

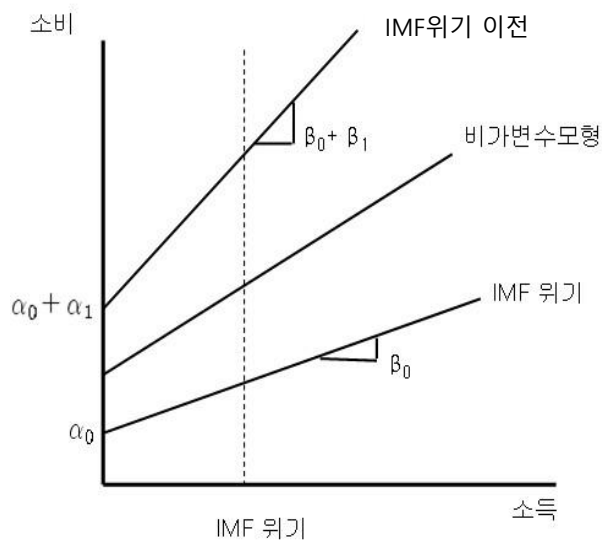
# 10주차 1차시 : R 실습(가변수모형 1)

## 1.가변수모형 1

## 1.가변수모형 1

$$C_t = \alpha_0 + \alpha_1 D_t + \beta_0 Y_t + \beta_1 D_t Y_t + u_t$$

$$\text{단, } D_t = \begin{cases} 1, IMF\text{위기 이전}(1995:1 \sim 1997:4) \\ 0, IMF\text{위기}(1998:1 \sim 2001:1) \end{cases}$$



> (cbind(y,c,d,dy))

		y	c	d	dy
1995	Q1	93061.99	58431.8	1	93061.99
1995	Q2	93613.55	59455.3	1	93613.55
1995	Q3	94788.82	61165.7	1	94788.82
1995	Q4	95894.36	63787.3	1	95894.36
1996	Q1	99094.99	62845.6	1	99094.99
1996	Q2	99903.92	63957.8	1	99903.92
1996	Q3	100951.85	64929.8	1	100951.85
1996	Q4	102886.05	68684.3	1	102886.05
1997	Q1	103604.50	65445.2	1	103604.50
1997	Q2	106036.68	66575.1	1	106036.68
1997	Q3	106458.19	68103.8	1	106458.19
1997	Q4	106926.21	68598.5	1	106926.21
1998	Q1	99153.69	58780.6	0	0.00
1998	Q2	97622.45	58902.6	0	0.00
1998	Q3	97887.44	60811.6	0	0.00
1998	Q4	100077.50	63193.2	0	0.00
1999	Q1	104465.50	62768.3	0	0.00
1999	Q2	108484.40	64474.1	0	0.00
1999	Q3	110529.11	67192.6	0	0.00
1999	Q4	114271.82	70045.3	0	0.00
2000	Q1	116666.09	68711.6	0	0.00
2000	Q2	118947.45	69481.3	0	0.00
2000	Q3	120696.31	70508.4	0	0.00
2000	Q4	119995.03	72155.9	0	0.00
2001	Q1	120633.92	68975.7	0	0.00

```
> stargazer(m1.lm, m2.lm, m3.lm, type="text", title="Regression Results of using Dummy Variab
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Regression Results of using Dummy variable
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	Dependent variable:		
	(1)	c (2)	(3)
d	3,418.648*** (697.938)		-12,172.840 (9,656.625)
y	0.509*** (0.040)	0.504*** (0.038)	0.476*** (0.044)
dy		0.034*** (0.007)	0.152 (0.094)
Constant	9,854.362** (4,432.226)	10,433.910** (4,236.569)	13,476.090** (4,827.492)
Observations	25	25	25
R2	0.884	0.889	0.897
Adjusted R2	0.874	0.879	0.882
Residual Std. Error	1,447.710 (df = 22)	1,415.773 (df = 22)	1,397.192 (df = 21)
F Statistic	83.870*** (df = 2; 22)	88.199*** (df = 2; 22)	60.903*** (df = 3; 21)

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Note:
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*p<0.1; **p<0.05; ***p<0.01
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-----
> jointHo<-c("d","dy")
> linearHypothesis(m3.lm, jointHo)
Linear hypothesis test
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Hypothesis:
d = 0
dy = 0
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Model 1: restricted model
Model 2: c ~ d + y + dy
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	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	23	96393877				
2	21	40995058	2	55398818	14.189	0.0001262 ***

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Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

(case 3)절편과 기울기의 동시변화를 나타내는 가변수

$$C_t = \alpha_0 + \alpha_1 D_t + \beta_0 Y_t + \beta_1 D_t Y_t + u_t$$

$$\text{단, } D_t = \begin{cases} 1, IMF\text{위기 이전}(1995:1 \sim 1997:4) \\ 0, IMF\text{위기}(1998:1 \sim 2001:1) \end{cases}$$

(IMF위기)  $C_t = \alpha_0 + \beta_0 Y_t + u_t$

(IMF위기 이전)  $C_t = (\alpha_0 + \alpha_1) + (\beta_0 + \beta_1) Y_t + u_t$

Regression Results of separate period

Dependent variable:			
	(1)	(2)	(3)
d	-12,172.840 (9,656.625)		
y	0.476*** (0.044)	0.629*** (0.080)	0.476*** (0.045)
dy	0.152 (0.094)		
Constant	13,476.090** (4,827.492)	1,303.246 (8,060.937)	13,476.090** (4,980.879)
Observations	25	12	13
R2	0.897	0.860	0.910
Adjusted R2	0.882	0.846	0.902
Residual Std. Error	1,397.192 (df = 21)	1,346.670 (df = 10)	1,441.586 (df = 11)
F Statistic	60.903*** (df = 3; 21)	61.279*** (df = 1; 10)	111.266*** (df = 1; 11)

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

(case 2) 기울기의 변화를 나타내는 가변수

$$C_t = \beta_0 + \beta_1 Y_t + \beta_2 D_t Y_t + u_t$$

$$\text{단, } D_t = \begin{cases} 1, IMF\text{위기 이전}(1995:1 \sim 1997:4) \\ 0, IMF\text{위기}(1998:1 \sim 2001:1) \end{cases}$$

(IMF위기)  $C_t = \beta_0 + \beta_1 Y_t + u_t$

(IMF위기 이전)  $C_t = \beta_0 + (\beta_1 + \beta_2) Y_t + u_t$

Regression Results of separate period

Dependent variable: C			
	(1)	(2)	(3)
y	0.504*** (0.038)	0.504*** (0.004)	0.538*** (0.004)
dy	0.034*** (0.007)		
Constant	10,433.910** (4,236.569)		
Observations	25	13	12
R2	0.889	1.000	1.000
Adjusted R2	0.879	1.000	1.000
Residual Std. Error	1,415.773 (df = 22)	1,403.422 (df = 12)	1,363.884 (df = 11)
F Statistic	88.199*** (df = 2; 22)	28,731.620*** (df = 1; 12)	26,759.200*** (df = 1; 11)

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

(case 1) 절편의 변화를 나타내는 가변수

$$C_t = \beta_0 + \beta_1 Y_t + \beta_2 D_t + u_t$$

$$\text{단, } D_t = \begin{cases} 1, IMF\text{위기 이전}(1995:1 \sim 1997:4) \\ 0, IMF\text{위기}(1998:1 \sim 2001:1) \end{cases}$$

(IMF위기)  $C_t = \beta_0 + \beta_1 Y_t + u_t$

(IMF위기 이전)  $C_t = (\beta_0 + \beta_2) + \beta_1 Y_t + u_t$

Regression Results of separate period

Dependent variable:			
	(1)	<sup>c</sup> (2)	(3)
d	3,418.648*** (697.938)		
y	0.509*** (0.040)		
Constant	9,854.362** (4,432.226)	9,854.357*** (391.952)	13,273.010*** (409.575)
Observations	25	13	12
R2	0.884	0.000	0.000
Adjusted R2	0.874	0.000	0.000
Residual Std. Error	1,447.710 (df = 22)	1,413.204 (df = 12)	1,418.810 (df = 11)
F Statistic	83.870*** (df = 2; 22)		

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

## 1.가변수모형 1(b2-ch4-1-rev.R) (download from <http://kanggc.iptime.org/em/em.html>)

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library(car)
library(stargazer)
data<-read.table("http://kanggc.iptime.org/book/data/dummy.txt",
header=T)
y<-ts(data$GDP, start=c(1995,1), frequency=4)
c<-ts(data$CONSUME, start=c(1995,1), frequency=4)
n=length(c)
tr=1:n
tr
d.log<-tr <= 12
d.log
d<-as.numeric(d.log)
d
dy<-d*y
(cbind(y,c,d,dy))
m1.lm<-lm(c~d+y)
summary(m1.lm)
m2.lm<-lm(c~y+dy)
summary(m2.lm)
m3.lm<-lm(c~d+y+dy)
summary(m3.lm)
stargazer(m1.lm, m2.lm, m3.lm, type="text", title="Regression Res
ults of using Dummy Variable")
  
```

```

(계속)
jointHo<-c("d","dy")
linearHypothesis(m3.lm, jointHo)
m4.lm<-lm(c~y, data=data, subset=(d==1))
summary(m4.lm)
m5.lm<-lm(c~y, data=data, subset=(d==0))
summary(m5.lm)
stargazer(m4.lm, m5.lm, type="text", title="Regression Results of separa
te period")

m1_1.lm<-lm(c~offset(0.5092*y), data=data, subset=(d==0))
summary(m1_1.lm)
m1_2.lm<-lm(c~offset(0.5092*y), data=data, subset=(d==1))
summary(m1_2.lm)
stargazer(m1.lm, m1_1.lm, m1_2.lm, type="text", title="Regression Resul
ts of separate period")

m2_1.lm<-lm(c~y-1, offset=rep(10434,length(c)), data=data, subset=(d
==0))
summary(m2_1.lm)
m2_2.lm<-lm(c~y-1, offset=rep(10434, length(c)), data=data, subset=(
d==1))
summary(m2_2.lm)
stargazer(m2.lm, m2_1.lm, m2_2.lm, type="text", title="Regression Resul
ts of separate period")
  
```