LAMPIRAN

Lampiran 1. Data Variabel Kelapa Sawit Indonesia tahun 1994-2014

Tahun	A**	Q**	Y**	HCPO***	HK**	HPU*	T	E**	IHK*
1994	1.804,149	4.008.062	3.877	627.62	1427.39	294	1	1.306.615	157.42
1995	2.024,986	4.479.670	3.616	740.11	1985.25	333	2	1.004.403	172.27
1996	2.249,514	4.898.658	3.431	616.93	1713.64	389	3	986.363	185.92
1997	2.922,296	5.448.508	3.459	718.39	2474.01	444	4	1.448.362	198.22
1998	3.560,196	5.930.415	3.491	2341.96	3199.85	527	5	403.843	168.32
1999	3.901,802	6.455.590	3.219	1469.01	1988.75	1088	6	865.427	202.79
2000	4.158,077	7.000.508	2.856	1147.09	2939.07	1352	7	1.817.664	210.27
2001	4.713,435	8.396.472	2.841	873.49	2527.51	1442	8	1.849.142	234.46
2002	5.067,058	9.622.345	2.909	1082.68	2432.99	1533	9	2.804.792	262.31
2003	5.283,557	10.440.834	3.045	1179.94	2722.55	1591	10	2.892.130	279.59
2004	5.284,723	10.830.389	2.833	3242.38	9540.83	1621	11	3.819.927	113.25
2005	5.453,817	11.861.615	2.925	3301.62	9989.60	1664	12	4.564.788	125.09
2006	6.594,914	17.350.848	3.498	2800.39	13106.45	1782	13	5.199.287	141.48
2007	6.766,836	17.664.725	3.619	2779.80	21116.57	1855	14	5.701.286	150.55
2008	7.363,847	17.539.788	3.424	5526.25	4558.12	1940	15	7.904.179	132.73
2009	7.873,294	19.324.293	3.487	6881.62	6709.54	2042	16	11.119.997	115.06
2010	8.385,394	21.958.120	3.596	5588.64	11228.98	2143	17	11.158.124	121.89
2011	8.992,824	23.096.541	3.526	6070.64	13152.41	2356	18	10.428.085	127.68
2012	9.572,715	26.015.518	3.722	6687.73	8527.46	2612	19	7.252.519	132.9
2013	10.465,020	27.782.004	3.536	6057.81	10785.62	2911	20	6.584.732	142.18
2014	10.956,231	29.344.479	3.601	7406.81	13544.43	3207	21	5.726.820	113.22

Sumber: * = Badan Pusat Statistik

** = Direktorat Jenderal Perkebunan

*** = BAPPEPTI

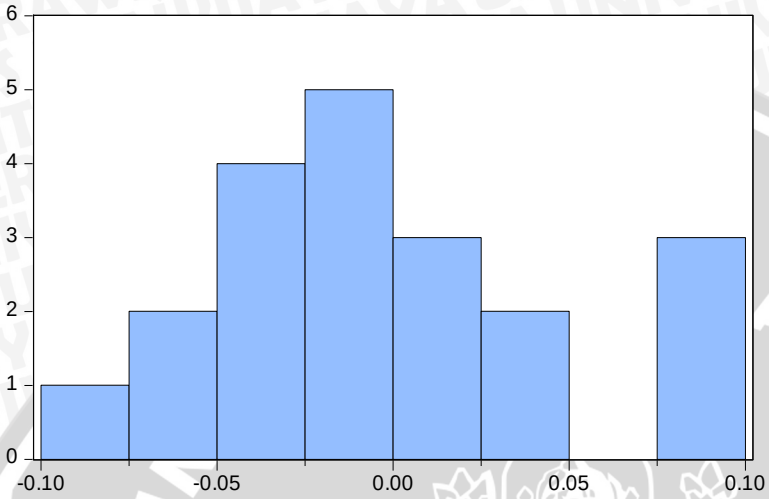
Lampiran 1. Lanjutan

Keterangan:

A	= Luas areal panen (Ha)
HCPO	= Harga riil CPO (Rp/kg)
HK	= Harga riil karet (Rp/kg)
Y	= Produktivitas pada (ton/ha)
T	= *Trend* teknologi sebelumnya
HPU	= Harga riil pupuk urea sebelumnya (Rp/kg)
E	= Ekspor CPO (ton/ha)

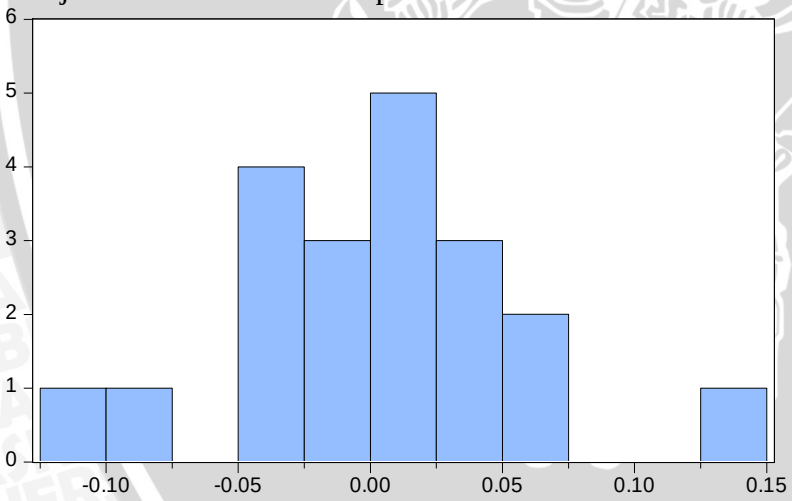
Lampiran 2. Uji Normalitas Model Respon Luas Areal Kelapa Sawit dan Model Respon Produktivitas Kelapa Sawit.

a. Uji Normalitas Model Respon Luas Areal



Series: Residuals	
Sample 1 20	
Observations 20	
Mean	-2.71e-15
Median	-0.002797
Maximum	0.093095
Minimum	-0.077347
Std. Dev.	0.046736
Skewness	0.476088
Kurtosis	2.562645
Jarque-Bera	0.914934
Probability	0.632885

b. Uji Normalitas Model Respon Produktivitas



Series: Residuals	
Sample 1 20	
Observations 20	
Mean	-3.83e-17
Median	0.003185
Maximum	0.125069
Minimum	-0.102764
Std. Dev.	0.050571
Skewness	0.293322
Kurtosis	3.627608
Jarque-Bera	0.615036
Probability	0.735270

Lampiran 3. Tabel Uji Multikolinearitas (*Variance Inflation Factor*) Model Respon Luas Areal dan Produktivitas.

1. Tabel VIF Model Respon Luas Areal

Variance Inflation Factors
Date: 06/23/16 Time: 03:01
Sample: 1 20
Included observations: 20

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
LOG(AT)	0.002643	4552.218	4.885984
LOG(E)	4.15E-05	65.17403	1.368486
LOG(HCPO)	0.000878	384.7280	4.032610
LOG(HK)	0.000672	352.3619	3.203662
C	0.309552	2237.638	NA

2. Tabel VIF Model Produktivitas

Variance Inflation Factors

Date: 06/23/16 Time: 03:51
Sample: 1 20
Included observations: 20

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
LOG(HCPO)	0.001218	456.1272	4.780996
LOG(HPU)	0.001614	525.6036	3.641641
T	3.37E-05	29.85931	6.918620
LOG(YT)	0.021078	189.5381	1.243645
C	0.159454	984.4567	NA

Lampiran 4. Hasil uji *Breusch-Godfrey Serial Correlation LM Test* pada model respon luas arel dan respon produktivitas.

1. Tabel Model Luas Areal

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.826207	Prob. F(2,13)	0.2000
Obs*R-squared	4.386649	Prob. Chi-Square(2)	0.1115

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 06/23/16 Time: 03:02
Sample: 1 20
Included observations: 20
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(AT)	0.073403	0.068345	1.074007	0.3024
LOG(E)	-0.013411	0.010017	-1.338804	0.2036
LOG(HCPO)	-0.028265	0.033743	-0.837647	0.4174
LOG(HK)	-0.004631	0.024891	-0.186049	0.8553
C	-0.680093	0.693389	-0.980824	0.3446
RESID(-1)	-0.451456	0.382319	-1.180835	0.2588
RESID(-2)	-0.627348	0.330699	-1.897034	0.0803

R-squared	0.219332	Mean dependent var	-2.71E-15
Adjusted R-squared	-0.140976	S.D. dependent var	0.046736
S.E. of regression	0.049922	Akaike info criterion	-2.887483
Sum squared resid	0.032399	Schwarz criterion	-2.538977
Log likelihood	35.87483	Hannan-Quinn criter.	-2.819451
F-statistic	0.608736	Durbin-Watson stat	2.179463
Prob(F-statistic)	0.719652		

2. Tabel Model Produktivitas

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.228320	Prob. F(2,13)	0.3246
Obs*R-squared	3.178751	Prob. Chi-Square(2)	0.2041

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 06/23/16 Time: 03:49

Sample: 1 20
Included observations: 20
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(HCPO)	-0.000685	0.035145	-0.019478	0.9848
LOG(HPU)	-0.003288	0.039635	-0.082962	0.9351
T	0.000482	0.005773	0.083561	0.9347
LOG(YT)	0.093649	0.180702	0.518251	0.6130
C	-0.087604	0.402067	-0.217885	0.8309
RESID(-1)	-0.019257	0.307299	-0.062664	0.9510
RESID(-2)	-0.454664	0.293779	-1.547641	0.1457

R-squared	0.158938	Mean dependent var	-3.83E-17
Adjusted R-squared	-0.229245	S.D. dependent var	0.050571
S.E. of regression	0.056069	Akaike info criterion	-2.655251
Sum squared resid	0.040869	Schwarz criterion	-2.306745
Log likelihood	33.55251	Hannan-Quinn criter.	-2.587219
F-statistic	0.409440	Durbin-Watson stat	1.993303
Prob(F-statistic)	0.859881		

Lampiran 5. Uji Heteroskedasitas Model Respon Luas Areal dan Produktivitas

1. Tabel Uji Model Luas Areal Tanam

Heteroskedasticity Test: White

F-statistic	1.665251	Prob. F(14,5)	0.2994
Obs*R-squared	16.46812	Prob. Chi-Square(14)	0.2856
Scaled explained SS	7.237636	Prob. Chi-Square(14)	0.9252

2. Tabel Uji Model Produktivitas

Heteroskedasticity Test: White

F-statistic	0.524857	Prob. F(14,5)	0.8428
Obs*R-squared	11.90153	Prob. Chi-Square(14)	0.6142
Scaled explained SS	8.795401	Prob. Chi-Square(14)	0.8439

Lampiran 6. Tabel Pendugaan Model Respon

1. Hasil Pendugaan Respon Luas Areal Kelapa Sawit

Dependent Variable: LOG(A)
Method: Least Squares
Date: 06/23/16 Time: 02:59
Sample: 1 20
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(AT)	0.839209	0.051414	16.32264	0.0000
LOG(E)	0.005295	0.006443	0.821827	0.4240
LOG(HCPO)	0.055660	0.029625	1.878807	0.0798
LOG(HK)	0.007936	0.025932	0.306030	0.7638
C	1.995017	0.556374	3.585747	0.0027

R-squared	0.990822	Mean dependent var	15.51681
Adjusted R-squared	0.988374	S.D. dependent var	0.487835
S.E. of regression	0.052600	Akaike info criterion	-2.839877
Sum squared resid	0.041502	Schwarz criterion	-2.590944
Log likelihood	33.39877	Hannan-Quinn criter.	-2.791283
F-statistic	404.8184	Durbin-Watson stat	2.013273
Prob(F-statistic)	0.000000		

2. Tabel Model Produktivitas

Dependent Variable: LOG(Y)
Method: Least Squares
Date: 06/23/16 Time: 03:21
Sample: 1 20
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(HCPO)	0.021461	0.034904	0.614851	0.5479
LOG(HPU)	-0.062113	0.040177	-1.545985	0.1429
T	0.007073	0.005805	1.218298	0.2419
LOG(YT)	0.610640	0.145183	4.205998	0.0008
C	0.673669	0.399317	1.687052	0.1123

R-squared	0.720474	Mean dependent var	1.199187
Adjusted R-squared	0.645934	S.D. dependent var	0.095652
S.E. of regression	0.056916	Akaike info criterion	-2.682161
Sum squared resid	0.048592	Schwarz criterion	-2.433228
Log likelihood	31.82161	Hannan-Quinn criter.	-2.633567
F-statistic	9.665591	Durbin-Watson stat	1.891961
Prob(F-statistic)	0.000451		

Lampiran 7. Perhitungan Koefisien Penyesuaian Respon Penawaran Kelapa Sawit di Indonesia

1. Model Respon Luas Areal Kelapa Sawit di Indonesia

Mengacu pada persamaan:

$A_t = \delta\alpha_0 + \delta\alpha_1 HCPO_{t-1} + \delta\alpha_2 HK_{t-1} + \delta\alpha_3 Et_{-1} + (1-\delta)\alpha_4 A_{t-1} + \delta u^A_t$

dan persamaan:

$LnA_t = \alpha_0 + \alpha_1 LnHCPO_{t-1} + \alpha_2 LnHK_{t-1} + \alpha_3 LnEt_{-1} + \alpha_4 LnA_{t-1} + u_t$

Hasil Pendugaan OLS:

$A_t = 1.995017 + 0.055660HCPO_{t-1} + 0.007936HK_{t-1} + 0.005295E_{t-1} + 0.839209AT_{t-1}$

diketahui:

α_0 : $\delta\alpha_0$ = 1.995017

α_1 : $\delta\alpha_1$ = 0.055660

α_2 : $\delta\alpha_2$ = 0.007936

α_3 : $\delta\alpha_3$ = 0.005295

α_4 : $(1-\delta)$ = 0.839209

Koefisien Penyesuaian (Koefisien *Adjustment*):

$\delta = 1 - \alpha_4$

$= 1 - (0.839209)$

$= 0.16$

2. Model Respon Produktivitas Kelapa Sawit di Indonesia

Mengacu pada persamaan:

$Y_t = \delta\beta_0 + \delta\beta_1 HCPO_{t-1} + \delta\beta_2 HPU_{t-1} + \delta\beta_3 T_{t-1} + (\delta-1)\beta_4 Y_{t-1} + u_t$

dan persamaan:

$LnY_t = \beta_0 + \beta_1 LnHCPO_{t-1} + \beta_2 LnHPU_{t-1} + \beta_3 LnHPSP_{t-1} + \beta_4 LnY_{t-1} + u_t$

Hasil pendugaan OLS:

$Y_t = 0.673669 + 0.021461HCPO_{t-1} - 0.062113HPU_{t-1} + 0.007073T_{t-1} + 0.610641YT_{t-1}$

diketahui:

β_0 : $\delta\beta_0$ = 0.673669

β_1 : $\delta\beta_1$ = 0.021461

Lampiran 7. Lanjutan

β_2 : $\delta\beta_2$ = - 0.062113

β_3 : $\delta\beta_3$ = 0.007073

β_4 : (1-δ) = 0.610641

Koefisien Penyesuain (Koefisien *Adjustment*):

δ = 1- β_4

= 1- (0.610641)

= 0.38

Lampiran 8. Perhitungan Respon Penawaran terhadap Harga Crude Palm Oil di Indonesia dalam Jangka Pendek dan Jangka Panjang.

1. Respon Luas Areal Terhadap Harga *Crude Palm Oil*

Berdasarkan persamaan:

$A_t = 1.995017 + 0.055660HCPO_{t-1} + 0.007936HK_{t-1} + 0.005295E_{t-1} + 0.839209AT_{t-1}$

Maka nilai elastisitas jangka pendek luas areal terhadap harga *crude palm oil* adalah sebesar:

$EA_{(sr)} = \delta\alpha_1$

$EA_{(sr)} = 0.05566$

Sedangkan untuk nilai elastisitas jangka panjang nya adalah:

$EA_{(lr)} = \frac{EA(sr)}{(1-\delta)}$

$EA_{(lr)} = \frac{0.05566}{0.16}$

$EA_{(lr)} = 0.3478$

2. Respon Produktivitas Kelapa Sawit terhadap Harga *Crude Palm Oil*

Berdasarkan persamaan:

$Y_t = 0.673669 + 0.021461HCPO_{t-1} - 0.062113HPU_{t-1} + 0.007073T_{t-1} + 0.610641YT_{t-1}$

Maka nilai elastisitas jangka pendek produktivitas terhadap harga *crude palm oil* adalah sebesar:

$EY_{(sr)} = \delta\beta_1$

$EY_{(sr)} = 0.021461$

Sedangkan untuk nilai elastisitas jangka panjangnya adalah:

$EY_{(lr)} = \frac{EY(sr)}{(1-\delta)}$

$EY_{(lr)} = \frac{0.02146}{0.38}$

$EY_{(lr)} = 0.05647$

Lampiran 8. Lanjutan

3. Respon Penawaran Kelapa Sawit

Sesuai dengan persamaan 4.11, nilai elastisitas penawaran dirumuskan menjadi:

$e_{QP} = e_{AP} + e_{YP}$

maka:

Elastisitas penawaran jangka pendek adalah:

$e_{QP} = e_{AP(sr)} + e_{YP(sr)}$

$e_{QP} = 0.05566 + 0.02146$

$e_{QP} = 0.07712$

Elastisitas penawaran jangka panjang adalah:

$e_{QP} = e_{AP(lr)} + e_{YP(lr)}$

$e_{QP} = 0.3478 + 0.0564$

$e_{QP} = 0.4042$

Lampiran 9. Perhitungan Harga Riil

Rumus:

$PX_{it} = \frac{X(1,2,3)}{IHK} \times 100\%$

dimana:

PX_{it} = Harga Riil X tahun ke t

t = tahun pengamatan (t= 1,2,3,4……20)

$X_1(CPO_t)$ = Harga CPO tahun ke t (Rp/kg)

X_2 (K_t) = Harga karet (*sheet*) tahun ke t (Rp/kg)

X_3 (PU_t) = Harga pupuk urea tahun ke t (Rp/kg)

IHK = Indeks Harga Konsumen

Contoh Perhitungan:

1. Harga *Crude Palm Oil* (CPO)

   Diketahui : Harga CPO : 899

   $IHK_{(1994)}$: 157.42

   Maka,

   $PHCPOt = \frac{CPOt}{IHK} = \frac{899}{157.42} \times 100\% = 627.621$

2. Harga Karet (*sheet*)

   Diketahui : Harga Karet (*sheet*) : 2247

   $IHK_{(1994)}$: 157.42

   Maka,

   $PHCPOt = \frac{Kt}{IHK} = \frac{2247}{157.42} \times 100\% = 1427.392$

3. Harga Pupuk Urea

   Diketahui : Harga Pupuk Urea : 46.281

   $IHK_{(1994)}$: 157.42

   Maka,

   $PHCPOt = \frac{Kt}{IHK} = \frac{46.281}{157.42} \times 100\% = 293.996$