ANALISIS FAKTOR-FAKTOR YANG MEMPENGARUHI ALIH FUNGSI LAHAN PADI SAWAH DI SUMATERA UTARA

TESIS

Oleh

RINALDI HARAHAP
NIM. 71220725028

MAGISTER AGRIBISNIS
FAKULTAS PERTANIAN
UNIVERSITAS ISLAM SUMATERA UTARA
MEDAN
2024

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Tesis ini Merupakan Syarat Terakhir untuk Mendapatkan Gelar Megister
Pertanian Program Studi Agribisnis FakultasPertanian
Universitas Islam Sumatera Utara

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Judul	**: Analisis Faktor-Faktor yang Mempengaruhi Alih Fungsi Lahan Padi Sawah di Sumatera Utara**
Nama	**: Rinaldi Harahap**
NIM	**: 71220725028**
Program Studi	**: Megister Agribisnis**

Menyetujui
Komisi Pembimbing,

Ketua	**Anggota**
	
(Prof. Dr. Ir. Mhd. Asaad. Msi)	**(Dr. Lindawati S.P., M.Si)**

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FAKULTAS PERTANIAN
UNIVERSITAS ISLAM SUMATERA UTARA
MEDAN
2024

RIWAYAT HIDUP

A. IDENTITAS DIRI

Nama Lengkap dengan Gelar	Rinaldi Harahap, S.P.
Tempat, Tanggal Lahir	Medan, 25 Agustus 1996
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B. RIWAYAT PENDIDIKAN

TINGKAT PENDIDIKAN	NAMA SEKOLAH	TAHUN
SD	SDN 200104 Padangsidimpuan	2002 s/d 2008
SMP	MTsN Padangsidimpuan	2008 s/d 2011
SMA	SMA Nurul Ilmi Padangsidimpuan	2011 s/d 2014
Asal Perguruan Tinggi (S1)	Padangsidimpuan	2014 s/d 2018
Nama Universitas	Universitas Graha Nusantara	
Fakultas	Fakultas Pertanian	
Peogram Studi	Agroteknologi	

C. RIWAYAT KELUARGA

KELUARGA	NAMA	TEMPAT TINGGAL LAHIR
Ayah Kandung	H. Ir. Tamho Harahap	Nagasaribu, 05 April 1956
Ibu Kandung	Hj. Nurhotna Wati Siregar	Sihoda-Hoda, 07 April 1966
Kakak Kandung	Sulhan Harahap, S.Sos	Padangsidimpuan, 30 Juli 1986
Abang Kandung	Sefti Harahap, S.K.M	Padangsidimpuan, 01 September 1987
Abang Kandung	Febriana Harahap, S.K.M	Padangsidimpuan, 05 Februari 1992

D. RIWAYAT PEKERJAAN

INSTANSI	NAMA JABATAN	TAHUN
Dinas Pertanian Kabupaten Padang Lawas Utara	Pegawai Negeri Sipil	2020 s/d Sekarang

Medan, 01 Juli 2024

Rinaldi Harahap
NIM. 71220725028

KATA PENGANTAR

Puji syukur penulis panjatkan pada Tuhan Yang Maha Esa atas berkat, rahmat dan karunia-Nya sehinga penulis dapat menyelesaikan penyusunan tesis ini. Penyusunan Tesis ini merupakan sebagai salah satu syarat untuk memperoleh gelar Magister pada Pascasarjana Universitas Islam Sumatera Utara.

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Medan, 1 Juli 2024

Rinaldi Harahap
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DAFTAR ISI

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DAFTAR GAMBAR

DAFTAR LAMPIRAN

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LAMPIRAN

Lampiran 1. Alih Fungsi Lahan Padi Sawah di Sumatera Utara Periode 1993-2023

Tahun	Jumlah (hektar)
1993	2420.08
1994	2617.38
1995	2617.75
1996	2730.39
1997	2895.19
1998	2918.15
1999	3079.96
2000	3134.53
2001	3136.76
2002	3212.2
2003	2321.04
2004	3472.44
2005	3531.13
2006	3284.29
2007	3153.3
2008	3403.07
2009	3418.78
2010	3447.39
2011	3007.63
2012	3265.83
2013	3340.79
2014	3527.29
2015	3582.3
2016	3607.4
2017	3715.51
2018	3727.68
2019	3631.03
2020	4044.82
2021	4609.79
2022	1203.11
2023	2479.38

Lampiran 2. Jumlah Penduduk Sumatera Utara Periode 1993-2023

Tahun	Produksi (Ton)
1993	9873.03
1994	9765.93
1995	9678.01
1996	9835.91
1997	9864.81
1998	10765.83
1999	10926.75
2000	10956.08
2001	10986.91
2002	11256.07
2003	12123.36
2004	12322.09
2005	12455.69
2006	12589.66
2007	12723.96
2008	12858.57
2009	12982.20
2010	13103.59
2011	13103.59
2012	13215.40
2013	13326.31
2014	13766.80
2015	13937.79
2016	14102.91
2017	14262.14
2018	14415.39
2019	14562.54
2020	14799.36
2021	14936.14
2022	15115.20
2023	15470.01

Lampiran 3. Jumlah Industri di Sumatera Utara Periode 1993-2023

Tahun	Jumlah (unit)
1993	573.84
1994	574.2
1995	603.9
1996	633.6
1997	634.5
1998	752.71
1999	929.02
2000	923.56
2001	1140.21
2002	1281.77
2003	2603.55
2004	2465.00
2005	2981.25
2006	3208.33
2007	3177.33
2008	3019.44
2009	3725.00
2010	4563.89
2011	5503.63
2012	6151.56
2013	6349.00
2014	6431.50
2015	8128.63
2016	8414.33
2017	9174.72
2018	9687.98
2019	10574.00
2020	10505.00
2021	9922.00
2022	8500.00
2023	9316

Lampiran 4. PDRB Sumatera Utara Periode 1993-2023

Tahun	Persen
1993	15.98
1994	15.56
1995	15.95
1996	15.07
1997	16.95
1998	16.02
1999	17.85
2000	17.83
2001	17.65
2002	17.09
2003	18.35
2004	18.41
2005	18.57
2006	18.67
2007	18.92
2008	18.85
2009	19.86
2010	19.59
2011	19.74
2012	19.89
2013	20.01
2014	20.07
2015	20.19
2016	20.26
2017	20.32
2018	20.47
2019	20.54
2020	20.67
2021	20.71
2022	20.86
2023	20.98

Lampiran 5. Jumlah Produksi Padi Sawah di Sumatera Utara Periode 1993-2023

Tahun	Jumlah (ton)
1993	2369841
1994	2478460
1995	2584678
1996	3715280
1997	2750463
1998	2904484
1999	2964280
2000	2966681
2001	3046330
2002	3144544
2003	3274270
2004	3310814
2005	3110615
2006	2981889
2007	3195515
2008	3214782
2009	3240209
2010	2870994
2011	3107570
2012	3189758
2013	3382066
2014	3422264
2015	3440262
2016	3552373
2017	3571141
2018	3490516
2019	3868880
2020	4387035
2021	4669777
2022	4664865
2023	4200112

Lampiran 6. Hasil Output Stasioneritas Variabel Alih Fungsi Lahan pada Level

Null Hypothesis: LOGY has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.595178	0.0010
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGY)
Method: Least Squares
Date: 07/02/24 Time: 21:55
Sample (adjusted): 1994 2023
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGY(-1)	-0.856036	0.186290	-4.595178	0.0001
C	6.891137	1.500077	4.593857	0.0001

R-squared	0.429917	Mean dependent var	0.000807
Adjusted R-squared	0.409557	S.D. dependent var	0.304159
S.E. of regression	0.233717	Akaike info criterion	-0.005075
Sum squared resid	1.529456	Schwarz criterion	0.088339
Log likelihood	2.076120	Hannan-Quinn criter.	0.024809
F-statistic	21.11566	Durbin-Watson stat	2.018910
Prob(F-statistic)	0.000084		

Lampiran 7. Hasil Output Stasioneritas Variabel Jumlah Penduduk Sumatera Utara pada Level

Null Hypothesis: LOGX1 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.613643	0.8531
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGX1)
Method: Least Squares
Date: 07/02/24 Time: 21:56
Sample (adjusted): 1994 2023
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGX1(-1)	-0.016118	0.026267	-0.613643	0.5444
C	0.166851	0.247535	0.674052	0.5058

R-squared	0.013270	Mean dependent var	0.014970
Adjusted R-squared	-0.021970	S.D. dependent var	0.019891
S.E. of regression	0.020109	Akaike info criterion	-4.910999
Sum squared resid	0.011322	Schwarz criterion	-4.817585
Log likelihood	75.66498	Hannan-Quinn criter.	-4.881115
F-statistic	0.376558	Durbin-Watson stat	1.833281
Prob(F-statistic)	0.544404		

Lampiran 8. Hasil Output Stasioneritas Variabel Jumlah Produksi Padi Sawah Sumatera Utara pada level

Null Hypothesis: LOGX2 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.082742	0.2525
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGX2)
Method: Least Squares
Date: 07/02/24 Time: 21:58
Sample (adjusted): 1994 2023
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGX2(-1)	-0.232461	0.111613	-2.082742	0.0465
C	3.504911	1.673769	2.094024	0.0454

R-squared	0.134141	Mean dependent var	0.019076
Adjusted R-squared	0.103217	S.D. dependent var	0.101778
S.E. of regression	0.096382	Akaike info criterion	-1.776648
Sum squared resid	0.260107	Schwarz criterion	-1.683235
Log likelihood	28.64972	Hannan-Quinn criter.	-1.746764
F-statistic	4.337812	Durbin-Watson stat	2.416213
Prob(F-statistic)	0.046527		

Lampiran 9. Hasil Output Stasioneritas Variabel PDRB Sumatera Utara pada Level

Null Hypothesis: LOGX3 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.315093	0.1740
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGX3)
Method: Least Squares
Date: 07/02/24 Time: 22:02
Sample (adjusted): 1994 2023
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGX3(-1)	-0.034428	0.014871	-2.315093	0.0282
C	0.792987	0.282513	2.806906	0.0090

R-squared	0.160663	Mean dependent var	0.140426
Adjusted R-squared	0.130686	S.D. dependent var	0.111688
S.E. of regression	0.104134	Akaike info criterion	-1.621931
Sum squared resid	0.303630	Schwarz criterion	-1.528518
Log likelihood	26.32897	Hannan-Quinn criter.	-1.592047
F-statistic	5.359655	Durbin-Watson stat	2.147035
Prob(F-statistic)	0.028156		

Lampiran 10. Hasil Output Stasioneritas Variabel Jumlah Industri di Sumatera Utara pada Level

Null Hypothesis: LOGX4 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.266569	0.6317
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGX4)
Method: Least Squares
Date: 07/02/24 Time: 22:05
Sample (adjusted): 1994 2023
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGX4(-1)	-0.033793	0.026681	-1.266569	0.2157
C	0.362069	0.214284	1.689669	0.1022

R-squared	0.054188	Mean dependent var	0.092905
Adjusted R-squared	0.020409	S.D. dependent var	0.152072
S.E. of regression	0.150513	Akaike info criterion	-0.885201
Sum squared resid	0.634312	Schwarz criterion	-0.791787
Log likelihood	15.27801	Hannan-Quinn criter.	-0.855317
F-statistic	1.604196	Durbin-Watson stat	2.147441
Prob(F-statistic)	0.215745		

Lampiran 11. Hasil Output Stasioneritas Variabel Jumlah Penduduk Sumatera Utara pada 1st Difference

Null Hypothesis: D(LOGX1) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.083487	0.0003
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGX1,2)
Method: Least Squares
Date: 07/02/24 Time: 21:57
Sample (adjusted): 1995 2023
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGX1(-1))	-0.949978	0.186875	-5.083487	0.0000
C	0.015128	0.004611	3.280468	0.0029

R-squared	0.489041	Mean dependent var	0.001176
Adjusted R-squared	0.470117	S.D. dependent var	0.027415
S.E. of regression	0.019956	Akaike info criterion	-4.924060
Sum squared resid	0.010753	Schwarz criterion	-4.829764
Log likelihood	73.39887	Hannan-Quinn criter.	-4.894528
F-statistic	25.84184	Durbin-Watson stat	2.046829
Prob(F-statistic)	0.000024		

Lampiran 12. Hasil Output Stasioneritas Variabel Jumlah Produksi Padi Sawah Sumatera Utara pada 1st Difference

Null Hypothesis: D(LOGX2) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.427164	0.0000
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGX2,2)
Method: Least Squares
Date: 07/02/24 Time: 22:01
Sample (adjusted): 1995 2023
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGX2(-1))	-1.369017	0.184326	-7.427164	0.0000
C	0.026806	0.018757	1.429121	0.1644

R-squared	0.671384	Mean dependent var	-0.005164
Adjusted R-squared	0.659213	S.D. dependent var	0.168414
S.E. of regression	0.098315	Akaike info criterion	-1.734806
Sum squared resid	0.260978	Schwarz criterion	-1.640510
Log likelihood	27.15469	Hannan-Quinn criter.	-1.705274
F-statistic	55.16277	Durbin-Watson stat	2.049667
Prob(F-statistic)	0.000000		

Lampiran 13. Hasil Output Stasioneritas Variabel PDRB Sumatera Utara pada 1st Difference

Null Hypothesis: D(LOGX3) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.038896	0.0003
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGX3,2)
Method: Least Squares
Date: 07/02/24 Time: 22:04
Sample (adjusted): 1995 2023
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGX3(-1))	-0.952644	0.189058	-5.038896	0.0000
C	0.137692	0.034114	4.036261	0.0004

R-squared	0.484639	Mean dependent var	0.002442
Adjusted R-squared	0.465552	S.D. dependent var	0.155094
S.E. of regression	0.113383	Akaike info criterion	-1.449623
Sum squared resid	0.347102	Schwarz criterion	-1.355327
Log likelihood	23.01953	Hannan-Quinn criter.	-1.420091
F-statistic	25.39047	Durbin-Watson stat	2.054598
Prob(F-statistic)	0.000027		

Lampiran 14. Hasil Output Stasioneritas Variabel Jumlah Industri di Sumatera Utara pada 1st Difference

Null Hypothesis: D(LOGX4) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.534439	0.0001
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGX4,2)
Method: Least Squares
Date: 07/02/24 Time: 22:06
Sample (adjusted): 1995 2023
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGX4(-1))	-1.056381	0.190874	-5.534439	0.0000
C	0.101327	0.034019	2.978537	0.0061

R-squared	0.531494	Mean dependent var	0.003139
Adjusted R-squared	0.514142	S.D. dependent var	0.224254
S.E. of regression	0.156313	Akaike info criterion	-0.807438
Sum squared resid	0.659713	Schwarz criterion	-0.713141
Log likelihood	13.70785	Hannan-Quinn criter.	-0.777905
F-statistic	30.63002	Durbin-Watson stat	1.989101
Prob(F-statistic)	0.000007		

Lampiran 15. Hasil Output Uji *Autoregressive Distributed Lag*

Dependent Variable: LOGY
Method: ARDL
Date: 07/02/24 Time: 22:07
Sample (adjusted): 1997 2023
Included observations: 27 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): LOGX4 LOGX3 LOGX2 LOGX1
Fixed regressors: C
Number of models evaluated: 2500
Selected Model: ARDL(4, 4, 4, 4, 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOGY(-1)	-1.420257	0.286740	-4.953123	0.0158
LOGY(-2)	-5.622960	1.306022	-4.305409	0.0231
LOGY(-3)	-3.951283	1.402418	-2.817479	0.0669
LOGY(-4)	1.445704	0.729348	1.982186	0.1418
LOGX4	-1.968778	0.625392	-3.148070	0.0513
LOGX4(-1)	3.108835	0.987037	3.149663	0.0513
LOGX4(-2)	1.043313	0.790641	1.319579	0.2786
LOGX4(-3)	-1.633066	0.848349	-1.924993	0.1499
LOGX4(-4)	1.942154	0.591478	3.283559	0.0463
LOGX3	-7.528314	1.695938	-4.439026	0.0213
LOGX3(-1)	1.971674	2.318788	0.850303	0.4576
LOGX3(-2)	5.174608	1.120527	4.618014	0.0191
LOGX3(-3)	1.247595	0.982919	1.269275	0.2939
LOGX3(-4)	-1.538831	1.219630	-1.261719	0.2962
LOGX2	-2.485856	1.298843	-1.913900	0.1515
LOGX2(-1)	-0.315754	1.244816	-0.253655	0.8162
LOGX2(-2)	2.241493	1.555767	1.440764	0.2453
LOGX2(-3)	0.841269	1.000158	0.841135	0.4620
LOGX2(-4)	3.103818	1.345700	2.306470	0.1044
LOGX1	0.240945	4.237351	0.056862	0.9582
LOGX1(-1)	-9.713323	5.944377	-1.634035	0.2008
LOGX1(-2)	-26.11848	7.338175	-3.559262	0.0378
LOGX1(-3)	21.64988	8.500886	2.546779	0.0842
C	161.4904	62.21224	2.595799	0.0807

R-squared	0.956700	Mean dependent var	8.068347
Adjusted R-squared	0.624732	S.D. dependent var	0.237714
S.E. of regression	0.145621	Akaike info criterion	-1.435062
Sum squared resid	0.063617	Schwarz criterion	-0.283207
Log likelihood	43.37333	Hannan-Quinn criter.	-1.092555
F-statistic	2.881903	Durbin-Watson stat	2.044104
Prob(F-statistic)	0.208369		

*Note: p-values and any subsequent tests do not account for model selection.

Lampiran 16. Hasil Output Jangka Panjang dan Jangka Pendek *Autoregressive Distributed Lag*

ARDL Long Run Form and Bounds Test
Dependent Variable: D(LOGY)
Selected Model: ARDL(4, 4, 4, 4, 3)
Case 2: Restricted Constant and No Trend
Date: 07/02/24 Time: 22:12
Sample: 1993 2023
Included observations: 27

Conditional Error Correction Regression

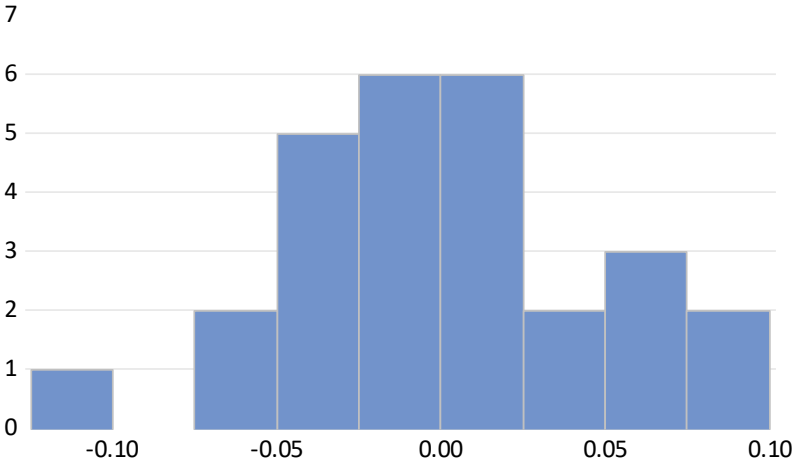
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	161.4904	62.21224	2.595799	0.0807
LOGY(-1)*	-10.54880	2.505405	-4.210416	0.0245
LOGX4(-1)	2.492458	0.851736	2.926327	0.0612
LOGX3(-1)	-0.673268	0.486578	-1.383679	0.2604
LOGX2(-1)	3.384970	2.332230	1.451387	0.2426
LOGX1(-1)	-13.94098	6.126120	-2.275663	0.1074
D(LOGY(-1))	8.128539	2.328277	3.491225	0.0397
D(LOGY(-2))	2.505579	1.579198	1.586615	0.2108
D(LOGY(-3))	-1.445704	0.729348	-1.982186	0.1418
D(LOGX4)	-1.968778	0.625392	-3.148070	0.0513
D(LOGX4(-1))	-1.352401	1.031203	-1.311479	0.2810
D(LOGX4(-2))	-0.309088	0.679925	-0.454592	0.6803
D(LOGX4(-3))	-1.942154	0.591478	-3.283559	0.0463
D(LOGX3)	-7.528314	1.695938	-4.439026	0.0213
D(LOGX3(-1))	-4.883372	1.753687	-2.784631	0.0687
D(LOGX3(-2))	0.291236	1.434685	0.202996	0.8521
D(LOGX3(-3))	1.538831	1.219630	1.261719	0.2962
D(LOGX2)	-2.485856	1.298843	-1.913900	0.1515
D(LOGX2(-1))	-6.186580	2.412946	-2.563911	0.0829
D(LOGX2(-2))	-3.945087	1.495249	-2.638415	0.0778
D(LOGX2(-3))	-3.103818	1.345700	-2.306470	0.1044
D(LOGX1)	0.240945	4.237351	0.056862	0.9582
D(LOGX1(-1))	4.468604	6.400314	0.698185	0.5353
D(LOGX1(-2))	-21.64988	8.500886	-2.546779	0.0842

* p-value incompatible with t-Bounds distribution.

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGX4	0.236279	0.105928	2.230569	0.1119
LOGX3	-0.063824	0.053312	-1.197177	0.3172
LOGX2	0.320887	0.225962	1.420091	0.2507
LOGX1	-1.321571	0.677694	-1.950100	0.1463
C	15.30890	6.350915	2.410503	0.0950

Lampiran 17. Hasil Output Uji Normalitas



Series: Residuals	
Sample 1997 2023	
Observations 27	
Mean	-1.89e-14
Median	-0.000289
Maximum	0.097735
Minimum	-0.119417
Std. Dev.	0.049465
Skewness	-0.051794
Kurtosis	3.091669
Jarque-Bera	0.021525
Probability	0.989295

Lampiran 18. Hasil Output Uji Autokorelasi

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	263.4302	Prob. F(2,1)	0.0435
Obs*R-squared	26.94885	Prob. Chi-Square(2)	0.0000

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 07/02/24 Time: 22:16
Sample: 1997 2023
Included observations: 27
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGY(-1)	-0.175455	0.023013	-7.624209	0.0830
LOGY(-2)	-1.878410	0.133739	-14.04535	0.0452
LOGY(-3)	0.839170	0.112918	7.431653	0.0852
LOGY(-4)	-0.041062	0.059059	-0.695277	0.6132
LOGX4	0.658029	0.056686	11.60822	0.0547
LOGX4(-1)	1.140004	0.107770	10.57809	0.0600
LOGX4(-2)	-1.535574	0.089735	-17.11236	0.0372
LOGX4(-3)	0.054703	0.067553	0.809774	0.5667
LOGX4(-4)	-0.277956	0.046206	-6.015560	0.1049
LOGX3	-1.746424	0.168563	-10.36064	0.0613
LOGX3(-1)	2.849056	0.226161	12.59749	0.0504
LOGX3(-2)	1.336776	0.108313	12.34176	0.0515
LOGX3(-3)	-1.480784	0.114102	-12.97770	0.0490
LOGX3(-4)	-2.042459	0.162624	-12.55941	0.0506
LOGX2	1.398591	0.191630	7.298401	0.0867
LOGX2(-1)	2.509672	0.187888	13.35728	0.0476
LOGX2(-2)	-0.037843	0.141746	-0.266980	0.8339
LOGX2(-3)	0.302120	0.081377	3.712576	0.1675
LOGX2(-4)	0.200776	0.145469	1.380197	0.3992
LOGX1	1.679809	0.442444	3.796657	0.1640
LOGX1(-1)	-11.78306	0.852009	-13.82974	0.0460
LOGX1(-2)	9.391460	0.774668	12.12320	0.0524
LOGX1(-3)	10.16630	0.896750	11.33682	0.0560
C	-125.0821	7.216901	-17.33183	0.0367
RESID(-1)	-0.590757	0.101871	-5.799067	0.1087
RESID(-2)	-3.166344	0.138123	-22.92405	0.0278

R-squared	0.998106	Mean dependent var	-1.89E-14
Adjusted R-squared	0.950745	S.D. dependent var	0.049465
S.E. of regression	0.010978	Akaike info criterion	-7.555745
Sum squared resid	0.000121	Schwarz criterion	-6.307902
Log likelihood	128.0026	Hannan-Quinn criter.	-7.184696
F-statistic	21.07442	Durbin-Watson stat	3.074687
Prob(F-statistic)	0.170672		

Lampiran 19. Hasil Output Uji Multikolineritas

Variance Inflation Factors
Date: 07/02/24 Time: 22:17
Sample: 1993 2023
Included observations: 27

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
LOGY(-1)	0.082220	6826.471	5.542329
LOGY(-2)	1.705694	142554.6	39.32224
LOGY(-3)	1.966776	163518.7	38.75766
LOGY(-4)	0.531949	44019.09	11.04605
LOGX4	0.391115	34218.26	391.0936
LOGX4(-1)	0.974243	83310.04	1072.146
LOGX4(-2)	0.625113	52250.53	745.2556
LOGX4(-3)	0.719696	58652.01	899.3739
LOGX4(-4)	0.349847	27762.12	444.7641
LOGX3	2.876206	1375293.	3780.424
LOGX3(-1)	5.376780	2536169.	7657.815
LOGX3(-2)	1.255580	583218.1	2035.478
LOGX3(-3)	0.966130	442017.9	1716.751
LOGX3(-4)	1.487498	670268.6	2814.452
LOGX2	1.686994	485288.1	42.38154
LOGX2(-1)	1.549566	445482.7	36.03781
LOGX2(-2)	2.420412	693810.9	50.15265
LOGX2(-3)	1.000317	285841.9	17.87360
LOGX2(-4)	1.810910	515893.6	30.54310
LOGX1	17.95514	2048740.	310.8495
LOGX1(-1)	35.33562	4017691.	667.9295
LOGX1(-2)	53.84881	6101371.	1109.067
LOGX1(-3)	72.26506	8160816.	1562.461
C	3870.362	4927942.	NA

Lampiran 20. Hasil Output Uji Heterokedastisitas

Heteroskedasticity Test: Glejser
Null hypothesis: Homoskedasticity

F-statistic	1.460828	Prob. F(23,3)	0.4294
Obs*R-squared	24.78683	Prob. Chi-Square(23)	0.3614
Scaled explained SS	3.426705	Prob. Chi-Square(23)	1.0000

Test Equation:
Dependent Variable: ARESID
Method: Least Squares
Date: 07/02/24 Time: 22:17
Sample: 1997 2023
Included observations: 27

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	31.14653	11.97654	2.600629	0.0803
LOGY(-1)	-0.013204	0.055201	-0.239208	0.8264
LOGY(-2)	0.100787	0.251424	0.400864	0.7154
LOGY(-3)	-0.391425	0.269981	-1.449824	0.2430
LOGY(-4)	0.121144	0.140408	0.862800	0.4517
LOGX4	-0.238586	0.120395	-1.981695	0.1418
LOGX4(-1)	-0.021838	0.190016	-0.114926	0.9158
LOGX4(-2)	0.326205	0.152207	2.143170	0.1215
LOGX4(-3)	-0.138556	0.163317	-0.848387	0.4586
LOGX4(-4)	0.212258	0.113866	1.864100	0.1592
LOGX3	-0.277135	0.326487	-0.848839	0.4583
LOGX3(-1)	-0.426302	0.446392	-0.954993	0.4100
LOGX3(-2)	0.307753	0.215714	1.426674	0.2489
LOGX3(-3)	0.346583	0.189223	1.831615	0.1644
LOGX3(-4)	0.195313	0.234792	0.831853	0.4665
LOGX2	-0.422841	0.250042	-1.691084	0.1894
LOGX2(-1)	-0.250600	0.239641	-1.045734	0.3725
LOGX2(-2)	0.007772	0.299502	0.025951	0.9809
LOGX2(-3)	0.095597	0.192541	0.496503	0.6536
LOGX2(-4)	-0.065233	0.259062	-0.251805	0.8175
LOGX1	-0.031850	0.815737	-0.039044	0.9713
LOGX1(-1)	0.279446	1.144358	0.244195	0.8228
LOGX1(-2)	-1.928418	1.412679	-1.365079	0.2656
LOGX1(-3)	-0.829705	1.636514	-0.506996	0.6471

R-squared	0.918031	Mean dependent var	0.035929
Adjusted R-squared	0.289599	S.D. dependent var	0.033260
S.E. of regression	0.028034	Akaike info criterion	-4.730266
Sum squared resid	0.002358	Schwarz criterion	-3.578411
Log likelihood	87.85859	Hannan-Quinn criter.	-4.387759
F-statistic	1.460828	Durbin-Watson stat	3.000178
Prob(F-statistic)	0.429410		