

DAFTAR PUSTAKA

- Alamsyah, S., & Sarra, H. D. (2019). Perilaku Analisis Efek di Pasar Modal Indonesia Berdasarkan Perspektif Laporan Keuangan. *Jurnal Online Insan ...*, 4(2), 157–170. <http://ejournal-binainsani.ac.id/index.php/JOIA/article/view/1195>
- Aprilia, A. E., Soehardjoepri, & Widjajati, F. A. (2017). Estimasi Risiko. *Sains Dan Seni ITS*, 6(2), A83–A87.
- Ari Pani Desvina, N. R. (2016). Penerapan Metode ARCH / GARCH dalam Peramalan Indeks Harga Saham Sektoral. *Jurnal Sains Matematika Dan Statistika*, 2(I), 1–10.
- Arin, R. E., Iskandar, Y., & Ningrum, H. F. (2020). Faktor – Faktor yang Mempengaruhi Harga Saham pada Perusahaan Sektor Keuangan. *Jurnal Proaksi*, 7(1), 1–15.
- Ashari, B. H., Wibawa, B. M., & Persada, S. F. (2017). Analisis Deskriptif dan Tabulasi Silang pada Konsumen Online shop di Instagram (Studi Kasus 6 Universitas di Kota Surabaya). *Jurnal Sains Dan Seni ITS*, 6(1), 17–21. <https://doi.org/10.12962/j23373520.v6i1.21403>
- Eka, G., Safitry, V., & Kristin, Y. (2017). Penentuan Model Terbaik untuk Peramalan Data Saham Closing PT. CIMB Niaga Indonesia Menggunakan Metode Arch-Garch. *Jurnal Statistika Dan Aplikasinya*, 1(1), 1–12. <https://doi.org/10.21009/jsa.01101>
- Hidayati, A. N. (2017). Investasi : Analisis dan Relevansinya dengan Ekonomi Islam. *Jurnal Ekonomi Islam*, 8(2), 227–242.
- Insani, N. H. (2015). Peramalan Curah Hujan Dengan Menggunakan Metode Arima Box-Jenkins Sebagai Pendukung Kalender Tanam Padi Di Kabupaten Bojonegoro. *Tugas Akhir Program Studi Diploma III Fakultas Matematika Dan Ilmu Pengetahuan Alam*, 1–131.
- Makridakis, S., Wheelwright, S. C., & McGEE, V. E. (1999). *Forecasting: methode and application*.
- Marlina, W. A., Erizal, N., & Ahmad, F. A. (2018). *Jurnal Manajemen*. 9(2), 187–196. <https://doi.org/10.32832/jm-uika.v9i2.1567>
- Marvillia, B. L. (2012). *Pemodelan Dan Peramalan Penutupan Harga Saham PT. Telkom Dengan Metode ARCH - GARCH*.
- Mudjiyono, M. (2012). Investasi Dalam Saham & Obligasi Dan Meminimalisasi Risiko Sekuritas Pada Pasar Modal Indonesia. *Jurnal STIE Semarang*, 4(2), 1–18.
- Nasution, Y. S. J. (2015). Peranan Pasar Modal Dalam Perekonomian Negara. *HUMAN FALAH: Jurnal Ekonomi Dan Bisnis Islam*, 2(1), 95–112.
- Nunung Ghoniyah, N. (2013). Analisis Risiko Investasi Saham pada Perusahaan yang Go

- Publik di Jakarta Islamic Index (JII). *Media Ekonomi Dan Manajemen*, 28(2), 76–103.
- Pangruruk, F. A., Barus, S. P., & Siregar, B. (2021). Peramalan Harga Saham Tutup Dengan Metode Interpolasi Polinom Lagrange. *Seminar Nasional Variansi ...*, Snso. <https://ojs.unm.ac.id/variansistatistika/article/view/19488>
- Permata, C. P., & Ghoni, M. A. (2019). Peranan Pasar Modal Dalam Perekonomian Negara Indonesia. *Jurnal Akun Stie*, 5(2), 50–61.
- Prasetya, B. D., Pamungkas, F. S., & Kharisudin, I. (2020). Pemodelan dan Peramalan Data Saham dengan Analisis Time Series menggunakan Python. *PRISMA, Prosiding Seminar Nasional Matematika*, 3, 714–718. <https://journal.unnes.ac.id/sju/index.php/prisma/> ISSN
- Purnomo, E., & Suhendra, E. S. (2020). Analisis masa kerja dan promosi terhadap kinerja karyawan BPJS Ketenagakerjaan. *Jurnal Nusantara Aplikasi Manajemen Bisnis*, 5(1), 32–43. <https://doi.org/10.29407/nusamba.v5i1.13801>
- Raneo, A. P., & Muthia, F. (2019). Penerapan Model GARCH Dalam Peramalan Volatilitas di Bursa Efek Indonesia. *Jurnal Manajemen Dan Bisnis Sriwijaya*, 16(3), 194–202. <https://doi.org/10.29259/jmbs.v16i3.7462>
- Robial, S. M. (2018). Perbandingan Model Statistik pada Analisis Metode Peramalan Time Series (Studi Kasus: PT. Telekomunikasi Indonesia, Tbk Kandatel Sukabumi). *Jurnal Ilmiah SANTIKA*, 8(2), 1–17.
- Ruhiat, D., & Suwanda, C. (2019). Peramalan Data Deret Waktu Berpolo Musiman Menggunakan Metode Regresi Spektral (Studi Kasus : Debit Sungai Citarum-Nanjung). *TEOREMA : Teori Dan Riset Matematika*, 4(1), 1. <https://doi.org/10.25157/teorema.v4i1.1887>
- Soeksin, S. D., & Fatanah, C. (2020). Peramalan Harga Saham PT. Bumi Serpong Damai Tbk. Dengan Metode Garch. *JAMAN (Jurnal Aplikasi ...)*, 1(1), 64–71.
- Suseno, S. W. (2017). Penerapan Metode Arima Box-Jenkins Untuk Peramalan Pasien Rawat Jalan Di Rsud Kartini Kabupaten Jepara Berbantuan Eviews. *Skripsi*. <https://lib.unnes.ac.id/32221/>
- Tambunan, D. (2020). Investasi Saham di Masa Pandemi COVID-19. *Widya Cipta: Jurnal Sekretari Dan Manajemen*, 4(2), 117–123. <https://doi.org/10.31294/widyacipta.v4i2.8564>
- Widodo, D. M., Sudarno, S., & Hoyyi, A. (2018). Pemodelan Return Harga Saham Menggunakan Model Intervensi–ARCH/GARCH (Studi Kasus : Return Harga Saham PT Bayan Resources Tbk). *Jurnal Gaussian*, 7(2), 110–118. <https://doi.org/10.14710/j.gauss.v7i2.26642>

LAMPIRAN

Lampiran 1 Data Penutupan Harga Saham PT. Gudang Garam Tbk

	Tanggal	Penutupan		Tanggal	Penutupan
Minggu-1	7/1/2018	83050	Minggu-2	14/10/2018	78475
Minggu-2	14/1/2018	84025	Minggu-3	21/10/2018	74000
Minggu-3	21/1/2018	84250	Minggu-4	28/10/2018	77075
Minggu-4	28/1/2018	81500	Minggu-1	4/11/2018	77500
Minggu-1	4/2/2018	81200	Minggu-2	11/11/2018	78550
Minggu-2	11/2/2018	80625	Minggu-3	18/11/2018	80500
Minggu-3	18/2/2018	81400	Minggu-4	25/11/2018	82000
Minggu-4	25/2/2018	80000	Minggu-1	2/12/2018	83825
Minggu-1	4/3/2018	78300	Minggu-2	9/12/2018	82800
Minggu-2	11/3/2018	75200	Minggu-3	16/12/2018	82825
Minggu-3	18/3/2018	71000	Minggu-4	23/12/2018	83625
Minggu-4	25/3/2018	72475	Minggu-5	30/12/2018	83500
Minggu-1	1/4/2018	73900	Minggu-1	6/1/2019	83275
Minggu-2	8/4/2018	76000	Minggu-2	13/1/2019	83900
Minggu-3	15/4/2018	76875	Minggu-3	20/1/2019	84650
Minggu-4	22/4/2018	72500	Minggu-4	27/1/2019	83000
Minggu-5	29/4/2018	67200	Minggu-1	3/2/2019	80900
Minggu-1	6/5/2018	70200	Minggu-2	10/2/2019	83875
Minggu-2	13/5/2018	67225	Minggu-3	17/2/2019	81775
Minggu-3	20/5/2018	68900	Minggu-4	24/2/2019	91725
Minggu-4	27/5/2018	68500	Minggu-1	3/3/2019	90000
Minggu-1	3/6/2018	70250	Minggu-2	10/3/2019	92800
Minggu-2	10/6/2018	70250	Minggu-3	17/3/2019	84500
Minggu-3	17/6/2018	66525	Minggu-4	24/3/2019	83200
Minggu-4	24/6/2018	67250	Minggu-5	31/3/2019	79150
Minggu-1	1/7/2018	68450	Minggu-1	7/4/2019	77375
Minggu-2	8/7/2018	70475	Minggu-2	14/4/2019	79100
Minggu-3	15/7/2018	71000	Minggu-3	21/4/2019	82950
Minggu-4	22/7/2018	72550	Minggu-4	28/4/2019	80800
Minggu-5	29/7/2018	75000	Minggu-1	5/5/2019	83325
Minggu-1	5/8/2018	77000	Minggu-2	12/5/2019	79725
Minggu-2	12/8/2018	71600	Minggu-3	19/5/2019	79075
Minggu-3	19/8/2018	74000	Minggu-4	26/5/2019	80475
Minggu-4	26/8/2018	73000	Minggu-1	2/6/2019	80475
Minggu-1	2/9/2018	73375	Minggu-2	9/6/2019	77500
Minggu-2	9/9/2018	75725	Minggu-3	16/6/2019	76000
Minggu-3	16/9/2018	75025	Minggu-4	23/6/2019	76875
Minggu-4	23/9/2018	74050	Minggu-5	30/6/2019	77200
Minggu-5	30/9/2018	71775	Minggu-1	7/7/2019	74000
Minggu-1	7/10/2018	74275	Minggu-2	14/7/2019	79300

	Tanggal	Penutupan		Tanggal	Penutupan
Minggu-3	21/7/2019	74950	Minggu-4	26/4/2020	45300
Minggu-4	28/7/2019	74800	Minggu-1	3/5/2020	44050
Minggu-1	4/8/2019	73625	Minggu-2	10/5/2020	49275
Minggu-2	11/8/2019	76500	Minggu-3	17/5/2020	47525
Minggu-3	18/8/2019	76475	Minggu-4	24/5/2020	48750
Minggu-4	25/8/2019	69475	Minggu-5	31/5/2020	48400
Minggu-1	1/9/2019	67700	Minggu-1	7/6/2020	47200
Minggu-2	8/9/2019	68800	Minggu-2	14/6/2020	49000
Minggu-3	15/9/2019	54600	Minggu-3	21/6/2020	46875
Minggu-4	22/9/2019	52500	Minggu-4	28/6/2020	47125
Minggu-5	29/9/2019	49500	Minggu-1	5/7/2020	46875
Minggu-1	6/10/2019	52950	Minggu-2	12/7/2020	49600
Minggu-2	13/10/2019	52050	Minggu-3	19/7/2020	47700
Minggu-3	20/10/2019	54650	Minggu-4	26/7/2020	49975
Minggu-4	27/10/2019	53650	Minggu-1	2/8/2020	50475
Minggu-1	3/11/2019	53500	Minggu-2	9/8/2020	52500
Minggu-2	10/11/2019	53500	Minggu-3	16/8/2020	54175
Minggu-3	17/11/2019	53250	Minggu-4	23/8/2020	49250
Minggu-4	24/11/2019	50375	Minggu-5	30/8/2020	47475
Minggu-1	1/12/2019	52800	Minggu-1	6/9/2020	44175
Minggu-2	8/12/2019	52025	Minggu-2	13/9/2020	43400
Minggu-3	15/12/2019	53100	Minggu-3	20/9/2020	40700
Minggu-4	22/12/2019	53250	Minggu-4	27/9/2020	40000
Minggu-5	29/12/2019	54100	Minggu-1	4/10/2020	44250
Minggu-1	5/1/2020	58100	Minggu-2	11/10/2020	43900
Minggu-2	12/1/2020	58300	Minggu-3	18/10/2020	40925
Minggu-3	19/1/2020	58300	Minggu-4	25/10/2020	40975
Minggu-4	26/1/2020	55775	Minggu-1	1/11/2020	41800
Minggu-1	2/2/2020	56375	Minggu-2	8/11/2020	41650
Minggu-2	9/2/2020	54575	Minggu-3	15/11/2020	44125
Minggu-3	16/2/2020	55975	Minggu-4	22/11/2020	44325
Minggu-4	23/2/2020	51000	Minggu-5	29/11/2020	44000
Minggu-1	1/3/2020	50400	Minggu-1	6/12/2020	41350
Minggu-2	8/3/2020	44000	Minggu-2	13/12/2020	42025
Minggu-3	15/3/2020	39475	Minggu-3	20/12/2020	41075
Minggu-4	22/3/2020	44000	Minggu-4	27/12/2020	41000
Minggu-5	29/3/2020	46650	Minggu-1	3/1/2021	41250
Minggu-1	5/4/2020	47825	Minggu-2	10/1/2021	40800
Minggu-2	12/4/2020	46000	Minggu-3	17/1/2021	40850
Minggu-3	19/4/2020	42800	Minggu-4	24/1/2021	37725
	Tanggal	Penutupan		Tanggal	Penutupan
Minggu-5	31/1/2021	38875	Minggu-1	7/11/2021	33650
Minggu-1	7/2/2021	38725	Minggu-2	14/11/2021	33275

Minggu-2	14/2/2021	37750	Minggu-3	21/11/2021	33175
Minggu-3	21/2/2021	36500	Minggu-4	28/11/2021	31950
Minggu-4	28/2/2021	36600	Minggu-1	5/12/2021	32050
Minggu-1	7/3/2021	36225	Minggu-2	12/12/2021	31000
Minggu-2	14/3/2021	37775	Minggu-3	19/12/2021	30525
Minggu-3	21/3/2021	36100	Minggu-4	26/12/2021	30600
Minggu-4	28/3/2021	36325	Minggu-1	2/1/2022	31125
Minggu-1	4/4/2021	38050	Minggu-2	9/1/2022	31975
Minggu-2	11/4/2021	36400	Minggu-3	16/1/2022	31750
Minggu-3	18/4/2021	36050	Minggu-4	23/1/2022	30500
Minggu-4	25/4/2021	36100	Minggu-5	30/1/2022	30650
Minggu-1	2/5/2021	35075	Minggu-1	6/2/2022	30500
Minggu-2	9/5/2021	35050	Minggu-2	13/2/2022	31800
Minggu-3	16/5/2021	32925	Minggu-3	20/2/2022	31400
Minggu-4	23/5/2021	32900	Minggu-4	27/2/2022	31350
Minggu-5	30/5/2021	33350	Minggu-1	6/3/2022	30850
Minggu-1	6/6/2021	33600	Minggu-2	13/3/2022	33575
Minggu-2	13/6/2021	35750	Minggu-3	20/3/2022	30850
Minggu-3	20/6/2021	38750	Minggu-4	27/3/2022	31900
Minggu-4	27/6/2021	47250	Minggu-1	3/4/2022	30800
Minggu-1	4/7/2021	41150	Minggu-2	10/4/2022	30600
Minggu-2	11/7/2021	40200	Minggu-3	17/4/2022	30600
Minggu-3	18/7/2021	36050	Minggu-4	24/4/2022	30700
Minggu-4	25/7/2021	32800	Minggu-1	1/5/2022	30700
Minggu-1	1/8/2021	32800	Minggu-2	8/5/2022	30525
Minggu-2	8/8/2021	32600	Minggu-3	15/5/2022	30775
Minggu-3	15/8/2021	30300	Minggu-4	22/5/2022	30925
Minggu-4	22/8/2021	31975	Minggu-5	29/5/2022	31350
Minggu-5	29/8/2021	33100	Minggu-1	5/6/2022	30850
Minggu-1	5/9/2021	33150	Minggu-2	12/6/2022	30450
Minggu-2	12/9/2021	31850	Minggu-3	19/6/2022	31175
Minggu-3	19/9/2021	31075	Minggu-4	26/6/2022	31525
Minggu-4	26/9/2021	32050	Minggu-1	3/7/2022	31675
Minggu-1	3/10/2021	34650	Minggu-2	10/7/2022	29175
Minggu-2	10/10/2021	34400	Minggu-3	17/7/2022	29700
Minggu-3	17/10/2021	34875			
Minggu-4	24/10/2021	33500			
Minggu-5	31/10/2021	33025			

Lampiran 2 Data Hasil Transformasi Closing Price Saham

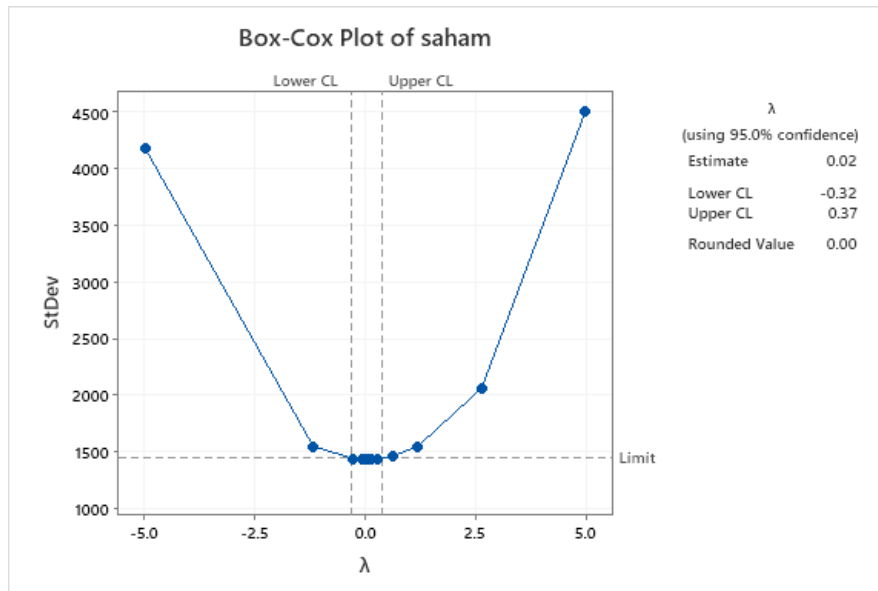
	Tanggal	tf		Tanggal	tf
Minggu-1	7/1/2018	11.3271981	Minggu-2	14/10/2018	11.27053538
Minggu-2	14/1/2018	11.3388697	Minggu-3	21/10/2018	11.21182037
Minggu-3	21/1/2018	11.3415439	Minggu-4	28/10/2018	11.25253425
Minggu-4	28/1/2018	11.3083583	Minggu-1	4/11/2018	11.25803322
Minggu-1	4/2/2018	11.3046705	Minggu-2	11/11/2018	11.27149064
Minggu-2	11/2/2018	11.2975641	Minggu-3	18/11/2018	11.29601246
Minggu-3	18/2/2018	11.3071306	Minggu-4	25/11/2018	11.31447453
Minggu-4	25/2/2018	11.2897819	Minggu-1	2/12/2018	11.33648657
Minggu-1	4/3/2018	11.2683029	Minggu-2	9/12/2018	11.32418334
Minggu-2	11/3/2018	11.2279065	Minggu-3	16/12/2018	11.32448523
Minggu-3	18/3/2018	11.1704352	Minggu-4	23/12/2018	11.3340978
Minggu-4	25/3/2018	11.190997	Minggu-5	30/12/2018	11.33260191
Minggu-1	1/4/2018	11.2104681	Minggu-1	6/1/2019	11.32990366
Minggu-2	8/4/2018	11.2384886	Minggu-2	13/1/2019	11.33738089
Minggu-3	15/4/2018	11.249936	Minggu-3	20/1/2019	11.34628039
Minggu-4	22/4/2018	11.1913418	Minggu-4	27/1/2019	11.32659589
Minggu-5	29/4/2018	11.1154285	Minggu-1	3/2/2019	11.3009691
Minggu-1	6/5/2018	11.1591036	Minggu-2	10/2/2019	11.33708287
Minggu-2	13/5/2018	11.1158005	Minggu-3	17/2/2019	11.31172685
Minggu-3	20/5/2018	11.1404115	Minggu-4	24/2/2019	11.42655025
Minggu-4	27/5/2018	11.134589	Minggu-1	3/3/2019	11.40756495
Minggu-1	3/6/2018	11.1598156	Minggu-2	10/3/2019	11.43820192
Minggu-2	10/6/2018	11.1598156	Minggu-3	17/3/2019	11.34450681
Minggu-3	17/6/2018	11.1053331	Minggu-4	24/3/2019	11.32900263
Minggu-4	24/6/2018	11.1161723	Minggu-5	31/3/2019	11.27910007
Minggu-1	1/7/2018	11.1338588	Minggu-1	7/4/2019	11.25641901
Minggu-2	8/7/2018	11.1630133	Minggu-2	14/4/2019	11.27846815
Minggu-3	15/7/2018	11.1704352	Minggu-3	21/4/2019	11.3259933
Minggu-4	22/7/2018	11.1920313	Minggu-4	28/4/2019	11.29973224
Minggu-5	29/7/2018	11.2252434	Minggu-1	5/5/2019	11.3305039
Minggu-1	5/8/2018	11.2515607	Minggu-2	12/5/2019	11.28633849
Minggu-2	12/8/2018	11.1788504	Minggu-3	19/5/2019	11.27815205
Minggu-3	19/8/2018	11.2118204	Minggu-4	26/5/2019	11.29570186
Minggu-4	26/8/2018	11.1982147	Minggu-1	2/6/2019	11.29570186
Minggu-1	2/9/2018	11.2033386	Minggu-2	9/6/2019	11.25803322
Minggu-2	9/9/2018	11.2348636	Minggu-3	16/6/2019	11.23848862
Minggu-3	16/9/2018	11.2255767	Minggu-4	23/6/2019	11.24993601
Minggu-4	23/9/2018	11.2124958	Minggu-5	30/6/2019	11.25415474
Minggu-5	30/9/2018	11.1812915	Minggu-1	7/7/2019	11.21182037
Minggu-1	7/10/2018	11.2155297	Minggu-2	14/7/2019	11.28099341

	Tanggal	tf		Tanggal	tf
Minggu-3	21/7/2019	11.2245765	Minggu-4	26/4/2020	10.72106231
Minggu-4	28/7/2019	11.2225732	Minggu-1	3/5/2020	10.69308063
Minggu-1	4/8/2019	11.2067399	Minggu-2	10/5/2020	10.80517213
Minggu-2	11/8/2019	11.245046	Minggu-3	17/5/2020	10.76901117
Minggu-3	18/8/2019	11.2447192	Minggu-4	24/5/2020	10.79446048
Minggu-4	25/8/2019	11.1487223	Minggu-5	31/5/2020	10.78725509
Minggu-1	1/9/2019	11.1228415	Minggu-1	7/6/2020	10.76214917
Minggu-2	8/9/2019	11.138959	Minggu-2	14/6/2020	10.79957558
Minggu-3	15/9/2019	10.9077892	Minggu-3	21/6/2020	10.75523976
Minggu-4	22/9/2019	10.8685685	Minggu-4	28/6/2020	10.76055892
Minggu-5	29/9/2019	10.809728	Minggu-1	5/7/2020	10.75523976
Minggu-1	6/10/2019	10.8771034	Minggu-2	12/7/2020	10.81174611
Minggu-2	13/10/2019	10.8599601	Minggu-3	19/7/2020	10.77268668
Minggu-3	20/10/2019	10.9087045	Minggu-4	26/7/2020	10.81927816
Minggu-4	27/10/2019	10.8902368	Minggu-1	2/8/2020	10.82923344
Minggu-1	3/11/2019	10.8874369	Minggu-2	9/8/2020	10.86856845
Minggu-2	10/11/2019	10.8874369	Minggu-3	16/8/2020	10.89997483
Minggu-3	17/11/2019	10.8827531	Minggu-4	23/8/2020	10.80466465
Minggu-4	24/11/2019	10.8272503	Minggu-5	30/8/2020	10.76795854
Minggu-1	1/12/2019	10.8742665	Minggu-1	6/9/2020	10.6959143
Minggu-2	8/12/2019	10.8594797	Minggu-2	13/9/2020	10.67821472
Minggu-3	15/12/2019	10.8799322	Minggu-3	20/9/2020	10.61398337
Minggu-4	22/12/2019	10.8827531	Minggu-4	27/9/2020	10.59663473
Minggu-5	29/12/2019	10.8985895	Minggu-1	4/10/2020	10.69761065
Minggu-1	5/1/2020	10.9699209	Minggu-2	11/10/2020	10.6896696
Minggu-2	12/1/2020	10.9733574	Minggu-3	18/10/2020	10.6194964
Minggu-3	19/1/2020	10.9733574	Minggu-4	25/10/2020	10.6207174
Minggu-4	26/1/2020	10.929081	Minggu-1	1/11/2020	10.64065162
Minggu-1	2/2/2020	10.9397811	Minggu-2	8/11/2020	10.63705665
Minggu-2	9/2/2020	10.9073312	Minggu-3	15/11/2020	10.69478179
Minggu-3	16/2/2020	10.9326604	Minggu-4	22/11/2020	10.69930413
Minggu-4	23/2/2020	10.8395809	Minggu-5	29/11/2020	10.69194491
Minggu-1	1/3/2020	10.8277465	Minggu-1	6/12/2020	10.6298277
Minggu-2	8/3/2020	10.6919449	Minggu-2	13/12/2020	10.64601996
Minggu-3	15/3/2020	10.5834228	Minggu-3	20/12/2020	10.62315494
Minggu-4	22/3/2020	10.6919449	Minggu-4	27/12/2020	10.62132735
Minggu-5	29/3/2020	10.7504282	Minggu-1	3/1/2021	10.62740639
Minggu-1	5/4/2020	10.7753038	Minggu-2	10/1/2021	10.61643736
Minggu-2	12/4/2020	10.7363967	Minggu-3	17/1/2021	10.6176621
Minggu-3	19/4/2020	10.6642934	Minggu-4	24/1/2021	10.53807828

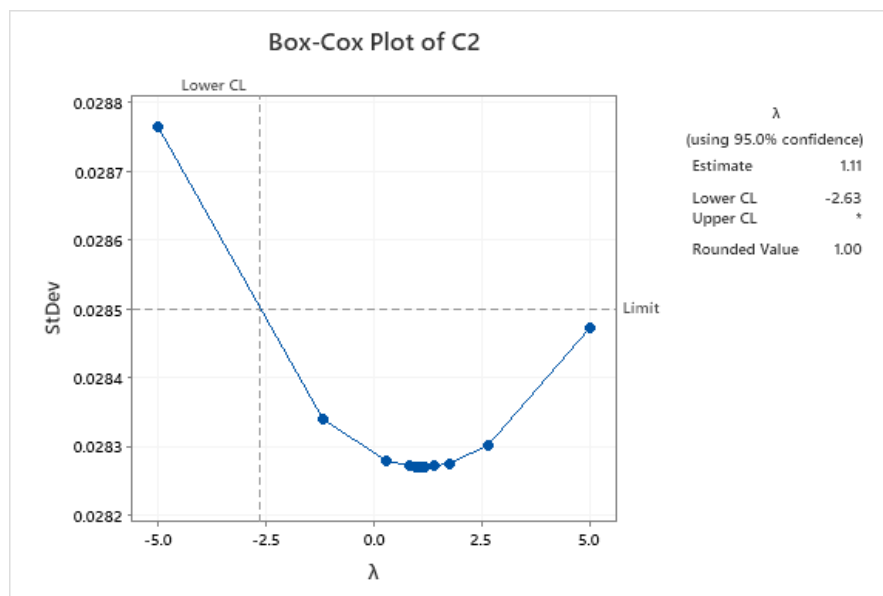
	Tanggal	tf		Tanggal	tf
Minggu-5	31/1/2021	10.5681067	Minggu-1	7/11/2021	10.42376834
Minggu-1	7/2/2021	10.5642407	Minggu-2	14/11/2021	10.41256164
Minggu-2	14/2/2021	10.5387408	Minggu-3	21/11/2021	10.40955186
Minggu-3	21/2/2021	10.5050675	Minggu-4	28/11/2021	10.37192746
Minggu-4	28/2/2021	10.5078035	Minggu-1	5/12/2021	10.37505246
Minggu-1	7/3/2021	10.4975048	Minggu-2	12/12/2021	10.34174248
Minggu-2	14/3/2021	10.5394028	Minggu-3	19/12/2021	10.3263013
Minggu-3	21/3/2021	10.4940481	Minggu-4	26/12/2021	10.32875529
Minggu-4	28/3/2021	10.5002615	Minggu-1	2/1/2022	10.34576663
Minggu-1	4/4/2021	10.5466564	Minggu-2	9/1/2022	10.37270963
Minggu-2	11/4/2021	10.5023241	Minggu-3	16/1/2022	10.365648
Minggu-3	18/4/2021	10.4926621	Minggu-4	23/1/2022	10.32548196
Minggu-4	25/4/2021	10.4940481	Minggu-5	30/1/2022	10.33038794
Minggu-1	2/5/2021	10.4652439	Minggu-1	6/2/2022	10.32548196
Minggu-2	9/5/2021	10.4645309	Minggu-2	13/2/2022	10.36722157
Minggu-3	16/5/2021	10.4019875	Minggu-3	20/2/2022	10.35456317
Minggu-4	23/5/2021	10.4012279	Minggu-4	27/2/2022	10.35296955
Minggu-5	30/5/2021	10.4148131	Minggu-1	6/3/2022	10.33689203
Minggu-1	6/6/2021	10.4222814	Minggu-2	13/3/2022	10.42153702
Minggu-2	13/6/2021	10.4843056	Minggu-3	20/3/2022	10.33689203
Minggu-3	20/6/2021	10.564886	Minggu-4	27/3/2022	10.37036129
Minggu-4	27/6/2021	10.7632079	Minggu-1	3/4/2022	10.33526997
Minggu-1	4/7/2021	10.6249792	Minggu-2	10/4/2022	10.32875529
Minggu-2	11/7/2021	10.6016223	Minggu-3	17/4/2022	10.32875529
Minggu-3	18/7/2021	10.4926621	Minggu-4	24/4/2022	10.33201793
Minggu-4	25/7/2021	10.3981838	Minggu-1	1/5/2022	10.33201793
Minggu-1	1/8/2021	10.3981838	Minggu-2	8/5/2022	10.3263013
Minggu-2	8/8/2021	10.3920676	Minggu-3	15/5/2022	10.33445795
Minggu-3	15/8/2021	10.318903	Minggu-4	22/5/2022	10.3393202
Minggu-4	22/8/2021	10.3727096	Minggu-5	29/5/2022	10.35296955
Minggu-5	29/8/2021	10.4072886	Minggu-1	5/6/2022	10.33689203
Minggu-1	5/9/2021	10.408798	Minggu-2	12/6/2022	10.32384127
Minggu-2	12/9/2021	10.3687927	Minggu-3	19/6/2022	10.34737177
Minggu-3	19/9/2021	10.3441589	Minggu-4	26/6/2022	10.35853616
Minggu-4	26/9/2021	10.3750525	Minggu-1	3/7/2022	10.36328301
Minggu-1	3/10/2021	10.453053	Minggu-2	10/7/2022	10.28106746
Minggu-2	10/10/2021	10.4458118	Minggu-3	17/7/2022	10.29890232
Minggu-3	17/10/2021	10.4595255			
Minggu-4	24/10/2021	10.4193007			
Minggu-5	31/10/2021	10.4050201			

Lampiran 3 Uji Stasioner *Box-Cox Transformation*

➤ Sebelum Transformasi Data



➤ Setelah Transformasi Data



Lampiran 4 Uji *Augmented Dickey Fuller* Saham

➤ Sebelum differencing

Null Hypothesis: TF has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=14)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-0.878617	0.7938
Test critical values:		
1% level	-3.457984	
5% level	-2.873596	
10% level	-2.573270	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(TF)

Method: Least Squares

Date: 08/17/22 Time: 22:57

Sample (adjusted): 1/14/2018 7/17/2022

Included observations: 236 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TF(-1)	-0.007204	0.008200	-0.878617	0.3805
C	0.073709	0.088901	0.829113	0.4079
R-squared	0.003288	Mean dependent var		-0.004357
Adjusted R-squared	-0.000971	S.D. dependent var		0.045688
S.E. of regression	0.045710	Akaike info criterion		-3.324540
Sum squared resid	0.488931	Schwarz criterion		-3.295186
Log likelihood	394.2957	Hannan-Quinn criter.		-3.312707
F-statistic	0.771968	Durbin-Watson stat		2.147453
Prob(F-statistic)	0.380510			

➤ Setelah di differencing

Null Hypothesis: D(TF) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=14)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-16.51420	0.0000
Test critical values:		
1% level	-3.458104	
5% level	-2.873648	
10% level	-2.573298	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(TF,2)

Method: Least Squares

Date: 08/17/22 Time: 22:58

Sample (adjusted): 1/21/2018 7/17/2022

Included observations: 235 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TF(-1))	-1.078780	0.065324	-16.51420	0.0000
C	-0.004776	0.002997	-1.593520	0.1124
R-squared	0.539270	Mean dependent var		2.62E-05
Adjusted R-squared	0.537292	S.D. dependent var		0.067227
S.E. of regression	0.045729	Akaike info criterion		-3.323677
Sum squared resid	0.487244	Schwarz criterion		-3.294234
Log likelihood	392.5320	Hannan-Quinn criter.		-3.311807
F-statistic	272.7187	Durbin-Watson stat		1.985702
Prob(F-statistic)	0.000000			

Lampiran 5 Estimasi Parameter Model ARIMA

➤ ARIMA (0,1,1)

Dependent Variable: D(TF)

Method: ARMA Maximum Likelihood (OPG - BHHH)

Date: 08/17/22 Time: 23:31

Sample: 1/14/2018 7/17/2022

Included observations: 236

Convergence achieved after 18 iterations

Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MA(1)	-0.058157	0.044721	-1.300425	0.1947
SIGMASQ	0.002089	0.000111	18.74438	0.0000
R-squared	-0.005121	Mean dependent var		-0.004357
Adjusted R-squared	-0.009416	S.D. dependent var		0.045688
S.E. of regression	0.045903	Akaike info criterion		-3.316125
Sum squared resid	0.493056	Schwarz criterion		-3.286770
Log likelihood	393.3027	Hannan-Quinn criter.		-3.304292
Durbin-Watson stat	2.009880			
Inverted MA Roots	.06			

➤ ARIMA (0,1,2)

Dependent Variable: D(TF)

Method: ARMA Maximum Likelihood (OPG - BHHH)

Date: 08/17/22 Time: 23:33

Sample: 1/14/2018 7/17/2022

Included observations: 236

Convergence achieved after 15 iterations

Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MA(2)	0.117902	0.053337	2.210506	0.0280
SIGMASQ	0.002072	0.000113	18.25976	0.0000
R-squared	0.003322	Mean dependent var		-0.004357
Adjusted R-squared	-0.000937	S.D. dependent var		0.045688
S.E. of regression	0.045710	Akaike info criterion		-3.324455
Sum squared resid	0.488914	Schwarz criterion		-3.295101
Log likelihood	394.2857	Hannan-Quinn criter.		-3.312622
Durbin-Watson stat	2.094767			
Inverted MA Roots	-.00+.34i	-.00-.34i		

➤ ARIMA (0,1,3)

Dependent Variable: D(TF)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 08/17/22 Time: 23:36
Sample: 1/14/2018 7/17/2022
Included observations: 236
Convergence achieved after 17 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MA(3)	-0.166545	0.053098	-3.136542	0.0019
SIGMASQ	0.002048	0.000109	18.71836	0.0000
R-squared	0.014867	Mean dependent var		-0.004357
Adjusted R-squared	0.010657	S.D. dependent var		0.045688
S.E. of regression	0.045444	Akaike info criterion		-3.335868
Sum squared resid	0.483251	Schwarz criterion		-3.306513
Log likelihood	395.6324	Hannan-Quinn criter.		-3.324035
Durbin-Watson stat	2.129897			
Inverted MA Roots	.55	-.28+.48i	-.28-.48i	

➤ ARIMA (1,1,0)

Dependent Variable: D(TF)
Method: ARMA Maximum Likelihood (OPG - BHHH)
Date: 08/17/22 Time: 23:45
Sample: 1/14/2018 7/17/2022
Included observations: 236
Convergence achieved after 15 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	-0.068410	0.046420	-1.473718	0.1419
SIGMASQ	0.002088	0.000111	18.78636	0.0000
R-squared	-0.004375	Mean dependent var		-0.004357
Adjusted R-squared	-0.008668	S.D. dependent var		0.045688
S.E. of regression	0.045886	Akaike info criterion		-3.316861
Sum squared resid	0.492690	Schwarz criterion		-3.287506
Log likelihood	393.3896	Hannan-Quinn criter.		-3.305028
Durbin-Watson stat	1.986413			
Inverted AR Roots	-.07			

➤ ARIMA (1,1,1)

Dependent Variable: D(TF)

Method: ARMA Maximum Likelihood (OPG - BHHH)

Date: 08/17/22 Time: 23:47

Sample: 1/14/2018 7/17/2022

Included observations: 236

Convergence achieved after 23 iterations

Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	-0.790653	0.228973	-3.453049	0.0007
MA(1)	0.711442	0.255727	2.782032	0.0058
SIGMASQ	0.002063	0.000109	18.92384	0.0000
R-squared	0.007629	Mean dependent var		-0.004357
Adjusted R-squared	-0.000889	S.D. dependent var		0.045688
S.E. of regression	0.045709	Akaike info criterion		-3.320289
Sum squared resid	0.486801	Schwarz criterion		-3.276257
Log likelihood	394.7941	Hannan-Quinn criter.		-3.302539
Durbin-Watson stat	1.949201			
Inverted AR Roots	-.79			
Inverted MA Roots	-.71			

➤ ARIMA (1,1,2)

Dependent Variable: D(TF)

Method: ARMA Maximum Likelihood (OPG - BHHH)

Date: 08/17/22 Time: 23:49

Sample: 1/14/2018 7/17/2022

Included observations: 236

Convergence achieved after 35 iterations

Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	-0.049031	0.047899	-1.023631	0.3071
MA(2)	0.109161	0.056408	1.935226	0.0542
SIGMASQ	0.002067	0.000115	18.00071	0.0000
R-squared	0.005654	Mean dependent var		-0.004357
Adjusted R-squared	-0.002881	S.D. dependent var		0.045688
S.E. of regression	0.045754	Akaike info criterion		-3.318328
Sum squared resid	0.487770	Schwarz criterion		-3.274296
Log likelihood	394.5627	Hannan-Quinn criter.		-3.300578
Durbin-Watson stat	1.999758			
Inverted AR Roots	-.05			
Inverted MA Roots	-.00+.33i	-.00-.33i		

➤ ARIMA (1,1,3)

Dependent Variable: D(TF)

Method: ARMA Maximum Likelihood (OPG - BHHH)

Date: 08/17/22 Time: 23:50

Sample: 1/14/2018 7/17/2022

Included observations: 236

Convergence achieved after 24 iterations

Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	-0.065148	0.047022	-1.385469	0.1672
MA(3)	-0.165212	0.054368	-3.038747	0.0026
SIGMASQ	0.002039	0.000109	18.74605	0.0000
R-squared	0.019074	Mean dependent var		-0.004357
Adjusted R-squared	0.010654	S.D. dependent var		0.045688
S.E. of regression	0.045444	Akaike info criterion		-3.331660
Sum squared resid	0.481187	Schwarz criterion		-3.287628
Log likelihood	396.1358	Hannan-Quinn criter.		-3.313910
Durbin-Watson stat	1.989014			
Inverted AR Roots	-.07			
Inverted MA Roots	.55	-.27+.48i	-.27-.48i	

➤ ARIMA (2,1,0)

Dependent Variable: D(TF)

Method: ARMA Maximum Likelihood (OPG - BHHH)

Date: 08/17/22 Time: 23:51

Sample: 1/14/2018 7/17/2022

Included observations: 236

Convergence achieved after 11 iterations

Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(2)	0.103724	0.052943	1.959166	0.0513
SIGMASQ	0.002075	0.000113	18.30115	0.0000
R-squared	0.001749	Mean dependent var		-0.004357
Adjusted R-squared	-0.002517	S.D. dependent var		0.045688
S.E. of regression	0.045746	Akaike info criterion		-3.322905
Sum squared resid	0.489686	Schwarz criterion		-3.293551
Log likelihood	394.1028	Hannan-Quinn criter.		-3.311072
Durbin-Watson stat	2.095646			
Inverted AR Roots	.32	-.32		

➤ ARIMA (2,1,1)

Dependent Variable: D(TF)

Method: ARMA Maximum Likelihood (OPG - BHHH)

Date: 08/17/22 Time: 23:52

Sample: 1/14/2018 7/17/2022

Included observations: 236

Convergence achieved after 35 iterations

Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(2)	0.096242	0.058080	1.657058	0.0989
MA(1)	-0.049231	0.048110	-1.023302	0.3072
SIGMASQ	0.002070	0.000114	18.08223	0.0000
R-squared	0.004116	Mean dependent var		-0.004357
Adjusted R-squared	-0.004433	S.D. dependent var		0.045688
S.E. of regression	0.045789	Akaike info criterion		-3.316809
Sum squared resid	0.488525	Schwarz criterion		-3.272777
Log likelihood	394.3835	Hannan-Quinn criter.		-3.299059
Durbin-Watson stat	1.999834			
Inverted AR Roots	.31	-.31		
Inverted MA Roots	.05			

➤ ARIMA (2,1,2)

Dependent Variable: D(TF)

Method: ARMA Maximum Likelihood (OPG - BHHH)

Date: 08/17/22 Time: 23:55

Sample: 1/14/2018 7/17/2022

Included observations: 236

Convergence achieved after 33 iterations

Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(2)	-0.219822	0.510716	-0.430418	0.6673
MA(2)	0.334796	0.495597	0.675540	0.5000
SIGMASQ	0.002069	0.000113	18.25673	0.0000
R-squared	0.004694	Mean dependent var		-0.004357
Adjusted R-squared	-0.003850	S.D. dependent var		0.045688
S.E. of regression	0.045776	Akaike info criterion		-3.317345
Sum squared resid	0.488241	Schwarz criterion		-3.273313
Log likelihood	394.4467	Hannan-Quinn criter.		-3.299596
Durbin-Watson stat	2.104107			
Inverted AR Roots	-.00+.47i	-.00-.47i		
Inverted MA Roots	-.00+.58i	-.00-.58i		

➤ ARIMA (2,1,3)

Dependent Variable: D(TF)

Method: ARMA Maximum Likelihood (OPG - BHHH)

Date: 08/17/22 Time: 23:56

Sample: 1/14/2018 7/17/2022

Included observations: 236

Convergence achieved after 18 iterations

Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(2)	0.090109	0.057580	1.564916	0.1190
MA(3)	-0.156603	0.052940	-2.958102	0.0034
SIGMASQ	0.002031	0.000111	18.27482	0.0000
R-squared	0.022767	Mean dependent var		-0.004357
Adjusted R-squared	0.014379	S.D. dependent var		0.045688
S.E. of regression	0.045359	Akaike info criterion		-3.335418
Sum squared resid	0.479375	Schwarz criterion		-3.291386
Log likelihood	396.5793	Hannan-Quinn criter.		-3.317668
Durbin-Watson stat	2.121015			
Inverted AR Roots	.30	-.30		
Inverted MA Roots	.54	-.27+.47i	-.27-.47i	

➤ ARIMA (3,1,0)

Dependent Variable: D(TF)

Method: ARMA Maximum Likelihood (OPG - BHHH)

Date: 08/17/22 Time: 23:57

Sample: 1/14/2018 7/17/2022

Included observations: 236

Convergence achieved after 13 iterations

Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(3)	-0.143043	0.052543	-2.722372	0.0070
SIGMASQ	0.002054	0.000112	18.39823	0.0000
R-squared	0.011691	Mean dependent var		-0.004357
Adjusted R-squared	0.007468	S.D. dependent var		0.045688
S.E. of regression	0.045517	Akaike info criterion		-3.332744
Sum squared resid	0.484809	Schwarz criterion		-3.303389
Log likelihood	395.2638	Hannan-Quinn criter.		-3.320911
Durbin-Watson stat	2.129594			
Inverted AR Roots	.26-.45i	.26+.45i	-.52	

➤ ARIMA (3,1,1)

Dependent Variable: D(TF)

Method: ARMA Maximum Likelihood (OPG - BHHH)

Date: 08/17/22 Time: 23:58

Sample: 1/14/2018 7/17/2022

Included observations: 236

Convergence achieved after 23 iterations

Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(3)	-0.141800	0.054069	-2.622571	0.0093
MA(1)	-0.055247	0.045640	-1.210496	0.2273
SIGMASQ	0.002047	0.000111	18.42610	0.0000
R-squared	0.015258	Mean dependent var		-0.004357
Adjusted R-squared	0.006805	S.D. dependent var		0.045688
S.E. of regression	0.045533	Akaike info criterion		-3.327876
Sum squared resid	0.483059	Schwarz criterion		-3.283844
Log likelihood	395.6893	Hannan-Quinn criter.		-3.310126
Durbin-Watson stat	2.009908			
Inverted AR Roots	.26+.45i	.26-.45i	-.52	
Inverted MA Roots	.06			

ARIMA (3,1,2)

Dependent Variable: D(TF)

Method: ARMA Maximum Likelihood (OPG - BHHH)

Date: 08/17/22 Time: 23:59

Sample: 1/14/2018 7/17/2022

Included observations: 236

Convergence achieved after 22 iterations

Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(3)	-0.135110	0.052882	-2.554936	0.0113
MA(2)	0.106715	0.057568	1.853710	0.0650
SIGMASQ	0.002034	0.000113	17.94590	0.0000
R-squared	0.021526	Mean dependent var		-0.004357
Adjusted R-squared	0.013128	S.D. dependent var		0.045688
S.E. of regression	0.045387	Akaike info criterion		-3.334202
Sum squared resid	0.479984	Schwarz criterion		-3.290170
Log likelihood	396.4358	Hannan-Quinn criter.		-3.316452
Durbin-Watson stat	2.116285			
Inverted AR Roots	.26-.44i	.26+.44i	-.51	
Inverted MA Roots	-.00+.33i	-.00-.33i		

➤ ARIMA (3,1,3)

Dependent Variable: D(TF)

Method: ARMA Maximum Likelihood (OPG - BHHH)

Date: 08/18/22 Time: 00:01

Sample: 1/14/2018 7/17/2022

Included observations: 236

Convergence achieved after 19 iterations

Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(3)	0.335016	0.359935	0.930768	0.3529
MA(3)	-0.495714	0.350174	-1.415623	0.1582
SIGMASQ	0.002037	0.000113	18.10685	0.0000
R-squared	0.019807	Mean dependent var		-0.004357
Adjusted R-squared	0.011393	S.D. dependent var		0.045688
S.E. of regression	0.045427	Akaike info criterion		-3.332296
Sum squared resid	0.480828	Schwarz criterion		-3.288264
Log likelihood	396.2109	Hannan-Quinn criter.		-3.314547
Durbin-Watson stat	2.130186			
Inverted AR Roots	.69	-.35+.60i	-.35-.60i	
Inverted MA Roots	.79	-.40+.69i	-.40-.69i	

Lampiran 6 Uji Independensi Residual

➤ ARIMA (0,1,2)

Date: 08/18/22 Time: 00:12

Sample: 1/07/2018 7/24/2022

Included observations: 236

Q-statistic probabilities adjusted for 1 ARMA term

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
		1 -0.056	-0.056	0.7487	
		2 -0.012	-0.015	0.7849	0.376
		3 -0.142	-0.144	5.6127	0.060
		4 -0.064	-0.082	6.5908	0.086
		5 -0.038	-0.054	6.9375	0.139
		6 -0.046	-0.079	7.4491	0.189
		7 0.017	-0.016	7.5224	0.275
		8 0.026	0.003	7.6855	0.361
		9 -0.085	-0.113	9.4916	0.303
		10 0.023	-0.003	9.6232	0.382
		11 -0.063	-0.074	10.628	0.387
		12 0.024	-0.019	10.775	0.462
		13 0.023	0.008	10.903	0.537
		14 0.065	0.042	11.987	0.529
		15 0.010	-0.002	12.011	0.605
		16 -0.031	-0.026	12.260	0.659
		17 -0.070	-0.065	13.532	0.634
		18 0.041	0.034	13.975	0.669
		19 -0.027	-0.024	14.164	0.718
		20 0.019	-0.012	14.254	0.769
		21 0.004	0.006	14.259	0.817
		22 -0.119	-0.142	18.000	0.649
		23 0.112	0.103	21.337	0.500
		24 -0.015	-0.004	21.398	0.557
		25 0.089	0.060	23.515	0.490
		26 0.092	0.117	25.773	0.420
		27 -0.029	-0.007	26.005	0.463
		28 0.023	0.035	26.148	0.510
		29 -0.047	0.026	26.744	0.532
		30 -0.086	-0.074	28.765	0.477
		31 0.056	0.069	29.631	0.485
		32 -0.010	0.025	29.659	0.535
		33 0.096	0.060	32.234	0.455
		34 0.016	0.079	32.303	0.502
		35 -0.122	-0.111	36.489	0.354
		36 -0.107	-0.095	39.697	0.269

➤ ARIMA (0,1,3)

Date: 08/18/22 Time: 00:18

Sample: 1/07/2018 7/24/2022

Included observations: 236

Q-statistic probabilities adjusted for 1 ARMA term

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
		1 -0.080	-0.080	1.5298	
		2 0.077	0.071	2.9511	0.086
		3 -0.003	0.008	2.9537	0.228
		4 -0.084	-0.090	4.6423	0.200
		5 -0.038	-0.052	4.9966	0.288
		6 -0.067	-0.061	6.0820	0.298
		7 -0.006	-0.010	6.0921	0.413
		8 0.007	0.008	6.1037	0.528
		9 -0.098	-0.106	8.4782	0.388
		10 0.031	0.000	8.7185	0.464
		11 -0.062	-0.054	9.6874	0.468
		12 0.021	0.005	9.7986	0.549
		13 0.017	0.010	9.8726	0.627
		14 0.045	0.039	10.381	0.662
		15 0.015	-0.002	10.436	0.730
		16 -0.026	-0.035	10.609	0.780
		17 -0.061	-0.072	11.573	0.773
		18 0.045	0.041	12.097	0.794
		19 -0.058	-0.032	12.967	0.794
		20 0.026	0.002	13.137	0.831
		21 0.017	0.017	13.215	0.868
		22 -0.114	-0.125	16.653	0.732
		23 0.147	0.131	22.339	0.440
		24 -0.021	0.020	22.459	0.493
		25 0.089	0.072	24.560	0.430
		26 0.112	0.104	27.889	0.313
		27 -0.042	-0.025	28.360	0.341
		28 0.051	0.019	29.056	0.358
		29 -0.032	0.021	29.332	0.396
		30 -0.082	-0.066	31.161	0.358
		31 0.073	0.080	32.628	0.339
		32 -0.043	0.017	33.142	0.363
		33 0.059	0.029	34.110	0.366
		34 0.018	0.061	34.196	0.410
		35 -0.118	-0.119	38.061	0.290
		36 -0.102	-0.127	40.966	0.225

➤ ARIMA (1,1,1)

Date: 08/18/22 Time: 00:19

Sample: 1/07/2018 7/24/2022

Included observations: 236

Q-statistic probabilities adjusted for 2 ARMA terms

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.015	0.015	0.0530	
		2	0.025	0.025	0.2074	
		3	-0.107	-0.108	2.9705	0.085
		4	-0.125	-0.124	6.7540	0.034
		5	-0.023	-0.016	6.8874	0.076
		6	-0.083	-0.090	8.5823	0.072
		7	0.027	0.002	8.7569	0.119
		8	0.002	-0.014	8.7583	0.188
		9	-0.077	-0.106	10.242	0.175
		10	0.009	-0.010	10.263	0.247
		11	-0.058	-0.059	11.089	0.270
		12	0.020	-0.011	11.188	0.343
		13	0.034	0.016	11.485	0.404
		14	0.058	0.040	12.336	0.419
		15	0.017	-0.014	12.406	0.495
		16	-0.032	-0.028	12.666	0.553
		17	-0.071	-0.068	13.954	0.529
		18	0.037	0.048	14.305	0.576
		19	-0.036	-0.035	14.641	0.621
		20	0.015	-0.011	14.702	0.682
		21	0.004	-0.002	14.706	0.741
		22	-0.115	-0.128	18.176	0.576
		23	0.118	0.119	21.874	0.407
		24	-0.003	0.010	21.876	0.467
		25	0.098	0.063	24.426	0.381
		26	0.111	0.109	27.698	0.273
		27	-0.032	-0.016	27.967	0.309
		28	0.031	0.023	28.234	0.347
		29	-0.056	0.025	29.087	0.357
		30	-0.083	-0.070	30.976	0.318
		31	0.056	0.082	31.825	0.328
		32	-0.007	0.031	31.839	0.375
		33	0.087	0.049	33.953	0.327
		34	0.011	0.054	33.985	0.372
		35	-0.126	-0.116	38.418	0.237
		36	-0.107	-0.094	41.619	0.173

➤ ARIMA (3,1,0)

Date: 08/18/22 Time: 00:20

Sample: 1/07/2018 7/24/2022

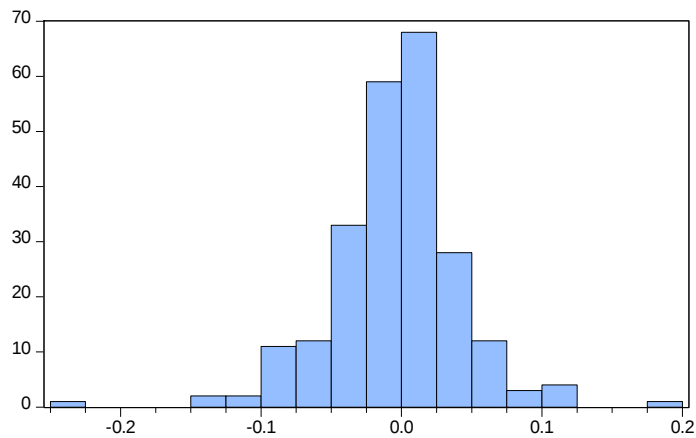
Included observations: 236

Q-statistic probabilities adjusted for 1 ARMA term

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
		1 -0.079	-0.079	1.4736	
		2 0.081	0.075	3.0554	0.080
		3 -0.022	-0.010	3.1719	0.205
		4 -0.084	-0.094	4.8774	0.181
		5 -0.037	-0.048	5.2050	0.267
		6 -0.088	-0.082	7.0984	0.213
		7 -0.004	-0.014	7.1018	0.312
		8 0.006	0.009	7.1113	0.417
		9 -0.097	-0.109	9.4394	0.307
		10 0.033	-0.002	9.7171	0.374
		11 -0.061	-0.054	10.644	0.386
		12 0.023	-0.000	10.781	0.462
		13 0.019	0.011	10.868	0.540
		14 0.047	0.039	11.420	0.576
		15 0.015	-0.006	11.478	0.648
		16 -0.023	-0.031	11.613	0.708
		17 -0.065	-0.076	12.686	0.696
		18 0.044	0.039	13.186	0.724
		19 -0.057	-0.031	14.022	0.728
		20 0.020	-0.005	14.122	0.777
		21 0.017	0.017	14.200	0.820
		22 -0.115	-0.128	17.673	0.670
		23 0.145	0.126	23.214	0.390
		24 -0.020	0.023	23.319	0.442
		25 0.090	0.067	25.459	0.381
		26 0.109	0.106	28.633	0.280
		27 -0.041	-0.024	29.092	0.307
		28 0.049	0.014	29.746	0.326
		29 -0.034	0.028	30.063	0.360
		30 -0.079	-0.063	31.763	0.330
		31 0.069	0.079	33.056	0.320
		32 -0.042	0.023	33.541	0.345
		33 0.065	0.032	34.728	0.339
		34 0.014	0.062	34.784	0.383
		35 -0.113	-0.113	38.358	0.278
		36 -0.096	-0.122	40.969	0.225

Lampiran 7 Uji Normalitas Residual

➤ ARIMA (0,1,2)

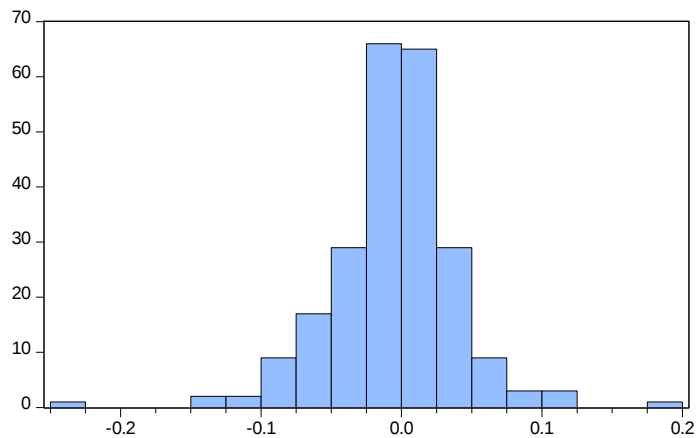


Series: Residuals
Sample 1/14/2018 7/17/2022
Observations 236

Mean	-0.003928
Median	-0.000523
Maximum	0.191295
Minimum	-0.228107
Std. Dev.	0.045442
Skewness	-0.308040
Kurtosis	6.733709

Jarque-Bera	140.8147
Probability	0.000000

➤ ARIMA (0,1,3)

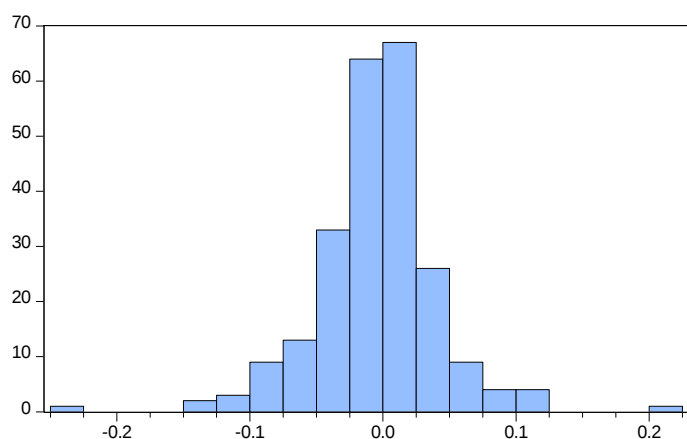


Series: Residuals
Sample 1/14/2018 7/17/2022
Observations 236

Mean	-0.005179
Median	-0.002513
Maximum	0.197878
Minimum	-0.247269
Std. Dev.	0.045049
Skewness	-0.447815
Kurtosis	7.840941

Jarque-Bera	238.3291
Probability	0.000000

➤ ARIMA (1,1,1)

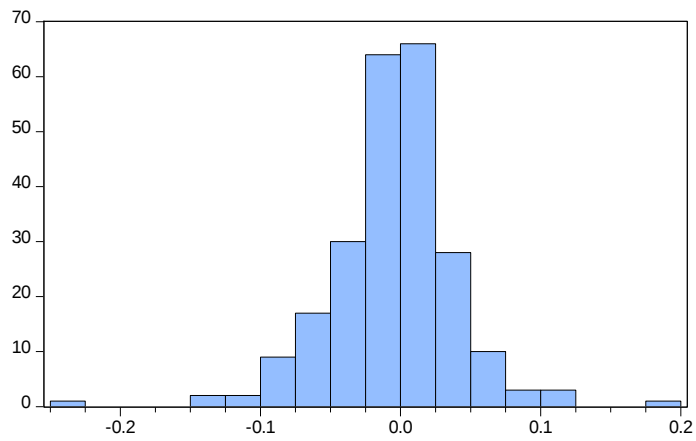


Series: Residuals
Sample 1/14/2018 7/17/2022
Observations 236

Mean	-0.004575
Median	-0.001686
Maximum	0.202148
Minimum	-0.230347
Std. Dev.	0.045282
Skewness	-0.284167
Kurtosis	7.091818

Jarque-Bera	167.8155
Probability	0.000000

➤ ARIMA (3,1,0)



Series: Residuals
Sample 1/14/2018 7/17/2022
Observations 236

Mean	-0.004943
Median	-0.002195
Maximum	0.199390
Minimum	-0.244902
Std. Dev.	0.045149
Skewness	-0.419428
Kurtosis	7.719182

Jarque-Bera	225.9145
Probability	0.000000

Lampiran 8 Uji *Lagrange Multiplier*

➤ ARCH (1)

Heteroskedasticity Test: ARCH

F-statistic	5.098439	Prob. F(1,233)	0.0249
Obs*R-squared	5.032091	Prob. Chi-Square(1)	0.0249

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 08/18/22 Time: 01:27

Sample (adjusted): 1/21/2018 7/17/2022

Included observations: 235 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001755	0.000374	4.691383	0.0000
RESID^2(-1)	0.146323	0.064803	2.257972	0.0249
R-squared	0.021413	Mean dependent var		0.002056
Adjusted R-squared	0.017213	S.D. dependent var		0.005406
S.E. of regression	0.005360	Akaike info criterion		-7.611363
Sum squared resid	0.006693	Schwarz criterion		-7.581919
Log likelihood	896.3351	Hannan-Quinn criter.		-7.599492
F-statistic	5.098439	Durbin-Watson stat		2.009652
Prob(F-statistic)	0.024874			

➤ ARCH (2)

Heteroskedasticity Test: ARCH

F-statistic	2.645510	Prob. F(2,231)	0.0731
Obs*R-squared	5.239719	Prob. Chi-Square(2)	0.0728

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 08/26/22 Time: 09:28

Sample (adjusted): 1/28/2018 7/17/2022

Included observations: 234 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001705	0.000393	4.335441	0.0000
RESID^2(-1)	0.140826	0.065768	2.141264	0.0333
RESID^2(-2)	0.033911	0.065828	0.515143	0.6069
R-squared	0.022392	Mean dependent var		0.002065
Adjusted R-squared	0.013928	S.D. dependent var		0.005416
S.E. of regression	0.005378	Akaike info criterion		-7.600096
Sum squared resid	0.006682	Schwarz criterion		-7.555797
Log likelihood	892.2112	Hannan-Quinn criter.		-7.582234
F-statistic	2.645510	Durbin-Watson stat		2.006322
Prob(F-statistic)	0.073119			

➤ ARCH (3)

Heteroskedasticity Test: ARCH

F-statistic	2.528039	Prob. F(3,229)	0.0581
Obs*R-squared	7.469222	Prob. Chi-Square(3)	0.0584

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 08/26/22 Time: 09:40

Sample (adjusted): 2/04/2018 7/17/2022

Included observations: 233 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001540	0.000409	3.762425	0.0002
RESID^2(-1)	0.137359	0.065773	2.088364	0.0379
RESID^2(-2)	0.019348	0.066476	0.291049	0.7713
RESID^2(-3)	0.099997	0.065852	1.518501	0.1303
R-squared	0.032057	Mean dependent var		0.002069
Adjusted R-squared	0.019376	S.D. dependent var		0.005428
S.E. of regression	0.005375	Akaike info criterion		-7.597200
Sum squared resid	0.006615	Schwarz criterion		-7.537954
Log likelihood	889.0737	Hannan-Quinn criter.		-7.573309
F-statistic	2.528039	Durbin-Watson stat		1.999939
Prob(F-statistic)	0.058141			

Lampiran 9 Estimasi Parameter ARCH/GARCH

➤ ARCH (1)

Dependent Variable: D(TF)

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

Date: 08/18/22 Time: 01:50

Sample (adjusted): 1/14/2018 7/17/2022

Included observations: 236 after adjustments

Convergence achieved after 12 iterations

Coefficient covariance computed using outer product of gradients

MA Backcast: 12/24/2017 1/07/2018

Presample variance: backcast (parameter = 0.7)

GARCH = $C(2) + C(3)*RESID(-1)^2$

Variable	Coefficient	Std. Error	z-Statistic	Prob.
MA(3)	-0.182523	0.048544	-3.759935	0.0002
Variance Equation				
C	0.001629	9.99E-05	16.30316	0.0000
RESID(-1)^2	0.212169	0.068752	3.085992	0.0020
R-squared	0.014799	Mean dependent var		-0.004357
Adjusted R-squared	0.014799	S.D. dependent var		0.045688
S.E. of regression	0.045349	Akaike info criterion		-3.380565
Sum squared resid	0.483284	Schwarz criterion		-3.336533
Log likelihood	401.9067	Hannan-Quinn criter.		-3.362815
Durbin-Watson stat	2.129370			
Inverted MA Roots	.57	-.28+.49i	-.28-.49i	

Lampiran 10 Uji Langrange Multiplier

➤ ARCH (1)

Heteroskedasticity Test: ARCH

F-statistic	0.029369	Prob. F(1,233)	0.8641
Obs*R-squared	0.029617	Prob. Chi-Square(1)	0.8634

Test Equation:

Dependent Variable: WGT_RESID^2

Method: Least Squares

Date: 08/18/22 Time: 03:52

Sample (adjusted): 1/21/2018 7/17/2022

Included observations: 235 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.015200	0.195430	5.194705	0.0000
WGT_RESID^2(-1)	-0.011226	0.065506	-0.171373	0.8641
R-squared	0.000126	Mean dependent var		1.003933
Adjusted R-squared	-0.004165	S.D. dependent var		2.815388
S.E. of regression	2.821245	Akaike info criterion		4.920708
Sum squared resid	1854.546	Schwarz criterion		4.950151
Log likelihood	-576.1832	Hannan-Quinn criter.		4.932578
F-statistic	0.029369	Durbin-Watson stat		1.999401
Prob(F-statistic)	0.864079			