.7	-0.015155674	-15155.67	TRUE
250	15-Jan-15	687.6	0.008670011	8670.011	TRUE
251	16-Jan-15	681.7	-0.008551857	-8551.857	TRUE
252	19-Jan-15	681.6	-7.33471E-05	-73.34712	TRUE
253	20-Jan-15	688.6	0.010240009	10240.01	TRUE
254	21-Jan-15	702.1	0.019575383	19575.38	TRUE
255	22-Jan-15	708.8	0.009599772	9599.772	TRUE
256	23-Jan-15	716.7	0.011130862	11130.86	TRUE
257	26-Jan-15	705.4	-0.015766049	-15766.05	TRUE
258	27-Jan-15	707.7	0.003232071	3232.071	TRUE
259	28-Jan-15	706.1	-0.002289073	-2289.073	TRUE
260	29-Jan-15	703.1	-0.004234588	-4234.588	TRUE
261	30-Jan-15	706.7	0.005091737	5091.737	TRUE
262	2-Feb-15	701.5	-0.00733005	-7330.05	TRUE
263	3-Feb-15	704.6	0.004476123	4476.123	TRUE
264	4-Feb-15	708.7	0.005790191	5790.191	TRUE
265	5-Feb-15	700.4	-0.011739474	-11739.47	TRUE
266	6-Feb-15	711.5	0.015876642	15876.64	TRUE
267	9-Feb-15	710.9	-0.000885428	-885.4284	TRUE
268	10-Feb-15	707	-0.005457947	-5457.947	TRUE

269	11-Feb-15	712.1	0.007255909	7255.909	TRUE
270	12-Feb-15	714	0.002583762	2583.762	TRUE
271	13-Feb-15	721.5	0.010574526	10574.53	TRUE
272	16-Feb-15	709.6	-0.016534309	-16534.31	TRUE
273	17-Feb-15	714.3	0.00667982	6679.82	TRUE
274	18-Feb-15	718.7	0.006075538	6075.538	TRUE
275	20-Feb-15	715.4	-0.00461958	-4619.58	TRUE
276	23-Feb-15	718.4	0.00423563	4235.63	TRUE
277	24-Feb-15	720.4	0.002839683	2839.683	TRUE
278	25-Feb-15	727.4	0.0097303	9730.3	TRUE
279	26-Feb-15	727.4	-9.62279E-05	-96.22787	TRUE
280	27-Feb-15	722.1	-0.007245281	-7245.281	TRUE
281	2-Mar-15	728.6	0.009015372	9015.372	TRUE
282	3-Mar-15	730.2	0.002182237	2182.237	TRUE
283	4-Mar-15	723.4	-0.009326212	-9326.212	TRUE
284	5-Mar-15	722.1	-0.001797094	-1797.094	TRUE
285	6-Mar-15	734.9	0.017670927	17670.93	TRUE
286	9-Mar-15	724.7	-0.013880384	-13880.38	TRUE
287	10-Mar-15	725.9	0.001655972	1655.972	TRUE
288	11-Mar-15	720.5	-0.007329338	-7329.338	TRUE
289	12-Mar-15	723.8	0.00449669	4496.69	TRUE
290	13-Mar-15	723.7	-0.000124349	-124.3489	TRUE
291	16-Mar-15	725.4	0.00230765	2307.65	TRUE
292	17-Mar-15	724.7	-0.000923692	-923.692	TRUE
293	18-Mar-15	718.3	-0.008776287	-8776.287	TRUE
294	19-Mar-15	724.9	0.009104577	9104.577	TRUE
295	20-Mar-15	721.7	-0.00440085	-4400.85	TRUE
296	23-Mar-15	721	-0.000928402	-928.4022	TRUE
297	24-Mar-15	721.5	0.000693481	693.4813	TRUE
298	25-Mar-15	711	-0.014511435	-14511.43	TRUE
299	26-Mar-15	703.5	-0.010618399	-10618.4	TRUE
300	27-Mar-15	710	0.009239779	9239.779	TRUE
301	30-Mar-15	720.5	0.014817319	14817.32	TRUE
302	31-Mar-15	728.2	0.010687023	10687.02	TRUE
303	1-Apr-15	718.6	-0.013196924	-13196.92	TRUE
304	2-Apr-15	716.8	-0.002490989	-2490.989	TRUE
305	6-Apr-15	720.9	0.005678013	5678.013	TRUE
306	7-Apr-15	727.6	0.009280453	9280.453	TRUE
307	8-Apr-15	720	-0.01040464	-10404.64	TRUE

308	9-Apr-15	723.9	0.005361186	5361.186	TRUE
309	10-Apr-15	722.1	-0.002445258	-2445.258	TRUE
310	13-Apr-15	717.4	-0.00643973	-6439.73	TRUE
311	14-Apr-15	711.1	-0.008809222	-8809.222	TRUE
312	15-Apr-15	711.1	-2.8125E-05	-28.12504	TRUE
313	16-Apr-15	710.4	-0.000956278	-956.2784	TRUE
314	17-Apr-15	709.3	-0.001520249	-1520.249	TRUE
315	20-Apr-15	704.3	-0.007161688	-7161.688	TRUE
316	21-Apr-15	718	0.019495918	19495.92	TRUE
317	22-Apr-15	716.1	-0.002590601	-2590.601	TRUE
318	23-Apr-15	718.9	0.00381221	3812.21	TRUE
319	24-Apr-15	723.3	0.006176532	6176.532	TRUE
320	27-Apr-15	698.2	-0.034633411	-34633.41	**FALSE**
321	28-Apr-15	701.1	0.004067369	4067.369	TRUE
322	29-Apr-15	674.9	-0.037385177	-37385.18	**FALSE**
323	30-Apr-15	664.8	-0.014921392	-14921.39	TRUE
324	4-May-15	679.2	0.021600481	21600.48	TRUE
325	5-May-15	686.3	0.010439366	10439.37	TRUE
326	6-May-15	692.3	0.008816029	8816.029	TRUE
327	7-May-15	686	-0.009143435	-9143.435	TRUE
328	8-May-15	696.7	0.015642083	15642.08	TRUE
329	11-May-15	696.2	-0.000775083	-775.0825	TRUE
330	12-May-15	697	0.001134797	1134.797	TRUE
331	13-May-15	706	0.013028194	13028.19	TRUE
332	15-May-15	708.9	0.003994165	3994.165	TRUE
333	18-May-15	708.5	-0.00047965	-479.6501	TRUE
334	19-May-15	711.8	0.004572977	4572.977	TRUE
335	20-May-15	714.8	0.004285213	4285.213	TRUE
336	21-May-15	712.3	-0.003525462	-3525.462	TRUE
337	22-May-15	711.8	-0.000716011	-716.0106	TRUE
338	25-May-15	711.3	-0.000702474	-702.4741	TRUE
339	26-May-15	719.3	0.011289665	11289.66	TRUE
340	27-May-15	707.8	-0.016029473	-16029.47	TRUE
341	28-May-15	707.2	-0.000861862	-861.8619	TRUE
342	29-May-15	698.1	-0.012854234	-12854.23	TRUE
343	1-Jun-15	700.7	0.003695904	3695.904	TRUE
344	3-Jun-15	692.4	-0.011774781	-11774.78	TRUE
345	4-Jun-15	685.3	-0.010268631	-10268.63	TRUE
346	5-Jun-15	684.8	-0.000787988	-787.9876	TRUE

347	8-Jun-15	672.9	-0.017349398	-17349.4	TRUE
348	9-Jun-15	655.7	-0.025517559	-25517.56	**FALSE**
349	10-Jun-15	664.8	0.013802044	13802.04	TRUE
350	11-Jun-15	666.6	0.002783001	2783.001	TRUE
351	12-Jun-15	665.7	-0.001410141	-1410.141	TRUE
352	15-Jun-15	648	-0.02646997	-26469.97	**FALSE**
353	16-Jun-15	653	0.007700142	7700.142	TRUE
354	17-Jun-15	660.8	0.011929008	11929.01	TRUE
355	18-Jun-15	665.1	0.006416271	6416.271	TRUE
356	19-Jun-15	666.8	0.002646378	2646.378	TRUE
357	22-Jun-15	661.6	-0.007768213	-7768.213	TRUE
358	23-Jun-15	657.1	-0.006846624	-6846.624	TRUE
359	24-Jun-15	666.4	0.014092009	14092.01	TRUE
360	25-Jun-15	659.8	-0.009874394	-9874.394	TRUE
361	26-Jun-15	658.9	-0.001424696	-1424.696	TRUE
362	29-Jun-15	652.8	-0.009152311	-9152.311	TRUE
363	30-Jun-15	657	0.006387672	6387.672	TRUE
364	1-Jul-15	654.8	-0.003318163	-3318.163	TRUE
365	2-Jul-15	662.4	0.011621692	11621.69	TRUE
366	3-Jul-15	670.9	0.012846834	12846.83	TRUE
367	6-Jul-15	661.4	-0.014248878	-14248.88	TRUE
368	7-Jul-15	657.7	-0.005518847	-5518.847	TRUE
369	8-Jul-15	653.3	-0.006796205	-6796.205	TRUE
370	9-Jul-15	645.6	-0.011725985	-11725.99	TRUE
371	10-Jul-15	648.7	0.004879258	4879.258	TRUE
372	13-Jul-15	654.8	0.009372013	9372.013	TRUE
373	14-Jul-15	655.9	0.001649308	1649.308	TRUE
374	15-Jul-15	653.7	-0.003430401	-3430.401	TRUE
375	22-Jul-15	658.4	0.007251587	7251.587	TRUE
376	23-Jul-15	656.3	-0.003113656	-3113.656	TRUE
377	24-Jul-15	646.9	-0.014321845	-14321.85	TRUE
378	27-Jul-15	632.1	-0.022876928	-22876.93	**FALSE**
379	28-Jul-15	628.6	-0.005552567	-5552.567	TRUE
380	29-Jul-15	629.1	0.000747658	747.6576	TRUE
381	30-Jul-15	628.9	-0.000317914	-317.9145	TRUE
382	31-Jul-15	642	0.020782318	20782.32	TRUE
383	3-Aug-15	637	-0.007757372	-7757.372	TRUE
384	4-Aug-15	634.2	-0.004348577	-4348.577	TRUE
385	5-Aug-15	644.3	0.015814702	15814.7	TRUE

386	6-Aug-15	634.6	-0.01491657	-14916.57	TRUE
387	7-Aug-15	631.8	-0.004522249	-4522.249	TRUE
388	10-Aug-15	628.8	-0.004653592	-4653.592	TRUE
389	11-Aug-15	607.8	-0.033522574	-33522.57	**FALSE**
390	12-Aug-15	585.3	-0.036906623	-36906.62	**FALSE**
391	13-Aug-15	605.3	0.034135174	34135.17	TRUE
392	14-Aug-15	606.4	0.001833801	1833.801	TRUE
393	18-Aug-15	597.2	-0.015204235	-15204.23	TRUE
394	19-Aug-15	592.1	-0.008473015	-8473.015	TRUE
395	20-Aug-15	588	-0.006991708	-6991.708	TRUE
396	21-Aug-15	572	-0.027177333	-27177.33	**FALSE**
397	24-Aug-15	544.4	-0.048285869	-48285.87	**FALSE**
398	25-Aug-15	554.9	0.019250905	19250.9	TRUE
399	26-Aug-15	553.1	-0.003207959	-3207.959	TRUE
400	27-Aug-15	585.2	0.05800141	58001.41	TRUE
401	28-Aug-15	586.1	0.001572193	1572.193	TRUE
402	31-Aug-15	598.3	0.020798853	20798.85	TRUE
403	1-Sep-15	584.1	-0.023701277	-23701.28	**FALSE**
404	2-Sep-15	582.7	-0.002465331	-2465.331	TRUE
405	3-Sep-15	590.9	0.014124876	14124.88	TRUE
406	4-Sep-15	589.1	-0.002961634	-2961.634	TRUE
407	7-Sep-15	565.3	-0.040414842	-40414.84	**FALSE**
408	8-Sep-15	567.3	0.003555445	3555.445	TRUE
409	9-Sep-15	575	0.013483978	13483.98	TRUE
410	10-Sep-15	577.1	0.003600063	3600.063	TRUE
411	11-Sep-15	584.9	0.013586109	13586.11	TRUE
412	14-Sep-15	591.7	0.011591725	11591.73	TRUE
413	15-Sep-15	580.3	-0.019267171	-19267.17	**FALSE**
414	16-Sep-15	577.1	-0.005531812	-5531.812	TRUE
415	17-Sep-15	584.4	0.012754085	12754.09	TRUE
416	18-Sep-15	584.8	0.000701538	701.5383	TRUE
417	21-Sep-15	583.3	-0.002667396	-2667.396	TRUE
418	22-Sep-15	576.2	-0.01220683	-12206.83	TRUE
419	23-Sep-15	561.5	-0.025392252	-25392.25	**FALSE**
420	25-Sep-15	557.2	-0.00765765	-7657.65	TRUE
421	28-Sep-15	542	-0.027331622	-27331.62	**FALSE**
422	29-Sep-15	554.4	0.022933579	22933.58	TRUE
423	30-Sep-15	556.1	0.002994066	2994.066	TRUE
424	1-Oct-15	563.1	0.012533942	12533.94	TRUE

425	2-Oct-15	553.9	-0.016321529	-16321.53	TRUE
426	5-Oct-15	576.3	0.040569087	40569.09	TRUE
427	6-Oct-15	596.7	0.035291668	35291.67	TRUE
428	7-Oct-15	602.6	0.009837769	9837.769	TRUE
429	8-Oct-15	601.2	-0.002323459	-2323.459	TRUE
430	9-Oct-15	615.4	0.023754471	23754.47	TRUE
431	12-Oct-15	619.1	0.005930813	5930.813	TRUE
432	13-Oct-15	593	-0.042159333	-42159.33	**FALSE**
433	15-Oct-15	599.5	0.010961584	10961.58	TRUE
434	16-Oct-15	602	0.004220324	4220.324	TRUE
435	19-Oct-15	612.1	0.01677713	16777.13	TRUE
436	20-Oct-15	612.8	0.001192596	1192.596	TRUE
437	21-Oct-15	616.9	0.006673846	6673.846	TRUE
438	22-Oct-15	611.3	-0.009060996	-9060.996	TRUE
439	23-Oct-15	620.2	0.014558184	14558.18	TRUE
440	26-Oct-15	623.6	0.005433381	5433.381	TRUE
441	27-Oct-15	620.9	-0.004281522	-4281.522	TRUE
442	28-Oct-15	610.9	-0.016169034	-16169.03	TRUE
443	29-Oct-15	587	-0.039171714	-39171.71	**FALSE**
444	30-Oct-15	586.1	-0.001482188	-1482.188	TRUE
445	2-Nov-15	593.6	0.012762327	12762.33	TRUE
446	3-Nov-15	599.5	0.009922841	9922.841	TRUE
447	4-Nov-15	610.5	0.018349542	18349.54	TRUE
448	5-Nov-15	605.2	-0.00858355	-8583.55	TRUE
449	6-Nov-15	603.8	-0.002379261	-2379.261	TRUE
450	9-Nov-15	591.4	-0.020570066	-20570.07	**FALSE**
451	10-Nov-15	582.2	-0.015489457	-15489.46	TRUE
452	11-Nov-15	584.9	0.004585974	4585.974	TRUE
453	12-Nov-15	582.5	-0.004103406	-4103.406	TRUE
454	13-Nov-15	587.6	0.008704162	8704.162	TRUE
455	16-Nov-15	581.5	-0.010245937	-10245.94	TRUE
456	17-Nov-15	589.3	0.013361306	13361.31	TRUE
457	18-Nov-15	593.8	0.007619209	7619.209	TRUE
458	19-Nov-15	596.9	0.005170178	5170.178	TRUE
459	20-Nov-15	604.5	0.012867339	12867.34	TRUE
460	23-Nov-15	595.6	-0.014788103	-14788.1	TRUE
461	24-Nov-15	594.9	-0.001208865	-1208.865	TRUE
462	25-Nov-15	599.3	0.00739645	7396.45	TRUE
463	26-Nov-15	601.8	0.004188359	4188.359	TRUE

464	27-Nov-15	601	-0.001246282	-1246.282	TRUE
465	30-Nov-15	579.8	-0.035338746	-35338.75	**FALSE**
466	1-Dec-15	598	0.031441877	31441.88	TRUE
467	2-Dec-15	596.9	-0.001889537	-1889.537	TRUE
468	3-Dec-15	596.6	-0.000552856	-552.8564	TRUE
469	4-Dec-15	592.9	-0.006151835	-6151.835	TRUE
470	7-Dec-15	595.7	0.004756283	4756.283	TRUE
471	8-Dec-15	582.2	-0.02267844	-22678.44	**FALSE**
472	10-Dec-15	578.3	-0.00671579	-6715.79	TRUE
473	11-Dec-15	565.1	-0.022842815	-22842.82	**FALSE**
474	14-Dec-15	565.6	0.0009556	955.6	TRUE
475	15-Dec-15	573.2	0.013347948	13347.95	TRUE
476	16-Dec-15	583.2	0.01742908	17429.08	TRUE
477	17-Dec-15	600.5	0.029751187	29751.19	TRUE
478	18-Dec-15	588.2	-0.020482249	-20482.25	**FALSE**
479	21-Dec-15	591.7	0.005899153	5899.153	TRUE
480	22-Dec-15	595.6	0.00660819	6608.19	TRUE
481	23-Dec-15	593.3	-0.003945601	-3945.601	TRUE
482	28-Dec-15	597.3	0.006793089	6793.089	TRUE
483	29-Dec-15	599.4	0.003616394	3616.394	TRUE
484	30-Dec-15	603.4	0.006522755	6522.755	TRUE
485	4-Jan-16	592.1	-0.01862932	-18629.32	TRUE
486	5-Jan-16	597.3	0.008697708	8697.708	TRUE
487	6-Jan-16	612.2	0.025047718	25047.72	TRUE
488	7-Jan-16	599.4	-0.020972853	-20972.85	**FALSE**
489	8-Jan-16	600.5	0.00183523	1835.23	TRUE
490	11-Jan-16	586.7	-0.022931655	-22931.65	**FALSE**
491	12-Jan-16	596	0.015902234	15902.23	TRUE
492	13-Jan-16	601.9	0.009764445	9764.445	TRUE
493	14-Jan-16	594.1	-0.012860134	-12860.13	TRUE
494	15-Jan-16	594.6	0.000875244	875.2441	TRUE
495	18-Jan-16	587.5	-0.012007265	-12007.26	TRUE
496	19-Jan-16	592.4	0.008340426	8340.426	TRUE
497	20-Jan-16	582.8	-0.016205267	-16205.27	TRUE
498	21-Jan-16	581.8	-0.001750172	-1750.172	TRUE
499	22-Jan-16	590.7	0.01528069	15280.69	TRUE
500	25-Jan-16	595.4	0.008024785	8024.785	TRUE
501	26-Jan-16	595	-0.000772577	-772.5769	TRUE
502	27-Jan-16	605.2	0.017278763	17278.76	TRUE

503	28-Jan-16	607.8	0.004163706	4163.706	TRUE
504	29-Jan-16	612.8	0.008227067	8227.067	TRUE
505	1-Feb-16	611.1	-0.002692778	-2692.778	TRUE
506	2-Feb-16	603.7	-0.012076583	-12076.58	TRUE
507	3-Feb-16	610.2	0.010783145	10783.14	TRUE
508	4-Feb-16	622	0.019255035	19255.03	TRUE
509	5-Feb-16	642.6	0.033071803	33071.8	TRUE
510	9-Feb-16	636.1	-0.00999144	-9991.44	TRUE
511	10-Feb-16	634.2	-0.003081131	-3081.131	TRUE
512	11-Feb-16	644	0.015469038	15469.04	TRUE
513	12-Feb-16	630.5	-0.020947856	-20947.86	**FALSE**
514	15-Feb-16	634	0.005519517	5519.517	TRUE
515	16-Feb-16	635.3	0.002082117	2082.117	TRUE
516	17-Feb-16	638.3	0.004722253	4722.253	TRUE
517	18-Feb-16	641.4	0.004903727	4903.727	TRUE
518	19-Feb-16	631.1	-0.016151663	-16151.66	TRUE
519	22-Feb-16	631.8	0.001109245	1109.245	TRUE
520	23-Feb-16	623.5	-0.013027099	-13027.1	TRUE
521	24-Feb-16	620.8	-0.004346222	-4346.222	TRUE
522	25-Feb-16	623.9	0.005009504	5009.504	TRUE
523	26-Feb-16	636.6	0.02033882	20338.82	TRUE
524	29-Feb-16	641.9	0.00823097	8230.97	TRUE
525	1-Mar-16	648.9	0.010999283	10999.28	TRUE
526	2-Mar-16	660	0.017074524	17074.52	TRUE
527	3-Mar-16	657.4	-0.003984848	-3984.848	TRUE
528	4-Mar-16	654.5	-0.004335458	-4335.458	TRUE
529	7-Mar-16	650.6	-0.006050235	-6050.235	TRUE
530	8-Mar-16	648.4	-0.003381702	-3381.702	TRUE
531	10-Mar-16	649.2	0.001264729	1264.729	TRUE
532	11-Mar-16	653	0.00589975	5899.75	TRUE
533	14-Mar-16	665.5	0.019080872	19080.87	TRUE
534	15-Mar-16	658	-0.011180068	-11180.07	TRUE
535	16-Mar-16	661.7	0.005531663	5531.663	TRUE
536	17-Mar-16	668.1	0.009778288	9778.288	TRUE
537	18-Mar-16	669.3	0.001736163	1736.163	TRUE
538	21-Mar-16	668.3	-0.001553862	-1553.862	TRUE
539	22-Mar-16	664.2	-0.006090444	-6090.444	TRUE
540	23-Mar-16	657	-0.010840272	-10840.27	TRUE
541	24-Mar-16	653.2	-0.005799175	-5799.175	TRUE

542	28-Mar-16	646.1	-0.010885208	-10885.21	TRUE
543	29-Mar-16	645	-0.001656167	-1656.167	TRUE
544	30-Mar-16	650.7	0.008790698	8790.698	TRUE
545	31-Mar-16	652.7	0.003104492	3104.492	TRUE
546	1-Apr-16	657	0.006618762	6618.762	TRUE
547	4-Apr-16	662.1	0.00779288	7792.88	TRUE
548	5-Apr-16	658.6	-0.005406793	-5406.793	TRUE
549	6-Apr-16	660.4	0.002794017	2794.017	TRUE
550	7-Apr-16	661.1	0.001014552	1014.552	TRUE
551	8-Apr-16	660.4	-0.000953015	-953.0149	TRUE
552	11-Apr-16	650.2	-0.015535333	-15535.33	TRUE
553	12-Apr-16	658.7	0.013181168	13181.17	TRUE
554	13-Apr-16	661.9	0.004781856	4781.856	TRUE
555	14-Apr-16	654.9	-0.010545559	-10545.56	TRUE
556	15-Apr-16	667.8	0.019697363	19697.36	TRUE
557	18-Apr-16	673.4	0.008295773	8295.773	TRUE
558	19-Apr-16	679.5	0.009148288	9148.288	TRUE
559	20-Apr-16	678.6	-0.001353917	-1353.917	TRUE
560	21-Apr-16	682.6	0.005850366	5850.366	TRUE
561	22-Apr-16	683.1	0.000820441	820.4407	TRUE
562	25-Apr-16	678.8	-0.006309287	-6309.287	TRUE
563	26-Apr-16	666.4	-0.01825253	-18252.53	TRUE
564	27-Apr-16	663.2	-0.004846793	-4846.793	TRUE
565	28-Apr-16	656.4	-0.010223315	-10223.31	TRUE
566	29-Apr-16	653.3	-0.00479883	-4798.83	TRUE
567	2-May-16	645.6	-0.011725806	-11725.81	TRUE
568	3-May-16	645.7	0.000185874	185.8736	TRUE
569	4-May-16	650.5	0.007371616	7371.616	TRUE
570	9-May-16	640.7	-0.014988931	-14988.93	TRUE
571	10-May-16	643.8	0.004775803	4775.803	TRUE
572	11-May-16	651.1	0.011308035	11308.04	TRUE
573	12-May-16	649	-0.00322546	-3225.46	TRUE
574	13-May-16	640.1	-0.013621585	-13621.58	TRUE
575	16-May-16	634.3	-0.009076281	-9076.281	TRUE
576	17-May-16	636.5	0.003405221	3405.221	TRUE
577	18-May-16	639.1	0.004147813	4147.813	TRUE
578	19-May-16	632.2	-0.010889974	-10889.97	TRUE
579	20-May-16	632.9	0.001186409	1186.409	TRUE
580	23-May-16	638.9	0.009448421	9448.421	TRUE

581	24-May-16	635.3	-0.005681729	-5681.729	TRUE
582	25-May-16	648.5	0.020826118	20826.12	TRUE
583	26-May-16	649.4	0.001341578	1341.578	TRUE
584	27-May-16	655.7	0.009686461	9686.461	TRUE
585	30-May-16	653.9	-0.002608099	-2608.099	TRUE
586	31-May-16	648.9	-0.007783589	-7783.589	TRUE
587	1-Jun-16	654.7	0.008969716	8969.716	TRUE
588	2-Jun-16	653.5	-0.001802435	-1802.435	TRUE
589	3-Jun-16	658	0.006901406	6901.406	TRUE
590	6-Jun-16	667.5	0.014483283	14483.28	TRUE
591	7-Jun-16	674	0.00973739	9737.39	TRUE
592	8-Jun-16	669.1	-0.007284542	-7284.542	TRUE
593	9-Jun-16	663.7	-0.008100191	-8100.191	TRUE
594	10-Jun-16	657.7	-0.009040229	-9040.229	TRUE
595	13-Jun-16	652.9	-0.007282956	-7282.956	TRUE
596	14-Jun-16	655.6	0.0041047	4104.7	TRUE
597	15-Jun-16	660.4	0.007275889	7275.889	TRUE
598	16-Jun-16	657	-0.005027561	-5027.561	TRUE
599	17-Jun-16	662.6	0.008386095	8386.095	TRUE
600	20-Jun-16	666.9	0.006580635	6580.635	TRUE
601	21-Jun-16	668.6	0.002594053	2594.053	TRUE
602	22-Jun-16	673	0.006505743	6505.743	TRUE
603	23-Jun-16	670	-0.004442859	-4442.859	TRUE
604	24-Jun-16	663.9	-0.009044776	-9044.776	TRUE
605	27-Jun-16	665.6	0.002455041	2455.041	TRUE
606	28-Jun-16	671	0.00818847	8188.47	TRUE
607	29-Jun-16	688.9	0.026571488	26571.49	TRUE
608	30-Jun-16	694.3	0.007969805	7969.805	TRUE
609	1-Jul-16	686.8	-0.010801625	-10801.62	TRUE
610	11-Jul-16	701.7	0.021577078	21577.08	TRUE
611	12-Jul-16	703.1	0.001995268	1995.268	TRUE
612	13-Jul-16	714.4	0.016115268	16115.27	TRUE
613	14-Jul-16	700.2	-0.019919092	-19919.09	**FALSE**
614	15-Jul-16	704.7	0.006427102	6427.102	TRUE
615	18-Jul-16	708.6	0.005534584	5534.584	TRUE
616	19-Jul-16	712.4	0.005475895	5475.895	TRUE
617	20-Jul-16	718	0.007748021	7748.021	TRUE
618	21-Jul-16	709.8	-0.011351607	-11351.61	TRUE
619	22-Jul-16	709.4	-0.000521266	-521.2663	TRUE

620	25-Jul-16	719.9	0.014687641	14687.64	TRUE
621	26-Jul-16	722.5	0.003653488	3653.488	TRUE
622	27-Jul-16	733.7	0.015557309	15557.31	TRUE
623	28-Jul-16	740.5	0.009158682	9158.682	TRUE
624	29-Jul-16	726.6	-0.018691336	-18691.34	TRUE
625	1-Aug-16	751	0.033539313	33539.31	TRUE
626	2-Aug-16	744.8	-0.008175983	-8175.983	TRUE
627	3-Aug-16	741.2	-0.004900381	-4900.381	TRUE
628	4-Aug-16	744.5	0.004519759	4519.759	TRUE
629	5-Aug-16	750	0.007279663	7279.663	TRUE
630	8-Aug-16	758.2	0.010933916	10933.92	TRUE
631	9-Aug-16	757.3	-0.001200274	-1200.274	TRUE
632	10-Aug-16	754.8	-0.003195774	-3195.774	TRUE
633	11-Aug-16	751.9	-0.003908165	-3908.165	TRUE
634	12-Aug-16	744.2	-0.010267596	-10267.6	TRUE
635	15-Aug-16	731.1	-0.017496237	-17496.24	TRUE
636	16-Aug-16	739.1	0.010846076	10846.08	TRUE
637	18-Aug-16	756.7	0.023894895	23894.89	TRUE
638	19-Aug-16	742.5	-0.018857452	-18857.45	TRUE
639	22-Aug-16	749.4	0.009374242	9374.242	TRUE
640	23-Aug-16	750.4	0.001267647	1267.647	TRUE
641	24-Aug-16	746.1	-0.005703853	-5703.853	TRUE
642	25-Aug-16	757	0.014649707	14649.71	TRUE
643	26-Aug-16	755.7	-0.00171726	-1717.26	TRUE
644	29-Aug-16	741.4	-0.018895887	-18895.89	TRUE
645	30-Aug-16	743	0.002130988	2130.988	TRUE
646	31-Aug-16	746.9	0.005181556	5181.556	TRUE
647	1-Sep-16	737.1	-0.013148205	-13148.21	TRUE
648	2-Sep-16	742.1	0.006810935	6810.935	TRUE
649	5-Sep-16	743.7	0.002142655	2142.655	TRUE
650	6-Sep-16	749	0.007113466	7113.466	TRUE
651	7-Sep-16	750.2	0.001695707	1695.707	TRUE
652	8-Sep-16	744.9	-0.007131242	-7131.242	TRUE
653	9-Sep-16	730.5	-0.019305382	-19305.38	**FALSE**
654	13-Sep-16	720.1	-0.014237019	-14237.02	TRUE
655	14-Sep-16	705.7	-0.020039162	-20039.16	**FALSE**
656	15-Sep-16	729.5	0.033812318	33812.32	TRUE
657	16-Sep-16	723.2	-0.008718061	-8718.061	TRUE
658	19-Sep-16	736.5	0.018377676	18377.68	TRUE

659	20-Sep-16	734.3	-0.002987304	-2987.304	TRUE
660	21-Sep-16	741.5	0.009819544	9819.544	TRUE
661	22-Sep-16	747.1	0.007566153	7566.153	TRUE
662	23-Sep-16	748.9	0.002462955	2462.955	TRUE
663	26-Sep-16	741.3	-0.010121376	-10121.38	TRUE
664	27-Sep-16	752.5	0.015067514	15067.51	TRUE
665	28-Sep-16	752.7	0.000252492	252.4917	TRUE
666	29-Sep-16	757.1	0.005819129	5819.129	TRUE
667	30-Sep-16	739.7	-0.022956926	-22956.93	**FALSE**
668	3-Oct-16	756.6	0.022860928	22860.93	TRUE
669	4-Oct-16	756.7	0.000118953	118.9532	TRUE
670	5-Oct-16	747	-0.012792557	-12792.56	TRUE
671	6-Oct-16	743.6	-0.004524705	-4524.705	TRUE
672	7-Oct-16	738.3	-0.0071272	-7127.2	TRUE
673	10-Oct-16	736.6	-0.002302493	-2302.493	TRUE
674	11-Oct-16	740.8	0.00564734	5647.34	TRUE
675	12-Oct-16	738.2	-0.003509767	-3509.767	TRUE
676	13-Oct-16	733.9	-0.005838605	-5838.605	TRUE
677	14-Oct-16	742.3	0.011405134	11405.13	TRUE
678	17-Oct-16	740.6	-0.002276861	-2276.861	TRUE
679	18-Oct-16	746.1	0.007426812	7426.812	TRUE
680	19-Oct-16	742	-0.005495537	-5495.537	TRUE
681	20-Oct-16	741.1	-0.001199526	-1199.526	TRUE
682	21-Oct-16	739.4	-0.00222651	-2226.51	TRUE
683	24-Oct-16	742.2	0.003732655	3732.655	TRUE
684	25-Oct-16	740.1	-0.002789081	-2789.081	TRUE
685	26-Oct-16	739.8	-0.000364811	-364.8106	TRUE
686	27-Oct-16	742.2	0.003203395	3203.395	TRUE
687	28-Oct-16	739.4	-0.003812937	-3812.937	TRUE
688	31-Oct-16	739.9	0.000716817	716.8168	TRUE
689	1-Nov-16	737.2	-0.003649092	-3649.092	TRUE
690	2-Nov-16	734.4	-0.003825233	-3825.233	TRUE
691	3-Nov-16	720.7	-0.018682172	-18682.17	TRUE
692	4-Nov-16	724.7	0.005550391	5550.391	TRUE
693	7-Nov-16	728.3	0.004995377	4995.377	TRUE
694	8-Nov-16	740.9	0.017314531	17314.53	TRUE
695	9-Nov-16	730.1	-0.014590363	-14590.36	TRUE
696	10-Nov-16	737.3	0.009930283	9930.283	TRUE
697	11-Nov-16	698.8	-0.052309654	-52309.65	**FALSE**

698	14-Nov-16	680.9	-0.025530575	-25530.58	**FALSE**
699	15-Nov-16	673.8	-0.010529717	-10529.72	TRUE
700	16-Nov-16	694.3	0.030441107	30441.11	TRUE
701	17-Nov-16	693	-0.001771645	-1771.645	TRUE
702	18-Nov-16	687.8	-0.00757532	-7575.32	TRUE
703	21-Nov-16	683.5	-0.006266448	-6266.448	TRUE
704	22-Nov-16	684.2	0.000980277	980.2774	TRUE
705	23-Nov-16	689.9	0.00844844	8448.44	TRUE
706	24-Nov-16	674.4	-0.02250953	-22509.53	**FALSE**
707	25-Nov-16	678	0.005293594	5293.594	TRUE
708	28-Nov-16	680.9	0.004277475	4277.475	TRUE
709	29-Nov-16	685.6	0.006976368	6976.368	TRUE
710	30-Nov-16	682.7	-0.004244334	-4244.334	TRUE
711	1-Dec-16	696	0.019422595	19422.6	TRUE
712	2-Dec-16	703.4	0.010675748	10675.75	TRUE
713	5-Dec-16	708.4	0.007136764	7136.764	TRUE
714	6-Dec-16	705.7	-0.003853646	-3853.646	TRUE
715	7-Dec-16	700.7	-0.007014411	-7014.411	TRUE
716	8-Dec-16	706.4	0.008119987	8119.987	TRUE
717	9-Dec-16	707.6	0.001656215	1656.215	TRUE
718	13-Dec-16	705.7	-0.002699265	-2699.265	TRUE
719	14-Dec-16	697.4	-0.01181822	-11818.22	TRUE
720	15-Dec-16	694.3	-0.0044454	-4445.4	TRUE
721	16-Dec-16	685.8	-0.012157004	-12157	TRUE
722	19-Dec-16	679.4	-0.009346612	-9346.612	TRUE
723	20-Dec-16	670	-0.013821019	-13821.02	TRUE
724	21-Dec-16	666.6	-0.005134252	-5134.252	TRUE
725	22-Dec-16	655.7	-0.016307365	-16307.36	TRUE
726	23-Dec-16	648.1	-0.011590666	-11590.67	TRUE
727	27-Dec-16	661	0.019842617	19842.62	TRUE
728	28-Dec-16	680.2	0.029139434	29139.43	TRUE
729	29-Dec-16	696.1	0.023389492	23389.49	TRUE
730	30-Dec-16	694.1	-0.002873027	-2873.027	TRUE
731	3-Jan-17	691.5	-0.003760103	-3760.103	TRUE
732	4-Jan-17	696.4	0.006999075	6999.075	TRUE
733	5-Jan-17	700.4	0.005859038	5859.038	TRUE
734	6-Jan-17	703.9	0.004896922	4896.922	TRUE
735	9-Jan-17	700.6	-0.004631537	-4631.537	TRUE
736	10-Jan-17	701.1	0.000713664	713.6638	TRUE

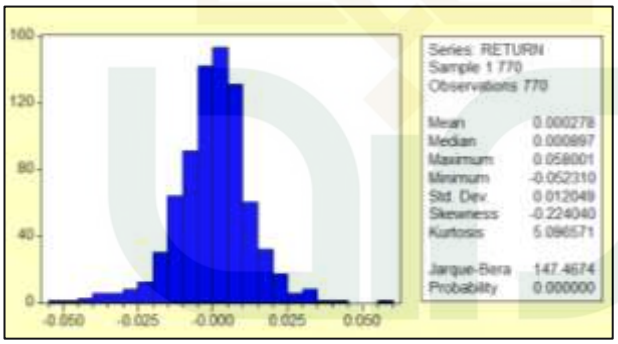
737	11-Jan-17	696.4	-0.006760708	-6760.708	TRUE
738	12-Jan-17	692.5	-0.005571751	-5571.751	TRUE
739	13-Jan-17	691.3	-0.001761758	-1761.758	TRUE
740	16-Jan-17	688.2	-0.004470033	-4470.033	TRUE
741	17-Jan-17	688.9	0.001046238	1046.238	TRUE
742	18-Jan-17	696.1	0.010480476	10480.48	TRUE
743	19-Jan-17	697.3	0.001738206	1738.206	TRUE
744	20-Jan-17	687.2	-0.014469476	-14469.48	TRUE
745	23-Jan-17	687.7	0.000712997	712.9969	TRUE
746	24-Jan-17	694.6	0.010033007	10033.01	TRUE
747	25-Jan-17	695.9	0.001813915	1813.915	TRUE
748	26-Jan-17	699.4	0.00500079	5000.79	TRUE
749	27-Jan-17	696.4	-0.004189485	-4189.485	TRUE
750	30-Jan-17	690.6	-0.008399862	-8399.862	TRUE
751	31-Jan-17	689.3	-0.001839007	-1839.007	TRUE
752	1-Feb-17	696.3	0.010096907	10096.91	TRUE
753	2-Feb-17	701.1	0.006922502	6922.502	TRUE
754	3-Feb-17	702.4	0.001911282	1911.282	TRUE
755	6-Feb-17	705	0.003701384	3701.384	TRUE
756	7-Feb-17	700.3	-0.006708839	-6708.839	TRUE
757	8-Feb-17	698.8	-0.00209907	-2099.07	TRUE
758	9-Feb-17	698.6	-0.000343426	-343.4262	TRUE
759	10-Feb-17	701.6	0.004265674	4265.674	TRUE
760	13-Feb-17	705.1	0.005060007	5060.007	TRUE
761	14-Feb-17	698.6	-0.009289067	-9289.067	TRUE
762	16-Feb-17	701.6	0.004280111	4280.111	TRUE
763	17-Feb-17	695.5	-0.008595008	-8595.008	TRUE
764	20-Feb-17	694.7	-0.001265204	-1265.204	TRUE
765	21-Feb-17	696.6	0.002749547	2749.547	TRUE
766	22-Feb-17	697.6	0.00142125	1421.25	TRUE
767	23-Feb-17	698	0.000645106	645.1058	TRUE
768	24-Feb-17	699.9	0.002664718	2664.718	TRUE
769	27-Feb-17	698	-0.002643348	-2643.348	TRUE
770	28-Feb-17	698.1	8.59574E-05	85.95742	TRUE

Lampiran 2 : Deskriptif, Uji Normalitas, dan Uji Stasioneritas Data

1. Deskriptif data *return* indeks saham JII

	RETURN
Mean	0.000278
Median	0.000897
Maximum	0.058001
Minimum	-0.052310
Std. Dev.	0.012049
Skewness	-0.224040
Kurtosis	5.096571
Jarque-Bera	147.4674
Probability	0.000000
Sum	0.213780
Sum Sq. Dev.	0.111637
Observations	770

2. Uji Normalitas data *return* indeks saham JII



3. Uji Stasioner dengan Uji akar unit

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-16.61579	0.0000
Test critical values:	1% level	-3.438739	
	5% level	-2.865132	
	10% level	-2.568738	

Lampiran 3 : Estimasi Model ARIMA

1. ARIMA (1,0,0) dengan Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 00:01
Sample (adjusted): 2 770
Included observations: 769 after adjustments
Convergence achieved after 2 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000278	0.000434	0.641180	0.5216
AR(1)	-0.003415	0.036108	-0.094569	0.9247

R-squared	0.000012	Mean dependent var	0.000278
Adjusted R-squared	-0.001292	S.D. dependent var	0.012057
S.E. of regression	0.012064	Akaike info criterion	-5.994531
Sum squared resid	0.111635	Schwarz criterion	-5.982450
Log likelihood	2306.897	F-statistic	0.008943
Durbin-Watson stat	1.997477	Prob(F-statistic)	0.924682

Inverted AR Roots	-.00

2. ARIMA (1,0,0) tanpa Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 00:05
Sample (adjusted): 2 770
Included observations: 769 after adjustments
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	-0.002881	0.036084	-0.079841	0.9364

R-squared	-0.000524	Mean dependent var	0.000278
Adjusted R-squared	-0.000524	S.D. dependent var	0.012057
S.E. of regression	0.012060	Akaike info criterion	-5.996596
Sum squared resid	0.111695	Schwarz criterion	-5.990555
Log likelihood	2306.691	Durbin-Watson stat	1.997434

Inverted AR Roots	-.00

3. ARIMA (2,0,0) dengan Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 00:09
Sample (adjusted): 3 770
Included observations: 768 after adjustments
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000301	0.000419	0.717974	0.4730
AR(2)	-0.038238	0.036054	-1.060553	0.2892

R-squared	0.001466	Mean dependent var	0.000301
Adjusted R-squared	0.000163	S.D. dependent var	0.012047
S.E. of regression	0.012046	Akaike info criterion	-5.997559
Sum squared resid	0.111152	Schwarz criterion	-5.985466
Log likelihood	2305.063	F-statistic	1.124772
Durbin-Watson stat	2.016743	Prob(F-statistic)	0.289228

4. ARIMA (2,0,0) tanpa Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:30
Sample (adjusted): 3 770
Included observations: 768 after adjustments
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(2)	-0.037633	0.036033	-1.044401	0.2966

R-squared	0.000795	Mean dependent var	0.000301
Adjusted R-squared	0.000795	S.D. dependent var	0.012047
S.E. of regression	0.012042	Akaike info criterion	-5.999491
Sum squared resid	0.111227	Schwarz criterion	-5.993444
Log likelihood	2304.804	Durbin-Watson stat	2.015271

5. ARIMA (3,0,0) dengan Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:31
Sample (adjusted): 4 770
Included observations: 767 after adjustments
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000311	0.000396	0.785535	0.4324
AR(3)	-0.093579	0.035930	-2.604483	0.0094

R-squared	0.008789	Mean dependent var	0.000314
Adjusted R-squared	0.007493	S.D. dependent var	0.012049
S.E. of regression	0.012004	Akaike info criterion	-6.004519
Sum squared resid	0.110237	Schwarz criterion	-5.992413
Log likelihood	2304.733	F-statistic	6.783331
Durbin-Watson stat	2.021376	Prob(F-statistic)	0.009380

Inverted AR Roots	.23+.39i	.23-.39i	-.45

6. ARIMA (3,0,0) tanpa Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:32
Sample (adjusted): 4 770
Included observations: 767 after adjustments
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(3)	-0.092928	0.035911	-2.587689	0.0098

R-squared	0.007990	Mean dependent var	0.000314
Adjusted R-squared	0.007990	S.D. dependent var	0.012049
S.E. of regression	0.012001	Akaike info criterion	-6.006321
Sum squared resid	0.110326	Schwarz criterion	-6.000268
Log likelihood	2304.424	Durbin-Watson stat	2.019677

Inverted AR Roots	.23+.39i	.23-.39i	-.45

7. ARIMA (0,0,1) dengan Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:33
Sample: 1 770
Included observations: 770
Convergence achieved after 6 iterations
Backcast: 0

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000278	0.000433	0.641377	0.5215
MA(1)	-0.003702	0.036084	-0.102583	0.9183

R-squared	0.000013	Mean dependent var	0.000278
Adjusted R-squared	-0.001289	S.D. dependent var	0.012049
S.E. of regression	0.012056	Akaike info criterion	-5.995837
Sum squared resid	0.111635	Schwarz criterion	-5.983769
Log likelihood	2310.397	F-statistic	0.009704
Durbin-Watson stat	1.999711	Prob(F-statistic)	0.921554

Inverted MA Roots .00

8. ARIMA (0,0,1) tanpa Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:34
Sample: 1 770
Included observations: 770
Convergence achieved after 6 iterations
Backcast: 0

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MA(1)	-0.003118	0.036061	-0.086478	0.9311

R-squared	-0.000523	Mean dependent var	0.000278
Adjusted R-squared	-0.000523	S.D. dependent var	0.012049
S.E. of regression	0.012052	Akaike info criterion	-5.997899
Sum squared resid	0.111695	Schwarz criterion	-5.991865
Log likelihood	2310.191	Durbin-Watson stat	1.999762

Inverted MA Roots .00

9. ARIMA (0,0,2) dengan Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:34
Sample: 1 770
Included observations: 770
Convergence achieved after 5 iterations
Backcast: -1 0

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000279	0.000417	0.668951	0.5037
MA(2)	-0.040061	0.036056	-1.111063	0.2669

R-squared	0.001528	Mean dependent var	0.000278
Adjusted R-squared	0.000228	S.D. dependent var	0.012049
S.E. of regression	0.012047	Akaike info criterion	-5.997354
Sum squared resid	0.111466	Schwarz criterion	-5.985285
Log likelihood	2310.981	F-statistic	1.175334
Durbin-Watson stat	2.015105	Prob(F-statistic)	0.278648

Inverted MA Roots	.20	-.20

10. ARIMA (0,0,2) tanpa Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:34
Sample: 1 770
Included observations: 770
Convergence achieved after 5 iterations
Backcast: -1 0

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MA(2)	-0.039356	0.036034	-1.092206	0.2751

R-squared	0.000947	Mean dependent var	0.000278
Adjusted R-squared	0.000947	S.D. dependent var	0.012049
S.E. of regression	0.012043	Akaike info criterion	-5.999369
Sum squared resid	0.111531	Schwarz criterion	-5.993335
Log likelihood	2310.757	Durbin-Watson stat	2.013781

Inverted MA Roots	.20	-.20

11. ARIMA (0,0,3) dengan Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:35
Sample: 1 770
Included observations: 770
Convergence achieved after 7 iterations
Backcast: -2 0

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000282	0.000386	0.730131	0.4655
MA(3)	-0.106876	0.035878	-2.978865	0.0030

R-squared	0.009982	Mean dependent var	0.000278
Adjusted R-squared	0.008693	S.D. dependent var	0.012049
S.E. of regression	0.011996	Akaike info criterion	-6.005857
Sum squared resid	0.110522	Schwarz criterion	-5.993788
Log likelihood	2314.255	F-statistic	7.743474
Durbin-Watson stat	2.019753	Prob(F-statistic)	0.005523

Inverted MA Roots	.47	-.24-.41i	-.24+.41i

12. ARIMA (0,0,3) tanpa Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:36
Sample: 1 770
Included observations: 770
Convergence achieved after 7 iterations
Backcast: -2 0

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MA(3)	-0.105888	0.035859	-2.952934	0.0032

R-squared	0.009296	Mean dependent var	0.000278
Adjusted R-squared	0.009296	S.D. dependent var	0.012049
S.E. of regression	0.011993	Akaike info criterion	-6.007761
Sum squared resid	0.110599	Schwarz criterion	-6.001727
Log likelihood	2313.988	Durbin-Watson stat	2.018224

Inverted MA Roots	.47	-.24+.41i	-.24-.41i

13. ARIMA (1,0,1) dengan Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:37
Sample (adjusted): 2 770
Included observations: 769 after adjustments
Convergence achieved after 44 iterations
Backcast: 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000307	0.000311	0.986361	0.3243
AR(1)	0.781419	0.113240	6.900559	0.0000
MA(1)	-0.844086	0.097146	-8.688873	0.0000

R-squared	0.010497	Mean dependent var	0.000278
Adjusted R-squared	0.007913	S.D. dependent var	0.012057
S.E. of regression	0.012009	Akaike info criterion	-6.002470
Sum squared resid	0.110465	Schwarz criterion	-5.984349
Log likelihood	2310.950	F-statistic	4.062916
Durbin-Watson stat	1.902935	Prob(F-statistic)	0.017571

Inverted AR Roots	.78
Inverted MA Roots	.84

14. ARIMA (1,0,1) tanpa Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:42
Sample (adjusted): 2 770
Included observations: 769 after adjustments
Convergence achieved after 11 iterations
Backcast: 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	0.985261	0.007039	139.9621	0.0000
MA(1)	-0.997460	0.003866	-257.9766	0.0000

R-squared	0.005582	Mean dependent var	0.000278
Adjusted R-squared	0.004285	S.D. dependent var	0.012057
S.E. of regression	0.012031	Akaike info criterion	-6.000116
Sum squared resid	0.111013	Schwarz criterion	-5.988035
Log likelihood	2309.045	Durbin-Watson stat	1.990827

Inverted AR Roots	.99
Inverted MA Roots	1.00

15. ARIMA (1,0,2) dengan Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:38
Sample (adjusted): 2 770
Included observations: 769 after adjustments
Convergence achieved after 7 iterations
Backcast: 0 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000280	0.000414	0.675621	0.4995
AR(1)	-0.007665	0.036133	-0.212129	0.8321
MA(2)	-0.041043	0.036104	-1.136783	0.2560

R-squared	0.001591	Mean dependent var	0.000278
Adjusted R-squared	-0.001016	S.D. dependent var	0.012057
S.E. of regression	0.012063	Akaike info criterion	-5.993510
Sum squared resid	0.111459	Schwarz criterion	-5.975389
Log likelihood	2307.505	F-statistic	0.610185
Durbin-Watson stat	1.997198	Prob(F-statistic)	0.543514

Inverted AR Roots	-.01	
Inverted MA Roots	.20	-.20

16. ARIMA (1,0,2) tanpa Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:42
Sample (adjusted): 2 770
Included observations: 769 after adjustments
Convergence achieved after 7 iterations
Backcast: 0 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	-0.006986	0.036109	-0.193461	0.8466
MA(2)	-0.040215	0.036082	-1.114561	0.2654

R-squared	0.000997	Mean dependent var	0.000278
Adjusted R-squared	-0.000306	S.D. dependent var	0.012057
S.E. of regression	0.012058	Akaike info criterion	-5.995516
Sum squared resid	0.111525	Schwarz criterion	-5.983435
Log likelihood	2307.276	Durbin-Watson stat	1.997201

Inverted AR Roots	-.01	
Inverted MA Roots	.20	-.20

17. ARIMA (1,0,3) dengan Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:38
Sample (adjusted): 2 770
Included observations: 769 after adjustments
Convergence achieved after 7 iterations
Backcast: -1 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000284	0.000383	0.742120	0.4582
AR(1)	-0.009963	0.036176	-0.275399	0.7831
MA(3)	-0.107931	0.035966	-3.000865	0.0028

R-squared	0.010116	Mean dependent var	0.000278
Adjusted R-squared	0.007531	S.D. dependent var	0.012057
S.E. of regression	0.012011	Akaike info criterion	-6.002086
Sum squared resid	0.110507	Schwarz criterion	-5.983964
Log likelihood	2310.802	F-statistic	3.913960
Durbin-Watson stat	1.998113	Prob(F-statistic)	0.020362

Inverted AR Roots	-.01		
Inverted MA Roots	.48	-.24-.41i	-.24+.41i

18. ARIMA (1,0,3) tanpa Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:43
Sample (adjusted): 2 770
Included observations: 769 after adjustments
Convergence achieved after 7 iterations
Backcast: -1 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	-0.009184	0.036151	-0.254035	0.7995
MA(3)	-0.106814	0.035946	-2.971521	0.0031

R-squared	0.009406	Mean dependent var	0.000278
Adjusted R-squared	0.008114	S.D. dependent var	0.012057
S.E. of regression	0.012008	Akaike info criterion	-6.003969
Sum squared resid	0.110587	Schwarz criterion	-5.991888
Log likelihood	2310.526	Durbin-Watson stat	1.998034

Inverted AR Roots	-.01		
Inverted MA Roots	.47	-.24-.41i	-.24+.41i

19. ARIMA (2,0,1) dengan Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:39
Sample (adjusted): 3 770
Included observations: 768 after adjustments
Convergence achieved after 6 iterations
Backcast: 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000301	0.000415	0.724833	0.4688
AR(2)	-0.039033	0.036080	-1.081844	0.2797
MA(1)	-0.008985	0.036157	-0.248500	0.8038

R-squared	0.001545	Mean dependent var	0.000301
Adjusted R-squared	-0.001065	S.D. dependent var	0.012047
S.E. of regression	0.012053	Akaike info criterion	-5.995034
Sum squared resid	0.111143	Schwarz criterion	-5.976894
Log likelihood	2305.093	F-statistic	0.592033
Durbin-Watson stat	1.998985	Prob(F-statistic)	0.553455

Inverted MA Roots	.01

20. ARIMA (2,0,1) tanpa Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:43
Sample (adjusted): 3 770
Included observations: 768 after adjustments
Convergence achieved after 6 iterations
Backcast: 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(2)	-0.038355	0.036058	-1.063681	0.2878
MA(1)	-0.008201	0.036133	-0.226965	0.8205

R-squared	0.000861	Mean dependent var	0.000301
Adjusted R-squared	-0.000444	S.D. dependent var	0.012047
S.E. of regression	0.012050	Akaike info criterion	-5.996952
Sum squared resid	0.111220	Schwarz criterion	-5.984859
Log likelihood	2304.830	Durbin-Watson stat	1.999056

Inverted MA Roots	.01

21. ARIMA (2,0,2) dengan Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:39
Sample (adjusted): 3 770
Included observations: 768 after adjustments
Convergence achieved after 13 iterations
Backcast: 1 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000321	0.000402	0.796851	0.4258
AR(2)	0.367993	0.436483	0.843086	0.3994
MA(2)	-0.416535	0.427553	-0.974231	0.3302

R-squared	0.003445	Mean dependent var	0.000301
Adjusted R-squared	0.000839	S.D. dependent var	0.012047
S.E. of regression	0.012042	Akaike info criterion	-5.996938
Sum squared resid	0.110932	Schwarz criterion	-5.978798
Log likelihood	2305.824	F-statistic	1.322077
Durbin-Watson stat	2.024352	Prob(F-statistic)	0.267190

Inverted AR Roots	.61	-.61
Inverted MA Roots	.65	-.65

22. ARIMA (2,0,2) tanpa Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:44
Sample (adjusted): 3 770
Included observations: 768 after adjustments
Convergence achieved after 11 iterations
Backcast: 1 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(2)	0.358965	0.448998	0.799480	0.4243
MA(2)	-0.406304	0.440344	-0.922698	0.3565

R-squared	0.002619	Mean dependent var	0.000301
Adjusted R-squared	0.001317	S.D. dependent var	0.012047
S.E. of regression	0.012039	Akaike info criterion	-5.998714
Sum squared resid	0.111024	Schwarz criterion	-5.986621
Log likelihood	2305.506	Durbin-Watson stat	2.022206

Inverted AR Roots	.60	-.60
Inverted MA Roots	.64	-.64

23. ARIMA (2,0,3) dengan Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:39
Sample (adjusted): 3 770
Included observations: 768 after adjustments
Convergence achieved after 7 iterations
Backcast: 0 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000302	0.000369	0.818649	0.4132
AR(2)	-0.045055	0.036076	-1.248875	0.2121
MA(3)	-0.108142	0.035946	-3.008451	0.0027

R-squared	0.011693	Mean dependent var	0.000301
Adjusted R-squared	0.009110	S.D. dependent var	0.012047
S.E. of regression	0.011992	Akaike info criterion	-6.005249
Sum squared resid	0.110014	Schwarz criterion	-5.987110
Log likelihood	2309.016	F-statistic	4.525610
Durbin-Watson stat	2.023199	Prob(F-statistic)	0.011120

Inverted MA Roots	.48	-.24+.41i	-.24-.41i

24. ARIMA (2,0,3) tanpa Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:44
Sample (adjusted): 3 770
Included observations: 768 after adjustments
Convergence achieved after 7 iterations
Backcast: 0 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(2)	-0.044188	0.036055	-1.225572	0.2207
MA(3)	-0.106946	0.035927	-2.976751	0.0030

R-squared	0.010829	Mean dependent var	0.000301
Adjusted R-squared	0.009538	S.D. dependent var	0.012047
S.E. of regression	0.011989	Akaike info criterion	-6.006980
Sum squared resid	0.110110	Schwarz criterion	-5.994887
Log likelihood	2308.680	Durbin-Watson stat	2.021350

Inverted MA Roots	.47	-.24-.41i	-.24+.41i

25. ARIMA (3,0,1) dengan Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:41
Sample (adjusted): 4 770
Included observations: 767 after adjustments
Convergence achieved after 6 iterations
Backcast: 3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000312	0.000391	0.796212	0.4262
AR(3)	-0.094284	0.035976	-2.620711	0.0089
MA(1)	-0.012763	0.036203	-0.352541	0.7245

R-squared	0.008935	Mean dependent var	0.000314
Adjusted R-squared	0.006340	S.D. dependent var	0.012049
S.E. of regression	0.012011	Akaike info criterion	-6.002058
Sum squared resid	0.110221	Schwarz criterion	-5.983900
Log likelihood	2304.789	F-statistic	3.443882
Durbin-Watson stat	1.997095	Prob(F-statistic)	0.032437

Inverted AR Roots	.23+.39i	.23-.39i	-.46
Inverted MA Roots	.01		

26. ARIMA (3,0,1) tanpa Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:44
Sample (adjusted): 4 770
Included observations: 767 after adjustments
Convergence achieved after 6 iterations
Backcast: 3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(3)	-0.093560	0.035957	-2.601956	0.0094
MA(1)	-0.011746	0.036179	-0.324671	0.7455

R-squared	0.008114	Mean dependent var	0.000314
Adjusted R-squared	0.006817	S.D. dependent var	0.012049
S.E. of regression	0.012008	Akaike info criterion	-6.003838
Sum squared resid	0.110312	Schwarz criterion	-5.991732
Log likelihood	2304.472	Durbin-Watson stat	1.997304

Inverted AR Roots	.23+.39i	.23-.39i	-.45
Inverted MA Roots	.01		

27. ARIMA (3,0,2) dengan Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:41
Sample (adjusted): 4 770
Included observations: 767 after adjustments
Convergence achieved after 6 iterations
Backcast: 2 3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000312	0.000376	0.828785	0.4075
AR(3)	-0.096373	0.035943	-2.681285	0.0075
MA(2)	-0.047801	0.036140	-1.322645	0.1863

R-squared	0.010936	Mean dependent var	0.000314
Adjusted R-squared	0.008347	S.D. dependent var	0.012049
S.E. of regression	0.011999	Akaike info criterion	-6.004080
Sum squared resid	0.109998	Schwarz criterion	-5.985922
Log likelihood	2305.565	F-statistic	4.223931
Durbin-Watson stat	2.023401	Prob(F-statistic)	0.014984

Inverted AR Roots	.23-.40i	.23+.40i	-.46
Inverted MA Roots	.22	-.22	

28. ARIMA (3,0,2) tanpa Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:45
Sample (adjusted): 4 770
Included observations: 767 after adjustments
Convergence achieved after 6 iterations
Backcast: 2 3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(3)	-0.095586	0.035925	-2.660717	0.0080
MA(2)	-0.046726	0.036118	-1.293708	0.1962

R-squared	0.010049	Mean dependent var	0.000314
Adjusted R-squared	0.008755	S.D. dependent var	0.012049
S.E. of regression	0.011997	Akaike info criterion	-6.005791
Sum squared resid	0.110097	Schwarz criterion	-5.993685
Log likelihood	2305.221	Durbin-Watson stat	2.021524

Inverted AR Roots	.23+.40i	.23-.40i	-.46
Inverted MA Roots	.22	-.22	

29. ARIMA (3,0,3) dengan Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:41
Sample (adjusted): 4 770
Included observations: 767 after adjustments
Convergence achieved after 9 iterations
Backcast: 1 3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000292	0.000347	0.841709	0.4002
AR(3)	0.513638	0.205515	2.499269	0.0127
MA(3)	-0.612799	0.188542	-3.250205	0.0012

R-squared	0.012393	Mean dependent var	0.000314
Adjusted R-squared	0.009808	S.D. dependent var	0.012049
S.E. of regression	0.011990	Akaike info criterion	-6.005554
Sum squared resid	0.109836	Schwarz criterion	-5.987396
Log likelihood	2306.130	F-statistic	4.793684
Durbin-Watson stat	2.025513	Prob(F-statistic)	0.008533

Inverted AR Roots	.80	-.40+.69i	-.40-.69i
Inverted MA Roots	.85	-.42+.74i	-.42-.74i

30. ARIMA (3,0,3) tanpa Konstanta

Dependent Variable: RETURN
Method: Least Squares
Date: 03/28/17 Time: 06:45
Sample (adjusted): 4 770
Included observations: 767 after adjustments
Convergence achieved after 9 iterations
Backcast: 1 3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(3)	0.519023	0.204989	2.531952	0.0115
MA(3)	-0.616427	0.188032	-3.278305	0.0011

R-squared	0.011481	Mean dependent var	0.000314
Adjusted R-squared	0.010189	S.D. dependent var	0.012049
S.E. of regression	0.011988	Akaike info criterion	-6.007238
Sum squared resid	0.109937	Schwarz criterion	-5.995132
Log likelihood	2305.776	Durbin-Watson stat	2.023371

Inverted AR Roots	.80	-.40+.70i	-.40-.70i
Inverted MA Roots	.85	-.43+.74i	-.43-.74i

Lampiran 4 : Uji ARCH-LM Model ARIMA

1. Model ARIMA (0,0,3) Tanpa Konstanta

ARCH Test:

F-statistic	17.36249	Probability	0.000034
Obs*R-squared	17.02243	Probability	0.000037

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 04/10/17 Time: 07:08
Sample (adjusted): 2 770
Included observations: 769 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000122	1.13E-05	10.82236	0.0000
RESID^2(-1)	0.148781	0.035706	4.166832	0.0000

R-squared	0.022136	Mean dependent var	0.000144
Adjusted R-squared	0.020861	S.D. dependent var	0.000282
S.E. of regression	0.000280	Akaike info criterion	-13.52448
Sum squared resid	5.99E-05	Schwarz criterion	-13.51240
Log likelihood	5202.164	F-statistic	17.36249
Durbin-Watson stat	2.016473	Prob(F-statistic)	0.000034

2. Model ARIMA (1,0,1) Tanpa Konstanta

ARCH Test:

F-statistic	12.08773	Probability	0.000536
Obs*R-squared	11.93101	Probability	0.000552

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 04/10/17 Time: 07:09
Sample (adjusted): 3 770
Included observations: 768 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000126	1.17E-05	10.79816	0.0000
RESID^2(-1)	0.124599	0.035838	3.476741	0.0005

R-squared	0.015535	Mean dependent var	0.000144
Adjusted R-squared	0.014250	S.D. dependent var	0.000292
S.E. of regression	0.000290	Akaike info criterion	-13.45203
Sum squared resid	6.43E-05	Schwarz criterion	-13.43993
Log likelihood	5167.578	F-statistic	12.08773
Durbin-Watson stat	2.014005	Prob(F-statistic)	0.000536

3. Model ARIMA (3,0,3) Tanpa Konstanta

ARCH Test:

F-statistic	17.50697	Probability	0.000032
Obs*R-squared	17.15959	Probability	0.000034

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 04/10/17 Time: 07:09
Sample (adjusted): 5 770
Included observations: 766 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000122	1.13E-05	10.77645	0.0000
RESID^2(-1)	0.149697	0.035777	4.184133	0.0000

R-squared	0.022402	Mean dependent var	0.000143
Adjusted R-squared	0.021122	S.D. dependent var	0.000282
S.E. of regression	0.000279	Akaike info criterion	-13.52913
Sum squared resid	5.94E-05	Schwarz criterion	-13.51701
Log likelihood	5183.657	F-statistic	17.50697
Durbin-Watson stat	2.017107	Prob(F-statistic)	0.000032

Lampiran 5 : Estimasi Model GARCH

1. Model GARCH (1,0)

Dependent Variable: RETURN
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/01/17 Time: 21:35
Sample: 1 770
Included observations: 770
Convergence achieved after 12 iterations
MA backcast: -2 0, Variance backcast: ON
GARCH = C(2) + C(3)*RESID(-1)^2

	Coefficient	Std. Error	z-Statistic	Prob.
MA(3)	-0.125379	0.026521	-4.727536	0.0000
Variance Equation				
C	0.000121	6.36E-06	18.97212	0.0000
RESID(-1)^2	0.161635	0.043178	3.743452	0.0002

R-squared	0.008959	Mean dependent var	0.000278
Adjusted R-squared	0.006375	S.D. dependent var	0.012049
S.E. of regression	0.012010	Akaike info criterion	-6.030944
Sum squared resid	0.110637	Schwarz criterion	-6.012842
Log likelihood	2324.914	Durbin-Watson stat	2.020773

Inverted MA Roots	.50	-.25+.43i	-.25-.43i

2. Model GARCH (2,0)

Dependent Variable: RETURN
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/01/17 Time: 21:43
Sample: 1 770
Included observations: 770
Convergence achieved after 12 iterations
MA backcast: -2 0, Variance backcast: ON
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*RESID(-2)^2

	Coefficient	Std. Error	z-Statistic	Prob.
MA(3)	-0.093386	0.030114	-3.101132	0.0019
Variance Equation				
C	0.000102	6.96E-06	14.66724	0.0000
RESID(-1)^2	0.176827	0.043160	4.096987	0.0000
RESID(-2)^2	0.127601	0.037888	3.367836	0.0008

R-squared	0.009158	Mean dependent var	0.000278
Adjusted R-squared	0.005277	S.D. dependent var	0.012049
S.E. of regression	0.012017	Akaike info criterion	-6.044303
Sum squared resid	0.110614	Schwarz criterion	-6.020166
Log likelihood	2331.057	Durbin-Watson stat	2.016631

Inverted MA Roots	.45	-.23+.39i	-.23-.39i

3. Model GARCH (3,0)

Dependent Variable: RETURN
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/01/17 Time: 21:45
Sample: 1 770
Included observations: 770
Convergence achieved after 11 iterations
MA backcast: -2 0, Variance backcast: ON
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*RESID(-2)^2 + C(5)*RESID(-3)^2

	Coefficient	Std. Error	z-Statistic	Prob.
MA(3)	-0.080697	0.037518	-2.150873	0.0315
Variance Equation				
C	9.08E-05	7.34E-06	12.37876	0.0000
RESID(-1)^2	0.191008	0.044152	4.326165	0.0000
RESID(-2)^2	0.101081	0.034151	2.959827	0.0031
RESID(-3)^2	0.091642	0.029934	3.061504	0.0022

R-squared	0.008737	Mean dependent var	0.000278
Adjusted R-squared	0.003554	S.D. dependent var	0.012049
S.E. of regression	0.012027	Akaike info criterion	-6.056581
Sum squared resid	0.110661	Schwarz criterion	-6.026410
Log likelihood	2336.784	Durbin-Watson stat	2.015047

Inverted MA Roots	.43	-.22-.37i	-.22+.37i

4. Model GARCH (0,1)

Dependent Variable: RETURN
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/01/17 Time: 21:45
Sample: 1 770
Included observations: 770
Convergence achieved after 23 iterations
MA backcast: -2 0, Variance backcast: ON
GARCH = C(2) + C(3)*GARCH(-1)

	Coefficient	Std. Error	z-Statistic	Prob.
MA(3)	-0.105957	0.030156	-3.513601	0.0004
Variance Equation				
C	7.14E-05	0.004824	0.014793	0.9882
GARCH(-1)	0.503371	33.57368	0.014993	0.9880

R-squared	0.009296	Mean dependent var	0.000278
Adjusted R-squared	0.006712	S.D. dependent var	0.012049
S.E. of regression	0.012008	Akaike info criterion	-6.002578
Sum squared resid	0.110599	Schwarz criterion	-5.984476
Log likelihood	2313.993	Durbin-Watson stat	2.018233

Inverted MA Roots	.47	-.24-.41i	-.24+.41i

5. Model GARCH (0,2)

Dependent Variable: RETURN
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/01/17 Time: 21:45
Sample: 1 770
Included observations: 770
Convergence achieved after 49 iterations
MA backcast: -2 0, Variance backcast: ON
GARCH = C(2) + C(3)*GARCH(-1) + C(4)*GARCH(-2)

	Coefficient	Std. Error	z-Statistic	Prob.
MA(3)	-0.114081	0.031582	-3.612259	0.0003
Variance Equation				
C	4.55E-05	1.56E-06	29.13630	0.0000
GARCH(-1)	1.697704	0.001314	1291.843	0.0000
GARCH(-2)	-1.003486	0.001694	-592.3126	0.0000

R-squared	0.009236	Mean dependent var	0.000278
Adjusted R-squared	0.005356	S.D. dependent var	0.012049
S.E. of regression	0.012016	Akaike info criterion	-6.009187
Sum squared resid	0.110606	Schwarz criterion	-5.985050
Log likelihood	2317.537	Durbin-Watson stat	2.019286

Inverted MA Roots	.48	-.24-.42i	-.24+.42i

6. Model GARCH (0,3)

Dependent Variable: RETURN
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/01/17 Time: 21:46
Sample: 1 770
Included observations: 770
Convergence achieved after 30 iterations
MA backcast: -2 0, Variance backcast: ON
GARCH = C(2) + C(3)*GARCH(-1) + C(4)*GARCH(-2) + C(5)*GARCH(-3)

	Coefficient	Std. Error	z-Statistic	Prob.
MA(3)	-0.112519	0.030674	-3.668259	0.0002
Variance Equation				
C	0.000287	9.73E-06	29.51718	0.0000
GARCH(-1)	0.097258	0.004275	22.74929	0.0000
GARCH(-2)	-0.166547	0.004364	-38.16025	0.0000
GARCH(-3)	-0.870846	0.005764	-151.0804	0.0000

R-squared	0.009257	Mean dependent var	0.000278
Adjusted R-squared	0.004076	S.D. dependent var	0.012049
S.E. of regression	0.012024	Akaike info criterion	-6.009209
Sum squared resid	0.110603	Schwarz criterion	-5.979037
Log likelihood	2318.545	Durbin-Watson stat	2.019082

Inverted MA Roots	.48	-.24-.42i	-.24+.42i

7. Model GARCH (1,1)

Dependent Variable: RETURN
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/01/17 Time: 21:46
Sample: 1 770
Included observations: 770
Convergence achieved after 12 iterations
MA backcast: -2 0, Variance backcast: ON
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

	Coefficient	Std. Error	z-Statistic	Prob.
MA(3)	-0.091605	0.038293	-2.392210	0.0167
Variance Equation				
C	1.16E-05	3.36E-06	3.458397	0.0005
RESID(-1)^2	0.118531	0.025392	4.667967	0.0000
GARCH(-1)	0.801911	0.039260	20.42574	0.0000

R-squared	0.009116	Mean dependent var	0.000278
Adjusted R-squared	0.005235	S.D. dependent var	0.012049
S.E. of regression	0.012017	Akaike info criterion	-6.080013
Sum squared resid	0.110619	Schwarz criterion	-6.055876
Log likelihood	2344.805	Durbin-Watson stat	2.016406

Inverted MA Roots	.45	-.23-.39i	-.23+.39i

8. Model GARCH (1,2)

Dependent Variable: RETURN
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/01/17 Time: 21:46
Sample: 1 770
Included observations: 770
Convergence achieved after 12 iterations
MA backcast: -2 0, Variance backcast: ON
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1) + C(5)
*GARCH(-2)

	Coefficient	Std. Error	z-Statistic	Prob.
MA(3)	-0.097045	0.038074	-2.548839	0.0108
Variance Equation				
C	1.42E-05	4.60E-06	3.085829	0.0020
RESID(-1)^2	0.152378	0.038663	3.941192	0.0001
GARCH(-1)	0.396727	0.215389	1.841912	0.0655
GARCH(-2)	0.353359	0.181218	1.949905	0.0512

R-squared	0.009227	Mean dependent var	0.000278
Adjusted R-squared	0.004046	S.D. dependent var	0.012049
S.E. of regression	0.012024	Akaike info criterion	-6.079616
Sum squared resid	0.110607	Schwarz criterion	-6.049445
Log likelihood	2345.652	Durbin-Watson stat	2.017094

Inverted MA Roots	.46	-.23-.40i	-.23+.40i

9. Model GARCH (1,3)

Dependent Variable: RETURN
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/01/17 Time: 21:46
Sample: 1 770
Included observations: 770
Convergence not achieved after 500 iterations
MA backcast: -2 0, Variance backcast: ON
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1) + C(5)
*GARCH(-2) + C(6)*GARCH(-3)

	Coefficient	Std. Error	z-Statistic	Prob.
MA(3)	-0.099661	0.037699	-2.643590	0.0082
	Variance Equation			
C	1.45E-05	4.94E-06	2.943265	0.0032
RESID(-1)^2	0.160006	0.044083	3.629690	0.0003
GARCH(-1)	0.351806	0.208679	1.685875	0.0918
GARCH(-2)	0.273060	0.241441	1.130961	0.2581
GARCH(-3)	0.115125	0.191521	0.601106	0.5478

R-squared	0.009261	Mean dependent var	0.000278
Adjusted R-squared	0.002778	S.D. dependent var	0.012049
S.E. of regression	0.012032	Akaike info criterion	-6.077260
Sum squared resid	0.110603	Schwarz criterion	-6.041055
Log likelihood	2345.745	Durbin-Watson stat	2.017426

Inverted MA Roots	.46	-.23-.40i	-.23+.40i

10. Model GARCH (2,1)

Dependent Variable: RETURN
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/01/17 Time: 21:47
Sample: 1 770
Included observations: 770
Convergence achieved after 14 iterations
MA backcast: -2 0, Variance backcast: ON
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*RESID(-2)^2 + C(5)
*GARCH(-1)

	Coefficient	Std. Error	z-Statistic	Prob.
MA(3)	-0.100367	0.036404	-2.757040	0.0058
	Variance Equation			
C	6.09E-06	2.30E-06	2.645027	0.0082
RESID(-1)^2	0.161147	0.048397	3.329693	0.0009
RESID(-2)^2	-0.086663	0.048035	-1.804144	0.0712
GARCH(-1)	0.883083	0.031142	28.35666	0.0000

R-squared	0.009269	Mean dependent var	0.000278
Adjusted R-squared	0.004088	S.D. dependent var	0.012049
S.E. of regression	0.012024	Akaike info criterion	-6.080199
Sum squared resid	0.110602	Schwarz criterion	-6.050028
Log likelihood	2345.877	Durbin-Watson stat	2.017516

Inverted MA Roots	.46	-.23-.40i	-.23+.40i

11. Model GARCH (2,2)

Dependent Variable: RETURN
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/01/17 Time: 21:47
Sample: 1 770
Included observations: 770
Convergence achieved after 13 iterations
MA backcast: -2 0, Variance backcast: ON
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*RESID(-2)^2 + C(5)
*GARCH(-1) + C(6)*GARCH(-2)

	Coefficient	Std. Error	z-Statistic	Prob.
MA(3)	-0.089194	0.036905	-2.416824	0.0157
Variance Equation				
C	8.23E-07	7.90E-07	1.042345	0.2973
RESID(-1)^2	0.154147	0.043109	3.575756	0.0003
RESID(-2)^2	-0.139373	0.039837	-3.498611	0.0005
GARCH(-1)	1.477892	0.182038	8.118594	0.0000
GARCH(-2)	-0.498613	0.168790	-2.954046	0.0031

R-squared	0.009050	Mean dependent var	0.000278
Adjusted R-squared	0.002565	S.D. dependent var	0.012049
S.E. of regression	0.012033	Akaike info criterion	-6.081912
Sum squared resid	0.110626	Schwarz criterion	-6.045707
Log likelihood	2347.536	Durbin-Watson stat	2.016104

Inverted MA Roots	.45	-.22-.39i	-.22+.39i

12. Model GARCH (2,3)

Dependent Variable: RETURN
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/01/17 Time: 21:48
Sample: 1 770
Included observations: 770
Convergence achieved after 18 iterations
MA backcast: -2 0, Variance backcast: ON
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)

	Coefficient	Std. Error	z-Statistic	Prob.
MA(3)	-0.093438	0.037252	-2.508265	0.0121
Variance Equation				
C	6.56E-07	8.70E-07	0.754071	0.4508
RESID(-1)^2	0.165721	0.047897	3.459974	0.0005
RESID(-2)^2	-0.154041	0.044961	-3.426084	0.0006
GARCH(-1)	1.329100	0.222223	5.980925	0.0000
GARCH(-2)	-0.149020	0.362110	-0.411531	0.6807
GARCH(-3)	-0.196463	0.196735	-0.998616	0.3180

R-squared	0.009159	Mean dependent var	0.000278
Adjusted R-squared	0.001367	S.D. dependent var	0.012049
S.E. of regression	0.012040	Akaike info criterion	-6.080041
Sum squared resid	0.110614	Schwarz criterion	-6.037802
Log likelihood	2347.816	Durbin-Watson stat	2.016637

Inverted MA Roots	.45	-.23-.39i	-.23+.39i

13. Model GARCH (3,1)

Dependent Variable: RETURN
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/01/17 Time: 21:48
Sample: 1 770
Included observations: 770
Convergence achieved after 15 iterations
MA backcast: -2 0, Variance backcast: ON
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*RESID(-2)^2 + C(5)*RESID(-3)^2 + C(6)*GARCH(-1)

	Coefficient	Std. Error	z-Statistic	Prob.
MA(3)	-0.097376	0.034952	-2.786026	0.0053
Variance Equation				
C	3.02E-06	1.57E-06	1.928341	0.0538
RESID(-1)^2	0.156451	0.047593	3.287307	0.0010
RESID(-2)^2	-0.074418	0.055208	-1.347965	0.1777
RESID(-3)^2	-0.035699	0.030654	-1.164576	0.2442
GARCH(-1)	0.932171	0.022680	41.10064	0.0000

R-squared	0.009232	Mean dependent var	0.000278
Adjusted R-squared	0.002748	S.D. dependent var	0.012049
S.E. of regression	0.012032	Akaike info criterion	-6.078399
Sum squared resid	0.110606	Schwarz criterion	-6.042193
Log likelihood	2346.184	Durbin-Watson stat	2.017136

Inverted MA Roots	.46	-.23-.40i	-.23+.40i

14. Model GARCH (3,2)

Dependent Variable: RETURN
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/01/17 Time: 21:48
Sample: 1 770
Included observations: 770
Convergence achieved after 29 iterations
MA backcast: -2 0, Variance backcast: ON
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)

	Coefficient	Std. Error	z-Statistic	Prob.
MA(3)	-0.101186	0.037332	-2.710394	0.0067
Variance Equation				
C	2.12E-05	7.86E-06	2.693099	0.0071
RESID(-1)^2	0.184067	0.048592	3.787980	0.0002
RESID(-2)^2	0.104880	0.030419	3.447787	0.0006
RESID(-3)^2	-0.063696	0.047336	-1.345624	0.1784
GARCH(-1)	-0.185726	0.050940	-3.645981	0.0003
GARCH(-2)	0.814194	0.051465	15.82031	0.0000

R-squared	0.009276	Mean dependent var	0.000278
Adjusted R-squared	0.001485	S.D. dependent var	0.012049
S.E. of regression	0.012040	Akaike info criterion	-6.083418
Sum squared resid	0.110601	Schwarz criterion	-6.041178
Log likelihood	2349.116	Durbin-Watson stat	2.017621

Inverted MA Roots	.47	-.23-.40i	-.23+.40i

15. Model GARCH (3,3)

Dependent Variable: RETURN
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/01/17 Time: 21:48
Sample: 1 770
Included observations: 770
Convergence achieved after 22 iterations
MA backcast: -2 0, Variance backcast: ON
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) + C(8)*GARCH(-3)

	Coefficient	Std. Error	z-Statistic	Prob.
MA(3)	-0.088102	0.039409	-2.235584	0.0254
Variance Equation				
C	3.24E-05	9.38E-06	3.454352	0.0006
RESID(-1)^2	0.137314	0.034051	4.032650	0.0001
RESID(-2)^2	0.019297	0.016632	1.160232	0.2460
RESID(-3)^2	0.146493	0.028281	5.179937	0.0000
GARCH(-1)	0.431995	0.070314	6.143806	0.0000
GARCH(-2)	-0.665024	0.047538	-13.98940	0.0000
GARCH(-3)	0.706152	0.054508	12.95506	0.0000

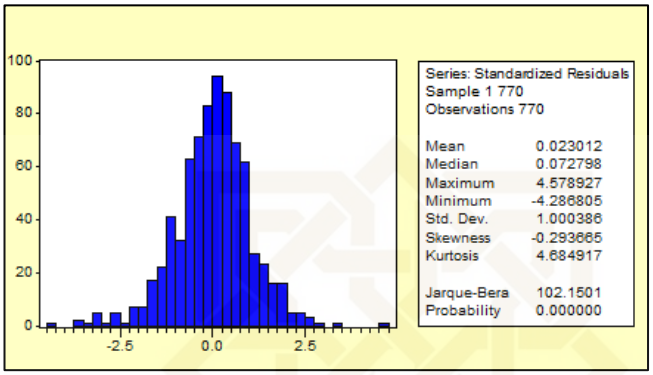
R-squared	0.009017	Mean dependent var	0.000278
Adjusted R-squared	-0.000086	S.D. dependent var	0.012049
S.E. of regression	0.012049	Akaike info criterion	-6.082937
Sum squared resid	0.110630	Schwarz criterion	-6.034663
Log likelihood	2349.931	Durbin-Watson stat	2.015967

Inverted MA Roots	.44	-.22-.39i	-.22+.39i

Lampiran 6 : Uji diagnosa Model GARCH

1. Model GARCH (1,0)

a. Uji Normalitas



b. Uji Autokorelasi

Date: 04/06/17 Time: 14:06
Sample: 1 770
Included observations: 770
Q-statistic probabilities adjusted for 1 ARMA term(s)

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prol
		1	-0.008	-0.008	0.0477	
		2	-0.041	-0.042	1.3798	0.24
		3	0.019	0.018	1.6476	0.43
		4	-0.028	-0.029	2.2527	0.52
		5	-0.038	-0.037	3.3601	0.49
		6	-0.051	-0.054	5.3749	0.37
		7	-0.014	-0.018	5.5376	0.47
		8	-0.017	-0.022	5.7650	0.56
		9	-0.027	-0.030	6.3524	0.60
		10	0.038	0.032	7.4713	0.58
		11	0.016	0.010	7.6639	0.66

c. Uji Heterokadastisitas

ARCH Test:

F-statistic	0.001285	Probability	0.971419
Obs*R-squared	0.001288	Probability	0.971372

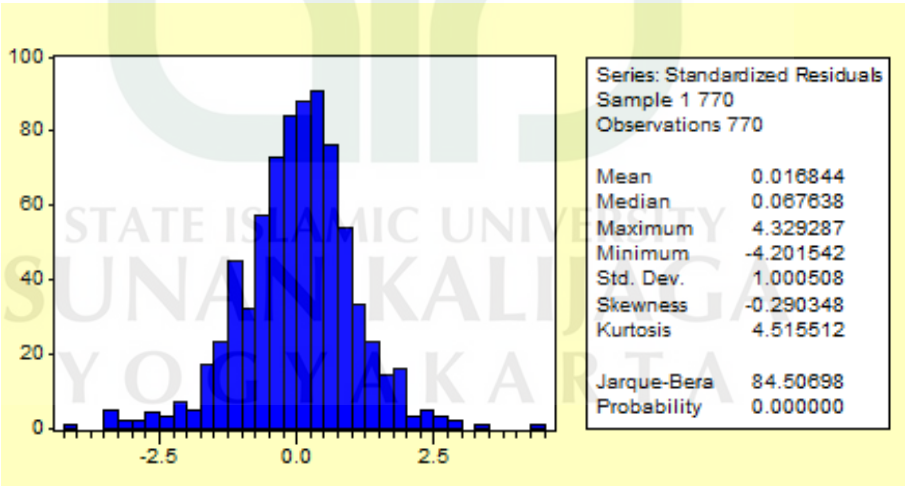
Test Equation:
Dependent Variable: STD_RESID^2
Method: Least Squares
Date: 04/06/17 Time: 14:07
Sample (adjusted): 2 770
Included observations: 769 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.000007	0.077965	12.82643	0.0000
STD_RESID^2(-1)	0.001294	0.036108	0.035841	0.9714

R-squared	0.000002	Mean dependent var	1.001303
Adjusted R-squared	-0.001302	S.D. dependent var	1.914251
S.E. of regression	1.915497	Akaike info criterion	4.140428
Sum squared resid	2814.221	Schwarz criterion	4.152509
Log likelihood	-1589.995	F-statistic	0.001285
Durbin-Watson stat	1.997966	Prob(F-statistic)	0.971419

2. Model GARCH (2,0)

a. Uji Normalitas



b. Uji Autokorelasi

Date: 04/06/17 Time: 14:10
Sample: 1 770
Included observations: 770
Q-statistic probabilities adjusted for 1 ARMA term(s)

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.000	0.000	4.E-05	
		2	-0.039	-0.039	1.1820	0.277
		3	-0.002	-0.002	1.1854	0.553
		4	-0.030	-0.031	1.8765	0.598
		5	-0.028	-0.029	2.5060	0.644
		6	-0.042	-0.044	3.8619	0.569
		7	-0.013	-0.016	3.9961	0.677
		8	-0.016	-0.021	4.1885	0.758
		9	-0.023	-0.027	4.6161	0.798
		10	0.040	0.035	5.8580	0.754
		11	0.003	-0.002	5.8657	0.826
		12	-0.003	-0.004	5.8750	0.882
		13	-0.028	-0.032	6.4965	0.889
		14	-0.069	-0.071	10.223	0.676
		15	0.017	0.013	10.443	0.729
		16	-0.006	-0.011	10.476	0.789
		17	0.026	0.025	11.016	0.808
		18	0.028	0.022	11.620	0.823
		19	-0.036	-0.039	12.662	0.811
		20	0.050	0.045	14.669	0.743
		21	0.004	-0.001	14.679	0.794
		22	0.015	0.018	14.854	0.830
		23	0.051	0.053	16.910	0.768
		24	0.000	0.011	16.910	0.814
		25	0.094	0.101	23.898	0.467
		26	0.035	0.043	24.850	0.471
		27	-0.013	-0.004	24.983	0.520
		28	0.025	0.031	25.491	0.547
		29	-0.022	-0.004	25.869	0.580
		30	0.060	0.074	28.747	0.478
		31	-0.009	0.010	28.815	0.527

c. Uji Heterokadastisitas

ARCH Test:

F-statistic	0.010141	Probability	0.919812
Obs*R-squared	0.010167	Probability	0.919683

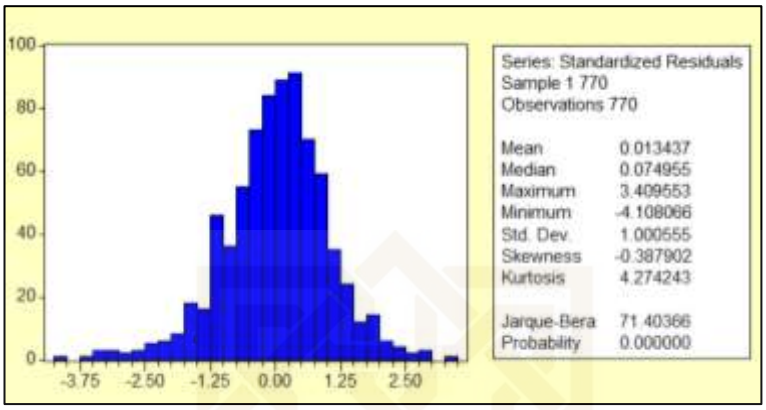
Test Equation:
Dependent Variable: STD_RESID^2
Method: Least Squares
Date: 04/06/17 Time: 14:10
Sample (adjusted): 2 770
Included observations: 769 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.997660	0.076604	13.02360	0.0000
STD_RESID^2(-1)	0.003636	0.036108	0.100703	0.9198

R-squared	0.000013	Mean dependent var	1.001301
Adjusted R-squared	-0.001291	S.D. dependent var	1.871604
S.E. of regression	1.872811	Akaike info criterion	4.095356
Sum squared resid	2690.193	Schwarz criterion	4.107437
Log likelihood	-1572.664	F-statistic	0.010141
Durbin-Watson stat	1.997397	Prob(F-statistic)	0.919812

3. Model GARCH (3,0)

a. Uji Normalitas



b. Uji Autokorelasi

Date: 04/06/17 Time: 14:11
Sample: 1 770
Included observations: 770
Q-statistic probabilities adjusted for 1 ARMA term(s)

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.004	0.004	0.0148	
		2	-0.038	-0.038	1.1135	0.291
		3	-0.003	-0.003	1.1201	0.571
		4	-0.037	-0.038	2.1821	0.535
		5	-0.034	-0.034	3.0676	0.547
		6	-0.044	-0.047	4.6036	0.466
		7	-0.011	-0.013	4.6920	0.584
		8	-0.016	-0.021	4.8929	0.673
		9	-0.024	-0.028	5.3429	0.720
		10	0.043	0.037	6.7874	0.659
		11	0.011	0.004	6.8748	0.737
		12	0.001	-0.001	6.8754	0.809
		13	-0.027	-0.031	7.4483	0.827
		14	-0.071	-0.072	11.378	0.579
		15	0.011	0.009	11.478	0.648
		16	-0.005	-0.008	11.500	0.716
		17	0.030	0.029	12.201	0.730
		18	0.026	0.019	12.739	0.753
		19	-0.034	-0.037	13.670	0.750
		20	0.050	0.044	15.638	0.681
		21	0.011	0.007	15.731	0.733
		22	0.020	0.023	16.035	0.768
		23	0.059	0.061	18.777	0.659
		24	0.001	0.013	18.778	0.714
		25	0.097	0.107	26.255	0.340
		26	0.028	0.038	26.874	0.362
		27	-0.015	-0.003	27.044	0.407
		28	0.020	0.027	27.373	0.444
		29	-0.028	-0.009	28.024	0.463
		30	0.063	0.080	31.187	0.357
		31	-0.007	0.012	31.230	0.404

c. Uji Heterokadastisitas

ARCH Test:

F-statistic	0.003511	Probability	0.952767
Obs*R-squared	0.003520	Probability	0.952690

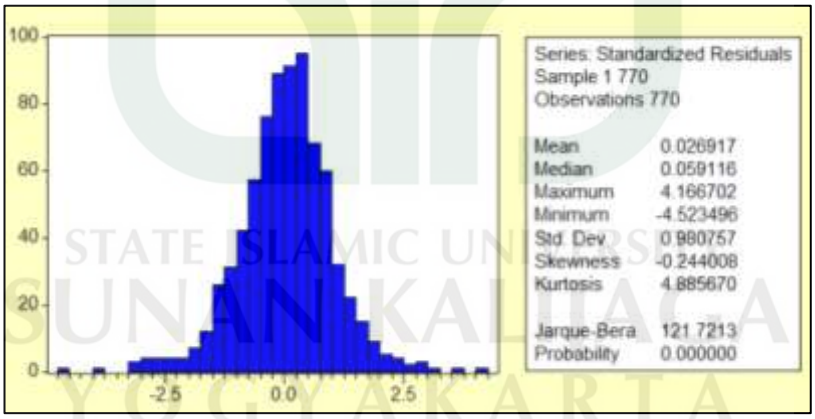
Test Equation:
Dependent Variable: STD_RESID^2
Method: Least Squares
Date: 04/06/17 Time: 14:12
Sample (adjusted): 2 770
Included observations: 769 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.003433	0.074512	13.46680	0.0000
STD_RESID^2(-1)	-0.002139	0.036108	-0.059251	0.9528

R-squared	0.000005	Mean dependent var	1.001290
Adjusted R-squared	-0.001299	S.D. dependent var	1.805558
S.E. of regression	1.806731	Akaike info criterion	4.023513
Sum squared resid	2503.700	Schwarz criterion	4.035593
Log likelihood	-1545.041	F-statistic	0.003511
Durbin-Watson stat	1.997374	Prob(F-statistic)	0.952767

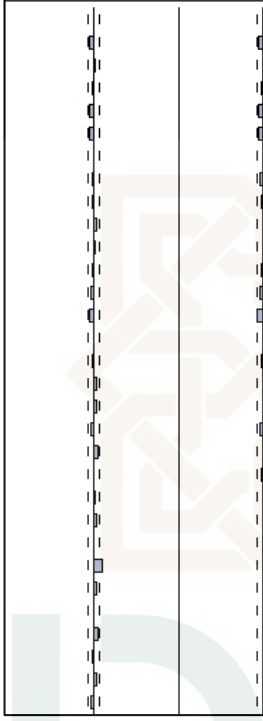
4. Model GARCH (0,2)

a. Uji Normalitas



b. Uji Autokorelasi

Date: 04/06/17 Time: 14:12
Sample: 1 770
Included observations: 770
Q-statistic probabilities adjusted for 1 ARMA term(s)



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.005	-0.005	0.0186	
		2	-0.046	-0.046	1.6377	0.201
		3	0.014	0.014	1.7921	0.408
		4	-0.014	-0.016	1.9346	0.586
		5	-0.053	-0.052	4.0909	0.394
		6	-0.054	-0.056	6.3319	0.275
		7	0.007	0.002	6.3755	0.382
		8	-0.023	-0.028	6.8044	0.450
		9	-0.020	-0.020	7.1018	0.526
		10	0.032	0.024	7.8782	0.546
		11	0.020	0.014	8.1942	0.610
		12	-0.018	-0.018	8.4450	0.673
		13	-0.031	-0.033	9.1845	0.687
		14	-0.056	-0.064	11.683	0.554
		15	-0.006	-0.008	11.708	0.630
		16	-0.018	-0.020	11.966	0.682
		17	0.040	0.039	13.261	0.654
		18	0.030	0.023	13.970	0.669
		19	-0.027	-0.031	14.543	0.693
		20	0.048	0.041	16.366	0.633
		21	-0.005	-0.012	16.387	0.692
		22	0.013	0.017	16.518	0.740
		23	0.041	0.046	17.827	0.716
		24	-0.000	0.006	17.827	0.767
		25	0.107	0.118	27.005	0.304
		26	0.039	0.049	28.251	0.296
		27	-0.007	0.002	28.286	0.345
		28	0.042	0.046	29.676	0.329
		29	-0.016	-0.007	29.890	0.369
		30	0.032	0.053	30.705	0.379
		31	-0.025	-0.000	31.199	0.406

c. Uji Heterokadastisitas

ARCH Test:

F-statistic	20.86885	Probability	0.000006
Obs*R-squared	20.36905	Probability	0.000006

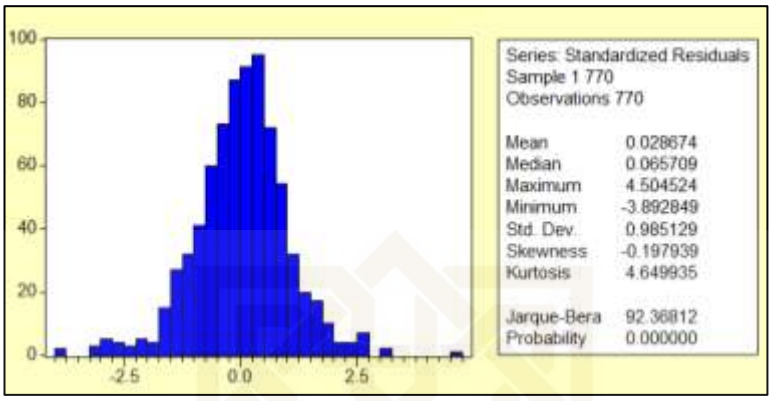
Test Equation:
Dependent Variable: STD_RESID^2
Method: Least Squares
Date: 04/06/17 Time: 14:13
Sample (adjusted): 2 770
Included observations: 769 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.805945	0.075524	10.67141	0.0000
STD_RESID^2(-1)	0.162750	0.035626	4.568243	0.0000

R-squared	0.026488	Mean dependent var	0.962610
Adjusted R-squared	0.025218	S.D. dependent var	1.889947
S.E. of regression	1.865964	Akaike info criterion	4.088030
Sum squared resid	2670.558	Schwarz criterion	4.100111
Log likelihood	-1569.848	F-statistic	20.86885
Durbin-Watson stat	2.015352	Prob(F-statistic)	0.000006

5. Model GARCH (0,3)

a. Uji Normalitas



b. Uji Autokorelasi

Date: 04/06/17 Time: 14:13
Sample: 1 770
Included observations: 770
Q-statistic probabilities adjusted for 1 ARMA term(s)

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.006	-0.006	0.0248	
		2	-0.044	-0.044	1.5156	0.218
		3	0.012	0.012	1.6324	0.442
		4	-0.015	-0.017	1.8078	0.613
		5	-0.050	-0.050	3.7746	0.437
		6	-0.057	-0.060	6.3113	0.277
		7	0.003	-0.002	6.3179	0.389
		8	-0.021	-0.025	6.6569	0.465
		9	-0.024	-0.025	7.1202	0.524
		10	0.036	0.030	8.1602	0.518
		11	0.017	0.010	8.3789	0.592
		12	-0.016	-0.016	8.5699	0.662
		13	-0.027	-0.030	9.1372	0.691
		14	-0.067	-0.074	12.668	0.474
		15	-0.006	-0.009	12.699	0.550
		16	-0.012	-0.014	12.812	0.617
		17	0.039	0.038	14.030	0.596
		18	0.031	0.025	14.774	0.612
		19	-0.029	-0.033	15.433	0.632
		20	0.049	0.040	17.311	0.569
		21	-0.006	-0.014	17.345	0.630
		22	0.012	0.016	17.469	0.682
		23	0.046	0.050	19.144	0.636
		24	-0.002	0.006	19.149	0.693
		25	0.101	0.111	27.283	0.291
		26	0.039	0.048	28.480	0.286
		27	-0.007	0.001	28.517	0.334
		28	0.038	0.041	29.681	0.329
		29	-0.015	-0.004	29.872	0.369
		30	0.030	0.049	30.600	0.384
		31	-0.024	0.002	31.071	0.412

c. Uji Heterokadastisitas

ARCH Test:

F-statistic	15.59035	Probability	0.000086
Obs*R-squared	15.31961	Probability	0.000091

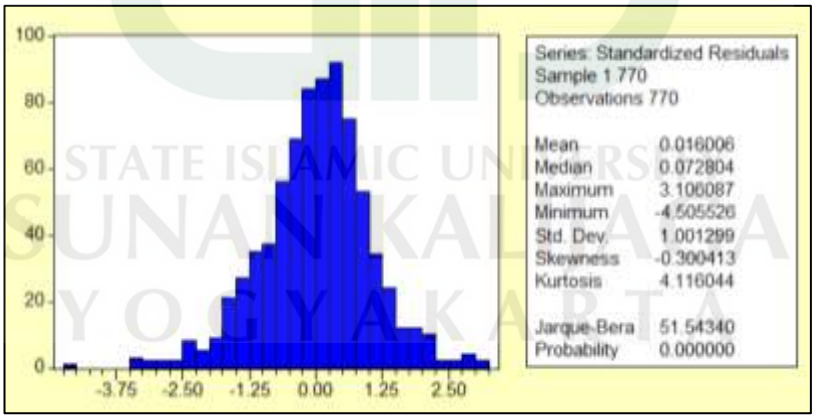
Test Equation:
Dependent Variable: STD_RESID^2
Method: Least Squares
Date: 04/06/17 Time: 14:14
Sample (adjusted): 2 770
Included observations: 769 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.834210	0.074614	11.18036	0.0000
STD_RESID^2(-1)	0.141143	0.035746	3.948462	0.0001

R-squared	0.019921	Mean dependent var	0.971303
Adjusted R-squared	0.018644	S.D. dependent var	1.848749
S.E. of regression	1.831435	Akaike info criterion	4.050674
Sum squared resid	2572.635	Schwarz criterion	4.062755
Log likelihood	-1555.484	F-statistic	15.59035
Durbin-Watson stat	2.018054	Prob(F-statistic)	0.000086

6. Model GARCH (1,1)

a. Uji Normalitas



b. Uji Autokorelasi

Date: 04/06/17 Time: 14:15
Sample: 1 770
Included observations: 770
Q-statistic probabilities adjusted for 1 ARMA term(s)

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.001	0.001	0.0007	
		2	-0.037	-0.037	1.0861	0.297
		3	0.007	0.007	1.1245	0.570
		4	-0.032	-0.033	1.9162	0.590
		5	-0.028	-0.028	2.5432	0.637
		6	-0.042	-0.044	3.8957	0.565
		7	-0.002	-0.003	3.8978	0.691
		8	-0.007	-0.011	3.9311	0.788
		9	-0.024	-0.026	4.3814	0.821
		10	0.037	0.033	5.4602	0.792
		11	0.003	-0.001	5.4675	0.858
		12	-0.005	-0.004	5.4835	0.906
		13	-0.025	-0.028	5.9611	0.918
		14	-0.070	-0.071	9.8090	0.709
		15	0.022	0.020	10.181	0.749
		16	0.000	-0.003	10.181	0.808
		17	0.030	0.031	10.888	0.816
		18	0.017	0.010	11.112	0.851
		19	-0.033	-0.034	11.955	0.850
		20	0.055	0.050	14.342	0.763
		21	0.011	0.011	14.439	0.808
		22	0.016	0.021	14.636	0.841
		23	0.057	0.058	17.201	0.752
		24	0.004	0.014	17.213	0.799
		25	0.093	0.100	24.044	0.459
		26	0.037	0.045	25.116	0.456
		27	-0.001	0.009	25.117	0.512
		28	0.016	0.021	25.330	0.556
		29	-0.035	-0.016	26.335	0.555
		30	0.057	0.070	28.918	0.469
		31	-0.001	0.015	28.918	0.522

c. Uji Heterokadastisitas

ARCH Test:

F-statistic	0.596494	Probability	0.440157
Obs*R-squared	0.597585	Probability	0.439501

Test Equation:
Dependent Variable: STD_RESID^2
Method: Least Squares
Date: 04/06/17 Time: 14:15
Sample (adjusted): 2 770
Included observations: 769 after adjustments

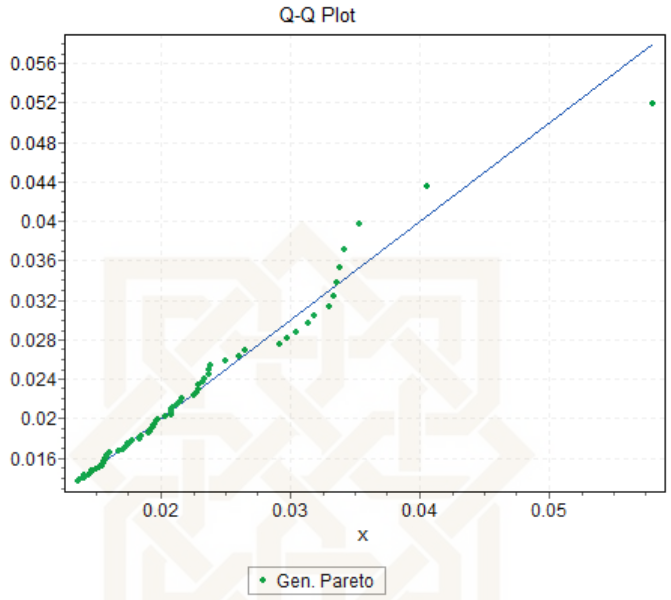
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.974900	0.073212	13.31608	0.0000
STD_RESID^2(-1)	0.027876	0.036094	0.772330	0.4402

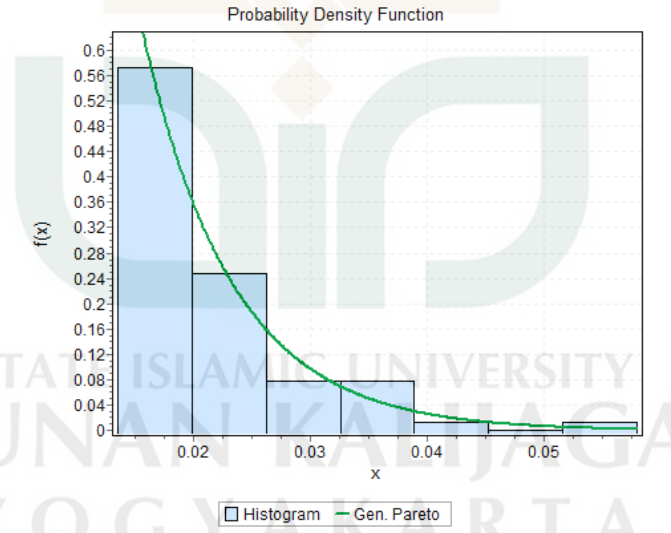
R-squared	0.000777	Mean dependent var	1.002856
Adjusted R-squared	-0.000526	S.D. dependent var	1.764276
S.E. of regression	1.764740	Akaike info criterion	3.976481
Sum squared resid	2388.672	Schwarz criterion	3.988562
Log likelihood	-1526.957	F-statistic	0.596494
Durbin-Watson stat	1.996339	Prob(F-statistic)	0.440157

Lampiran 7 : Data *return* terurut dari terbesar ke terkecil diatas nilai ekstrim

Data ke-	*Return*	Data ke-	*Return*	Data ke-	*Return*
1	0.058001	27	0.021577	53	0.016115
2	0.040569	28	0.021354	54	0.015902
3	0.035292	29	0.020995	55	0.015877
4	0.034135	30	0.020826	56	0.015815
5	0.033812	31	0.020799	57	0.015751
6	0.033539	32	0.020782	58	0.015687
7	0.033363	33	0.020339	59	0.015642
8	0.033072	34	0.019843	60	0.015557
9	0.031857	35	0.019697	61	0.015469
10	0.031442	36	0.019575	62	0.015465
11	0.030441	37	0.019496	63	0.015463
12	0.029751	38	0.019423	64	0.015281
13	0.029139	39	0.019255	65	0.015068
14	0.026571	40	0.019251	66	0.014817
15	0.026046	41	0.019081	67	0.014688
16	0.025048	42	0.018518	68	0.01465
17	0.023895	43	0.018378	69	0.014558
18	0.023778	44	0.01835	70	0.014483
19	0.023754	45	0.017777	71	0.014125
20	0.023389	46	0.017671	72	0.014105
21	0.02326	47	0.017472	73	0.014092
22	0.022934	48	0.017429	74	0.013991
23	0.022877	49	0.017315	75	0.013802
24	0.022861	50	0.017279	76	0.013586
25	0.022558	51	0.017075	77	0.013484
26	0.0216	52	0.016777		

Lampiran 8 : Uji kesesuaian Distribusi Pareto, Plot *Quantile*, Histogram dan *Kolmogorov-Smirnov* Nilai Ekstrim *return* indek saham JII





Gen. Pareto [#22]					
Kolmogorov-Smirnov					
Sample Size Statistic P-Value Rank	77 0.05185 0.97901 1				
α	0.2	0.1	0.05	0.02	0.01
Critical Value	0.12011	0.13723	0.15244	0.17045	0.1829
Reject?	No	No	No	No	No

Lampiran 9 : Program GPD

```
function res=gpd(data,threshold,nextremes,information),
%Fits a generalized Pareto model to excesses over a high threshold
%
%      USAGE: res=gpd(data,threshold,nextremes,information)
%
%Either threshold or nextremes should be defined. The undefined one should be entered as '[]'
%
%       data: Data vector
%  threshold: Excesses over this value will be fitted a model
%  nextremes: Implies a threshold value that number of observations remaining above is nextremes
%information: Default is 'observed'. Can be entered as 'expected' also. Determines whether
%             standard errors will be calculated with observed or expected information
%
%        res: Fitted distribution
%
%             res.par_ests: Estimated parameters. 1X2 vector:
%                                                  1st element: xi
%                                                  2nd element: beta
%               res.funval: Value of the negative log likelihood
%            res.terminated: Termination condition. 1 if successfully terminated
%               res.details: Details of the nonlinear minimization process of the negative
%                            likelihood
%               res.varcov: Variance-covariance matrix of the parameters
%              res.par_ses: Standard deviations of the parameters of the distribution
%                 res.data: Elements that are exceeding the threshold


warning off
n=length(data);
if (isempty(threshold)&isempty(nextremes))
    disp('Enter either a threshold or the number of upper extremes')
    return
end
if (~isempty(threshold)&~isempty(nextremes))
    disp('Enter Either a threshold or the number of upper extremes')
    return
end

if (~isempty(nextremes))
    threshold=findthresh(data,nextremes);
end
if nargin<4,
    information='observed';
end


exceedances=data(data>threshold);
excess=exceedances-threshold;
xbar=mean(excess);
s2=var(excess);
% xi0=-0.5*xbar*((xbar^2)/s2-1);
xi0=-0.5*((xbar^2)/s2-1); % Correction by Andrea Colombo May 9, 2005
beta0=0.5*xbar*((xbar^2)/s2+1);

theta=[xi0,beta0];

opts=optimset('MaxFunEvals',5000,'MaxIter',1000,'TolX',1e-6,'TolFun',1e-6,'Display','off');
xi=theta(1);
beta=theta(2);
cond1 = beta <= 0;
cond2 = ((xi <= 0) & (max(excess) > ( - beta/xi)));
if (cond1 | cond2),
    theta(1)=1;
    theta(2)=1;
end
```

```
[res.par_ests,res.funval,res.terminated,res.details] = fminsearch('negloglikgpd',theta,opts,excess);
[res.par_ests,res.funval,res.terminated,res.details] = fminunc('negloglikgpd',res.par_ests,opts,excess);
if strcmp(information,'observed'),
    res.varcov=hessigpd('negloglikgpd',res.par_ests,excess);
    res.par_ses=sqrt(diag(res.varcov))';
elseif strcmp(information,'expected'),
    one = (1 + res.par_ests(1))^2/length(excess);
    two = (2 * (1 + res.par_ests(1)) * res.par_ests(2)^2)/length(excess);
     cov =  - ((1 + res.par_ests(1)) * res.par_ests(2))/length(excess);
     res.varcov = [one,cov;cov,two];
    res.par_ses=sqrt(diag(res.varcov))';
else


    disp('WARNING 4th input should be either observed or expected');
    return
end

res.threshold=threshold;
res.data=exceedances;
res.p_less_thresh=1-length(excess)/n;


warning on
```

Lampiran 10 : Perhitungan GPD

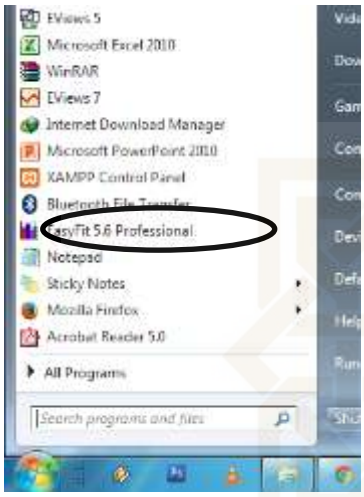
```
res =

      par_ests: [-0.0624 0.0088]
        funval: -269.7799
    terminated: -2
       details: [1x1 struct]
```

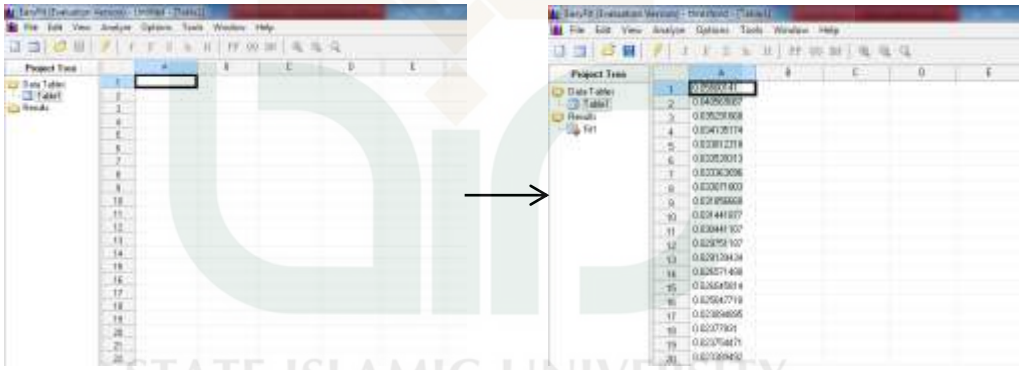
Lampiran 11: Langkah-langkah *EasyFit*

Langkah-langkah mendapatkan output hasil Uji Kesesuaian Distribusi dengan menggunakan *Software EasyFit*:

1. Membuka EasyFit



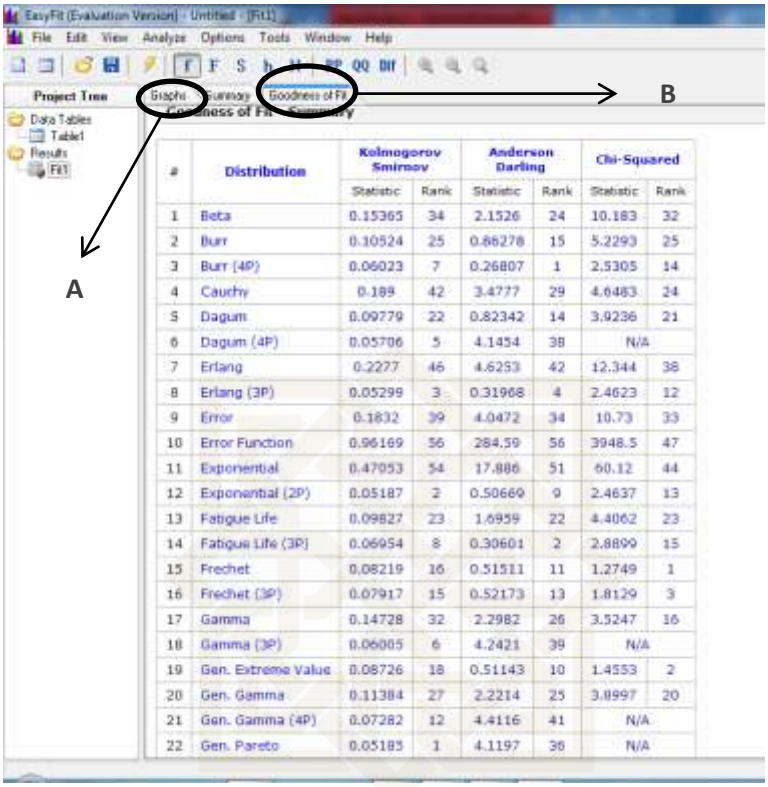
2. Isi data pada kolom berikut



3. Setelah data terinput kita akan langsung menguji distribusi data klik  Sehingga akan keluar dialog seperti berikut:

Dengan mengabaikan yang lain kita klik OK

4. Akan muncul output seperti gambar berikut

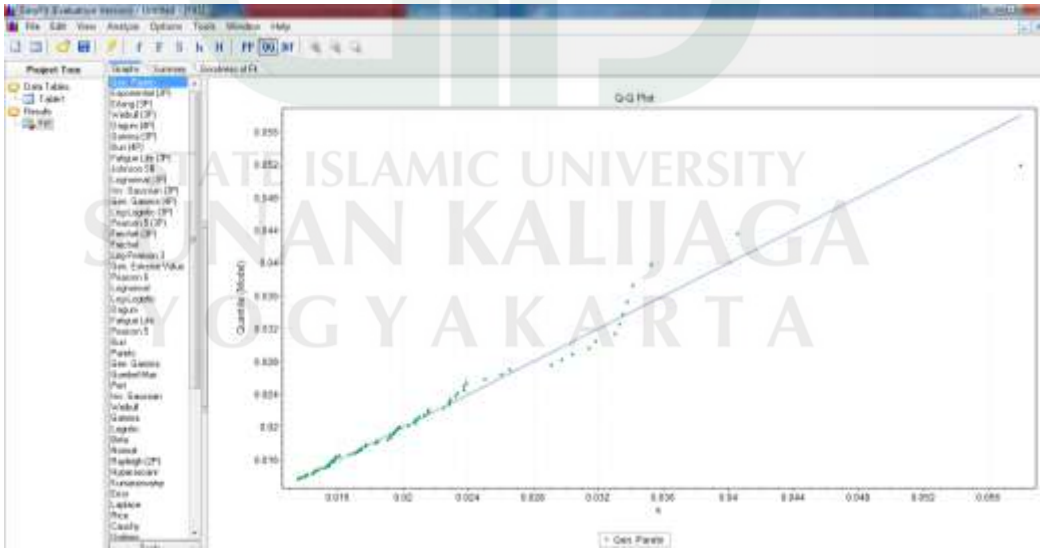


#	Distribution	Kolmogorov Smirnov		Anderson Darling		Chi-Squared	
		Statistic	Rank	Statistic	Rank	Statistic	Rank
1	Beta	0.15365	34	2.1526	24	10.183	32
2	Burr	0.10524	25	0.86278	15	5.2293	25
3	Burr (4P)	0.06023	7	0.26807	1	2.5305	14
4	Cauchy	0.189	42	3.4777	29	4.6483	24
5	Dagum	0.09779	22	0.82342	14	3.9236	21
6	Dagum (4P)	0.05706	5	4.1454	38	N/A	
7	Erlang	0.2277	46	4.6253	42	12.344	38
8	Erlang (3P)	0.05299	3	0.31968	4	2.4623	12
9	Error	0.1832	39	4.0472	34	10.73	33
10	Error Function	0.96169	56	284.59	56	3948.5	47
11	Exponential	0.47053	54	17.886	51	60.12	44
12	Exponential (2P)	0.05187	2	0.50669	9	2.4637	13
13	Fatigue Life	0.09827	23	1.6959	22	4.4062	23
14	Fatigue Life (3P)	0.06954	8	0.30601	2	2.8899	15
15	Frechet	0.08219	16	0.51511	11	1.2749	1
16	Frechet (3P)	0.07917	15	0.52173	13	1.8129	3
17	Gamma	0.14728	32	2.2982	26	3.5247	16
18	Gamma (3P)	0.06005	6	4.2421	39	N/A	
19	Gen. Extreme Value	0.08726	18	0.51143	10	1.4553	2
20	Gen. Gamma	0.11384	27	2.2214	25	3.8997	20
21	Gen. Gamma (4P)	0.07282	12	4.4116	41	N/A	
22	Gen. Pareto	0.05185	1	4.1197	36	N/A	

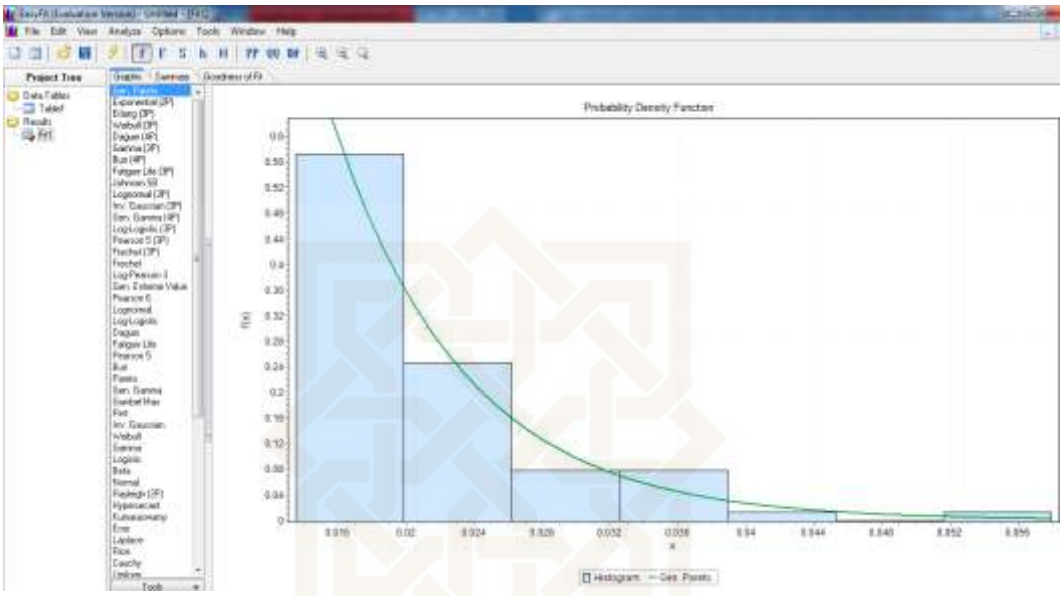
A. Untuk melihat output grafik

Kita akan melihat Plot *quantil* dan Fungsi Densitas Probabilitas

- Plot *Quantil* kita dapat mengklik QQ sehingga akan muncul grafik seperti berikut:



- Fungsi Densitas Probabilitas klik  sehingga akan munsul grafik seperti berikut:



B. Untuk melihat distribusi data
Kita akan mengetahui apa distribusi yang sesuai dengan data tersebut

Terlihat bahwa data tersebut berdistribusi pareto, karena distribusi pareto menduduki peringkat pertama pada uji Kolmogorov Smirnov

5. Selanjutnya kita akan mengetahui secara detail perhitungan dari Uji Kolmogorov Smirnov, maka kita klik distribusi Gen. Pareto pada output sebelumnya. Sehingga muncul uji Kolmogorov Smirnov sebagai berikut:

Gen. Pareto [#22]					
Kolmogorov-Smirnov					
Sample Size	77				
Statistic	0.05185				
P-Value	0.97901				
Rank	1				
α	0.2	0.1	0.05	0.02	0.01
Critical Value	0.12011	0.13723	0.15244	0.17045	0.1829
Reject?	No	No	No	No	No

Karena nilai *test critical values* pada tingkat 0.2, 0.2, 0.05, 0.02, 0.01 > α dan karena D_{hitung} = 0.05185 < $D_{(1-0.05,77)}$ = 0.15244 maka H_0 diterima, dengan kata lain dapat disimpulkan bahwa data tersebut mengikuti distribusi pareto.

Lampiran 12 :

Tabel Chi-Kuadrat

db	0.25	0.2	0.15	0.1	0.05	0.025	0.02	0.01
1	1.3233	1.6424	2.0723	2.7055	3.8415	5.0239	5.4119	6.6349
2	2.7726	3.2189	3.7942	4.6052	5.9915	7.3778	7.824	9.2103
3	4.1083	4.6416	5.317	6.2514	7.8147	9.3484	9.8374	11.345
4	5.3853	5.9886	6.7449	7.7794	9.4877	11.143	11.668	13.277
5	6.6257	7.2893	8.1152	9.2364	11.07	12.833	13.388	15.086
6	7.8408	8.5581	9.4461	10.645	12.592	14.449	15.033	16.812
7	9.0371	9.8032	10.748	12.017	14.067	16.013	16.622	18.475
8	10.219	11.03	12.027	13.362	15.507	17.535	18.168	20.09
9	11.389	12.242	13.288	14.648	16.919	19.023	19.679	21.666
10	12.549	13.442	14.543	15.987	18.307	20.482	21.161	23.209
11	13.701	14.631	15.767	17.275	19.675	21.92	22.618	24.725
12	14.845	15.812	16.989	18.549	21.026	23.337	24.054	26.217
13	15.984	16.985	18.202	19.812	22.362	24.736	25.472	27.688
14	17.117	18.151	19.406	21.064	23.685	26.119	26.873	29.141
15	18.245	19.311	20.603	22.307	24.996	27.488	28.259	30.578
16	19.369	20.465	21.793	23.542	26.296	28.845	29.633	32
17	20.489	21.615	22.977	24.769	27.587	30.191	30.995	33.409
18	21.605	22.76	24.155	25.989	28.869	31.526	32.346	34.805
19	22.718	23.9	25.329	27.204	30.144	32.852	33.687	36.191
20	23.828	25.038	26.498	28.412	31.41	34.17	35.02	37.566
21	24.241	29.171	27.662	29.615	32.671	35.479	36.343	38.932
22	26.039	27.301	28.822	30.813	33.924	36.781	37.659	40.289
23	27.141	28.429	29.979	32.007	35.172	38.076	38.968	41.638
24	28.241	29.553	31.132	33.196	36.415	39.364	40.27	42.98
25	29.339	30.675	32.282	34.382	37.652	40.646	41.566	44.314
26	30.435	31.795	33.429	35.563	38.885	41.923	42.856	45.642
27	31.528	32.912	34.547	36.741	40.113	43.195	44.14	46.963
28	32.62	34.027	35.715	37.916	41.337	44.461	45.419	48.278
29	33.711	35.359	36.854	39.087	42.557	45.722	46.693	49.588
30	34.8	36.25	37.99	40.256	43.773	46.979	47.962	50.892
31	35.887	37.359	39.124	41.422	44.985	48.232	49.226	52.191
32	36.973	38.466	40.256	42.585	46.194	49.48	50.487	53.486
33	38.058	39.572	41.386	43.745	47.4	50.725	51.743	54.776
34	39.141	40.676	42.514	44.903	48.602	51.966	52.995	56.061
35	40.223	41.778	43.64	46.059	49.802	53.203	54.224	57.342
36	41.304	42.479	44.764	47.212	50.998	54.437	55.489	58.619
37	42.383	43.978	45.886	48.363	52.192	55.668	56.73	59.893
38	43.462	45.076	47.007	49.513	53.384	56.896	57.969	61.162
39	44.539	46.173	48.126	50.66	54.572	58.12	59.204	62.248

db	0.25	0.2	0.15	0.1	0.05	0.025	0.02	0.01
40	45.616	47.269	49.244	51.805	59.342	60.436	63.436	63.691
41	46.692	48.363	50.36	52.949	56.942	60.561	61.665	64.95
42	47.766	49.456	51.457	54.09	58.124	61.777	62.892	66.206
43	48.84	50.548	52.588	55.23	59.304	62.99	64.116	67.459
44	49.913	51.639	53.7	56.369	60.481	64.201	65.337	68.71
45	50.985	52.729	54.81	57.505	61.656	65.41	66.555	69.957
46	52.056	53.818	55.92	58.641	62.83	66.617	67.771	71.201
47	53.127	54.906	57.028	59.774	64.001	67.821	68.985	72.443
48	54.196	55.993	58.135	60.907	65.171	69.023	70.197	73.683
49	55.265	57.079	59.241	62.038	66.339	70.222	71.406	74.919
50	56.334	58.164	60.346	63.167	67.505	71.42	72.613	76.154
51	57.401	59.248	61.45	64.295	68.669	72.616	73.818	77.386
52	58.468	60.332	62.553	65.422	69.832	73.81	75.021	78.616
53	59.534	61.414	63.654	66.548	70.993	75.002	76.223	79.843
54	60.6	62.496	64.755	67.673	72.153	76.192	77.442	81.069
55	61.665	63.577	65.855	68.796	73.311	77.38	78.619	82.292
56	62.729	64.658	66.954	69.919	74.468	74.567	79.815	83.513
57	63.793	65.737	68.052	71.04	75.624	79.752	81.009	84.733
58	64.857	66.816	69.149	72.16	76.778	80.936	82.201	85.95
59	65.919	67.894	70.246	73.279	77.931	82.117	83.391	87.166
60	66.981	68.972	71.341	74.397	79.082	82.298	84.58	88.379
61	68.043	70.049	72.436	75.514	80.232	84.476	85.767	89.591
62	69.104	71.125	73.53	76.63	81.381	85.654	86.953	90.802
63	70.165	72.201	74.623	77.745	82.529	86.83	88.137	91.01
64	71.225	73.276	75.715	78.86	83.675	88.004	89.32	93.217
65	72.285	74.351	76.807	79.973	84.821	89.177	90.501	94.422
66	73.344	75.424	77.898	81.085	85.965	90.349	91.681	95.626
67	74.403	76.498	78.988	82.197	87.108	91.519	92.86	96.828
68	75.461	77.571	80.087	83.308	88.25	92.689	94.037	98.028
69	76.519	78.643	81.167	84.418	89.391	93.856	95.213	99.228
70	77.577	79.715	82.255	85.527	90.531	95.023	96.388	100.43
71	78.634	80.786	83.343	86.635	91.67	96.189	97.561	101.62
72	79.69	81.857	84.43	87.743	92.808	97.353	98.733	102.82
73	80.747	82.927	85.517	88.85	93.945	98.516	99.904	104.01
74	81.803	83.997	86.602	89.956	95.081	99.678	101.07	105.2
75	82.858	85.066	87.688	91.061	96.217	100.84	102.24	106.39
76	83.913	86.135	88.772	92.166	97.351	102	103.41	107.58
77	84.968	87.203	89.857	93.27	98.484	103.16	104.58	108.77
78	86.022	88.271	90.94	94.374	99.617	104.32	105.74	109.96
79	87.077	89.338	92.023	95.476	100.75	105.47	106.91	111.14
80	88.13	90.405	93.106	96.578	101.88	106.63	108.07	112.33
81	89.184	91.472	94.188	97.68	103.01	107.78	109.23	113.51

db	0.25	0.2	0.15	0.1	0.05	0.025	0.02	0.01
82	90.237	92.538	95.269	98.78	104.14	108.94	110.39	114.69
83	91.289	93.604	96.35	99.88	105.27	110.09	111.55	115.88
84	92.342	94.669	97.431	100.98	106.39	111.24	112.71	117.06
85	93.394	95.734	98.511	102.08	107.52	112.39	113.87	118.24
86	94.446	96.799	99.59	103.18	108.65	113.54	115.03	119.41
87	95.497	97.863	100.67	104.28	109.77	114.69	116.18	120.59
88	96.548	98.927	101.75	105.37	110.9	115.84	117.34	121.77
89	97.599	99.991	102.83	106.47	112.02	116.99	118.49	122.94
90	98.65	101.05	103.9	107.57	113.15	118.14	119.65	124.12
91	99.7	102.12	104.98	108.66	114.27	119.28	120.8	125.29
92	100.75	103.18	106.06	109.76	115.39	120.43	121.95	126.46
93	101.8	104.24	107.13	110.85	116.51	121.57	123.1	127.63
94	102.85	105.3	108.21	111.94	117.63	122.72	124.26	128.8
95	103.9	106.36	109.29	113.04	118.75	123.86	125.4	129.97
96	104.95	107.43	110.36	114.13	119.87	125	126.55	131.14
97	106	108.49	111.44	115.22	120.99	126.14	127.7	132.31
98	107.05	109.55	112.51	116.32	122.11	127.28	128.85	133.48
99	108.09	110.61	113.59	117.41	123.23	128.42	130	134.64
100	109.14	111.67	114.66	118.5	124.34	129.56	131.14	135.81
101	110.19	112.73	115.73	119.59	125.46	130.7	132.29	136.97
102	111.24	113.79	116.81	120.68	126.57	131.84	133.43	138.13
103	112.28	114.84	117.88	121.77	127.69	132.97	134.57	139.3
104	113.33	115.9	118.95	122.86	128.8	134.11	135.72	140.46
105	114.38	116.96	120.02	123.95	129.92	135.25	136.86	141.62
106	115.42	118.02	121.09	125.04	131.03	136.38	138	142.78
107	116.47	119.08	122.16	126.12	132.14	137.52	139.14	143.94
108	117.52	120.14	123.24	127.21	133.26	138.65	140.28	145.1
109	118.56	121.19	124.31	128.3	134.37	139.78	141.42	146.26
110	119.61	122.25	125.38	129.39	135.48	140.92	142.56	147.41
111	120.65	123.31	126.45	130.47	136.59	142.05	143.7	148.57
112	121.7	124.36	127.52	131.56	137.7	143.18	144.84	149.73
113	122.74	125.42	128.59	132.64	138.81	144.31	145.97	150.88
114	123.79	126.48	129.65	133.73	139.92	145.44	147.11	152.04
115	124.83	127.53	130.72	134.81	141.03	146.57	148.25	153.19
116	125.88	128.59	131.79	135.9	142.14	147.7	149.38	154.34
117	126.92	129.64	132.86	136.98	143.25	148.83	150.52	155.5
118	127.97	130.7	133.93	138.07	144.35	149.96	151.65	156.65
119	129.01	131.75	134.99	139.15	145.46	151.08	152.79	157.8
120	130.05	132.81	136.06	140.23	146.57	152.21	153.92	158.95
121	131.1	133.86	137.13	141.32	147.67	153.34	155.05	160.1
122	132.14	134.91	138.2	142.2	148.78	154.46	156.18	161.25
123	133.18	135.97	139.26	143.48	149.88	155.59	157.31	161.4

db	0.25	0.2	0.15	0.1	0.05	0.025	0.02	0.01
124	134.23	137.02	140.33	144.56	150.99	156.71	158.44	163.55
125	135.27	138.08	141.39	145.64	152.09	157.84	159.58	164.69
126	136.31	139.13	142.46	146.72	153.2	158.96	160.71	165.84
127	137.36	140.18	143.52	147.8	154.3	160.09	161.83	166.99
128	138.4	141.24	144.59	148.89	155.4	161.21	162.96	168.13
129	139.44	142.29	145.65	149.97	156.51	162.33	164.09	169.28
130	140.48	143.34	146.72	151.05	157.61	163.45	165.22	170.42
131	141.52	144.39	147.78	152.12	158.71	164.57	166.35	171.57
132	142.57	145.55	148.85	153.2	159.81	165.7	167.47	172.71
133	143.61	146.5	149.91	154.28	160.91	166.82	168.6	173.85
134	144.65	147.55	150.98	155.36	162.02	167.94	169.73	175
135	145.69	148.6	152.04	156.44	163.12	169.06	170.85	176.14
136	146.73	149.65	153.1	157.52	164.22	170.18	171.98	177.28
137	147.77	150.7	154.16	158.6	165.32	171.29	173.1	178.42
138	148.81	151.75	155.23	159.67	166.42	171.41	174.22	179.56
139	149.85	153.8	156.29	160.75	167.51	173.53	176.35	180.7
140	150.89	153.85	157.35	161.83	168.61	174.65	176.47	181.84
141	151.93	154.9	158.41	162.9	169.71	175.76	177.59	182.98
142	152.97	155.95	159.48	163.98	170.81	176.88	178.72	184.12
143	154.01	157	160.54	165.06	171.91	178	179.84	185.26
144	155.05	158.05	161.6	166.13	173	179.11	180.96	186.39
145	156.09	159.1	162.66	167.21	174.1	180.23	182.08	187.53
146	157.13	160.15	163.72	168.28	175.2	181.34	183.2	188.67
147	185.17	161.2	164.78	169.36	176.29	182.46	184.32	189.8
148	159.21	162.25	165.84	170.43	177.39	183.57	185.44	190.94
149	160.25	163.3	166.9	171.49	178.49	184.69	186.56	192.07
150	161.29	165.35	167.96	172.58	179.58	185.8	187.68	193.21
151	162.33	165.4	169.02	173.66	180.68	186.91	188.8	194.34
152	163.37	166.45	170.08	174.73	181.77	188.03	189.92	195.48
153	164.41	167.49	171.14	175.8	182.86	189.14	191.03	196.61
154	165.45	168.54	172.2	176.88	183.96	190.25	192.15	197.74
155	166.48	169.59	173.26	177.95	185.05	191.36	193.27	198.87
156	167.52	170.64	174.32	179.02	186.15	192.47	194.38	200.01
157	168.56	171.38	175.38	180.09	187.24	193.58	195.5	201.14
158	169.6	172.73	176.44	181.17	188.33	194.7	196.62	202.27
159	170.64	173.78	177.49	182.24	189.42	195.81	197.73	203.4
160	171.68	174.83	178.55	183.31	190.52	196.92	198.85	204.53
161	172.71	175.88	179.61	184.38	191.61	198.02	199.96	204.53
162	173.75	176.92	180.67	185.45	192.7	199.13	201.08	206.79
163	174.79	177.97	181.73	186.52	193.79	200.24	202.19	207.92
164	175.83	179.02	182.78	187.6	194.88	201.35	203.3	209.05
165	176.86	180.06	183.84	188.67	195l97	202.46	204.42	210.18

db	0.25	0.2	0.15	0.1	0.05	0.025	0.02	0.01
166	177.9	181.11	184.9	189.74	197.06	203.57	205.53	211.3
167	178.94	182.15	185.95	190.81	198.15	204.67	206.64	22.43
168	179.97	183.2	187.01	191.88	199.24	205.78	207.75	213.56
169	181.01	184.25	188.07	192.95	200.33	206.89	208.87	214.69
170	182.05	185.29	189.12	194.02	201.42	208	209.98	215.81
171	183.08	186.34	190.18	195.09	202.51	209.1	211.09	216.94
172	184.12	187.38	191.24	196.16	203.6	210.21	212.2	218.06
173	185.16	188.43	192.29	197.23	204.69	211.31	213.31	219.19
174	186.19	189.47	193.35	198.29	205.78	212.42	214.42	220.31
175	187.23	190.52	194.4	199.36	206.87	213.52	215.53	221.44
176	188.27	191.56	195.46	200.43	207.95	214.63	216.64	222.56
177	189.3	192.61	196.61	201.5	209.04	215.73	217.75	223.69
178	190.34	193.65	197.57	202.57	210.13	216.84	218.86	224.81
179	191.37	194.7	198.62	203.64	211.22	217.94	219.97	225.93
180	192.41	195.74	199.68	204.7	212.3	219.04	221.08	227.06
181	193.44	196.79	200.73	205.77	213.39	220.15	222.19	228.18
182	194.48	197.83	201.79	206.86	214.48	221.25	223.29	229.3
183	195.52	198.88	202.84	207.91	215.56	222.35	224.4	230.42
184	196.55	199.92	203.9	208.97	216.65	223.46	225.51	231.54
185	197.59	200.96	204.95	210.04	217.73	224.56	226.62	231.67
186	198.62	202.01	206	211.11	218.82	225.66	227.72	233.79
187	199.66	203.05	207.06	212.91	219.91	226.76	198.15	234.91
188	200.69	204.1	208.11	213.24	220.99	227.86	229.93	236.03
189	201.73	205.14	209.17	214.31	222.08	228.96	231.04	237.15
190	202.76	206.18	210.22	215.37	223.16	230.06	232.15	238.27
191	203.79	207.23	211.27	216.44	224.24	231.16	233.25	239.39
192	204.83	208.27	212.32	217.5	225.33	232.27	234.36	240.5
193	205.86	209.31	213.38	218.57	226.41	233.37	235.46	241.62
194	206.9	210.35	214.43	219.63	227.5	234.46	236.57	242.74
195	207.93	211.4	215.48	220.7	228.58	235.56	237.67	243.86
196	208.97	212.44	216.54	221.76	229.66	236.66	238.77	244.98
197	210	213.48	217.59	222.83	230.75	237.76	239.88	246.09
198	211.03	214.52	218.64	223.89	231.83	238.86	240.98	247.21
199	212.07	215.57	219.69	224.96	232.91	239.96	242.08	248.33
200	213.1	216.61	220.74	226.02	233.99	241.06	243.19	249.45

DAFTAR RIWAYAT HIDUP

A. Data Pribadi

Nama	: Idrookuttafkiroh
Tempat, Tanggal, Lahir	: Wonosobo, 20 Desember 1995
Umur	: 21 tahun
Alamat	: Kalibeber Rt :02 Rw :01, Mojotengah, Wonosobo
Jenis Kelamin	: Perempuan
No Handphone	: 085729315867
Status	: Belum Menikah
Email	: Idroitaf3@gmail.com

B. Riwayat Pendidikan :

1. SD Negeri 1 Kalibeber
2. SMP Negeri 1 Mojotengah
3. SMA Negeri 2 Wonosobo
4. Universitas Islam Negeri Sunan Kalijaga Yogyakarta