NAME: BAQUE Wilmer Alfredo **WEEK3**

Questions This test exercise is of an applied nature and uses data that are available in the data file TestExer3. We consider the so-called Taylor rule for setting the (nominal) interest rate. This model describes the level of the nominal interest rate that the central bank sets as a function of equilibrium real interest rate and inflation, and considers the current level of inflation and production. Taylor (1993)1 considers the model:

$it = r* + \pi t + 0.5(\pi t - \pi*) + 0.5gt,$

with it the Federal funds target interest rate at time t, $r*$ the equilibrium real federal funds rate, πt a measure of inflation, $\pi*$ the target inflation rate and gt the output gap (how much actual output deviates from potential output). We simplify the Taylor rule in two manners. First, we avoid determining $r*$ and $\pi*$ and simply add an intercept to the model to capture these two variables (and any other deviations in the means). Second, we consider production yy rather than the output gap. In this form the Taylor rule is

$it = \beta 1 + \beta 2\pi t + \beta 3yt + \varepsilon t.$ (1)

Monthly data are available for the USA over the period 1960 through 2014 for the following variables:2

- INTRATE: Federal funds interest rate
- INFL: Inflation
- PROD: Production
- UNEMPL: Unemployment
- COMMPRI: Commodity prices
- PCE: Personal consumption expenditure
- PERSINC: Personal income
- HOUST: Housing starts

(a) Use general-to-specific to come to a model. Start by regressing the federal funds rate on the other 7 variables and eliminate 1 variable at a time.

Análisis de regresión lineal

Variable	N	R^2	R^2 Aj	ECMP	AIC	BIC
INTRATE	660	0.56	0.56	5.82	3034.26	3047.74

Eliminación backward. Máximo p-valor para retener: 0.05
Número original de regresoras: 1,regresoras retenidas en el modelo 1

Coeficientes de regresión y estadísticos asociados

Coef	Est.	E.E.	LI(95%)	LS(95%)	T	p-valor	CpMallows	VIF
const	1.64	0.16	1.33	1.96	10.37	<0.0001		
INFL	0.94	0.03	0.88	1.01	28.93	<0.0001	836.70	1.00

Error cuadrático medio: 5.774363

Análisis de regresión lineal

Variable	N	R^2	R^2 Aj	ECMP	AIC	BIC
INTRATE	660	0.61	0.61	5.14	2951.85	2969.82

Eliminación backward. Máximo p-valor para retener: 0.05
Número original de regresoras: 2,regresoras retenidas en el modelo 2

Coeficientes de regresión y estadísticos asociados

Coef	Est.	E.E.	LI(95%)	LS(95%)	T	p-valor	CpMallows	VIF
const	0.45	0.20	0.07	0.83	2.31	0.0211		
INFL	1.01	0.03	0.95	1.07	32.16	<0.0001	1034.45	1.05
PERSINC	0.44	0.05	0.35	0.53	9.47	<0.0001	91.50	1.05

Error cuadrático medio: 5.088859

Análisis de regresión lineal

Variable	N	R^2	R^2 Aj	ECMP	AIC	BIC
INTRATE	660	0.62	0.62	5.12	2946.77	2969.23

Eliminación backward. Máximo p-valor para retener: 0.05
Número original de regresoras: 3,regresoras retenidas en el modelo 3

Coeficientes de regresión y estadísticos asociados

Coef	Est.	E.E.	LI(95%)	LS(95%)	T	p-valor	CpMallows	VIF
const	0.45	0.19	0.07	0.83	2.32	0.0208		
INFL	0.99	0.03	0.93	1.05	30.70	<0.0001	943.82	1.12
PERSINC	0.35	0.05	0.25	0.46	6.46	<0.0001	44.64	1.52
UNEMPL	0.14	0.05	0.04	0.25	2.66	0.0080	10.07	1.45

Error cuadrático medio: 5.042220

Análisis de regresión lineal

Variable	N	R^2	R^2 Aj	ECMP	AIC	BIC
INTRATE	660	0.62	0.62	5.09	2942.16	2964.62

Eliminación backward. Máximo p-valor para retener: 0.05
Número original de regresoras: 4,regresoras retenidas en el modelo 3

Coeficientes de regresión y estadísticos asociados

Coef	Est.	E.E.	LI(95%)	LS(95%)	T	p-valor	CpMallows	VIF
const	0.02	0.23	-0.43	0.48	0.10	0.9190		
INFL	0.87	0.05	0.77	0.97	17.23	<0.0001	299.43	2.79
PERSINC	0.30	0.06	0.19	0.42	5.12	<0.0001	29.16	1.79
PCE	0.18	0.05	0.08	0.29	3.42	0.0007	14.70	2.96

Error cuadrático medio: 5.007160

Análisis de regresión lineal

Variable	N	R^2	R^2 Aj	ECMP	AIC	BIC
INTRATE	660	0.63	0.63	4.94	2920.38	2947.33

Eliminación backward. Máximo p-valor para retener: 0.05
Número original de regresoras: 5,regresoras retenidas en el modelo 4

Coeficientes de regresión y estadísticos asociados

Coef	Est.	E.E.	LI(95%)	LS(95%)	T	p-valor	CpMallows	VIF
const	-0.21	0.23	-0.66	0.24	-0.91	0.3633		
INFL	0.74	0.06	0.63	0.86	13.19	<0.0001	177.58	3.57
PERSINC	0.26	0.06	0.14	0.37	4.33	<0.0001	22.71	1.84
PCE	0.31	0.06	0.20	0.43	5.32	<0.0001	32.24	3.72
HOUST	-0.02	4.4E-03	-0.03	-0.01	-4.90	<0.0001	28.00	1.37

Error cuadrático medio: 4.837317

Análisis de regresión lineal

Variable	N	R^2	R^2 Aj	ECMP	AIC	BIC
INTRATE	660	0.64	0.63	4.90	2914.28	2945.72

Eliminación backward. Máximo p-valor para retener: 0.05
Número original de regresoras: 6,regresoras retenidas en el modelo 5

Coeficientes de regresión y estadísticos asociados

Coef	Est.	E.E.	LI(95%)	LS(95%)	T	p-valor	CpMallows	VIF
const	-0.24	0.23	-0.69	0.22	-1.03	0.3051		
INFL	0.72	0.06	0.61	0.83	12.60	<0.0001	163.46	3.67
PERSINC	0.24	0.06	0.12	0.36	4.05	0.0001	21.40	1.86
PCE	0.34	0.06	0.22	0.46	5.76	<0.0001	38.14	3.84
HOUST	-0.02	4.4E-03	-0.03	-0.01	-4.68	<0.0001	26.89	1.38
COMMPRI	-0.01	2.6E-03	-0.01	-2.3E-03	-2.84	0.0046	13.06	1.07

Error cuadrático medio: 4.785620

Análisis de regresión lineal

Variable	N	R^2	R^2 Aj	ECMP	AIC	BIC
INTRATE	660	0.64	0.63	4.90	2914.28	2945.72

Eliminación backward. Máximo p-valor para retener: 0.05
Número original de regresoras: 7,regresoras retenidas en el modelo 5

Coeficientes de regresión y estadísticos asociados

Coef	Est.	E.E.	LI(95%)	LS(95%)	T	p-valor	CpMallows	VIF
const	-0.24	0.23	-0.69	0.22	-1.03	0.3051		
INFL	0.72	0.06	0.61	0.83	12.60	<0.0001	163.46	3.67
PERSINC	0.24	0.06	0.12	0.36	4.05	0.0001	21.40	1.86
PCE	0.34	0.06	0.22	0.46	5.76	<0.0001	38.14	3.84
HOUST	-0.02	4.4E-03	-0.03	-0.01	-4.68	<0.0001	26.89	1.38
COMMPRI	-0.01	2.6E-03	-0.01	-2.3E-03	-2.84	0.0046	13.06	1.07

Error cuadrático medio: 4.785620

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-.215	.245		-.877	.381	-.695	.266
	INFL	.697	.062	.552	11.233	.000	.575	.819
	PROD	-.058	.040	-.076	-1.445	.149	-.136	.021
	UNEMPL	.104	.097	.056	1.078	.282	-.086	.294
	COMMPRI	-.006	.003	-.051	-1.858	.064	-.011	.000
	PCE	.343	.069	.268	4.949	.000	.207	.479
	PERSINC	.246	.061	.134	4.071	.000	.128	.365
	HOUST	-.019	.005	-.122	-4.157	.000	-.029	-.010
2	(Constant)	-.286	.236		-1.211	.226	-.749	.178
	INFL	.694	.062	.550	11.198	.000	.572	.816
	PROD	-.025	.026	-.033	-.963	.336	-.075	.026
	COMMPRI	-.007	.003	-.060	-2.316	.021	-.012	-.001
	PCE	.367	.065	.287	5.611	.000	.239	.496
	PERSINC	.251	.060	.136	4.161	.000	.133	.370
	HOUST	-.021	.004	-.132	-4.760	.000	-.030	-.012
3	(Constant)	-.236	.230		-1.026	.305	-.688	.216
	INFL	.718	.057	.568	12.598	.000	.606	.830
	COMMPRI	-.007	.003	-.069	-2.842	.005	-.013	-.002
	PCE	.340	.059	.266	5.761	.000	.224	.456
	PERSINC	.240	.059	.130	4.052	.000	.124	.357
	HOUST	-.021	.004	-.129	-4.682	.000	-.029	-.012

a. Dependent Variable: INTRATE

INTRATE=-0.236+0.718*INFL+0.240*PERSINC+0.340*PCE-0.021*HOUST-0.007*COMMPRI

(b) Use specific-to-general to come to a model. Start by regressing the federal funds rate on only a constant and add 1 variable at a time. Is the model the same as in (a)?

Análisis de regresión lineal

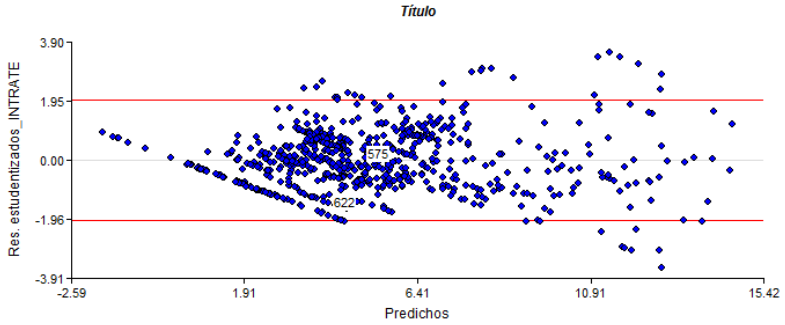
Variable	N	R^2	R^2 Aj	ECMP	AIC	BIC
INTRATE	660	0.64	0.63	4.93	2915.34	2951.28

Selección Forward. Máximo p-valor para entrar: 0.05
Número original de regresoras: 7,regresoras retenidas en el modelo 6

Coeficientes de regresión y estadísticos asociados

Coef	Est.	E.E.	LI(95%)	LS(95%)	T	p-valor	CpMallows	VIF
const	-0.29	0.24	-0.75	0.18	-1.21	0.2263		
PCE	0.37	0.07	0.24	0.50	5.61	<0.0001	37.43	4.72
PROD	-0.02	0.03	-0.08	0.03	-0.96	0.3357	6.93	2.06
INFL	0.69	0.06	0.57	0.82	11.20	<0.0001	131.20	4.35
HOUST	-0.02	4.4E-03	-0.03	-0.01	-4.76	<0.0001	28.63	1.40
PERSINC	0.25	0.06	0.13	0.37	4.16	<0.0001	23.29	1.93
COMMPRI	-0.01	2.8E-03	-0.01	-9.9E-04	-2.32	0.0209	11.36	1.23

Error cuadrático medio: 4.786145



Análisis de regresión lineal

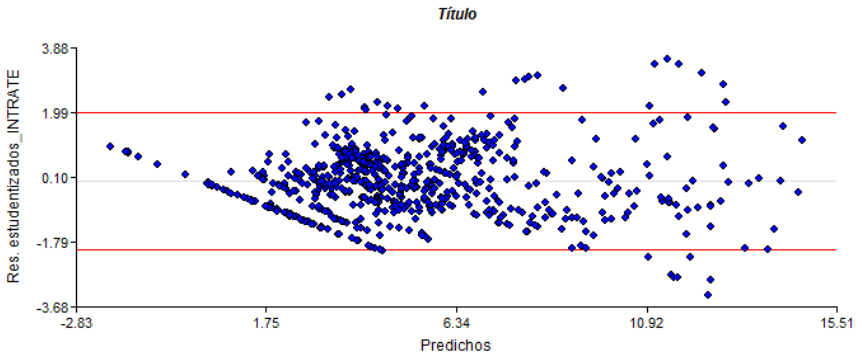
Variable	N	R^2	R^2 Aj	ECMP	AIC	BIC
INTRATE	660	0.64	0.63	4.90	2914.28	2945.72

Selección Forward. Máximo p-valor para entrar: 0.05
Número original de regresoras: 6,regresoras retenidas en el modelo 5

Coeficientes de regresión y estadísticos asociados

Coef	Est.	E.E.	LI(95%)	LS(95%)	T	p-valor	CpMallows	VIF
const	-0.24	0.23	-0.69	0.22	-1.03	0.3051		
INFL	0.72	0.06	0.61	0.83	12.60	<0.0001	163.46	3.67
PCE	0.34	0.06	0.22	0.46	5.76	<0.0001	38.14	3.84
HOUST	-0.02	4.4E-03	-0.03	-0.01	-4.68	<0.0001	26.89	1.38
PERSINC	0.24	0.06	0.12	0.36	4.05	0.0001	21.40	1.86
COMMPRI	-0.01	2.6E-03	-0.01	-2.3E-03	-2.84	0.0046	13.06	1.07

Error cuadrático medio: 4.785620



Análisis de regresión lineal

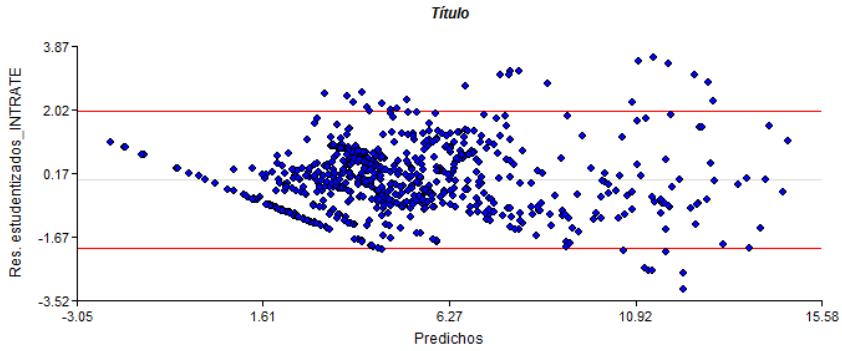
Variable	N	R^2	R^2 Aj	ECMP	AIC	BIC
INTRATE	660	0.63	0.63	4.94	2920.38	2947.33

Selección Forward. Máximo p-valor para entrar: 0.05
Número original de regresoras: 5,regresoras retenidas en el modelo 4

Coeficientes de regresión y estadísticos asociados

Coef	Est.	E.E.	LI(95%)	LS(95%)	T	p-valor	CpMallows	VIF
const	-0.21	0.23	-0.66	0.24	-0.91	0.3633		
PCE	0.31	0.06	0.20	0.43	5.32	<0.0001	32.24	3.72
INFL	0.74	0.06	0.63	0.86	13.19	<0.0001	177.58	3.57
HOUST	-0.02	4.4E-03	-0.03	-0.01	-4.90	<0.0001	28.00	1.37
PERSINC	0.26	0.06	0.14	0.37	4.33	<0.0001	22.71	1.84

Error cuadrático medio: 4.837317



Análisis de regresión lineal

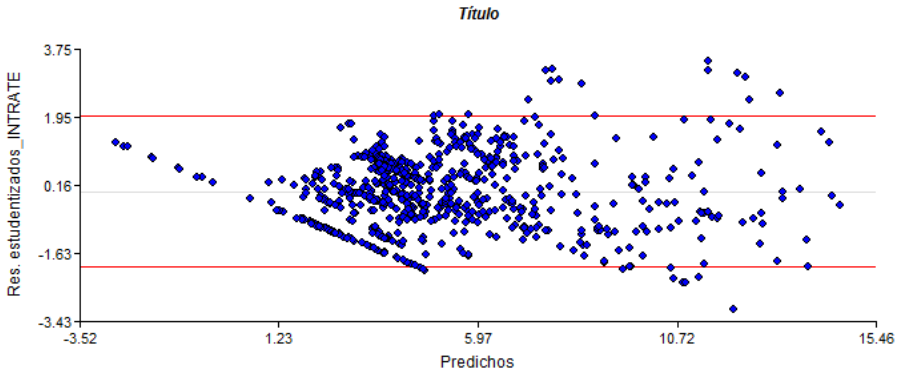
Variable	N	R^2	R^2 Aj	ECMP	AIC	BIC
INTRATE	660	0.62	0.62	5.09	2942.16	2964.62

Selección Forward. Máximo p-valor para entrar: 0.05
Número original de regresoras: 4,regresoras retenidas en el modelo 3

Coeficientes de regresión y estadísticos asociados

Coef	Est.	E.E.	LI(95%)	LS(95%)	T	p-valor	CpMallows	VIF
const	0.02	0.23	-0.43	0.48	0.10	0.9190		
INFL	0.87	0.05	0.77	0.97	17.23	<0.0001	299.43	2.79
PCE	0.18	0.05	0.08	0.29	3.42	0.0007	14.70	2.96
PERSINC	0.30	0.06	0.19	0.42	5.12	<0.0001	29.16	1.79

Error cuadrático medio: 5.007160



Análisis de regresión lineal

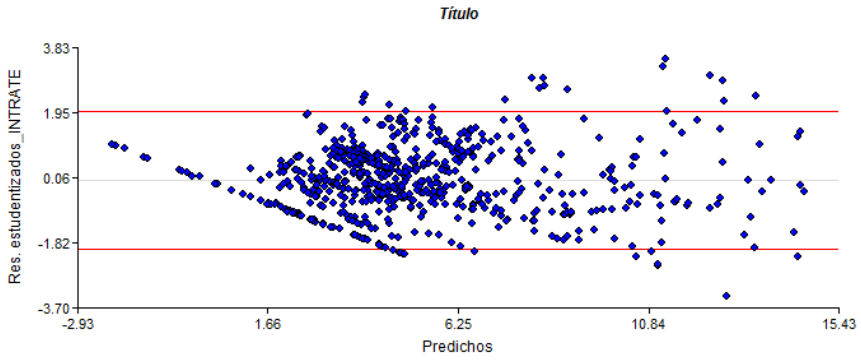
Variable	N	R^2	R^2 Aj	ECMP	AIC	BIC
INTRATE	660	0.61	0.61	5.14	2951.85	2969.82

Selección Forward. Máximo p-valor para entrar: 0.05
Número original de regresoras: 3,regresoras retenidas en el modelo 2

Coeficientes de regresión y estadísticos asociados

Coef	Est.	E.E.	LI(95%)	LS(95%)	T	p-valor	CpMallows	VIF
const	0.45	0.20	0.07	0.83	2.31	0.0211		
INFL	1.01	0.03	0.95	1.07	32.16	<0.0001	1034.45	1.05
PERSINC	0.44	0.05	0.35	0.53	9.47	<0.0001	91.50	1.05

Error cuadrático medio: 5.088859



Análisis de regresión lineal

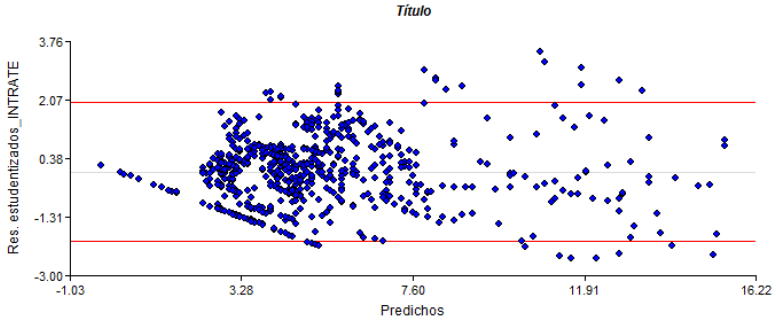
Variable	N	R^2	R^2 Aj	ECMP	AIC	BIC
INTRATE	660	0.56	0.56	5.82	3034.26	3047.74

Selección Forward. Máximo p-valor para entrar: 0.05
Número original de regresoras: 2,regresoras retenidas en el modelo 1

Coeficientes de regresión y estadísticos asociados

Coef	Est.	E.E.	LI(95%)	LS(95%)	T	p-valor	CpMallows	VIF
const	1.64	0.16	1.33	1.96	10.37	<0.0001		
INFL	0.94	0.03	0.88	1.01	28.93	<0.0001	836.70	1.00

Error cuadrático medio: 5.774363



Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.644	.159		10.370	.000	1.333	1.955
	INFL	.945	.033	.748	28.930	.000	.881	1.009
2	(Constant)	.451	.195		2.311	.021	.068	.834
	INFL	1.012	.031	.801	32.156	.000	.950	1.073
	PERSINC	.435	.046	.236	9.468	.000	.345	.526
3	(Constant)	.023	.230		.102	.919	-.429	.476
	INFL	.875	.051	.693	17.230	.000	.775	.974
	PERSINC	.305	.060	.165	5.118	.000	.188	.421
	PCE	.182	.053	.142	3.423	.001	.077	.286
4	(Constant)	-.210	.231		-.910	.363	-.665	.244
	INFL	.745	.056	.590	13.185	.000	.634	.856
	PERSINC	.257	.059	.139	4.329	.000	.140	.373
	PCE	.311	.058	.243	5.318	.000	.196	.425
	HOUST	-.022	.004	-.136	-4.902	.000	-.030	-.013
5	(Constant)	-.236	.230		-1.026	.305	-.688	.216
	INFL	.718	.057	.568	12.598	.000	.606	.830
	PERSINC	.240	.059	.130	4.052	.000	.124	.357
	PCE	.340	.059	.266	5.761	.000	.224	.456
	HOUST	-.021	.004	-.129	-4.682	.000	-.029	-.012
	COMMPRI	-.007	.003	-.069	-2.842	.005	-.013	-.002

a. Dependent Variable: INTRATE

Model

INTRATE= -0.236 +0.718*INFL+0.240*PERSINC+0.340*PCE-0.021*HOUST-0.007COMMPRI

It is exactly the same in model a.

(c) Compare your model from (a) and the Taylor rule of equation (1). Consider R2, AIC and BIC. Which of the models do you prefer?

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.758[a]	.575	.574	2.3635700	.575	444.128	2	657	.000

a. Predictors: (Constant), PROD, INFL

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4962.205	2	2481.103	444.128	.000[b]
	Residual	3670.306	657	5.586		
	Total	8632.512	659			

a. Dependent Variable: INTRATE

b. Predictors: (Constant), PROD, INFL

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.251	.176		7.103	.000	.905	1.597
	INFL	.974	.033	.772	29.792	.000	.910	1.039
	PROD	.095	.020	.125	4.810	.000	.056	.133

a. Dependent Variable: INTRATE

It=1.251+0.974*INFL+0.095*PROD

Análisis de regresión lineal

Variable	N	R^2	R^2 Aj	ECMP	AIC	BIC
INTRATE	660	0.57	0.56	5.82	3034.26	3047.74

Rsquare = 57.5% in (c) is lower than Rsquare in (a) 64% even in AIC, BIC is lower than Taylor Rule

Variable	N	R^2	R^2 Aj	ECMP	AIC	BIC
INTRATE	660	0.64	0.63	4.90	2914.28	2945.72

Selección Forward. Máximo p-valor para entrar: 0.05

Número original de regresoras: 6,regresoras retenidas en el modelo 5

I prefer model (a) is much stronger.

(d) Test the Taylor rule of equation (1) using the RESET test, Chow break and forecast test (with in both tests as break date January 1985) and a Jarque-Bera test. What do you conclude?

In 1085 is a breakpoint p-0.000 therefore there is a structural change.