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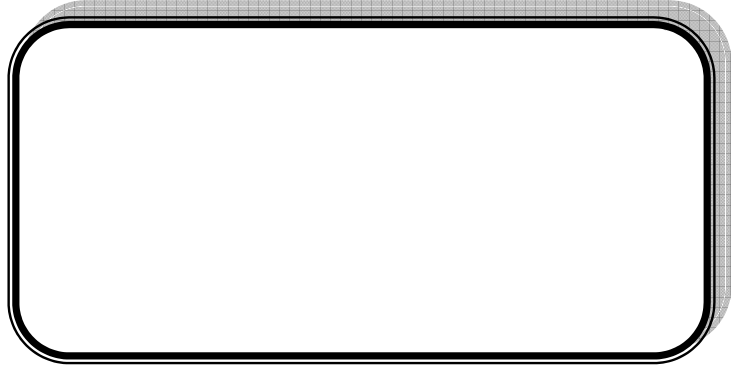
إهداء

شكر و تقدير

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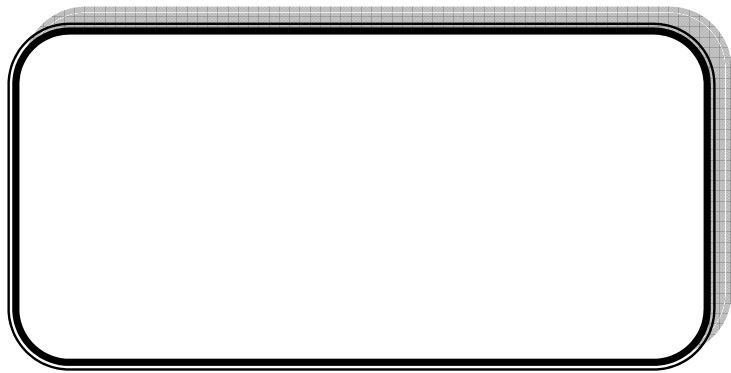
05		:	
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03			-1
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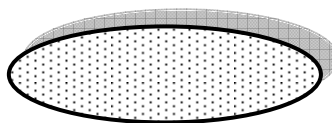
24		-3
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26	(TPPA)	-5
27	(TPTI) :	
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43		
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44		- 1
44	(1963-1962)	-1 .1
44	(1973-1964)	-2 .1
45	(1994-1973)	- 2
47	(1986-1973) (<i>passive</i>)	- 1 .2
48	(1994-1986) (<i>active</i>)	- 2 .2

50	1994	(<i>flottement</i>)	- 3
50	(1995	1994) (<i>le fixing</i>)	- 1 .3
51		(1996)	- 2 .3
			:
53		1993-1989	- 1
53			- 1 .1
54			- 2 .1
54			- 3 .1
56		(1993-1992)	- 4 .1
57			- 5 .1
58			- 6 .1
61		1998-1994	- 2
61		(PAS)	- 1 .2
62			- 2 .2
62			- 3 .2
65			- 4 .2
67		1999	- 3
67			- 1 .3
69			- 2 .3
69			- 3 .3
70			- 4 .3
72			
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74			
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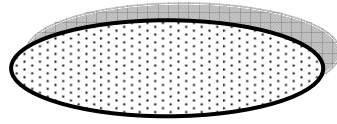
76		<i>VAR</i>	-1
76			-1 .1
76		<i>VAR(P)</i>	-2 .1
77		<i>VAR</i>	-3 .1
78			-2
78			-1 .2
81			-2 .2
81		<i>VAR MAX,VARX,VARMA</i>	-3
82			-4
83		<i>VAR</i>	-5
83			-1 .5
85			-2 .5
87		:	-1
87			- 1 .1
88			- 2 .1
90			- 3 .1
92	<i>VAR</i>		- 4 .1
93			- 2
94			- 3
96		:	- 1
96		<i>VAR</i>	- 1 .1
97			- 2 .1
100		<i>VAR</i>	- 3 .1
104			- 4 .1
105			- 5 .1
106			

108		- 6 .1
109		-2
110	(2001:01)	- 1 .2
111	(2003:04 /2001:01)	- 2 .2

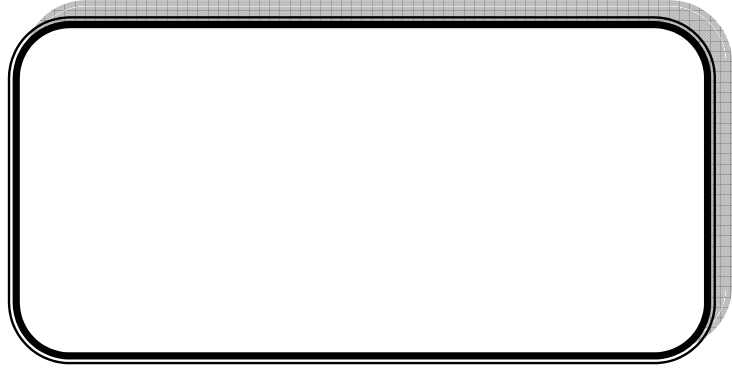




29		-	1 .2
30		-	2 .2
37		-	3 .2
38		-	4 .2
39		-	5 .2
53	(M2/PIB)	-	6 .3
			.(1993/1989)
55	/)	-	7 .3
			(2001/1989) (
57	.(1993/1991)	-	8 .3
57	:01)	-	9 .3
			.(1993:04/1990
59	(1994/1989)	-	10 .3
65	.(1998/1994)	-	11 .3
66		-	
			.(1998:04/1994:01)
68		-	13 .3
			.(2001:04/1998:01)
88		-	14 .3



9	.1946	-	1 .1
46	(1993/1990)	-	2 .3
54	(1994/1989)	-	3 .3
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99		-	7 .4
108	(2001:01) %20	-	8 .4
109	(2003:04/2001:01) %20	-	9 .4
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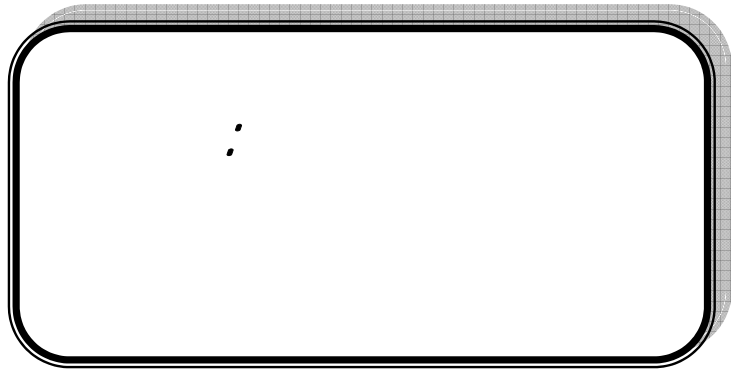
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2003

1990

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¹ - مصار منصف، "اشكالية سعر الصرف في الجزائر التخفيض أو سعر الصرف المتعدد"، مجلة معهد العلوم الاقتصادية، جامعة الجزائر، عدد 05، 1994.1995 ص 51.



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¹ - د. اسامة محمد (الغولي) ومجدي محمد شهاب ، " العلاقات الاقتصادية الدولية "، دار الجامعة الجديدة للنشر. 1997. ص 292.

² - PHILIPPE Avoyo ,ET Autres, « *finance appliquée* », paris, dunod, 1993.p53.

³ - د. حمدي (عبد العظيم) ، " سياسة سعر الصرف وعلاقته بالموازنة العامة للدولة "، مكتبة النهضة المصرية ، القاهرة ، 1984. ص 96.

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/) x = . (

.⁴

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. 0.5 = 1
(50/100) x 0.5 = ()
1 = 50 / 50 =

(0.55 = 1) % 10

(1.1)
% 10

%10

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⁴ -PERYRARD Josette , « *Gestion Financiere Internationale* »,3éme edtion , vuibert,paris.1995.p70.

⁵ -KRUGMAN.P et OBSTFELED.R, « *Economie Internationale* » , Belgique.1992.p470.

- 3.2

$$TCEN = \prod_{i=1}^n (ITNi)^{\alpha_i}$$

(...)	/	/	/	
60	40	122		2002
65	45	124		2003
0.6	0.25	0.15		α_i

(Année de base) 2002

(...)	/	/	/	
60	40	122		2002
65	45	124		2003 ⁶

⁶ - القيمة المتحصل عليها في 2003 تم حسابها كالتالي : قيمة سنة 2002 / قيمة سنة 2003 x 100.

: 2003 (TCEN)

$$TCNE = (108)^{0.6} \cdot (112)^{0.25} \cdot (101)^{0.15} = 107.89$$

.%7.89

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(TCER)

(TCER)

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$$TCER = \prod_{i=1}^n [Ri(Pe/Pi)]^{Wi}$$

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.Ri(Pe/Pi) (TCER) Pi

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1914

"1"

0.290

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⁷-FAUGERE.J-P et VOISIN.C, « *Le Système Financier et Monétaire International* ».edtion.nathan.1994.p80.

⁸- د. الحريري (محمد خالد)، "الإقتصاد الدولي"، جامعة دمشق، سوريا.1977.ص108.

: - 2.1

: - 1.2.1

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⁹- PEYRARD Josette , op cit .p06.

¹⁰ - كثير من الدول، ومن بينهما أنكلترا تخلت عن القاعدة سنة 1931، و تركت فرنسا العمل بهذا النظام سنة 1936.

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0.003		
0.302		
0.206		

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¹¹ - د. الموسوي: (ضياء مجيد)، "نظام النقد الدولي"، المؤسسة الجزائرية للطباعة. 1987. ص 41.

¹² %1

% 10

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¹² - عقب اتفاق واشنطن ، عدل مجال تقلب أسعار الصرف ليصبح +/- 2.25%

¹³ -SALLES Pierre , « *Problèmes Economiques Généraux* »,6ème edition . dunod.paris .1986.p317.

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¹⁵ (DTS)

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¹⁴ - عطون مروان، أسعار صرف العملات"، دار الهدى الجزائر. 1992. ص104.

¹⁵ - عبارة عن متوسط مرجح لأسعار صرف العملات الخمسة الأساسية المكونة للسلة وهي : الدولار الأمريكي، المارك الألماني، الفرنك الفرنسي، اللين البياني والجنيه الإنجليزي.

¹⁶ - مندور احمد، "مقدمة في الاقتصاد الدولي"، الدار الجامعية. 1990. ص152.

¹⁷- KRUGMAN P et Obstfeld.R. op cit .p37.

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¹⁹ -SALLES Pierre : op cit.p318.

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²⁰ - سالفاتور (دومينيك) ، " الأقتصاد الدولي " ، سلسلة ملخصات شوم ، دار ماكجرو هيل للنشر .1984.ص187.

²¹ -BENISAAD.M.E. « *Lajustement Structurel Objectifs Expériences* ».alain.edition .Alger.1993.p117.

²² -BERGER.Pierre. « *La Monnaie et ses Mécanismes* ».edition bouchene.alger.1993.p73.

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²³ - الفار (ابراهيم محمد)، "سعر الصرف بين النظرية والتطبيق"، دار النهضة العربية، القاهرة. 1992. ص 70.

²⁴ -- د. حمدي (عبد العظيم)، مرجع سابق. ص 56.

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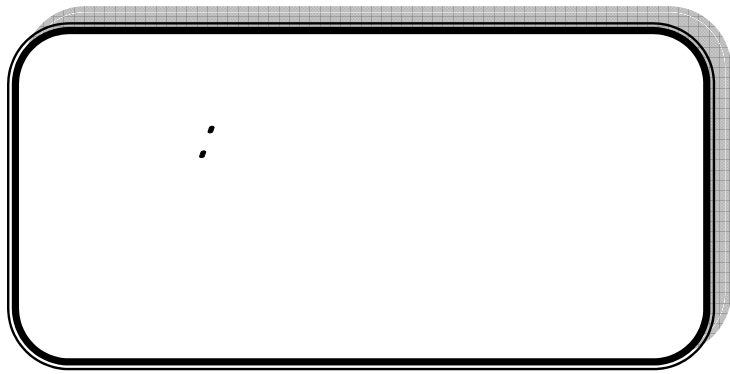
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(TPPA) () :

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$$S_t = \frac{P_t}{P_t^*} \quad (1.2)$$

:

: S_t

: P_t

: P_t^*

.A

t

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: A B N

$$P_t = \sum_{i=1}^N \alpha_i P_{it} \quad (2.2)$$

$$P_t^* = \sum_{i=1}^N \beta_i P_{it}^* \quad (3.2)$$

(i)

: α_i & β_i

:

$$S_{t,ppaa} = \frac{\sum \alpha_i P_i}{\sum \beta_i P_i} \quad (4.2)$$

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$$P_i = SP_i^*, i = 1 \dots N \quad (5.2)$$

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$$(0)$$

$$S_{ppaa}^{(0)} = \frac{\sum \alpha_i P_{i(0)}}{\sum \beta_i P_{i(0)}^*} \quad (6.2)$$

$$(0) \quad P_{i(1)}^* ; P_{i(1)} :$$

$$P_{I(1)} = \sum \alpha_i P_{i(1)} / \sum \alpha_i P_{i(0)} \quad (7.2)$$

$$P_{I(1)}^* = \sum \beta_i P_{i(1)}^* / \sum \beta_i P_{i(0)}^* \quad (8.2)$$

$$(1)$$

$$S_{ppaa}^{(1)} = \frac{S_{(0)} P_{I(1)}}{P_{I(1)}^*} \quad (9.2)$$

$$\frac{S_1 - S_0}{S_0} = \frac{I - I^*}{1 + I^*} \quad (10.2)$$

$$\frac{S_1 - S_0}{S_1} = I - I^* :$$

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$$R_t = \frac{S_t}{S_t^{ppaa}} \quad (11.2)$$

$$S_{ppaa} = P/P^*$$

$$R_t = S_t \frac{P^*}{P} \quad (12.2)$$

(1)

$$R_{t+n} = \frac{S_{t+n}}{S_{t+n}^{ppar}} \quad (13.2)$$

$$S_{t+n}^{ppar} = S_t (P_{t+n}/P_t) / (P_{t+n}^*/P_t^*) \quad (14.2)$$

$$R_{t+n} = \frac{S_{t+n}}{S_t [(P_{t+n}^*/P_t^*) / (P_{t+n}/P_t)]} \quad (15.2)$$

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$$MV = PY_{pe} \quad (16.2)$$

.() :M

: V

:P

:Y_{pe}

:Y -

:V -

: (P) (M)

$$\Delta P = \Delta M \text{ و } \Delta P^* = \Delta M^*$$

:

$$\Delta P^* \text{ و } \Delta M^*$$

:

$$\Delta P - \Delta P^* = \Delta M - \Delta M^* \quad (17.2)$$

$$\Delta M - \Delta M^* = \Delta S$$

⁴ --Patrick ARTUS : « *Economie des taux de change* », economica.paris.1997.p12.

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(KRUEGER⁵)

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(J.M.Keynse)

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:i x(1+i)

x :

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:i*

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:cc

$$\frac{x}{cc(1+i^*)}$$

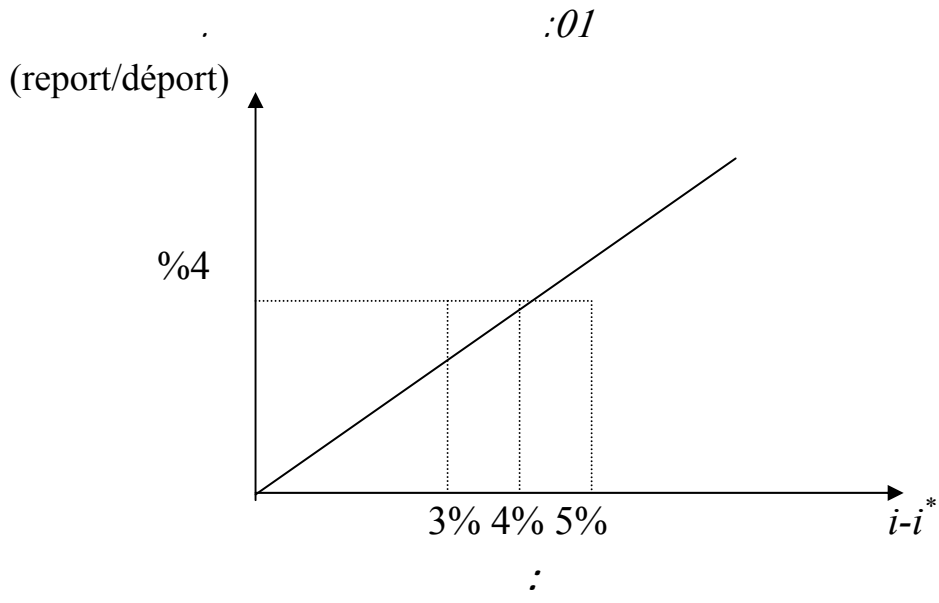
%2 %1

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%10

⁵ - Mc KINNON (Ronaldo) , « Money in International Exchange » , Oxford University Press (1979),repris dans KRUEGER(Anne.O) , « La Détermination du taux de change » ,édition Economica ,1985.P136.

⁶ -RICHARD.Baillie et PATRICK.Mcmahon : « Marche des change » , ED ESKA .Paris.1997.p145.



- 2.2

()

:

) Sa

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: i -

: i^* -

.($i^* + Sa$) :

i^*

.() : Sa

$$i - i^* = (Sa - S)/S = Sa \quad (23.2)$$

$$i - i^* = Sa \quad (24.2)$$

$$Sa > 0, i - i^* > 0 -$$

$$Sa < 0, i - i^* < 0 -$$

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$$Sa = i - i^* + \Pi \quad (25.2)$$

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: Sa

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(report ou déport)

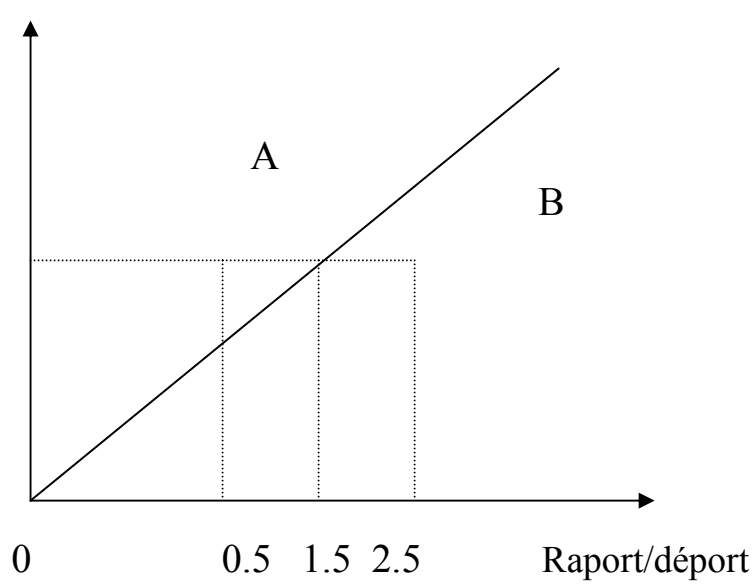
$$\Pi > 0$$

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.02 : (. .) :

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⁹ -BOURGUINAT.H : Op.Cit ,P385.

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¹⁰ -- *Dictionnaire d'économie et de sciences sociales*.p92.

¹¹ - HADJ NACER ABDERRAHMANE ROUSTOUMI : « *Les cahiers de réformes* », Edition ENAG N°5.1990.P120-147.

¹² -PIERRE HUBERT BRETON ET ARMAND DENIS SCHOR : « *la dévaluation* »QUE SAIS-JE ,édition bouchene.p4

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¹³ -EXCHANGE RATE POLICY ET EXCHANGE CONTROLS :*instruments of economic policy in africa association of africa central banks.p57.*

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(Ex) (Em)
: (Marshall-lermer)

$$Ex + Em > 1 \quad (26.2)$$

$$\cdot (X - M > 0)$$

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$$y = c + i + g + (x - z) \quad (27.2)$$

X

Px

$$X = X(Px), \quad X'Px < 0 \quad (28.2)$$

:

P

$$Px = eP \quad (29.2)$$

$$X = X(e, P), \quad \begin{matrix} X'e < 0 \\ X'P < 0 \end{matrix} \quad (30.2)$$

:

¹⁵: Y

$$Z = Z(Y, P, e), \quad \begin{matrix} Z'Y > 0 \\ Z'P > 0 \\ Z'e > 0 \end{matrix} \quad (31.2)$$

¹⁵ -BERAUD A. : « Introduction a l'analyse macroéconomique », édition anthropos.p462-467.

$$Y = C[Y - t(Y).a] + i(r) + g + X(p,e) - Z(Y,P,e) \quad (32.2)$$

(X)

(03) :

(t)

(S)

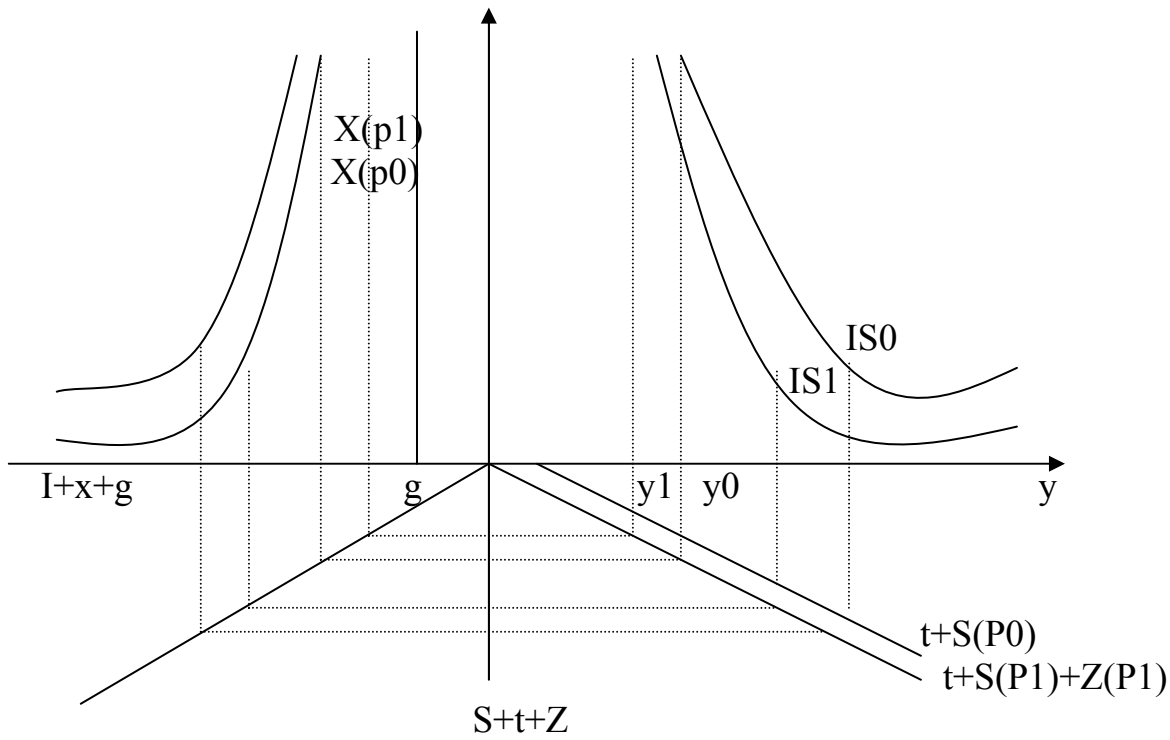
(Z)

(i, G)

P1 P0

IS1 IS0 IS

: 03



(32.2)

IS

:

$$\frac{dr}{dy} = \frac{I - c'(I - t') + z'}{i'r} < 0 \quad (33.2)$$

Z'

IS

Lm

IS

$$m = L(Y,r) \quad (34.2)$$

:

: E (r) (Y) Lm IS 05
 ()

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B

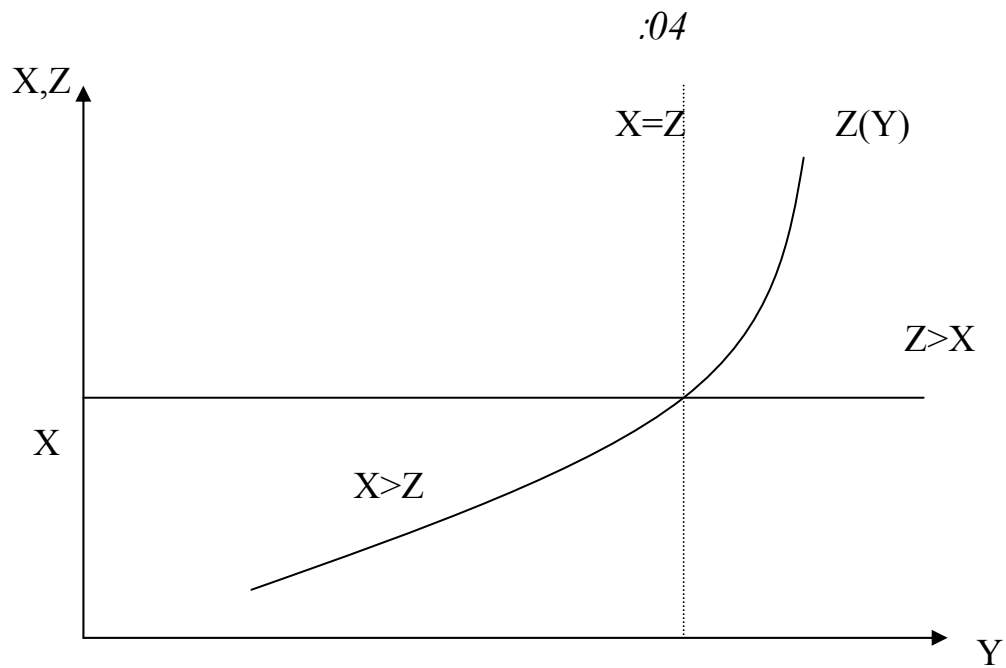
Z X F

$$B = X - Z + F \quad (35.2)$$

:

$$X - Z = P_x(P, e) - \frac{pf}{e.Z(Y, P, e)} \quad (36.2)$$

e pf P



.03:

\bar{Y}

Y

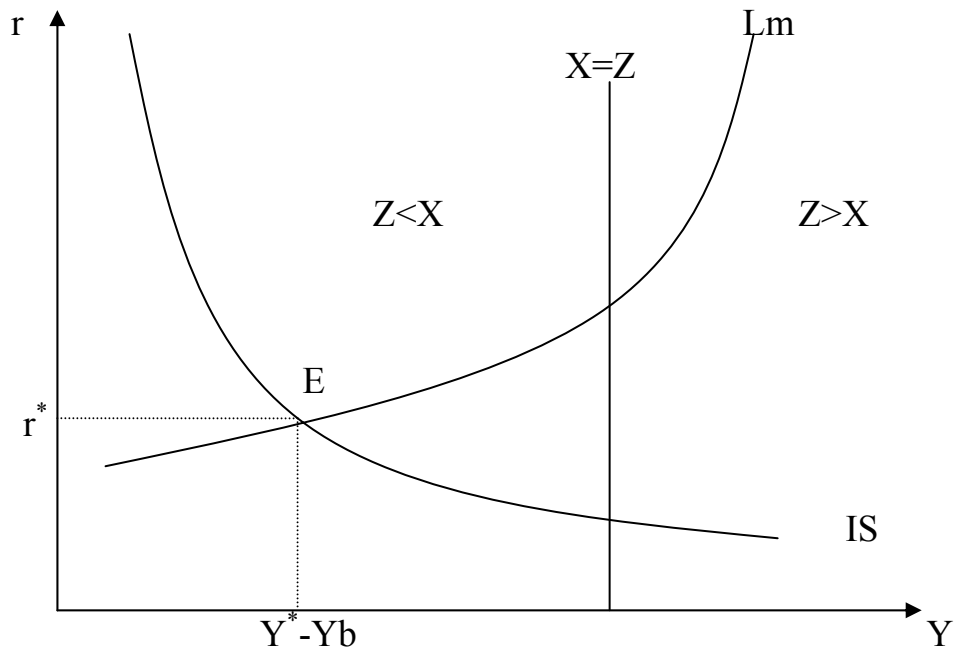
Lm

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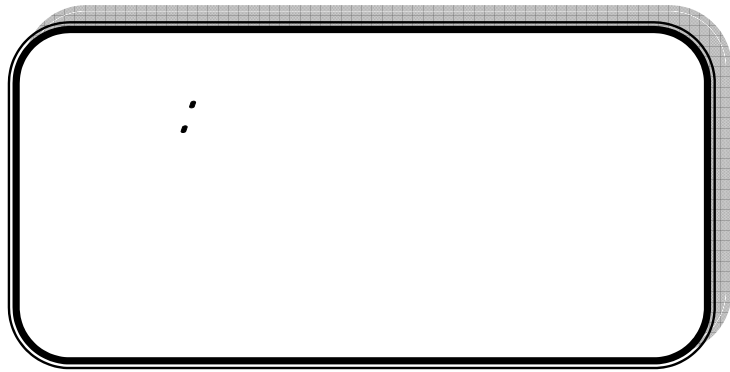
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¹ - كريم النشاشيبي، وآخرون: " الجزائر : تحقيق الاستقرار و التحول إلى اقتصاد السوق " دراسة خاصة 165 ، صندوق النقد الدولي، واشنطن.1998.ص01.

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.(flottement géré)

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: (1963-1962)

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- 1.1

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: (1973-1964)

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1964 10 ()

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 (%40)
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(X1):

(X0)

X_i ($i = 1,2,3,\dots,14$)

$$dX'_0 = \sum Z_i dX'_i \tag{1.3}$$

(%) : dX'_0

(i) : Z_i

(i) (%) : dX'_i

(t)

$$X_0(t) = X'_0(0) * (1 + dX'_0) \tag{2.3}$$

($X_0(0)$) :

:02

(%)	
40.15	
29.2	
11.5	
4	
3.85	
2.5	
2.25	
2	
1.5	
0.75	
0.2	
0.1	
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1.5	

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(fixing)

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17

1984³

:

•

•

" "

•

:(1986-1973) (passive)

- 1. 2

³ - BENBITOUR A , « *L'Algérie au Troisième Millénaire : D'fis et potentialités* » Ed. Marinoor .Alger.1998.p70.

4

:

-
-

. ()

%50

1980

:(1994-1986) (active)

- 2. 2

1986

()

:

⁴ - NASHASHIBI K. et autres , « *Algérie : stabilisation et transition à l'économie de marché* » . Fonds Monétaire International , washington.1998.p85.

:(rampantes)

- 1. 2. 2

1987

4.85

.1987

%160

1990

12.19

:

- 2. 2. 2

1991

(FMI)

1991

18.5

%22

.%22.5

.1991

%2

1980

%5

%4

1994

1991

24

⁵

%8.7

)

.(1993

PIB

.1993

%21.2

1992

%23.9

(M2)

.1993⁶

1991

%50

.1994

%4

⁵ - مصدر المعطيات : البنك الجزائر .

⁶ - NASHASHIBI K. et autres ,op cit .p85.

: - 3. 2 .2

(escompté)

1994 %40.17

1994 ()

: (FMI)

: **1994** (*flottement*) - 3

1994

:**(1995** **1994**) (*le fixing*) - 1. 3

2 :

1994 28 94-61 :

" : (instruction)

"

)

(

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.1995

:(1996)

- 2.3

1994

1995 23 08-95 :

%10

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%30

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(forword)

(spot)

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()

%50

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1996

:

1997 28 97-08 :

15000

1993-1989 - 1

1993 - 1989
1993 1992

: **1.1**

1990

1989

1988 %91.56

1993 % 72.5

1992 %49.09

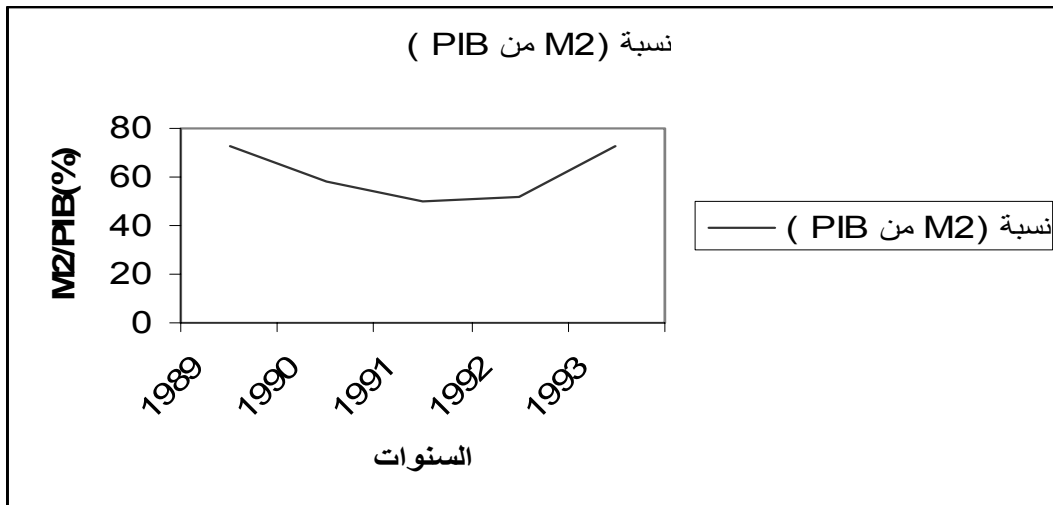
1997 % 46.5

. PIB

.1993/1989

(M2/PIB)

: 06



: - 2. 1

. 1993 1989

.(1993-1989) : 03

1993	1992	1991	1990	1989	
20.79	31.62	25.84	23.3	9.31	(%)

.Rétrospective statistique : 1970-1969.Edition 1999.(ONS⁷).p27 :

.%20 (1993 1990)

:

1993 .1989 :

.1988⁸ %10 %77

.1993 1992 -

: - 3. 1

1986

% 22 1991

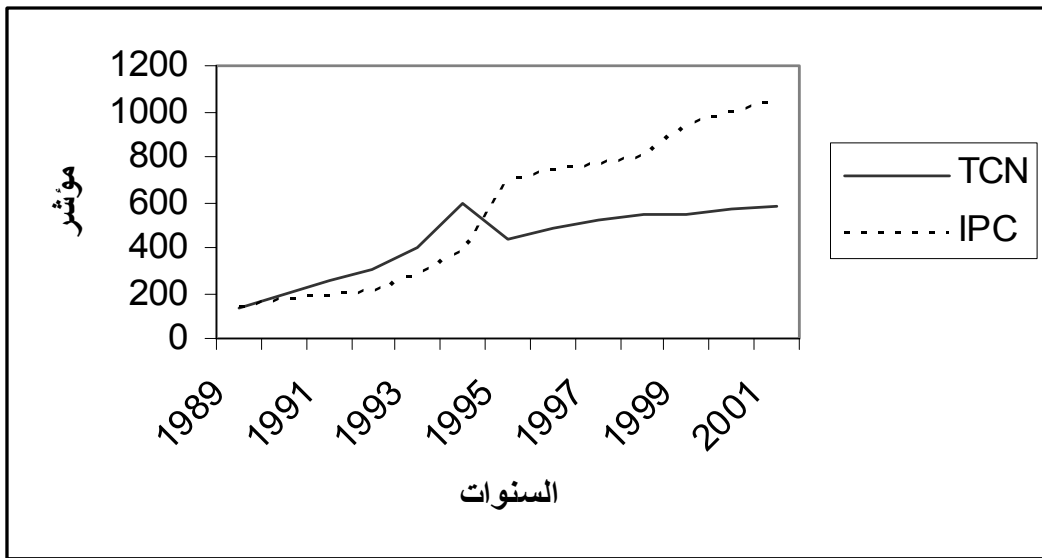
. ()

⁷- ديوان الوطني للإحصائيات.

⁸ - BENBITOUR A , op cit .p74

()
 : 2000 1984 17
 .1989 100 (IPC) -
 (ITC) (/) -
 .1989 100
 . 07 : (ITC) (IPC)

(/) : 07
 . 1989=100 (2001-1989)



-Donnée statistique,(IPC).N=308,1^{er} trimestre.2002. ONS .p05:

o

:

:

(ITC) (ITC) (IPC)

:

(ITC(-1))

	ITC	ITC(-1)
IPC	0.991	0.983

(ITC) (IPC)

(ITC)

1991-1989

-
-

1991 1988 %60

)

(

1989) (FMI) 1991 1989

.1993 1992 (1991

:(1993-1992) - **4.1**

1993 1992

%23.9 :(M2)

.1990 %11.3 1993 %21.2 1992

(PIB) %1.2

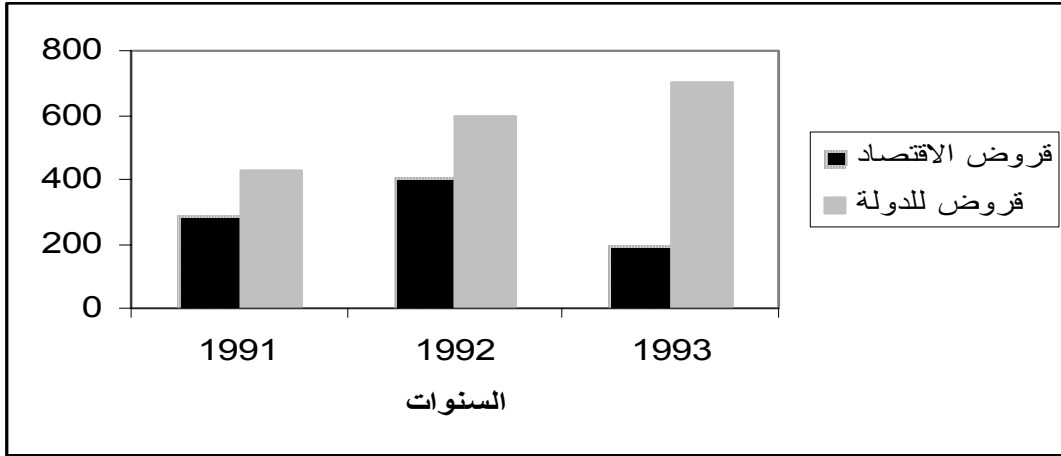
" "

1993 %8.7 1992

⁹ NASHASHIBI K. et autres ,op cit .p7.

:(1993-1991)

: 08

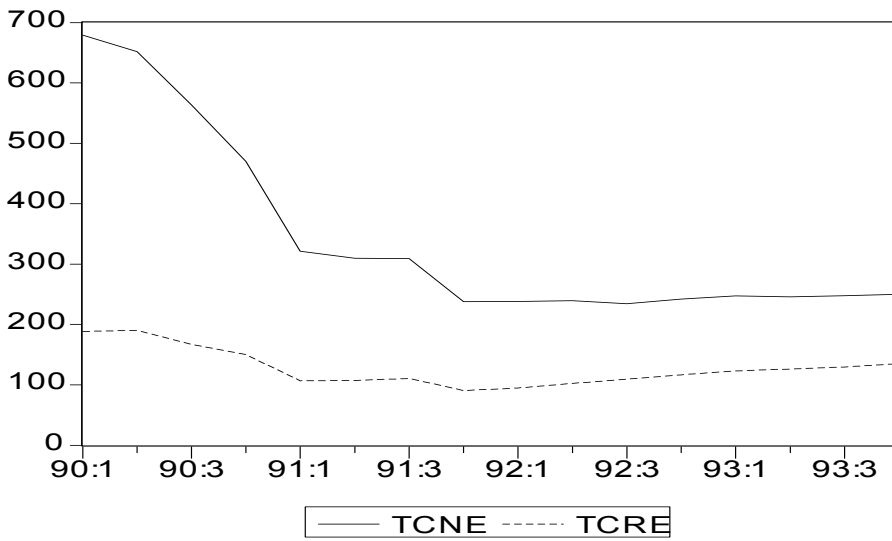


- 5.1

.1993 1992
(1993:04-1990:01)

:09

1990=100



.FMI :

09 :

1993-1992

(TCER)

1993 1991

. %48.27

: **- 6.1**

)

. (

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- 1.6.1

.(

)

-

.()

-

-

(04):

1974

1989

(10) :

.1994/

(1994/1989)

: 04

1994	1993	1992	1991	1990	1989	
10.5	4.2	4.36	3.75	1.8	1.5	
12.5	10	9.5	7	6.8	6	

Revue Algérienne d'économie et de gestion, Université d'Oran. Mai. 1997 :

- 1994

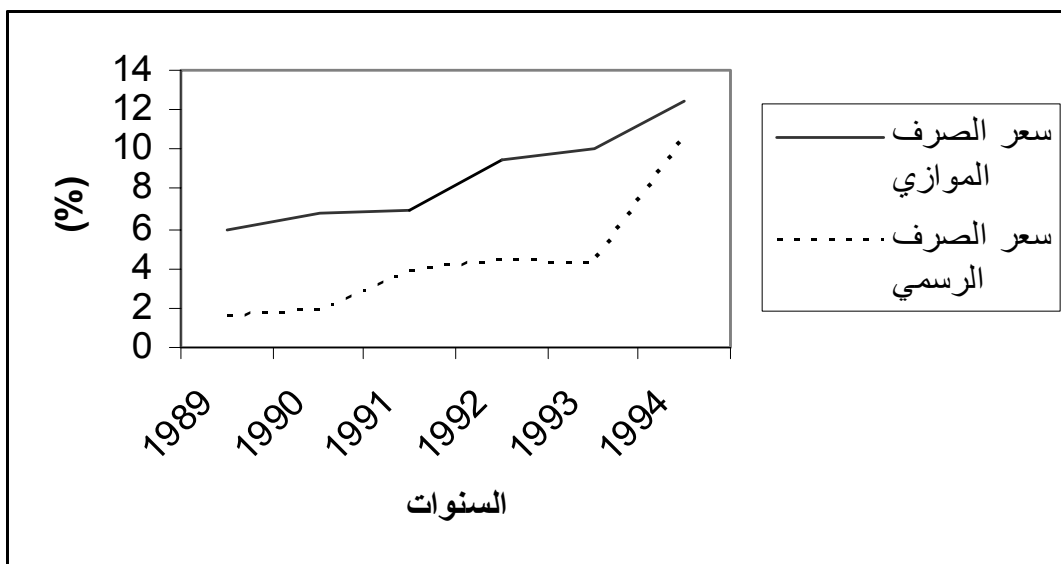
- %40

(1FF = 12 DA)

2000

(1994/1989)

: 10



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*

:

.(invisible payements)

.()

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*

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-

:

:1998-1994 - 2

1993

(FMI)

:(PAS) - 1.2

:¹⁰

1993

: -

.(%20.79) -

.(PIB) %8.7 -

.(%2.2-) (PIB) -

: -

1993 1991

1986 -

26 -

1985 %35 1993 %82.2 -

.()

.1985 3 1993 1.5 -

%7 1994

15.85 1993

: (Mr Kiramane)¹¹ (FMI)

-
-
-

¹⁰ - مصدر المعطيات : بنك الجزائر ، ONS ، n°18.1996. Annuaire statistique de l'Algérie , résultats.

¹¹ - Ex-Gouverneur de la banque d'Algérie de 1991 à 2001, Dans sa communication à l'Assemblée Nationale Populaire ,2000.Dans Media Bank NUMERO SPECIAL de 2000.P35

- 2. 2

:

:

-

-

- 1. 2. 2

:

1992)

(%4

).

(1993

:

%50

.1994

-

36

24

-

.1994

41

-

:

- 2. 2. 2

.1996

:¹²

- 3. 2

:

-

: -

:

:06

1998	1997	1996	1995	1994	1993	
18.77	18.50	14.44	10.48	15.75	21.19	(%) M2
9.31	10.36	9.31	24.9	2.76	17.88	(%)
42.59	36.37	26.53	41.52	60.51	69.29	(%)
47.41	63.63	73.19	58.48	39.49	30.71	(%)

:

%19 %10 (M2)

1993 %53.79

.1997 %35.68

" " (M2)

1994

.(agrégat)

1993

05 :)

1994

.(

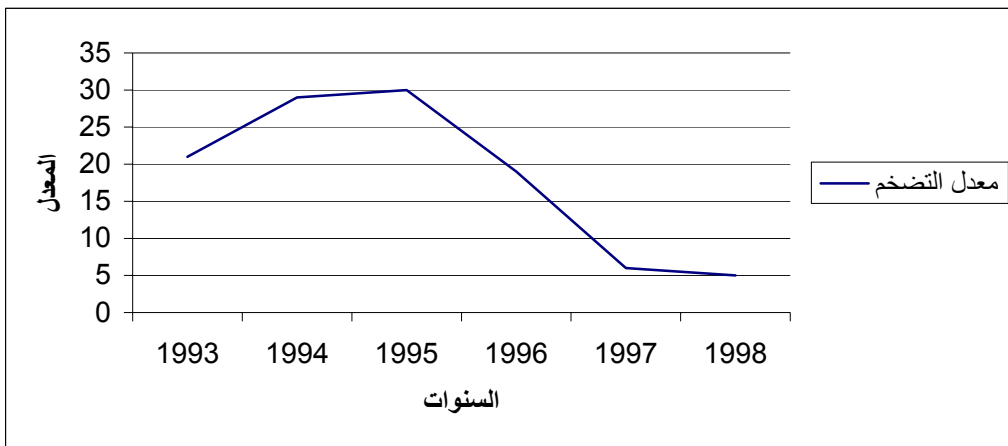
: - 4. 2
: - 1. 4. 2

.(%4 %3)

°.

.1998-1994

.(1998-1994) : 11



(1995 1994) :

: 1995 1994 (1998 1996)
.1994 -

1991) %20

1996 (1995

) "

: (

13"

(escompté)

%.4 %1 (%5) 1998

¹³ - M'HAMSADJI-BOUZIDI N , « 5 essais sur l'économie algérienne ».ED.ENAG.Alger.1998.p22.

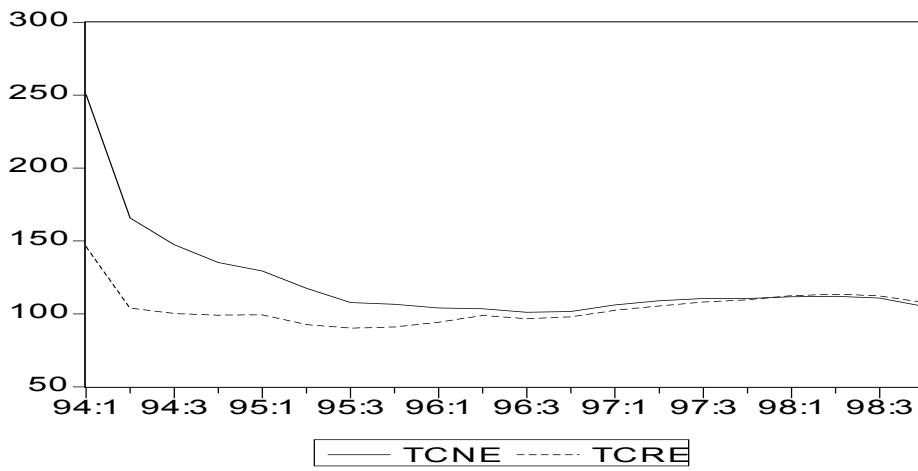
: - 2. 4. 2

1994 ()
1993 %30

.(11:) 1996

(1998: 04-1994:01) : 12

. 1990=100



.FMI :

1998

1994

: 1999 - 3

: - 1.3

: - 1.1.3

1995

2 :

95-08 :

.(%95)

:

:

! -

¹⁴ 1999 1998

1998 6.8 1997 8

1999 4.6

.2000 1998 %35

:

-

¹⁴ - بلغ متوسط سعر البرميل سنة 1997 حوالي \$19.5، لينخفض بعد ذلك إلى \$12.8 خلال سنة 1999، بينما بلغ خلال السداسي الأول من سنة 1999 حوالي \$ 13.4 في المتوسط.

:

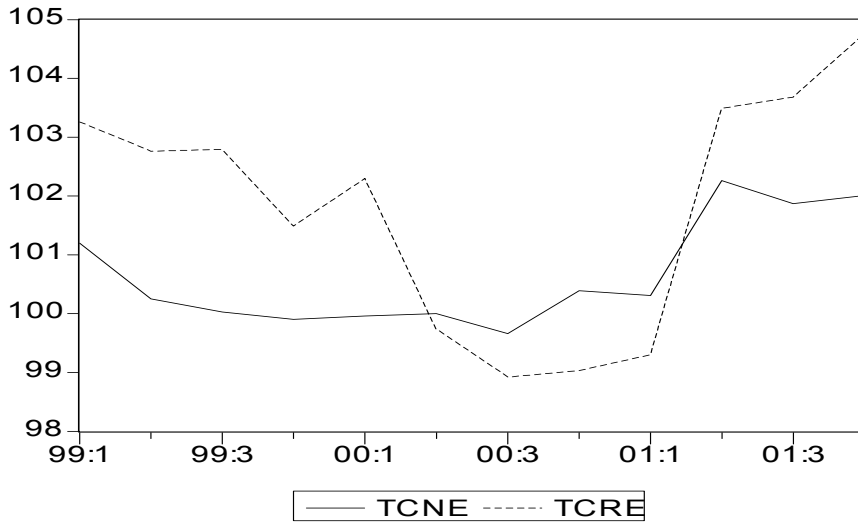
- 2. 1. 3

1999

1998

.(2001 :04-1998: 01)

: 13



.FMI :

1999

2002 2001 2000

)

2001

2001

(

: - 2.3

%0.3 2000
 .2000 2001 %2.2
 .2001 %4.2
 .%15

(13)
 (15)

¹⁵ (2001 5.6) 2001

2002
 . %2 2003 %3.23

: - 3.3

.2002 1996
 %-0.4 %4 %3.0 2002
 2001 %0.3
 (0.7) (1.0)
 %5.2 %3.0 %8.6
 (%61.4)

¹⁵ - BANQUE D'ALGERIE , « *Rapport 2001 : Evolution économique et monétaire en Algérie* », juillet 2002.P12

		(07)	
	()	%0.4	
1999	1997		2002
	%0.5		(2002 1999)
		: ¹⁶	- 4.3
(%1.4)			2002
2.8		(%2.2)	
	(%4.2)	2001	
.%2.2	%3.5	1.3	
	05		
%2.8		2002	
03			%9.4
	2001	(619.1)	
			2002
	.2001	2002	2002
	2002		
2002			2002
		2002	
	2001		
		2002	%1.8
	(%6.1)		04

¹⁶ - BANQUE D'ALGERIE , *Rapport 2001*. Op-Cit.P26.

%1.5 %2.8
(%2.3)

(frais)

2001

. (désinflation)

:

.

-

.

-

%8)

2002

(08)

(2002

%2.2

.

2002

2001

.

:

1986

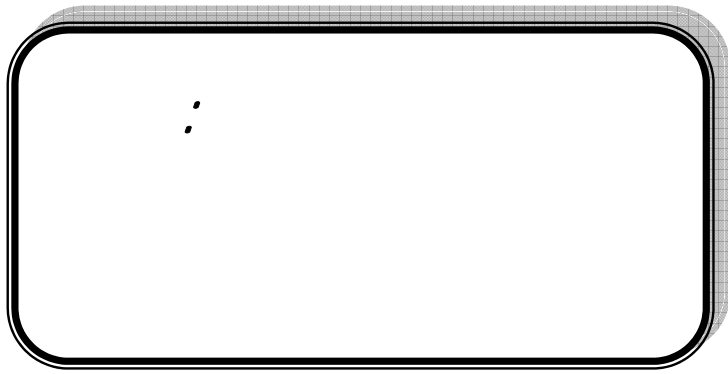
1994

:

: (1993-1989) -

: (1998-1994) -

: (-1999) -



: VAR

.VARX, VARMAX, VARMA

(...)

(Sims, Granger)

()

()

1

(VAR)

2

(Macroeconomics and Reality)

1980

:

:

:

¹ - Bresson G , Pirotte A, « *Econométrie des Séries Temporelles* », PUF.1995.PP225-226.

² - Sims.Christopher. « *Macroeconomics and Reality* ».econoetrica N° 1 Vol 48 ,1980.pp1-48.

$$\begin{aligned}
 & \cdot \quad \quad \quad : \\
 & \quad \quad \quad : \text{VAR} \quad \quad - \mathbf{1} \\
 & \quad \quad \quad : \quad \quad \quad - \mathbf{1.1}
 \end{aligned}$$

(VAR)

$$\begin{aligned}
 & X \quad n \\
 & :
 \end{aligned}$$

$$X_t = A_0 + \sum_{i=1}^n A_i X_{t-i} + \varepsilon_t \quad (4.1)$$

$$\begin{aligned}
 X_t &= (X_{1t}, X_{2t}, \dots, X_{nt})' \quad : \\
 & :
 \end{aligned}$$

$$\begin{aligned}
 \phi(L) X_t &= A_0 + \varepsilon_t \quad : \\
 & :
 \end{aligned}$$

$$\begin{aligned}
 \phi(L) &= I_n - \sum_{i=1}^n A_i L^i \\
 L^i X_t &= X_{t-i} \quad : \quad :L \\
 & : \text{VAR(P)} \quad - \mathbf{2.1}
 \end{aligned}$$

$$K \quad P \quad \quad \quad \text{VAR(P)}$$

$$X_t = A_0 + A_1 X_{t-1} + A_2 X_{t-2} + \dots + A_p X_{t-p} + u_t \quad (4.2)$$

$$t = 0, \pm 1, \pm 2, \dots$$

$$\begin{aligned}
 X_t &= (X_{1t}, X_{2t}, \dots, X_{kt})' \quad (K \times 1) \quad : X_t \\
 & \cdot (K \times K) \quad : A_i \\
 & \cdot (K \times 1) \quad : A_0 = (a_1^2, a_0^2, a_0^k) \\
 & : \quad \quad (K \times 1) \quad : u_t
 \end{aligned}$$

- $E(u_t) = 0$
- $E(u_t u_t') = \Omega$
- $E(u_t u_s') = 0, \forall s \neq t$

:

$$X_t = A_0 + A_1 L X_t + A_2 L^2 X_t + \dots + A_p L^p X_t + U_t \quad (3.4)$$

$$\Rightarrow (I_k - A_1 L - A_2 L^2 - \dots - A_p L^p) X_t = A_0 + U_t$$

$$\Rightarrow \phi(L) X_t = A_0 + U_t$$

:

$$\Rightarrow \phi(L) = I_k - A_1 L - A_2 L^2 - \dots - A_p L^p$$

: VAR - 3.1

:

VAR(p)

$$- E(X_t) = A_0, \forall t$$

$$- V(X_t) < \infty$$

$$- Cov(X_t, X_{t+h}) = E \left[(X_t - A_0)(X_{t+h} - A_0)' \right] = \Gamma_h, \forall t$$

:

$$(I_k - A_1 Z - \dots - A_p Z^p)$$

$$X_t \quad (\text{innovation}) \quad U_t$$

:

X_t

$$X_t = A_0 + \sum_{i=1}^n A_i X_{t-i} \quad (4.4)$$

t

X_t

$$\det \left(I - \sum_{i=1}^p A_i Z^i \right)$$

(1986)

(1/T)

(T)

(Angle, Granger) (1987)

(forme à

correction d'erreur)

: - 2

: VAR(P)

$$X_t = A_0 + A_1 X_{t-1} + A_2 X_{t-2} + \dots + A_p X_{t-p} + U_t \quad (5.4)$$

.(Kx1) : A₀

. (KxK) : A_i

.(Kx1) : U_t

: - 1. 2

3

$$X_t = (X_1, X_2, \dots, X_T)_{(K \times T)}$$

$$B = (A_0, A_1, \dots, A_p)_{(K \times (Kp + 1))}$$

$$Z_t = \begin{bmatrix} 1 \\ X_t \\ \vdots \\ X_{t-p+1} \end{bmatrix}_{((Kp+1) \times 1)}$$

$$Z = (Z_0, \dots, Z_{T-1})_{((Kp+1) \times T)}$$

$$U = (U_1, \dots, U_T)_{(K \times T)}$$

$$x = Vec(x) \dots (KT \times 1)$$

$$\beta = Vec(B) \dots [(K^2P + P) \times 1]$$

$$b = Vec(B)' \dots [(K^2P + K) \times 1]$$

$$\mu = Vec(U) \dots (KT \times 1)$$

³ Clement Emmanuelle.J.M Germain , « VAR et previsions conjoncturelles »,Annales d'économie et de statistiques N⁰ 32.1993.p58

$VAR(P)$

$$X = BZ + U \tag{6.4}$$

: Vec

$$Vec(x) = Vec(BZ) + Vec(U)$$

: Vec

$$Vec(X) = (Z' \otimes I_K).Vec(B) + Vec(U)$$

$$x = (Z' \otimes I_K)\beta + \mu$$

: U :

$$E(UU') = \Omega_u$$

: μ

$$\Omega_\mu = I_T \otimes \Omega_u$$

β $VAR(P)$

:

$$f(\beta) = \mu'(I_T \otimes \Omega_u)^{-1}.\mu \tag{7.4}$$

$$f(\beta) = \mu'(I_T \otimes \Omega_u^{-1}).\mu$$

$$f(\beta) = (x - (Z' \otimes I_K)\beta')(I_T \otimes \Omega_u^{-1}).(x - (Z' \otimes I_K)\beta)$$

$$f(\beta) = x'(I_T \otimes \Omega_u^{-1})x + \beta'(Z \otimes I_K).(I_T \otimes \Omega_u^{-1}).(Z' \otimes I_K).\beta - 2\beta'(Z \otimes I_K).(I_T \otimes \Omega_u^{-1}).x$$

$$f(\beta) = x'(I_T \otimes \Omega_u^{-1})x + \beta'(ZZ' \otimes \Omega_u^{-1}).\beta - 2\beta'(Z_T \otimes \Omega_u^{-1}).x$$

:

$$\frac{\partial f(\beta)}{\partial \beta} = 2(ZZ' \otimes \Omega_u^{-1})\beta - 2(Z \otimes \Omega_u^{-1})x = 0$$

:

$$(ZZ \otimes \Omega_u^{-1})\hat{\beta} = (Z \otimes \Omega_u^{-1})x$$

:

$$\hat{\beta} = [((ZZ')^{-1} \otimes \Omega_u).(Z \otimes \Omega_u^{-1})].x$$

$$\hat{\beta} = [(ZZ')^{-1}.Z \otimes I_K].x \tag{8.4}$$

$$\begin{aligned}
 & \hat{\beta} \\
 & : \qquad \qquad \qquad (OLS)^4 \\
 f(\beta) = U'U = (x - (Z' \otimes I_K) \cdot \beta)'(x - (Z' \otimes I_K) \cdot \beta) & \qquad (9.4) \\
 & : \qquad \qquad \qquad (OLS)
 \end{aligned}$$

$$\begin{aligned}
 \hat{b} &= Vec(\hat{\beta}') \\
 \hat{b} &= (I_K \otimes (ZZ')^{-1} Z) \cdot Vec(X') \qquad (10.4)
 \end{aligned}$$

(LS)

$$\begin{aligned}
 & \qquad \qquad \qquad K \quad (OLS) \\
 & \qquad \qquad \qquad b_K \quad B \quad K \qquad b_k \\
 b' &= (b'_1, b'_2, \dots, b'_K), \quad x_{(K)} = (X_{K1}, X_{K2}, \dots, X_{KT})' \\
 & \qquad \qquad \qquad : \quad K
 \end{aligned}$$

$$Vec(X') = \begin{bmatrix} x(1) \\ \vdots \\ x(k) \end{bmatrix}$$

$$\hat{b}_K = (ZZ')^{-1} Z \cdot X_K \qquad (11.4)$$

: OLS

$$x(k) = Z' b_K + U_K \qquad (12.4)$$

:

$$U_{(K)} = (U_{K1}, U_{K2}, \dots, U_{KT})'$$

$$\hat{b}' = (\hat{b}'_1, \hat{b}'_2, \dots, \hat{b}'_k)$$

⁴ - HIROY TODA, Philips.C.B, « Vector Autoregression And Causality », Econometrica, Vol 61.N=06.1993.P93.

: - 2. 2

()
 . (OLS)

: X_t

$$u = Vec(u) = \begin{bmatrix} U_1 \\ U_2 \\ \cdot \\ \cdot \\ U_t \end{bmatrix} \longrightarrow N(0, I_T \otimes \Omega u)$$

$$f(u) = \frac{1}{(2\pi)^{KT/2}} (I_T \otimes \Omega u)^{-1/2} \exp \{-1/2 u'(I_T \otimes \Omega_{u-1})u\} \quad (13.4)$$

X_t

VAR(p)

: *VAR MAX, VARX, VARMA* - 3

VAR

: *VARMA* - 1.3

VARMA *ARMA*

: *VMA(q) « q »* *VAR(P), P :*

$$X_t = A_0 + A_1 X_{t-1} + \dots + A_p X_{t-p} + U_t + M_1 U_{t-1} + \dots + M_q U_{t-q} \quad (14.4)$$

$$t = 0, \pm 1, \pm 2, \dots$$

:

$$X_t = A(L)^{-1} M(L) U_t \quad (15.4)$$

$$A(L) = I_K - \sum_{i=1}^p A_i L^i$$

$$M(L) = I_K - \sum_{i=1}^p M_i L^i$$

: VAR MAX, VARX, - 2 . 3

:

$$A_0 Y_t = A_1 Y_{t-1} + \dots + A_p Y_{t-p} + B_0 X_t + B_1 X_{t-1} + \dots + B_s X_{t-s} + W_t \quad (16.4)$$

$$.m \quad Y_t = (Y_{1t}, Y_{2t}, \dots, Y_{Kt}) :$$

$$. (K \times M) \quad (K \times K) \quad : B_j, A_i$$

$$.K \quad : W_t$$

W_t

X_t

(P,S) (VARX)

MA (q)

W_t X

. VARMAX(p,s,q)

: - 4

(⁵VAR) P

(Schwartz, Akaike) :

h) h 0 VAR

: Sc (p) Aic (p) (

$$Aic (P) = Ln (\det |\Omega_e|) + \frac{2 K^2 P}{n} \quad (17.4)$$

$$Sc (P) = Ln (\det |\Omega_e|) + \frac{2 K^2 P Ln (n)}{n} \quad (18.4)$$

:

.SCHWARTZ : SC AKAIKE : Aic

: K

: n

⁵ -BOURBONNAIS .R. « Econométrie » ,Dunod Paris 2^{ème} edition .1998. P239.

. Aic Sc

p

:VAR

- 5

X

:⁶

- 1. 5

X

:⁷Granger

- 1. 1. 5

X_{2t}

1969

X₂

X_{1t} ()

. X_{2t} X_{1t}

X_t

VAR(P)

$$\begin{pmatrix} X_{1t} \\ X_{2t} \end{pmatrix} = \begin{pmatrix} a_0 \\ b_0 \end{pmatrix} + \begin{bmatrix} a_1^1 & b_1^1 \\ a_1^2 & b_1^2 \end{bmatrix} \cdot \begin{pmatrix} X_{1t-1} \\ X_{2t-1} \end{pmatrix} + \begin{bmatrix} a_2^1 & b_2^1 \\ a_2^2 & b_2^2 \end{bmatrix} \cdot \begin{pmatrix} X_{1t-2} \\ X_{2t-2} \end{pmatrix} + \dots + \begin{bmatrix} a_p^1 & b_p^1 \\ a_p^2 & b_p^2 \end{bmatrix} \cdot \begin{pmatrix} X_{1t-p} \\ X_{2t-p} \end{pmatrix} + \begin{pmatrix} U_{1t} \\ U_{2t} \end{pmatrix}$$

$$\begin{pmatrix} X_{1t} \\ X_{2t} \end{pmatrix} = \begin{pmatrix} a_0 \\ b_0 \end{pmatrix} + \sum_{i=1}^p \begin{bmatrix} a_i^1 & b_i^1 \\ a_i^2 & b_i^2 \end{bmatrix} \cdot \begin{pmatrix} X_{1t-i} \\ X_{2t-i} \end{pmatrix} + \begin{pmatrix} U_{1t} \\ U_{2t} \end{pmatrix} \quad (19.4)$$

⁶ - TODA H.philips C.B. op-cit.p123.

⁷ - BOURBONNAIS .R. « Econométrie », Dunod Paris 3^{ème} edition .2000. P270.

$$\begin{matrix}
 & (X_{2t-1}, X_{2t-2}, \dots, X_{2t-p}) \\
 X_{2t} & (X_{1t-1}, X_{1t-2}, \dots, X_{1t-p}) \\
 & \cdot X_{1t}
 \end{matrix}$$

RVAR (VAR) (VAR) X_{2t}
Aic Sc (Restricted VAR)

$$\begin{matrix}
 : \\
 H_0 = b_1^1 = b_2^1 = \dots = b_p^1 = 0 \\
 : \\
 H_0 = a_1^2 = a_2^2 = \dots = a_p^2 = 0 \\
 X_{1t} \quad X_{2t} \quad X_{2t} \quad X_{1t} : \\
 : \\
 X_{2t} \quad X_{1t} -
 \end{matrix}$$

$$\begin{matrix}
 : \\
 H_0 = a_1^2 = a_2^2 = \dots = a_p^2 = 0 \\
 X_{1t} \quad X_{2t} \quad X_{2t} \quad X_{1t} : \\
 \cdot \text{(feedback effect)}
 \end{matrix}$$

(Fisher) χ^2
(UVAR) (VAR) χ^2
 : L^* (RVAR)

$$\begin{matrix}
 L^* = (n - c) \left| \ln |\Omega_r \text{ var}| - \ln |\Omega_u \text{ var}| \right| \longrightarrow \chi^2_{2p} \\
 \cdot 2p \quad \chi^2 \quad L^* \\
 : \\
 : \Omega_r \text{ var} \\
 : \Omega_u \text{ var} \\
 : n \\
 : c
 \end{matrix}$$

$$\left(\chi^2_{TAB} \right) L^* > \chi^2_{TAB} \cdot (H_0)$$

: - 2.1.5

1980

X_{1t} X_{2t} X_{2t} X_{1t}

:

$$X_{1t} = a_1^0 + \sum_{i=1}^p a_{1i}^1 X_{1t-i} + \sum_{i=1}^p a_{1i}^2 X_{2t-i} + \sum_{i=1}^p b_i^2 X_{2t+i} + U_{1t} \quad (20.4)$$

$$X_{2t} = a_2^0 + \sum_{i=1}^p a_{2i}^1 X_{2t-i} + \sum_{i=1}^p a_{2i}^2 X_{2t-i} + \sum_{i=1}^p b_i^2 X_{2t+i} + U_{2t} \quad (21.4)$$

:

X_{2t} X_{1t} -

$$H_0 = b_1^1 = b_2^1 = \dots = b_p^1 = 0$$

:

X_{1t} X_{2t} -

$$H_0 = b_1^1 = b_2^1 = \dots = b_p^1 = 0$$

:

$$F^* = \frac{SCRR - SCRU / C}{SCRU / n - k - 1}$$

:c

:SCRR

:SCRU

:n

:K

:

- 2.5

: VAR(p) M_A

$$X_t = \mu + \sum_{i=0}^{\infty} \theta_i W_{t-i} \quad (23.4)$$

$$\theta_i = \phi_i P$$

$$W_t = P^{-1} U_t$$

:

$$X_t = \mu + \sum_{i=0}^{\infty} \phi_i P P^{-1} U_{t-1} \quad (24.4)$$

. h

$$\sum_{i=0}^{\infty} W_i = I_K :$$

$$\begin{aligned}
 X_{t+h} - X_t(h) &= \sum_{i=0}^{h-1} \phi_i U_{t+h-i} = \sum_{i=0}^{h-1} \phi_i P P^{-1} U_{t+h-i} \\
 &= \sum_{i=0}^{h-1} \theta W_{t+h-i} \tag{25.4}
 \end{aligned}$$

X_t , j h , $\theta_{mn,i}$ θ_i mn

$$\begin{aligned}
 X_{j,t+h} - X_{j,t}(h) &= \sum_{i=0}^{h-1} (\theta_{j,i} \cdot W_{1,t+h-i} + \dots + \theta_{jKi} \cdot W_{K,t+h-i}) \\
 &= \sum_{K=1}^K (\theta_{jK,0} \cdot W_{K,t+h} + \dots + \theta_{jKh-1} \cdot W_{K,t+1}) \tag{26.4}
 \end{aligned}$$

(Innovations)

$$\theta_{mn,i} \quad , \quad X_t$$

$X_{j,t}(h)$ (MSE) $W_{K,t}$

$$E(X_{j,t+h} - X_{j,t}(h))^2 = \sum_{k=1}^k (\theta_{jk,0}^2 + \dots + \theta_{jk,h-1}^2) \tag{27.4}$$

$$\theta_{jk,0}^2 + \theta_{jk,h}^2 + \dots + \theta_{jk,h-1}^2 = \sum_{i=0}^{h-1} (e'_j \theta_i e_k)^2$$

$$MSE [X_{j,t}(h)] = \sum_{i=1}^{h-1} \sum_{k=1}^k \theta_{jk,i}^2 \tag{28.4}$$

:

: -1

o o :

: - 1 . 1

$$f(x_t, x_{t-1}, \dots, x_{t-p}, w_t, w_{t-1}, \dots, w_{t-q}, \alpha, \varepsilon_t)$$

:

. t : x_t

. t : w_t

: α

: ε_t

q p

: f

$$X_t^i = f^i(x_t, x_{t-1}, \dots, x_{t-p}, w_t, w_{t-1}, \dots, w_{t-q}, \beta, \mu_t) \quad (29.4)$$

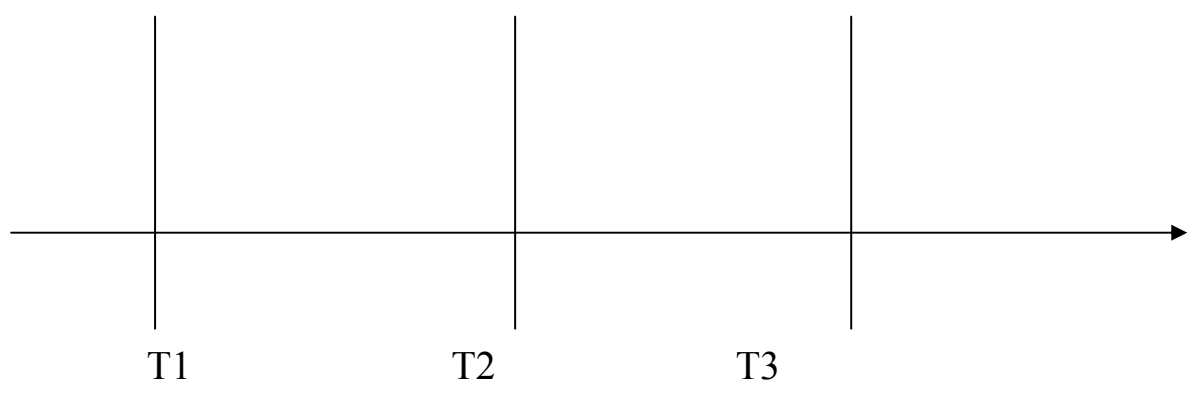
X_t i X_t^i
 n X_t^i

(Simulation Déterministe)

⁸

: - 2. 1

: 14



⁸ -JACQUINOT , MIHOUBI ,LOUFIR : « *Muscadine et muscade : deux outils de la micro informatique applique a la macroéconomie* »Ed : ECONOMICA ,PP133-151.

: - 1. 2. 1

. (T1, T2) .

: *

: *

: - 2. 2. 1

. (T2, T3)

: - 3. 2. 1

. (T3, Tf)

: - 3.1

-

-

. (Pseud Prevision)

:

: .1

p (Récursive)

(Prédéterminées)

.

:

$$X_i^i = g_i^i(x_i^i, \dots, x_i^{i-1}, P), i=1, 2, \dots, k \quad (30.4)$$

: .2

. x_i^b

:

$$X_i^i = g_i^i(x_i^i, \dots, x_i^{i-1}, x_i^b, P), i=k+1, \dots, 1 \quad (31.4)$$

: .3

$$X_i^i = g_i^i(x_i^i, \dots, x_i^i, P), i=i+1, \dots, m \quad (32.4)$$

: .4

.

$$X_i^i = g_i^i(x_i^i, \dots, x_i^{i-1}, P), i=m+1, \dots, n \quad (33.4)$$

(Matrice d'incidence)

: *

: •

$$Em = \frac{1}{T} \sum_{t=1}^T (x_t^e - x_t)$$

$$Em (\%) = \frac{1}{T} \sum_{t=1}^T \left(\frac{x_t^c - x_t}{x_t} \right)$$

: (Average Absolute Error)

$$AVABS = \frac{1}{T} \sum_{t=1}^T |x_t^c - x_t|$$

$$AVABS (\%) = \frac{1}{T} \sum_{t=1}^T \left| \frac{x_t^c - x_t}{x_t} \right|$$

: (Root Mean Square Error)

$$RMSE = \sqrt{\frac{1}{T} \sum_{t=1}^T (x_t^c - x_t)^2}$$

RMSE

: (Théil)

()

$$U = \frac{\sqrt{\frac{1}{T} \sum_{t=1}^T (x_t^c - x_t)^2}}{\sqrt{\frac{1}{T} \sum_{t=1}^T (x_t^c)^2} + \sqrt{\frac{1}{T} \sum_{t=1}^T (x_t)^2}}$$

. (Simulation parfaite)

t x^c=x U=0 -

.

()

U=1 -

⁹BOUTHEVILLAIN.K « La prévision macro-économique » : Précision relative et consensus in Economie et Prévision N°108.1993.P100.

: VAR

- 4. 1

T K

:

$u_{-s}, \dots, u_0, u_1, \dots, u_T$

V_1, V_2, \dots, V_k

K

$u_t \mapsto N(0, \Omega_u)$

: $PP' = \Omega_u$ (K*K) P

$$U_t = P \begin{pmatrix} v_1 \\ v_2 \\ \vdots \\ v_k \end{pmatrix}$$

T+S+1

A_i (Kx1)

V V, A_1, A_2, \dots, A_p

x_0, \dots, x_{-p+1} :

(K*K)

U_t

.VAR(P)

x_1, \dots, x_t

$X_t = V + A_1 X_{t-1} + \dots + A_p X_{t-p} + U_t$

t=T

... t=2, t=1

U_t

$m = (R_k - A_1 - \dots - A_p) \cdot V$

$X_t; t = -s, \dots, 0$

X_t

p

:

Ω_x

$$Vec(\Omega_x) = \left(I_{(kp)^2} - A \otimes A \right)^{-1} Vec(\Omega_u)$$

:

$$A = \begin{pmatrix} A_1 & A_2 & \dots & A_{p-1} & A_p \\ I_k & 0 & \dots & 0 & 0 \\ 0 & I_k & \dots & 0 & 0 \\ \vdots & \vdots & \dots & 0 & 0 \\ 0 & 0 & \dots & I_k & 0 \end{pmatrix}_{(kp \times kp)}$$

$$\Omega_u = \begin{pmatrix} \Omega_u & 0 & \dots & 0 \\ 0 & 0 & \dots & 0 \\ \vdots & \vdots & \dots & \vdots \\ 0 & 0 & \dots & 0 \end{pmatrix}_{(kp \times kp)}$$

$$p \quad QQ' = \Omega_x \quad (kp \times kp) \quad Q$$

:

$$\begin{pmatrix} x_0 \\ \vdots \\ x_{-p+1} \end{pmatrix} = Q \begin{pmatrix} v_1 \\ \vdots \\ v_{kp} \end{pmatrix} + \begin{pmatrix} m \\ m \\ \vdots \\ m \end{pmatrix}$$

V_i

: - 2

(Ex-post)

(Pseudo-Prévision)

.RMSE%

(Ex-ante)

(Ex-ante)

VAR

.(Horizon sup .a1)

: - 3

() (chocs)

$$Y_t = AY_{t-1} + BX_t \tag{34.4}$$

B :

$$(I - B)^{-1}B = B + AB + \dots + A^n B$$

A

n

$A^n B$

: *IPC* :

: *TIC*

: *IPPI*

: *M*

: *TCN*

1989

(2003/1990)

10

: *VAR*

- 1

:

- 1. 1

$$Y_t = (LIPC, LM, LIPPI, LTIC)$$

:

$\cdot Y_t$

$$X_t = (LTCN)$$

" "

: - 2. 1

: - 1. 2. 1

Dickey-Fuller -

:

: AR(1) - 1

$$X_t = \phi X_{t-1} + e_t$$

: AR(1) -2

$$X_t = \phi X_{t-1} + \alpha + e_t$$

: AR(1) -3

$$X_t = \phi X_{t-1} + \alpha + \beta_t + e_t$$

:

$(H_0 : \phi = 1)$

$$\hat{\beta} \quad (\phi_1 < 1) \text{ HI} \quad : (3)$$

$$(\alpha + \hat{\beta}_t)$$

Dickey-Fuller :

$$\phi_1 \quad (\phi_1 - 1)$$

$$H0 : \phi_1 - 1 = 0$$

: (1)

$$X_t - X_{t-1} = \phi_1 X_{t-1} - X_{t-1} + \varepsilon_t$$

$$\Delta X_t = (\phi_1 - 1) X_{t-1} + \varepsilon_t$$

. (3) (2)

ϕ

$$t_{\hat{\phi}} = \frac{\hat{\phi}_1}{\delta_{\hat{\phi}_1}}$$

.DF

H_0

$t < t_{\hat{\phi}_1}$

ε_t

DF

: ADF

-

1981

DF

(Augmented Dickey-Fuller)

$$(4) : \Delta X_t = \rho X_{t-1} \sum_{j=2}^p \phi_j \Delta X_{t-j+1} + \varepsilon_t$$

$$(5) : \Delta X_t = \rho X_{t-1} \sum_{j=2}^p \phi_j \Delta X_{t-j+1} + \alpha + \varepsilon_t$$

$$(6) : \Delta X_t = \rho X_{t-1} \sum_{j=2}^p \phi_j \Delta X_{t-j+1} + \alpha + \beta_t + \varepsilon_t$$

.... Bic Aic

P

. ρ

:

-

ADF

Aic

P

(α, β)

ADF

(.02 :

%99 %95 % 90

)

$I(1)$

(

(

)

(VAR)

: - 2.2.1

I(1)

$$LTIC = C + a LIPC + b LTCN + Ut$$

ADF

(-1.94)

%95

(-1.40)

(.03)

$$LTIC = C + b LIPC + Ut \dots \dots \dots (1)$$

$$LTIC = C + b LTCN + Ut \dots \dots \dots (2)$$

$$LTCN = C + b LIPC + Ut \dots \dots \dots (3)$$

$$LIPPI = C + b LM + Ut \dots \dots \dots (4)$$

: 07

<i>ADF</i>	<i>P</i>	
-1.33	4	1
-1.38	4	2
-1.56	4	3
-0.61	4	4

ADF

(EG)

: VAR - 3. 1
: - 1. 3. 1

(MVIC)

Aic **:VAR - 2. 3. 1**
P

: P

- Aic(1) = -13. 79*
- Aic(2) = -13. 49*
- Aic(3) = -13. 52*
- Aic(4) = -13. 97*

.P = 4 Aic

: - 3. 3. 1

: VAR(4)

-1

-2

.(EViews3.0.)

:

:() -

$$\begin{aligned}
LIPC = & -0.78 + 0.14*LIPPI(-1) - 0.22*LIPPI(-2) + 0.36*LIPPI(-3) - \\
& \quad (-1.21) \quad (0.74) \quad (-1.01) \quad (1.71) \\
& 0.24*LIPPI(-4) + 0.93*LIPC(-1) - 0.34*LIPC(-2) + 0.21*LIPC(-3) - \\
& \quad (-1.62) \quad (5.54) \quad (-1.56) \quad (0.98) \\
& 0.010*LIPC(-4) + 0.051*LM(-1) - 0.15*LM(-2) + 0.18*LM(-3) + 0.033*LM(-4) \\
& \quad (0.06) \quad (0.29) \quad (-0.80) \quad (0.83) \quad (0.15) \\
& + 0.057*LTIC(-1) - 0.017*LTIC(-2) - 0.031*LTIC(-3) + 0.083*LTIC(-4) + \\
& \quad (1.41) \quad (-0.38) \quad (-0.69) \quad (2.02) \\
& 0.02*LTCN \\
& \quad (0.24)
\end{aligned}$$

$R^2 = 0.9969$ $R^2 Adj = 0.9954$ $SSR = 0.03$ $Log Lik = 117.59$ $F.st = 117.59$
 $N = 52$

%99.69 $R^2 = 0.9969$

) ()

.(

()

:() -

$$\begin{aligned}
 LIPPI = & 0.054 + 0.46*LIPPI(-1) - 0.069*LIPPI(-2) - 0.12*LIPPI(-3) + \\
 & (0.14) \quad (4.04) \quad (-0.52) \quad (-0.99) \\
 & 0.10*LIPPI(-4) + 0.28*LIPC(-1) - 0.10*LIPC(-2) + 0.12*LIPC(-3) - \\
 & (1.21) \quad (2.90) \quad (-0.80) \quad (1.01) \\
 & 0.075*LIPC(-4) + 0.10*LM(-1) + 0.030*LM(-2) + 0.056*LM(-3) - 0.09*LM(-4) \\
 & (-0.82) \quad (0.99) \quad (0.25) \quad (0.43) \quad (-0.68) \\
 & + 0.0382*LTIC(-1) + 0.0051*LTIC(-2) + 0.028*LTIC(-3) + 0.025*LTIC(-4) + \\
 & (1.59) \quad (0.19) \quad (1.009) \quad (1.05) \\
 & 0.22*LTCN \\
 & (4.68)
 \end{aligned}$$

$R^2 = 0.9989$ $R^2 Adj = 0.9984$ $SSR = 0.01$ $Log Lik = 145.35$ $F.st = 1878.35$
 $N = 52$

%99.89 $R^2 = 0.9989$

5%

0.22

:() -

$$\begin{aligned}
 LM = & -0.64 + 0.22*LIPPI(-1) + 0.081*LIPPI(-2) - 0.14*LIPPI(-3) + \\
 & (-1.00) \quad (1.15) \quad (0.36) \quad (-0.68) \\
 & 0.11*LIPPI(-4) - 0.098*LIPC(-1) - 0.027*LIPC(-2) - 0.17*LIPC(-3) + \\
 & (0.75) \quad (-0.58) \quad (-0.12) \quad (-0.81) \\
 & 0.082*LIPC(-4) + 0.51*LM(-1) + 0.016*LM(-2) + 0.24*LM(-3) + 0.29*LM(-4) \\
 & (0.53) \quad (2.94) \quad (0.08) \quad (1.15) \quad (1.32) \\
 & - 0.023*LTIC(-1) + 0.020*LTIC(-2) - 0.022*LTIC(-3) + 0.0053*LTIC(-4) - \\
 & (-0.58) \quad (0.45) \quad (-0.50) \quad (0.13) \\
 & 0.15*LTCN \\
 & (-1.82)
 \end{aligned}$$

$R^2 = 0.9982$ $R^2 Adj = 0.9973$ $SSR = 0.032$ $Log Lik = 118.20$ $F.st = 1148.16$
 $N = 52$

%99.82 $R^2 = 0.9982$

0.15

:()

-

$$\begin{aligned}
LTIC = & 1.03 + 0.57*LIPPI(-1) - 0.56*LIPPI(-2) + 0.96*LIPPI(-3) - \\
& \quad (0.37) \quad (0.70) \quad (-0.59) \quad (1.08) \\
& 0.78*LIPPI(-4) + 1.15*LIPC(-1) - 0.79*LIPC(-2) + 0.73*LIPC(-3) - \\
& \quad (-1.24) \quad (1.60) \quad (-0.86) \quad (0.81) \\
& 0.95*LIPC(-4) - 0.81*LM(-1) - 1.06*LM(-2) + 1.81*LM(-3) - 0.048*LM(-4) + \\
& \quad (-1.43) \quad (-1.10) \quad (-1.26) \quad (1.97) \quad (-0.05) \\
& 0.65*LTIC(-1) - 0.044*LTIC(-2) + 0.076*LTIC(-3) - 0.0052*LTIC(-4) - \\
& \quad (3.76) \quad (-0.22) \quad (0.39) \quad (-0.03) \\
& 0.21*LTCN \\
& \quad (-0.60)
\end{aligned}$$

$R^2 = 0.9182$ $R^2 Adj = 0.8773$ $SSR = 0.58$ $Log Lik = 42.7$ $F.st = 22.45$
 $N = 52$

% 84.37 $R^2 = 0.84$

: - 4.1

(0.021)

LIPPI

:

LTIC 0.0074 LIPC 0.005 LM 0.0002 LIPPI 0.013
(05-04:)

%50 LIPPI

LIPPI

()

LTIC %36

%50

LIPPI

LIPPI

% 4

% 60

LTIC

LIPC

LIPC

% 8

LTIC

LIPC

LTIC

% 25

LM

LM

%30

LTIC

LM

LTIC

% 7

: - 5 . 1

(06 :)

LIPC

LIPC

(*F* = 10.80)

(*F* = 3.59)

LTCN

LIPC

(*F* = 3.59)

. (*F* = 3.14) *LTIC*

. (*F* = 3.22)

(*F* = 3.82)

(*F* = 2.80) :

LTIC

Calibrage

()

: Calibrage du modèle

- 6. 1

:() -

$$\begin{aligned}
 LIPC = & -0.061 + 0.10*LIPPI(-3) + 0.86*LIPC(-1) - 0.21*LIPC(-2) + \\
 & (-0.15) \quad (1.31) \quad (6.16) \quad (-1.64) \\
 & 0.062*LM(-1) + 0.078*LTIC(-4) + 0.12*LTCN \\
 & (1.50) \quad (2.60) \quad (2.41)
 \end{aligned}$$

$R^2 = 0.9961$ $R^2 Adj = 0.9956$ $SSR = 0.041$ $Log Lik = 111.41$ $F.st = 1934.54$
 $N = 52$

$$\bar{R}^2 = 0.9956$$

0.12

:() -

$$\begin{aligned}
 LIPPI = & 0.13 + 0.36*LIPPI(-1) + 0.26*LIPC(-1) + 0.093*LM(-1) + \\
 & (0.55) \quad (5.97) \quad (5.44) \quad (3.34) \\
 & 0.046*LTIC(-1) + 0.043*LTIC(-4) + 0.21*LTCN \\
 & (3.00) \quad (2.17) \quad (6.58)
 \end{aligned}$$

$R^2 = 0.9987$ $R^2 Adj = 0.9985$ $SSR = 0.013$ $Log Lik = 140.28$ $F.st = 5796.22$
 $N = 52$

%99.87

.0.21

:()

-

$$\begin{aligned}
 LM = & -0.95 + 0.31*LIPPI(-1) - 0.17*LIPC(-3) + 0.37*LM(-2) + 0.71*LM(-4) - \\
 & \quad (-2.24) \quad (3.12) \quad (-2.30) \quad (2.45) \quad (4.53) \\
 & 0.050*LTIC(-1) - 0.24*LTCN \\
 & \quad (-1.70) \quad (-4.38) \\
 R^2 = & 0.9975 \quad R^2 \text{ Adj} = 0.9972 \quad SSR = 0.045 \quad \text{Log Lik} = 109.17 \quad F.st = 3040.67 \\
 N = & 52
 \end{aligned}$$

$\alpha=5\%$

. t.student

.0.24

:()

-

$$\begin{aligned}
 LTIC = & 0.57 + 0.74*LIPPI(-1) - 0.49*LIPPI(-4) - 0.76*LIPC(-2) + \\
 & \quad (0.27) \quad (1.66) \quad (-1.39) \quad (-1.19) \\
 & 0.93*LIPC(-1) - 1.42*LM(-1) + 1.34*LM(-3) + 0.71*LTIC(-1) - 0.34*LTCN \\
 & \quad (1.39) \quad (-2.60) \quad (2.17) \quad (5.96) \quad (-1.21) \\
 R^2 = & 0.9063 \quad R^2 \text{ Adj} = 0.8889 \quad SSR = 0.67 \quad \text{Log Lik} = 39.18 \quad F.st = 52.01 \\
 N = & 52
 \end{aligned}$$

%90.63

%9.37

VAR

2000 :04 /)

LIPCF, LIPPIF, LTICF, LMF,

. (07 :)

(1990 :01

(08 :)

()

: : 08

	<i>ME</i>	<i>RSME</i>	<i>U</i>
<i>LIPC</i>	0.0029	0.039	0.0030
<i>LIPPI</i>	-0.027	0.043	0.0032
<i>LM</i>	-0.073	0.092	0.0031
<i>LTIC</i>	0.042	0.17	0.047

:

(U)

$(Y \approx Y^F)$

.(LTCN)

:(2001 :01) - 1. 2

0.20 (%20) 2001 :01

.LIPCT, LIPPIT, LTICT, LMT,

(%20) : 09

.(2001 :01)

<i>LTICT</i>	<i>LMT</i>	<i>LIPPIT</i>	<i>LIPCT</i>	<i>Obs</i>
2.05219054258	14.3433001278	6.72317150404	6.38477474576	2001:1
2.19885024722	14.4133501103	6.72475653114	6.41182353889	2001:2
2.15904330173	14.436689034	6.72948685981	6.4149125795	2001:3
2.05010972952	14.4956384725	6.72847322955	6.408164701	2001:4
1.96868332747	14.4998356089	6.72927807891	6.404870131	2002:1
1.95987771095	14.5694431013	6.73172630727	6.41378945793	2002:2
1.91569539302	14.5864303954	6.73442647516	6.42210107964	2002:3
1.86354429622	14.6548979617	6.73285518644	6.42074663574	2002:4
1.78674627371	14.6668020759	6.72892651819	6.41424275191	2003:1
1.74124119117	14.7402836105	6.7217347371	6.40764486542	2003:2
1.66575807834	14.7600402401	6.71073080721	6.39946180626	2003:3
1.59510669704	14.8458084645	6.68614303828	6.38166457078	2003:4

(1994 40.17%)

2001:01

2001:04

(2003)
 :(2003 :04 / 2001 :01) - 2.2

.(%20) ()

(%20) : 10

.(2003 :04 / 2001 :01)

<i>LTICL</i>	<i>LML</i>	<i>LIPPIL</i>	<i>LIPCL</i>	<i>obs</i>
2.05219054258	14.3433001278	6.72317150404	6.38477474576	2001:1
2.20687056975	14.3789691653	6.76481971158	6.4360698428	2001:2
2.29498849733	14.4127006215	6.79262964702	6.46127109915	2001:3
2.23600261941	14.453770933	6.81091664347	6.46887448373	2001:4
2.16549647286	14.4617138518	6.82485307962	6.47741110653	2002:1
2.17228434734	14.5048136221	6.83664911386	6.4968814487	2002:2
2.16488223091	14.5291010884	6.85017301075	6.52134111	2002:3
2.13172151189	14.5750338851	6.86030529714	6.53709965433	2002:4
2.07532371814	14.5929643012	6.86683629922	6.54351715484	2003:1
2.03599954785	14.6414807094	6.86876765376	6.54674494711	2003:2
1.98046897087	14.6681356414	6.86537323142	6.54729751486	2003:3
1.91585104177	14.7296600383	6.84759975838	6.5375946665	2003:4

%20

.(2003)

2001

()

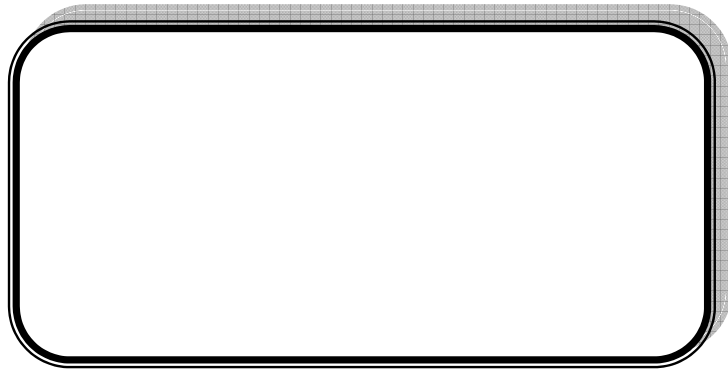
% 20

2001:04

2001:01

(%20)

.(2003)



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:(1993-1989)

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:(1998-1994)

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: (-1999) -

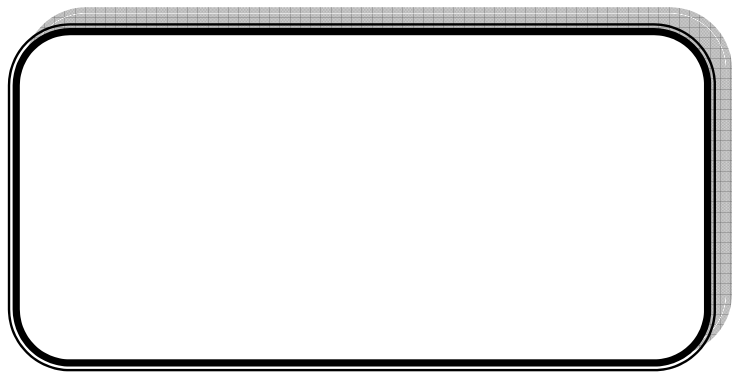
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: 01

: 02

: 03

: 04

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: 06

. (2000:04/1990:01) : 07

: 08

: 09

: *01*

d ($X_t \rightarrow I(d)$:) d
 .($\Delta^d X_t$ X_t)

$$\Delta X_t = X_t - X_{t-1}$$

$$\Delta X_t = \Delta(\Delta X_{t-1})$$

: 1

X_{1t}

$$X_{1t} \rightarrow I(0)$$

$$X_{2t} \rightarrow I(1) \Rightarrow X_{1t} + X_{2t} \rightarrow I(1)$$

$$Y_t = X_{1t} + X_{2t}$$

: d X_{2t} X_{1t} -

$$X_{1t} \rightarrow I(d)$$

$$X_{2t} \rightarrow I(d) \Rightarrow X_{1t} + X_{2t} \rightarrow I(?)$$

:

$$\alpha X_{1t} + \beta X_{2t} \rightarrow I(?)$$

α & β

$I(d)$

$I(0)$

:

$$X_{1t} \rightarrow I(d)$$

$$X_{2t} \rightarrow I(d) \Rightarrow \alpha X_{1t} + \beta X_{2t} \rightarrow I(?)$$

$d \neq (d)'$:

	:		-1
			-2
		:	-
:		$Y_t \quad X_t$	-
. d			-
			-
			:
		$X_t \rightarrow I(d)$	
		$Y_t \rightarrow I(d)$	
			:
		$\alpha_1 X_t + \alpha_2 X_t \rightarrow I(d - b)$	
			$d \geq b \geq 0$:
			$X_t, Y_t \rightarrow CI(d, b)$:
			: K
		$X_{1t} \rightarrow I(d)$	
		$X_{2t} \rightarrow I(d)$	
		$X_{Kt} \rightarrow I(d)$	
		$(X_{1t}, X_{2t}, \dots, X_{Kt}) \quad X_t$	
:		$d \geq b \geq 0$	$X_t \rightarrow CI(d, b) \quad d, b$
		. $[X_t \rightarrow I(d)] \quad d$	-1
$Z_t \rightarrow I(d - b)(Z_t) = (\alpha_i) X_t$	K	$\alpha_i \neq 0$	-2
		. X_t	α_i
r		$(i = 1, \dots, n) \quad \alpha_i$	-3
		. (k x r)	

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LTCN)
 Method: Least Squares
 Date: 02/15/05 Time: 00:51
 Sample(adjusted): 1991:2 2003:4
 Included observations: 51 after adjusting endpoints

ADF Test Statistic	-0.596171	1% Critical Value*	-4.1458
		5% Critical Value	-3.4987
		10% Critical Value	-3.1782

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTCN(-1)	-0.030789	0.051644	-0.596171	0.5541
D(LTCN(-1))	0.033720	0.118045	0.285653	0.7765
D(LTCN(-2))	0.021039	0.117496	0.179062	0.8587
D(LTCN(-3))	0.051650	0.117409	0.439917	0.6622
D(LTCN(-4))	-0.054428	0.116502	-0.467185	0.6427
C	0.157667	0.150805	1.045507	0.3015
@TREND(1990:1)	-0.000398	0.001877	-0.211881	0.8332

ADF Test Statistic	-1.912064	1% Critical Value*	-3.5625
		5% Critical Value	-2.9190
		10% Critical Value	-2.5970

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTCN(-1)	-0.040734	0.021304	-1.912064	0.0622
D(LTCN(-1))	0.037571	0.115393	0.325587	0.7462
D(LTCN(-2))	0.024177	0.115315	0.209660	0.8349
D(LTCN(-3))	0.055204	0.114965	0.480181	0.6334
D(LTCN(-4))	-0.049315	0.112759	-0.437346	0.6640
C	0.183503	0.087786	2.090343	0.0423

ADF Test Statistic	1.201763	1% Critical Value*	-2.6081
		5% Critical Value	-1.9471
		10% Critical Value	-1.6191

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTCN(-1)	0.003425	0.002850	1.201763	0.2366
D(LTCN(-1))	0.103706	0.114964	0.902074	0.3717
D(LTCN(-2))	0.090079	0.114912	0.783893	0.4371
D(LTCN(-3))	0.116984	0.115099	1.016383	0.3148
D(LTCN(-4))	0.015071	0.112373	0.134113	0.8939

$DLTCN \mapsto I(1) :$

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LTCN,2)

Method: Least Squares

Date: 02/15/05 Time: 00:58

Sample(adjusted): 1991:3 2003:4

Included observations: 50 after adjusting endpoints

ADF Test Statistic	-3.861227	1% Critical Value*	-4.1498
		5% Critical Value	-3.5005
		10% Critical Value	-3.1793

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LTCN(-1))	-1.007831	0.261013	-3.861227	0.0004
D(LTCN(-1),2)	0.048316	0.216064	0.223620	0.8241
D(LTCN(-2),2)	0.070160	0.188779	0.371652	0.7120
D(LTCN(-3),2)	0.117118	0.156169	0.749945	0.4574
D(LTCN(-4),2)	0.062713	0.117780	0.532453	0.5972
C	0.076403	0.034269	2.229519	0.0311
@TREND(1990:1)	-0.001551	0.000832	-1.864682	0.0691

ADF Test Statistic	-3.361156	1% Critical Value*	-3.5653
		5% Critical Value	-2.9202
		10% Critical Value	-2.5977

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LTCN(-1))	-0.703185	0.209209	-3.361156	0.0016
D(LTCN(-1),2)	-0.189657	0.179186	-1.058438	0.2956
D(LTCN(-2),2)	-0.109063	0.166990	-0.653111	0.5171
D(LTCN(-3),2)	-0.004268	0.145896	-0.029253	0.9768
D(LTCN(-4),2)	-0.004532	0.115237	-0.039326	0.9688
C	0.016674	0.012516	1.332147	0.1897

ADF Test Statistic	-3.238595	1% Critical Value*	-2.6090
		5% Critical Value	-1.9473
		10% Critical Value	-1.6192

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LTCN(-1))	-0.524578	0.161977	-3.238595	0.0023
D(LTCN(-1),2)	-0.318488	0.152140	-2.093384	0.0420
D(LTCN(-2),2)	-0.208241	0.150756	-1.381308	0.1740
D(LTCN(-3),2)	-0.074866	0.137095	-0.546090	0.5877
D(LTCN(-4),2)	-0.046633	0.111768	-0.417227	0.6785

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LM)
 Method: Least Squares
 Date: 02/15/05 Time: 01:26
 Sample(adjusted): 1991:2 2003:4
 Included observations: 51 after adjusting endpoints

ADF Test Statistic	2.353702	1% Critical Value*	-2.6081
		5% Critical Value	-1.9471
		10% Critical Value	-1.6191
LM(-1)	0.002657	0.001129	2.353702
D(LM(-1))	-0.176544	0.144658	-1.220420
D(LM(-2))	-0.048191	0.147481	-0.326760
D(LM(-3))	0.177636	0.166990	1.063753
D(LM(-4))	0.231512	0.163435	1.416535

$$DLM \mapsto I(1) :$$

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LM,2)

ADF Test Statistic	0.157167	1% Critical Value*	-2.6090
		5% Critical Value	-1.9473
		10% Critical Value	-1.6192
D(LM(-1))	0.017064	0.108570	0.157167
D(LM(-1),2)	-1.124178	0.183597	-6.123066
D(LM(-2),2)	-1.054767	0.225614	-4.675087
D(LM(-3),2)	-0.675223	0.222391	-3.036193
D(LM(-4),2)	-0.233296	0.160036	-1.457772

$$DDL M \mapsto I(2) :$$

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LM,3)

ADF Test Statistic	-4.053475	1% Critical Value*	-2.6100	
		5% Critical Value	-1.9474	
		10% Critical Value	-1.6193	
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LM(-1),2)	-3.531160	0.871144	-4.053475	0.0002
D(LM(-1),3)	1.440824	0.779466	1.848476	0.0713
D(LM(-2),3)	0.474058	0.607334	0.780556	0.4392
D(LM(-3),3)	-0.070411	0.378764	-0.185898	0.8534
D(LM(-4),3)	-0.148596	0.163001	-0.911627	0.3669

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LIPPI)
 Method: Least Squares
 Date: 02/15/05 Time: 01:08
 Sample(adjusted): 1991:2 2003:4
 Included observations: 51 after adjusting endpoints

ADF Test Statistic	1.205612	1% Critical Value*	-2.6081	
		5% Critical Value	-1.9471	
		10% Critical Value	-1.6191	
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LIPPI(-1)	0.000988	0.000819	1.205612	0.2341
D(LIPPI(-1))	0.486459	0.098729	4.927227	0.0000
D(LIPPI(-2))	0.112807	0.107779	1.046658	0.3007
D(LIPPI(-3))	-0.095222	0.106398	-0.894954	0.3755
D(LIPPI(-4))	0.174965	0.097960	1.786085	0.0807

$$DDLIPPI \mapsto I(2) ;$$

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LIPPI,3)
 Method: Least Squares
 Date: 02/15/05 Time: 01:19
 Sample(adjusted): 1991:4 2003:4
 Included observations: 49 after adjusting endpoints

ADF Test Statistic	-4.640828	1% Critical Value*	-2.6100	
		5% Critical Value	-1.9474	
		10% Critical Value	-1.6193	
D(LIPPI(-1),2)	-2.246973	0.484175	-4.640828	0.0000
D(LIPPI(-1),3)	0.788340	0.399835	1.971663	0.0550
D(LIPPI(-2),3)	0.590968	0.287874	2.052868	0.0461
D(LIPPI(-3),3)	0.247640	0.207780	1.191836	0.2397
D(LIPPI(-4),3)	0.058529	0.111469	0.525071	0.6022

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LTIC)
 Method: Least Squares
 Date: 02/15/05 Time: 01:43
 Sample(adjusted): 1991:2 2003:4
 Included observations: 51 after adjusting endpoints

ADF Test Statistic	-0.639256	1% Critical Value*	-2.6081	
		5% Critical Value	-1.9471	
		10% Critical Value	-1.6191	
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTIC(-1)	-0.005135	0.008033	-0.639256	0.5258
D(LTIC(-1))	-0.101240	0.144270	-0.701743	0.4864
D(LTIC(-2))	-0.048562	0.144323	-0.336479	0.7380
D(LTIC(-3))	0.071517	0.141643	0.504911	0.6160
D(LTIC(-4))	0.180339	0.136883	1.317469	0.1942

$$DLTIC \mapsto I(1) :$$

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LTIC,2)
 Method: Least Squares
 Date: 02/15/05 Time: 02:54
 Sample(adjusted): 1991:3 2003:4
 Included observations: 50 after adjusting endpoints

ADF Test Statistic	-3.419937	1% Critical Value*	-2.6090	
		5% Critical Value	-1.9473	
		10% Critical Value	-1.6192	
D(LTIC(-1))	-1.097910	0.321032	-3.419937	0.0013
D(LTIC(-1),2)	0.043427	0.294228	0.147598	0.8833
D(LTIC(-2),2)	0.020351	0.254979	0.079813	0.9367
D(LTIC(-3),2)	0.077776	0.200407	0.388092	0.6998
D(LTIC(-4),2)	0.234295	0.137088	1.709082	0.0943

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LIPC)
 Method: Least Squares
 Date: 02/15/05 Time: 02:58
 Sample(adjusted): 1991:2 2003:4
 Included observations: 51 after adjusting endpoints

ADF Test Statistic	0.624991	1% Critical Value*	-2.6081	
		5% Critical Value	-1.9471	
		10% Critical Value	-1.6191	
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LIPC(-1)	0.000680	0.001088	0.624991	0.5351
D(LIPC(-1))	0.223424	0.128527	1.738349	0.0888
D(LIPC(-2))	-0.031969	0.121011	-0.264179	0.7928
D(LIPC(-3))	0.132887	0.117077	1.135033	0.2622
D(LIPC(-4))	0.458722	0.117175	3.914846	0.0003

$$DLIPC \mapsto I(1) ;$$

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LIPC,2)
 Method: Least Squares
 Date: 02/15/05 Time: 03:01
 Sample(adjusted): 1991:3 2003:4
 Included observations: 50 after adjusting endpoints

ADF Test Statistic	-2.9736367	1% Critical Value*	-2.6090	
		5% Critical Value	-1.9473	
		10% Critical Value	-1.6192	
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LIPC(-1))	-0.155419	0.113144	-1.373637	0.1764
D(LIPC(-1),2)	-0.562043	0.168590	-3.333789	0.0017
D(LIPC(-2),2)	-0.576658	0.168327	-3.425826	0.0013
D(LIPC(-3),2)	-0.416872	0.160404	-2.598893	0.0126
D(LIPC(-4),2)	0.071255	0.134715	0.528933	0.5995

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(RESID0)
 Method: Least Squares
 Date: 02/15/05 Time: 03:15
 Sample(adjusted): 1991:2 2003:4
 Included observations: 51 after adjusting endpoints

ADF Test Statistic	-2.335529	1% Critical Value*	-4.1458
		5% Critical Value	-3.4987
		10% Critical Value	-3.1782

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID0(-1)	-0.163569	0.070035	-2.335529	0.0241
D(RESID0(-1))	-0.078380	0.141407	-0.554287	0.5822
D(RESID0(-2))	-0.024475	0.142116	-0.172217	0.8641
D(RESID0(-3))	0.058837	0.140028	0.420180	0.6764
D(RESID0(-4))	0.142236	0.136551	1.041626	0.3033
C	0.112249	0.057083	1.966419	0.0556
@TREND(1990:1)	-0.003728	0.001730	-2.155722	0.0366

ADF Test Statistic	-1.350284	1% Critical Value*	-3.5625
		5% Critical Value	-2.9190
		10% Critical Value	-2.5970

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID0(-1)	-0.083261	0.061661	-1.350284	0.1837
D(RESID0(-1))	-0.047962	0.146292	-0.327851	0.7445
D(RESID0(-2))	0.025697	0.145768	0.176284	0.8609
D(RESID0(-3))	0.128391	0.141675	0.906235	0.3696
D(RESID0(-4))	0.221016	0.136798	1.615631	0.1132
C	-0.003798	0.019744	-0.192343	0.8483

ADF Test Statistic	-1.408211	1% Critical Value*	-2.6081
		5% Critical Value	-1.9471
		10% Critical Value	-1.6191

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID0(-1)	-0.084995	0.060357	-1.408211	0.1658
D(RESID0(-1))	-0.046410	0.144532	-0.321102	0.7496
D(RESID0(-2))	0.027170	0.144035	0.188633	0.8512
D(RESID0(-3))	0.128966	0.140153	0.920180	0.3623
D(RESID0(-4))	0.220374	0.135319	1.628559	0.1102

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(RESID01)
 Method: Least Squares
 Date: 02/15/05 Time: 03:25
 Sample(adjusted): 1991:2 2003:4
 Included observations: 51 after adjusting endpoints

ADF Test Statistic	-1.336423	1% Critical Value*	-2.6081	
		5% Critical Value	-1.9471	
		10% Critical Value	-1.6191	
Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID01(-1)	-0.079245	0.059297	-1.336423	0.1880
D(RESID01(-1))	-0.041531	0.145880	-0.284693	0.7772
D(RESID01(-2))	0.005206	0.145698	0.035729	0.9717
D(RESID01(-3))	0.112973	0.141839	0.796485	0.4298
D(RESID01(-4))	0.213862	0.136160	1.570662	0.1231

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(RESID02)
 Method: Least Squares
 Date: 02/15/05 Time: 03:29
 Sample(adjusted): 1991:2 2003:4
 Included observations: 51 after adjusting endpoints

ADF Test Statistic	-1.384991	1% Critical Value*	-2.6081	
		5% Critical Value	-1.9471	
		10% Critical Value	-1.6191	
Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID02(-1)	-0.083012	0.059937	-1.384991	0.1727
D(RESID02(-1))	-0.044533	0.145008	-0.307110	0.7601
D(RESID02(-2))	0.019359	0.144624	0.133859	0.8941
D(RESID02(-3))	0.123283	0.140745	0.875934	0.3856
D(RESID02(-4))	0.218544	0.135582	1.611897	0.1138

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID03)
Method: Least Squares
Date: 02/15/05 Time: 03:31
Sample(adjusted): 1991:2 2003:4
Included observations: 51 after adjusting endpoints

ADF Test Statistic	-1.5611658	1% Critical Value*	-2.6081	
		5% Critical Value	-1.9471	
		10% Critical Value	-1.6191	
Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID03(-1)	-0.386919	0.105682	-3.661166	0.0006
D(RESID03(-1))	0.207768	0.115518	1.798577	0.0786
D(RESID03(-2))	0.106193	0.116324	0.912908	0.3661
D(RESID03(-3))	0.169812	0.113933	1.490458	0.1429
D(RESID03(-4))	0.213888	0.114931	1.861012	0.0691

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID04)
Method: Least Squares
Date: 02/15/05 Time: 03:34
Sample(adjusted): 1991:2 2003:4
Included observations: 51 after adjusting endpoints

ADF Test Statistic	-0.616998	1% Critical Value*	-2.6081	
		5% Critical Value	-1.9471	
		10% Critical Value	-1.6191	
Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID04(-1)	-0.018369	0.029772	-0.616998	0.5403
D(RESID04(-1))	0.280193	0.117105	2.392663	0.0209
D(RESID04(-2))	0.118687	0.120290	0.986674	0.3290
D(RESID04(-3))	0.071762	0.123124	0.582841	0.5628
D(RESID04(-4))	0.119018	0.121320	0.981021	0.3317

: : 04

Response of LIPC to one standard deviation Innovation

Response of LIPC:				
Period	LIPPI	LIPC	LM	LTIC
1	0.001480	0.031433	0.000000	0.000000
2	0.004826	0.026264	0.000695	0.006030
3	0.006624	0.021952	0.001063	0.009768
4	0.007422	0.018310	0.001202	0.011803
5	0.007575	0.015226	0.001184	0.012627
6	0.007322	0.012623	0.001065	0.012628
7	0.006828	0.010438	0.000885	0.012097
8	0.006203	0.008614	0.000673	0.011248
9	0.005525	0.007102	0.000449	0.010231
10	0.004842	0.005856	0.000225	0.009154
11	0.004186	0.004836	1.10E-05	0.008085
12	0.003578	0.004006	-0.000189	0.007070
13	0.003027	0.003335	-0.000373	0.006135
14	0.002537	0.002796	-0.000539	0.005293
15	0.002107	0.002367	-0.000687	0.004548
16	0.001735	0.002027	-0.000820	0.003899
17	0.001416	0.001760	-0.000938	0.003341
18	0.001145	0.001552	-0.001042	0.002866
19	0.000917	0.001393	-0.001135	0.002466
20	0.000726	0.001272	-0.001217	0.002132

Response of LIPPI to one standard deviation Innovation

Response of LIPPI:				
Period	LIPPI	LIPC	LM	LTIC
1	0.021872	0.000000	0.000000	0.000000
2	0.013689	0.005419	0.000276	0.007408
3	0.009598	0.006878	0.000242	0.009963
4	0.007328	0.006752	7.37E-05	0.010355
5	0.005889	0.006067	-0.000145	0.009813
6	0.004855	0.005254	-0.000376	0.008905
7	0.004041	0.004483	-0.000600	0.007896
8	0.003365	0.003814	-0.000809	0.006906
9	0.002792	0.003258	-0.001000	0.005993
10	0.002302	0.002806	-0.001173	0.005177
11	0.001884	0.002447	-0.001328	0.004464
12	0.001528	0.002164	-0.001466	0.003851
13	0.001228	0.001945	-0.001590	0.003330
14	0.000975	0.001779	-0.001701	0.002893
15	0.000765	0.001654	-0.001801	0.002529
16	0.000590	0.001562	-0.001891	0.002229
17	0.000446	0.001498	-0.001974	0.001985
18	0.000327	0.001454	-0.002050	0.001788
19	0.000230	0.001428	-0.002121	0.001630
20	0.000151	0.001414	-0.002188	0.001506

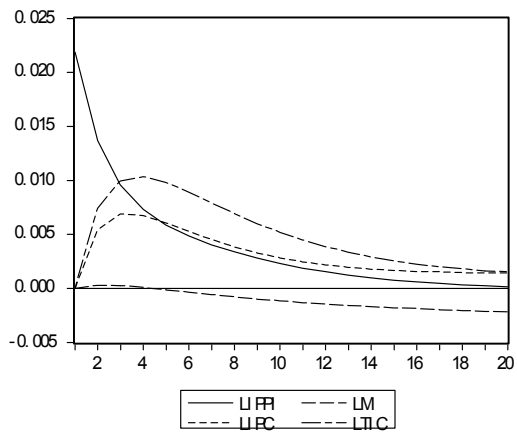
Response of LM to one standard deviation Innovation

Response of LM:				
Period	LIPPI	LIPC	LM	LTIC
1	0.001473	0.002517	0.028300	0.000000
2	0.004462	-0.002704	0.028749	-0.001842
3	0.005654	-0.006116	0.029212	-0.002888
4	0.005984	-0.008584	0.029668	-0.003750
5	0.005898	-0.010512	0.030120	-0.004630
6	0.005617	-0.012092	0.030574	-0.005565
7	0.005256	-0.013430	0.031038	-0.006539
8	0.004874	-0.014583	0.031518	-0.007520
9	0.004504	-0.015592	0.032018	-0.008482
10	0.004161	-0.016486	0.032540	-0.009406
11	0.003854	-0.017286	0.033087	-0.010280
12	0.003587	-0.018011	0.033659	-0.011097
13	0.003359	-0.018676	0.034255	-0.011857
14	0.003168	-0.019293	0.034876	-0.012561
15	0.003012	-0.019874	0.035520	-0.013214
16	0.002886	-0.020427	0.036188	-0.013820
17	0.002789	-0.020958	0.036877	-0.014386
18	0.002715	-0.021475	0.037589	-0.014916
19	0.002663	-0.021981	0.038320	-0.015416
20	0.002629	-0.022481	0.039073	-0.015893

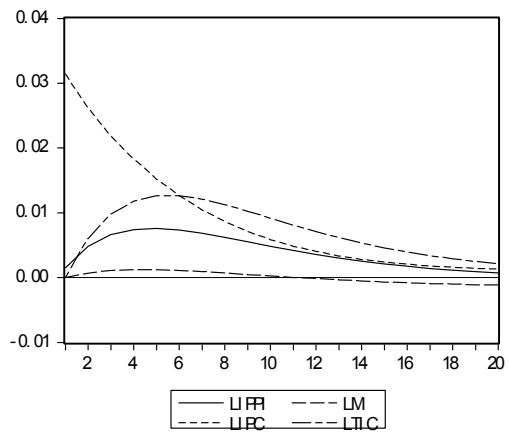
Response of LTIC to one standard deviation Innovation

Response of LTIC:				
Period	LIPPI	LIPC	LM	LTIC
1	0.025180	0.021706	-0.014580	0.115052
2	0.021870	0.012349	-0.019071	0.082126
3	0.016671	0.008764	-0.022411	0.060241
4	0.011625	0.007872	-0.024971	0.045178
5	0.007399	0.008240	-0.026983	0.034616
6	0.004104	0.009187	-0.028601	0.027173
7	0.001647	0.010377	-0.029933	0.021962
8	-0.000126	0.011644	-0.031057	0.018374
9	-0.001364	0.012903	-0.032034	0.015976
10	-0.002201	0.014111	-0.032906	0.014450
11	-0.002741	0.015249	-0.033707	0.013558
12	-0.003069	0.016311	-0.034461	0.013124
13	-0.003247	0.017295	-0.035188	0.013016
14	-0.003325	0.018208	-0.035900	0.013137
15	-0.003336	0.019055	-0.036609	0.013412
16	-0.003306	0.019844	-0.037322	0.013791
17	-0.003254	0.020584	-0.038043	0.014235
18	-0.003193	0.021281	-0.038777	0.014718
19	-0.003130	0.021944	-0.039526	0.015220
20	-0.003072	0.022579	-0.040292	0.015730

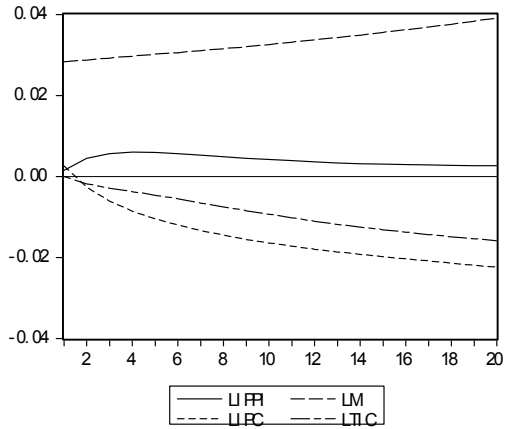
Response of LIPPI to One S.D. Innovations



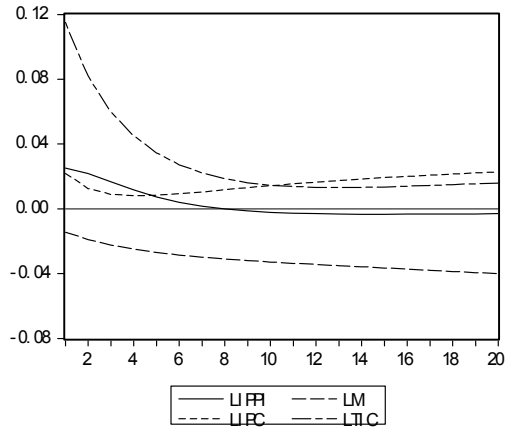
Response of LIPC to One S.D. Innovations



Response of LM to One S.D. Innovations



Response of LTIC to One S.D. Innovations



: 05

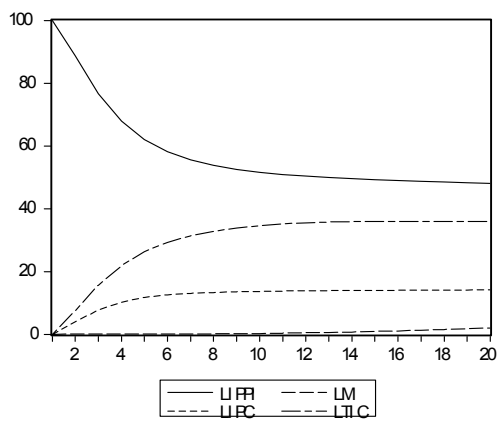
Variance Decomposition of LIPC:					
Period	S.E.	LIPPI	LIPC	LM	LTIC
1	0.031468	0.221058	99.77894	0.000000	0.000000
2	0.041715	1.464147	96.41857	0.027726	2.089553
3	0.048605	2.935931	91.41804	0.068269	5.577757
4	0.053791	4.300835	86.22523	0.105635	9.368300
5	0.057824	5.438017	81.55264	0.133318	12.87603
6	0.060968	6.333927	77.64350	0.150416	15.87216
7	0.063402	7.016732	74.50722	0.158573	18.31747
8	0.065265	7.525392	72.05740	0.160287	20.25692
9	0.066673	7.897360	70.17959	0.158117	21.76493
10	0.067727	8.164647	68.76106	0.154344	22.91995
11	0.068507	8.353202	67.70213	0.150851	23.79382
12	0.069080	8.483457	66.91936	0.149107	24.44808
13	0.069499	8.571189	66.34516	0.150190	24.93346
14	0.069805	8.628383	65.92615	0.154832	25.29063
15	0.070028	8.664000	65.62095	0.163485	25.55156
16	0.070192	8.684637	65.39808	0.176370	25.74091
17	0.070314	8.695063	65.23397	0.193543	25.87743
18	0.070406	8.698670	65.11124	0.214940	25.97515
19	0.070478	8.697823	65.01727	0.240420	26.04449
20	0.070536	8.694135	64.94300	0.269802	26.09306

Variance Decomposition of LIPPI:					
Period	S.E.	LIPPI	LIPC	LM	LTIC
1	0.021872	100.0000	0.000000	0.000000	0.000000
2	0.027388	88.75875	3.915572	0.010143	7.315537
3	0.031446	76.64542	7.754299	0.013593	15.58668
4	0.034574	67.89596	10.22856	0.011699	21.86378
5	0.036921	62.08200	11.66960	0.011802	26.23661
6	0.038649	58.23137	12.49703	0.020214	29.25139
7	0.039911	55.63260	12.98126	0.041533	31.34460
8	0.040831	53.83497	13.27597	0.078941	32.81012
9	0.041503	52.55843	13.46566	0.134499	33.84142
10	0.041998	51.62664	13.59643	0.209361	34.56757
11	0.042368	50.92622	13.69339	0.303958	35.07643
12	0.042650	50.38273	13.77022	0.418162	35.42889
13	0.042871	49.94635	13.83448	0.551445	35.66773
14	0.043050	49.58330	13.89038	0.703015	35.82330
15	0.043201	49.27037	13.94045	0.871934	35.91725
16	0.043332	48.99144	13.98625	1.057213	35.96510
17	0.043450	48.73523	14.02889	1.257880	35.97801
18	0.043561	48.49375	14.06919	1.473026	35.96403
19	0.043667	48.26132	14.10785	1.701836	35.92900
20	0.043770	48.03381	14.14541	1.943599	35.87718

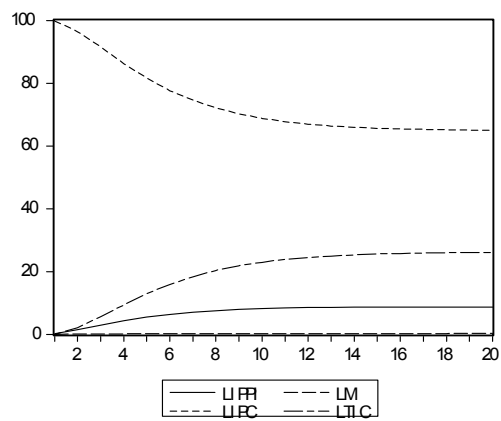
Variance Decomposition of LM:					
Period	S.E.	LIPPI	LIPC	LM	LTIC
1	0.028450	0.268233	0.783035	98.94873	0.000000
2	0.040823	1.324893	0.818954	97.65245	0.203704
3	0.050966	2.080826	1.965320	95.50218	0.451674
4	0.060011	2.495097	3.463801	93.32481	0.716288
5	0.068376	2.665939	5.031490	91.29228	1.010288
6	0.076281	2.684311	6.555664	89.41598	1.344046
7	0.083862	2.613762	7.988360	87.67794	1.719942
8	0.091210	2.495205	9.309449	86.06159	2.133754
9	0.098386	2.354035	10.51258	84.55622	2.577170
10	0.105433	2.205584	11.59897	83.15535	3.040095
11	0.112384	2.058799	12.57422	81.85464	3.512336
12	0.119263	1.918628	13.44630	80.65040	3.984672
13	0.126086	1.787551	14.22432	79.53874	4.449394
14	0.132869	1.666553	14.91766	78.51530	4.900483
15	0.139622	1.555745	15.53549	77.57522	5.333540
16	0.146358	1.454743	16.08641	76.71324	5.745605
17	0.153083	1.362911	16.57831	75.92386	6.134920
18	0.159807	1.279503	17.01828	75.20154	6.500677
19	0.166538	1.203746	17.41265	74.54080	6.842800
20	0.173281	1.134894	17.76697	73.93639	7.161745

Variance Decomposition of LTIC:					
Period	S.E.	LIPPI	LIPC	LM	LTIC
1	0.120643	4.356346	3.237161	1.460571	90.94592
2	0.149311	4.989473	2.797467	2.584982	89.62808
3	0.163645	5.191464	2.615647	4.027429	88.16546
4	0.172167	5.146176	2.572171	5.742271	86.53938
5	0.178018	4.986202	2.620134	7.668495	84.72517
6	0.182615	4.788870	2.742969	9.740251	82.72791
7	0.186646	4.592012	2.934859	11.89590	80.57723
8	0.190459	4.410048	3.192305	14.08345	78.31420
9	0.194228	4.245505	3.510947	16.26238	75.98117
10	0.198040	4.095963	3.884788	18.40308	73.61617
11	0.201940	3.957700	4.306420	20.48511	71.25077
12	0.205950	3.827320	4.767606	22.49519	68.90988
13	0.210077	3.702288	5.259870	24.42546	66.61238
14	0.214328	3.580958	5.774993	26.27194	64.37211
15	0.218703	3.462399	6.305368	28.03348	62.19876
16	0.223201	3.346188	6.844217	29.71085	60.09874
17	0.227822	3.232226	7.385695	31.30620	58.07588
18	0.232564	3.120597	7.924912	32.82251	56.13198
19	0.237427	3.011469	8.457884	34.26332	54.26733
20	0.242408	2.905035	8.981465	35.63244	52.48106

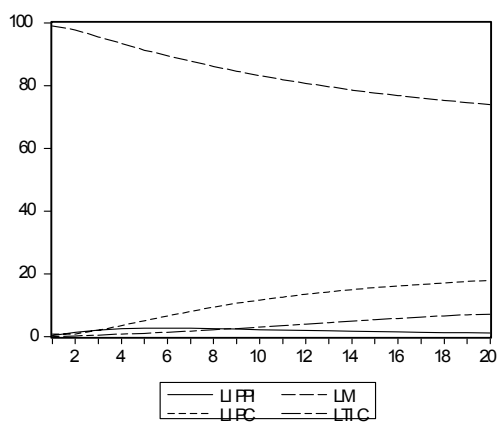
Variance Decomposition of LIPPI



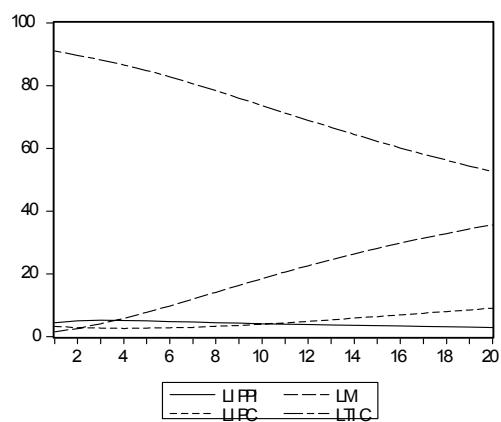
Variance Decomposition of LIPC



Variance Decomposition of LM



Variance Decomposition of LTIC



: 06

Pairwise Granger Causality Tests
Date: 01/16/05 Time: 01:30
Sample: 1990:1 2003:4
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
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LIPPI does not Granger Cause LIPC	54	3.59453	0.03494
LIPC does not Granger Cause LIPPI		10.8022	0.00013

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LM does not Granger Cause LIPC	54	0.56820	0.57023
LIPC does not Granger Cause LM		2.60725	0.08394

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LTIC does not Granger Cause LIPC	54	2.09500	0.13396
LIPC does not Granger Cause LTIC		3.14604	0.05183

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LTCN does not Granger Cause LIPC	54	0.87451	0.42347
LIPC does not Granger Cause LTCN		4.92991	0.01120

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LM does not Granger Cause LIPPI	54	0.10724	0.89852
LIPPI does not Granger Cause LM		1.11385	0.33646

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LTIC does not Granger Cause LIPPI	54	0.04875	0.95247
LIPPI does not Granger Cause LTIC		3.22338	0.04840

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LTCN does not Granger Cause LIPPI	54	2.04029	0.14089
LIPPI does not Granger Cause LTCN		0.64023	0.53152

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LTIC does not Granger Cause LM	54	1.08379	0.34628
LM does not Granger Cause LTIC		3.82443	0.02862

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LTCN does not Granger Cause LM	54	1.17990	0.31589
LM does not Granger Cause LTCN		0.41539	0.66239

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LTCN does not Granger Cause LTIC	54	2.80739	0.07010
LTIC does not Granger Cause LTCN		0.08007	0.92317

(2000:04/1990:01)

: 07

System: SYS1
 Estimation Method: Two-Stage Least Squares
 Date: 01/10/05 Time: 15:42
 Sample: 1991:1 2000:4
 Included observations: 40
 Total system (balanced) observations 160
 Instruments: C LIPPI(-1) LIPPI(-3) LIPPI(-4) LIPC(-1) LIPC(-2) LIPC(-3)
 LM(-1) LM(-2) LM(-3) LM(-4) LTIC(-1) LTIC(-4) LTCN

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.907845	0.455407	1.993479	0.0483
C(2)	0.393093	0.068730	5.719348	0.0000
C(3)	0.306848	0.060890	5.039384	0.0000
C(4)	0.009270	0.050348	0.184122	0.8542
C(5)	0.026162	0.022612	1.157001	0.2494
C(6)	0.029309	0.026619	1.101080	0.2729
C(7)	0.219739	0.041756	5.262421	0.0000
C(8)	0.276160	0.694448	0.397668	0.6915
C(9)	0.121972	0.085928	1.419474	0.1582
C(10)	0.945463	0.158450	5.966954	0.0000
C(11)	-0.280471	0.155585	-1.802688	0.0738
C(12)	0.023611	0.073517	0.321159	0.7486
C(13)	0.060680	0.036298	1.671703	0.0970
C(14)	0.132986	0.054850	2.424540	0.0167
C(15)	0.004480	0.754595	0.005937	0.9953
C(16)	0.273399	0.112656	2.426845	0.0166
C(17)	-0.109196	0.095556	-1.142738	0.2552
C(18)	0.443438	0.179365	2.472266	0.0147
C(19)	0.552387	0.182177	3.032145	0.0029
C(20)	-0.069910	0.038630	-1.809758	0.0726
C(21)	-0.188573	0.063640	-2.963118	0.0036
C(22)	6.165717	4.242849	1.453202	0.1486
C(23)	0.826021	0.505546	1.633920	0.1047
C(24)	0.009073	0.455076	0.019936	0.9841
C(25)	0.926365	0.829832	1.116328	0.2663
C(26)	-1.349412	0.876024	-1.540382	0.1259
C(27)	-1.988657	0.698195	-2.848284	0.0051
C(28)	1.423418	0.724527	1.964618	0.0516
C(29)	0.498612	0.176208	2.829682	0.0054
C(30)	0.043990	0.359424	0.122390	0.9028
Determinant residual covariance	1.70E-12			

$$\text{Equation: LIPPI} = C(1) + C(2)*\text{LIPPI}(-1) + C(3)*\text{LIPC}(-1) + C(4)*\text{LM}(-1) + C(5)*\text{LTIC}(-1) + C(6)*\text{LTIC}(-4) + C(7)*\text{LTCN}$$

Observations: 40

R-squared	0.998525	Mean dependent var	6.218385
Adjusted R-squared	0.998257	S.D. dependent var	0.458486
S.E. of regression	0.019142	Sum squared resid	0.012092
Durbin-Watson stat	1.848140		

$$\text{Equation: LIPC} = C(8) + C(9)*\text{LIPPI}(-3) + C(10)*\text{LIPC}(-1) + C(11)*\text{LIPC}(-2) + C(12)*\text{LM}(-1) + C(13)*\text{LTIC}(-4) + C(14)*\text{LTCN}$$

Observations: 40

R-squared	0.996714	Mean dependent var	5.894579
Adjusted R-squared	0.996117	S.D. dependent var	0.468812
S.E. of regression	0.029214	Sum squared resid	0.028165
Durbin-Watson stat	1.859250		

$$\text{Equation: LM} = C(15) + C(16)*\text{LIPPI}(-1) + C(17)*\text{LIPC}(-3) + C(18)*\text{LM}(-2) + C(19)*\text{LM}(-4) + C(20)*\text{LTIC}(-1) + C(21)*\text{LTCN}$$

Observations: 40

R-squared	0.995583	Mean dependent var	13.61177
Adjusted R-squared	0.994780	S.D. dependent var	0.448076
S.E. of regression	0.032373	Sum squared resid	0.034585
Durbin-Watson stat	1.544177		

$$\text{Equation: LTIC} = C(22) + C(23)*\text{LIPPI}(-1) + C(24)*\text{LIPPI}(-4) + C(25)*\text{LIPC}(-1) + C(26)*\text{LIPC}(-2) + C(27)*\text{LM}(-1) + C(28)*\text{LM}(-3) + C(29)*\text{LTIC}(-1) + C(30)*\text{LTCN}$$

Observations: 40

R-squared	0.804634	Mean dependent var	2.543794
Adjusted R-squared	0.754217	S.D. dependent var	0.260289
S.E. of regression	0.129042	Sum squared resid	0.516207
Durbin-Watson stat	2.263923		

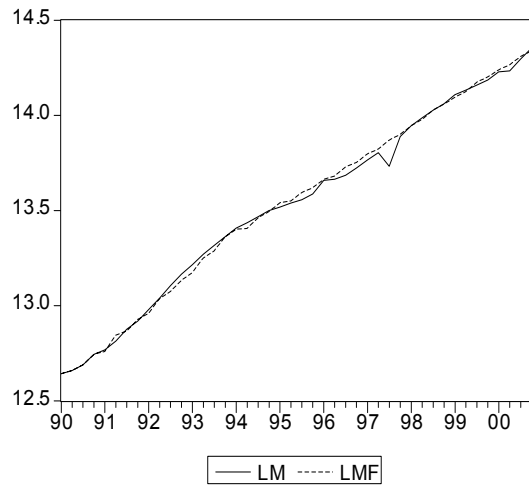
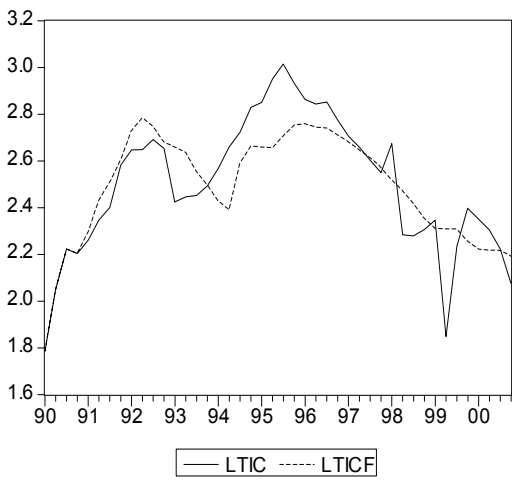
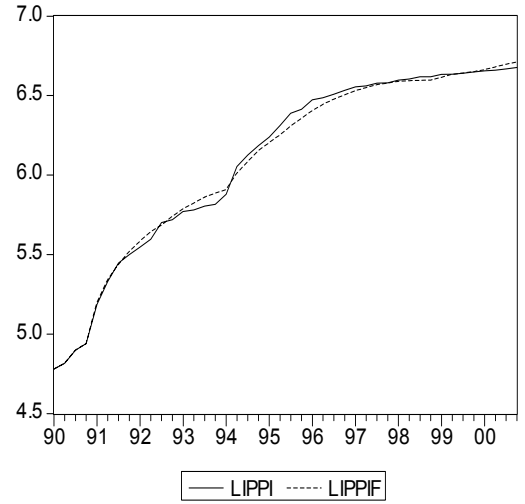
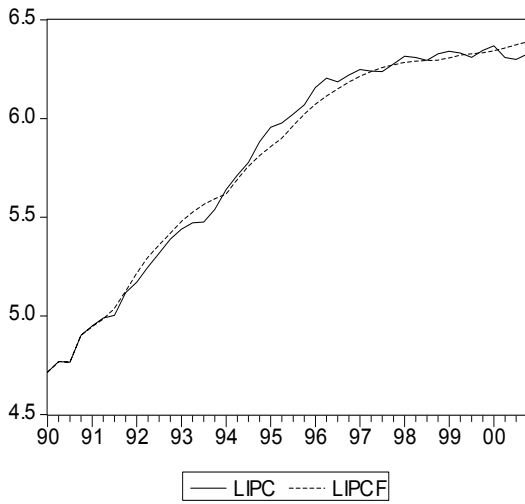
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: 08

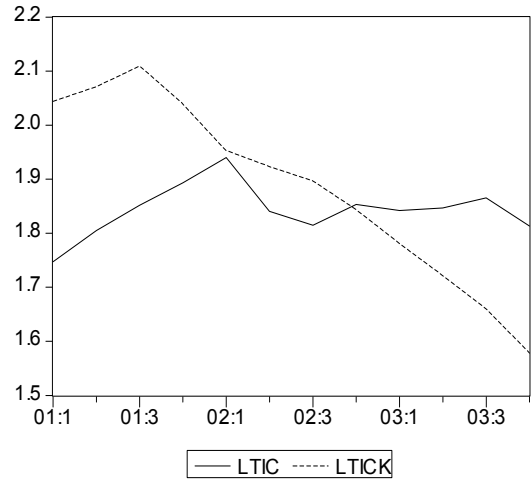
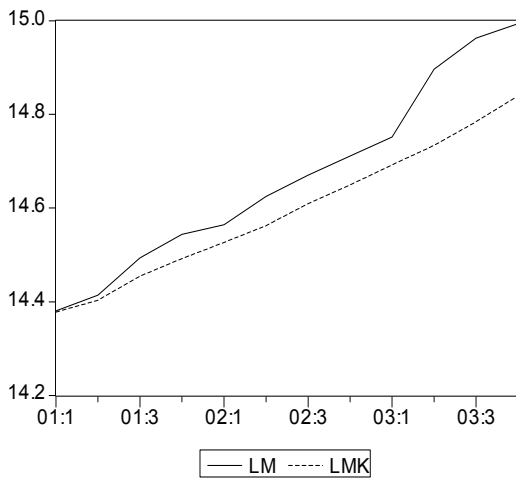
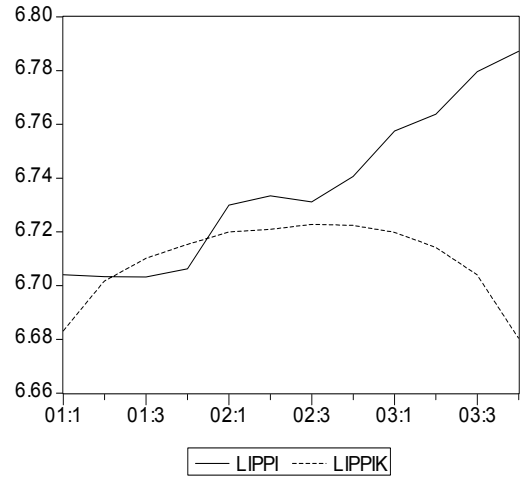
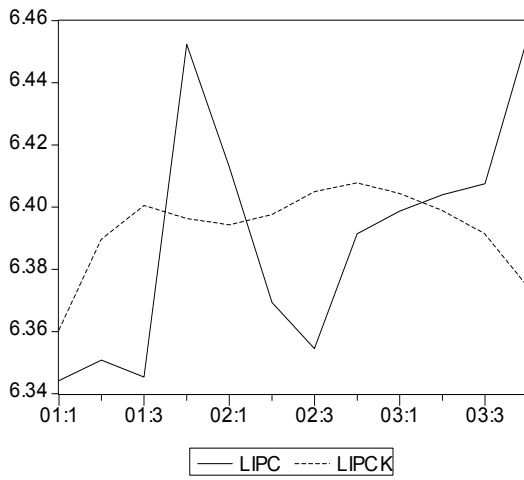
obs	LIPC	LIPCK	LIPPI	LIPPIK
2001:1	6.344285	6.360528	6.704047	6.683108
2001:2	6.350816	6.389711	6.703311	6.701677
2001:3	6.345391	6.400561	6.703188	6.710186
2001:4	6.452412	6.396334	6.706251	6.715342
2002:1	6.412967	6.394319	6.729944	6.719930
2002:2	6.369387	6.397641	6.733402	6.720903
2002:3	6.354544	6.404988	6.731137	6.722723
2002:4	6.391465	6.407825	6.740638	6.722396
2003:1	6.398761	6.404417	6.757514	6.719803
2003:2	6.404005	6.398909	6.763769	6.714125
2003:3	6.407540	6.391367	6.779581	6.703917
2003:4	6.454302	6.374683	6.787168	6.680450

obs	LM	LMK	LTIC	LTICK
2001:1	14.38053	14.37768	1.747459	2.044170
2001:2	14.41429	14.40296	1.805005	2.070925
2001:3	14.49380	14.45457	1.851599	2.109096
2001:4	14.54390	14.49189	1.893112	2.039189
2002:1	14.56439	14.52634	1.940179	1.953090
2002:2	14.62473	14.56214	1.840550	1.923098
2002:3	14.66992	14.60897	1.814825	1.896705
2002:4	14.71056	14.64887	1.853168	1.843144
2003:1	14.75131	14.69177	1.842136	1.780565
2003:2	14.89636	14.73339	1.846879	1.721289
2003:3	14.96258	14.78428	1.865629	1.659725
2003:4	14.99348	14.83905	1.813195	1.577987

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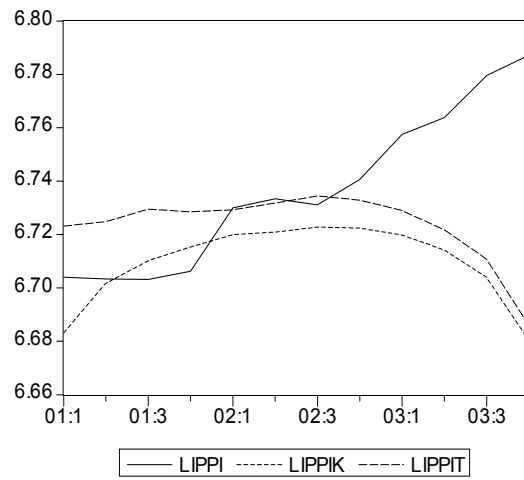
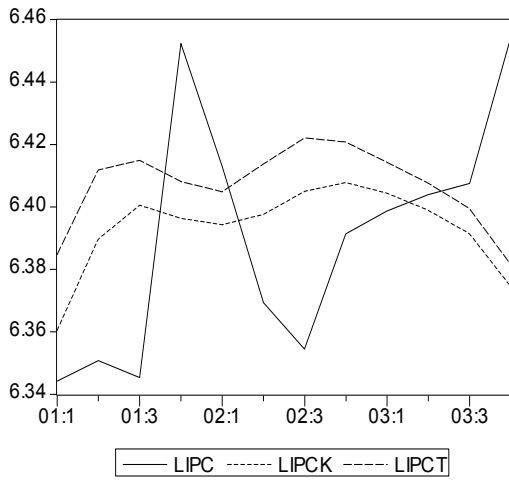
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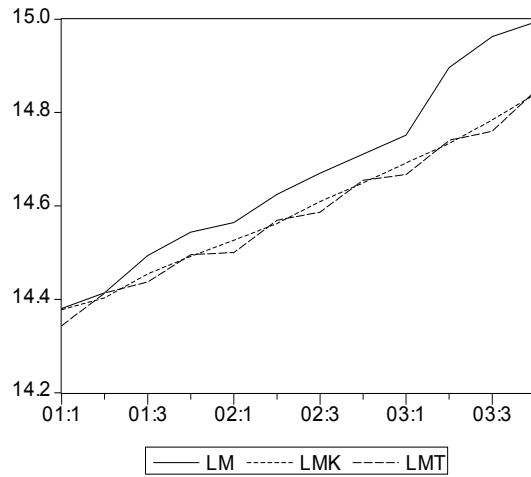
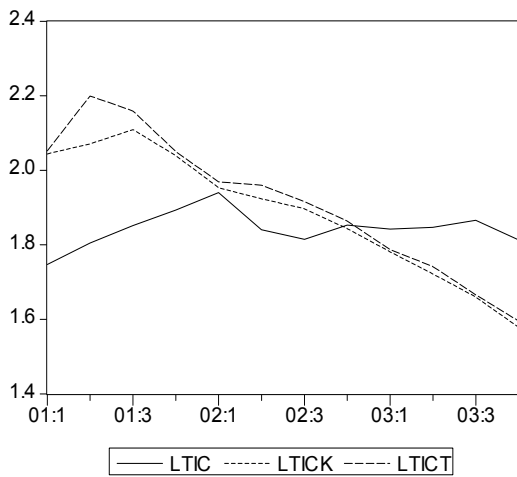
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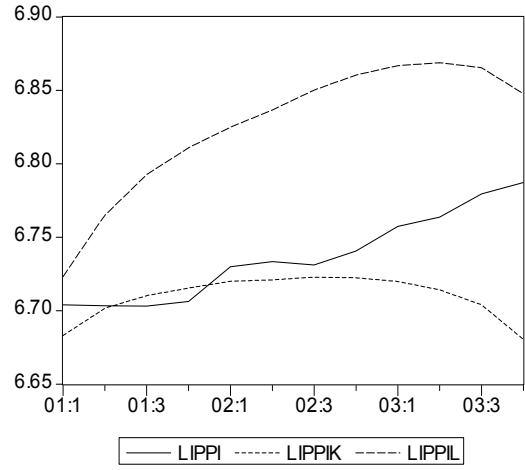
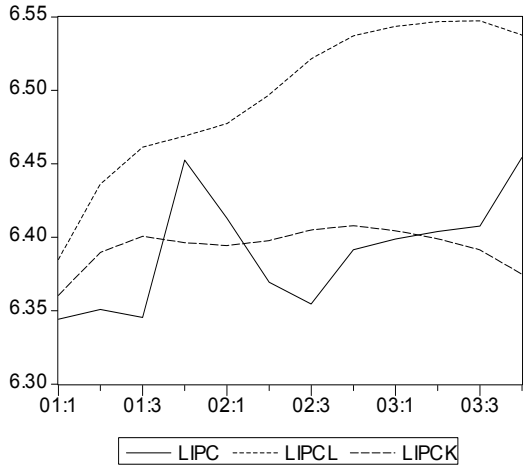


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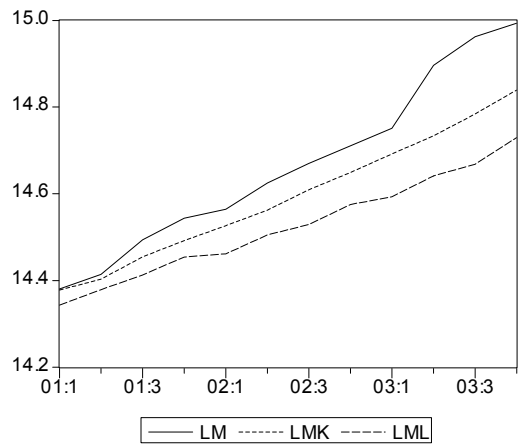
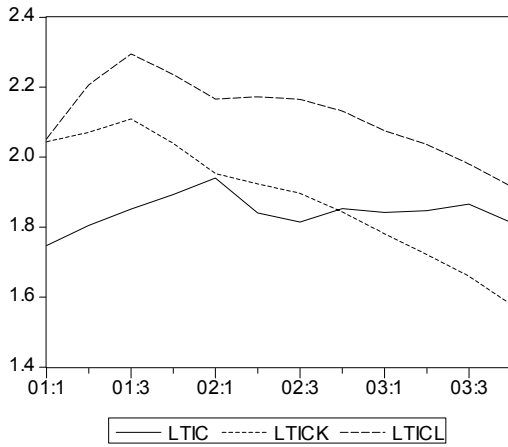


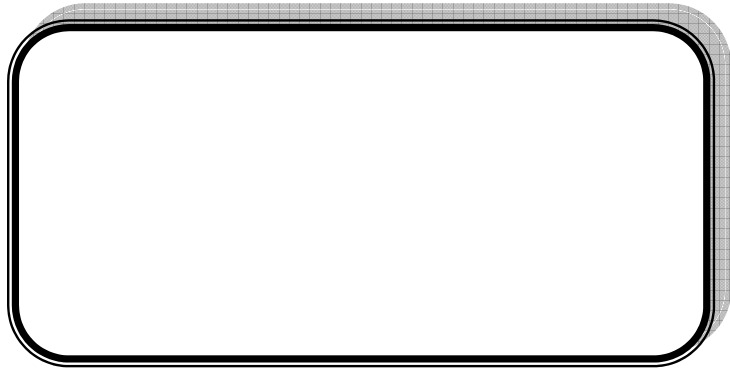
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