No.37

A Quarterly Econometric Model for the Brazilian Economy

March , 2001

Suminori TOKUNAGA

JICA Expert

and

Institute of Economic Research, Nagoya City University

03/20/01

A Quarterly Econometric Model for the Brazilian Economy

Ph.D. and Prof. Suminori TOKUNAGA
JICA Expert and Nagoya City University

March 20, 2000

1 Introduction

At IPEA in Brazil, the quarterly econometric model has been developed by the Group of Macroeconomic Analysis and Modeling (Gamma) at IPEA/DIPES. The latest version of this Gamma model in which is designed to make short-run projections and policy simulations for Brazilian Economy focus on the Balance of Payments Accounts Block in detail. Thus we present the prototype quarterly econometric model for the Brazilian economy in this paper.

The Brazilian economy was rapidly changes such as exchange rate regime and a new framework for monetary policy and had a low growth rate in the 1990s. In this paper, the observation period is 9 years (the first quarter 1992 to the fourth quarter 2000). In this period, GDP shows a low growth rate and the general price index shows a lower fixed level. Thus, it is important to have a systematic view of the national economy as a whole since the economic structure has changed using a quarterly econometric model for the Brazilian economy in the 1990s and analyze the mechanisms both brake and accelerator. This prototype modeling is designed to be used both for forecasting and for policy simulations such as fiscal and monetary policies on a variety of macro-economic aggregate variables.

2 Estimation of Quarterly Econometric Model

The estimated result of this model is as follows. This simple model is composed of nine behavioral equations and eight identities (see Appendix A and B). We are estimated by OLS. The sample period is from 1992 Q1to 2000Q4.

First, we estimated the aggregate demand side. Aggregate demand is given by individually estimated equation for private consumption and aggregate investment for machinery and construction. The government consumption and net export are as exogenous variables in this model.

The real private consumption expenditure (CP4) of equation (1) is estimated as a function of real disposable income (RD4), real interest rate (TJR4) and 94Q4 dummy (D94Q4) in Table 1 and Figure 1 in appendix A and B. Figure 1 shows the trends of each endogenous variable. In the figure, Actual, Fitted and Residual indicate the actual values, the estimated values, and the residual values which the difference between the actual values and the estimated values.

The real total private investment expenditure (FBKF4) is divided by for machinery and construction. We estimated the real private investment expenditure for machinery (FBKFM4) of equation (2) as a function of the ratio between real potential GDP and real GDP(PIBP4/PIB4), real interest rate (TJR4) , capacity utilization rate (CUTIND4), and capital stock (ELKT4) in Table 2 and Figure 2. Furthermore we estimated the real private investment expenditure for construction (FBKFC4) of equation (3) as a function of the ratio between real potential GDP and real GDP(PIBP4/PIB4), real interest rate (TJR4) , capacity utilization rate (CUTIND4), and capital stock (ELKT4) in Table 3 and Figure 3.

The government consumption and net export are as exogenous variables in this model. Then, real GDP is determined by summing-up these expenditure items. The disposable income (RDSN4) is defined by the nominal GDP as equation (8).

We estimated the real interest rate (TJR4) of equation (10) as a function of the nominal interest rate (TJOVER4) and the general price index (IGP4) in Table 4 and Figure 4. Next, we estimated the general price index (IGP4) of equation (11) in Table 5 and Figure

5. The general price index (IGP4) depends on the one-lag of the general price index (IGP4) and the ratio of nominal exchange (ERV4/ERV4(-1)).

Finally, we estimated the aggregate supply side. The capacity utilization rate index (CUTIND4) of equation (12) is determined based on the ratio between the real potential GDP and real GDP, the ratio between the employed population (POC4) and real capital stock (ELKT4), and real interest rte in Table 6 and Figure 6. The domestic capital stock is calculated according to identity of equation (13).

The potential production function (PIBP4) is given by the real capital stock (ELKT4) and the employed labor (POC4) as Cobb-Douglas-type function of equation (14) in Table 7 and Figure 7. This equation also includes in time trend as exogenous trend. Due to the lack of employment and wage data before 1990, the sample period is from 1993 to 1999. It is reasonable results, comparing with IPEA(1998). Although the sign of the estimated trend term, which implies productivity of growth rate, is negative, this value is very small.

Next, we estimated the labor demand function (POC4) of equation (15) in Table 8 and Figure 8. The employed population index (POC4) depends on one-lag of employed population index (POC4(-1)), the real wage (SAL4) and the real GDP (PIB4). Nominal wages (SALN4) of equation (16) is determined by the real GDP per employed population (PIB4/POC4) and real wage index (SAL4) in Table 9 and Figure 9.

3 Final Test of the Model

The historical simulations of the total test and the final tests are very important to evaluate how well the model can simulate the real economy. The model has been simulated over the period from 1993Q1 to 1999Q3, using the static and dynamic Gauss-Seidel method.

Figure 10 to Figure 24 shows the results of the total test. As the results of this total test suggest that this model is good performance, we will carry some policy simulations.

4 Conclusion

In this paper, we have conducted the prototype quarterly econometric model for the Brazilian economy with IPEA and found this model was good performance. However, there is something to be improved in this model. It will be necessary not only to combine the monetary-fiscal block and the balance of payment block from IPEA, but also to improve the estimation methods.

Reference

Eustaquio J.Reis, Marco A.F.H. Cavalcanti, A.S.de Castro, J.L.Rossi, Jr. and E.R. de Araujo, "A Brazilian Quarterly Economic Model", paper presented at the Project LINK world conference, 1998.

Fukuchi, Takao, "An Investigation of Virtuous Circle Between Real and Monetary Aspects of Brazilian Economy ", Discussion Papers. IPEA , 2000.

Fukuchi. Takao and Suminori TOKUNAGA, "Simulation Analysis of Exchange Rate Dynamics: the Case of Indonesia ". The Developing Economies. Vol.37.No.1. pp.35-58, 2000.

Obayashi, mamoru. "A Quarterly Econometric Model for the Brazilian Economy ", paper presented at IPEA seminar, March 2000.

Tokunaga, suminori, "Primary commodity, FDI and Economic Development in

Indonesia: An Econometric Model of the Indonesian Economy(1987-97)",
Journal of International and regional Economics, Vol.1, pp.130-154, 2001.

Appendix A: Model for projections and simulations of the Brazilian Economy

(GAMMA01-IPEA/JICA, March, 2001)

A: Final Demand Sector

(1) Private consumption expenditure equation (CP4)

Dependent Variable: CP4
Method: Least Squares
Date: 03/20/01 Time: 05:00
Sample(adjusted): 1992:2 1999:4
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1309.813	497.1804	-2.634483	0.0145
RD4(-1)	1.356344	0.189522	7.156642	0.0000
TJR4	-5.022840	3.017196	-1.664738	0.1090
D94Q4	444.8962	141.6542	3.140721	0.0044
@SEAS(1)	161.1283	75.83867	2.124620	0.0441
@SEAS(2)	335.7281	81.27334	4.130852	0.0004
@SEAS(3)	219.4868	68.96920	3.182388	0.0040

R-squared	0.752467	Mean dependent var	2021.726
Adjusted R-squared	0.690584	S.D. dependent var	234.3210
S.E. of regression	130.3415	Akaike info criterion	12.77387
Sum squared resid	407733.7	Schwarz criterion	13.09768
Log likelihood	-190.9950	F-statistic	12.15947
Durbin-Watson stat	1.807243	Prob(F-statistic)	0.000003

(2) Investment expenditure for machinery (FBKFM4)

Dependent Variable: FBKFM4
Method: Least Squares
Date: 03/21/01 Time: 23:54
Sample(adjusted): 1993:1 1999:4
Included observations: 28 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1790.269	308.8767	5.796064	0.0000
PIBP4(-1)/PIB4(-1)	-1425.248	223.2453	-6.384223	0.0000
CUTIND4(-4)	4.027478	1.547523	2.602532	0.0170
ELKT4(-1)	-0.007542	0.002948	-2.558354	0.0187
TJR4(-4)	-0.735989	0.402046	-1.830608	0.0821
@SEAS(1)	-24.79860	10.57443	-2.345148	0.0294
@SEAS(2)	6.598283	10.36825	0.636393	0.5317
@SEAS(3)	-0.190562	9.472873	-0.020117	0.9841

R-squared	0.868927	Mean dependent var	252.5126
Adjusted R-squared	0.823051	S.D. dependent var	41.95400
S.E. of regression	17.64806	Akaike info criterion	8.814085
Sum squared resid	6229.078	Schwarz criterion	9.194715
Log likelihood	-115.3972	F-statistic	18.94096
Durbin-Watson stat	1.492169	Prob(F-statistic)	0.000000

(3) Investment expenditure for construction (FBKFC4)

Dependent Variable: FBKFC4/ELKT4(-1)
Method: Least Squares
Date: 03/22/01 Time: 00:06
Sample(adjusted): 1993:1 1999:4
Included observations: 28 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.045052	0.008840	5.096512	0.0000
PIBP4(-1)/PIB4(-1)	-0.024860	0.005529	-4.496654	0.0002
CUTIND4(-1)	-0.000102	4.21E-05	-2.419233	0.0247
TJR4(-4)	-9.55E-06	8.49E-06	-1.124883	0.2733
@SEAS(1)	-0.000397	0.000192	-2.067510	0.0512
@SEAS(2)	0.000117	0.000212	0.552773	0.5863
@SEAS(3)	0.000461	0.000193	2.384593	0.0266

R-squared	0.683868	Mean dependent var	0.010070
Adjusted R-squared	0.593544	S.D. dependent var	0.000564
S.E. of regression	0.000360	Akaike info criterion	-12.81107
Sum squared resid	2.71E-06	Schwarz criterion	-12.47802
Log likelihood	186.3550	F-statistic	7.571312
Durbin-Watson stat	1.338784	Prob(F-statistic)	0.000204

(4) Investment expenditure (FBKF4)

FBKF4=(FBKFM4+FBKFC4)/(1-0.026)

(5) Net exports (XLBSNF4)

XLBSNF4 = (XVT4-MVT4+SNF4)*ERV4*1000/IGP4

(6) Real Gross Domestic Expenditure (PIB4)

PIB4=CP4+CG4+FBKF4+XLBSNF4+SD4

(7) Nominal Gross Domestic Expenditure (PIBN4)

PIBN4=PIB4*IGP4

B: Income Sector

(8) Nominal Disposable Income (RDN4)

RDN4 = PIBN4-CTRIBN4

(9) Real Disposable Income (RD4)

RD4 = RDN4/IGP4

C: Monetary Sector

(10) Real interest rate (TJR4)

Dependent Variable: TJR4

Method: Least Squares
Date: 03/21/01 Time: 04:13
Sample: 1993:1 1999:3
Included observations: 27

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.34341	3.848503	2.687644	0.0138
((1+TJOVER4/100)/(IGP4/IGP4(-1))^4-1)*100	0.516835	0.109753	4.709061	0.0001
D94Q3	49.25991	12.46800	3.950908	0.0007
@SEAS(1)	0.136284	3.172660	0.042956	0.9661
@SEAS(2)	-0.290561	3.051139	-0.095230	0.9250
@SEAS(3)	0.976442	3.313627	0.294675	0.7711

R-squared	0.549759	Mean dependent var	22.00418
Adjusted R-squared	0.442558	S.D. dependent var	7.223489
S.E. of regression	5.393203	Akaike info criterion	6.401286
Sum squared resid	610.8194	Schwarz criterion	6.689250
Log likelihood	-80.41736	F-statistic	5.128329
Durbin-Watson stat	2.476139	Prob(F-statistic)	0.003148

D: Deflator and Price Sector

(11) General price index (IGP4)
Dependent Variable: IGP4/IGP4(-1)
Method: Least Squares
Date: 03/20/01 Time: 23:15
Sample: 1992:3 2000:4
Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.069938	0.038488	-1.817133	0.0799
IGP4(-1)/IGP4(-2)	0.236006	0.043696	5.401127	0.0000
ERV4/ERV4(-1)	0.818379	0.045857	17.84630	0.0000
@SEAS(1)	-0.005809	0.035960	-0.161535	0.8728
@SEAS(2)	0.012663	0.035625	0.355445	0.7249
@SEAS(3)	0.014825	0.034486	0.429877	0.6706

R-squared	0.987135	Mean dependent var	1.355394
Adjusted R-squared	0.984838	S.D. dependent var	0.591636
S.E. of regression	0.072850	Akaike info criterion	-2.242038
Sum squared resid	0.148600	Schwarz criterion	-1.972680
Log likelihood	44.11465	F-statistic	429.7028
Durbin-Watson stat	2.093990	Prob(F-statistic)	0.000000

E: Supply and Stock Sector

(12) Capacity utilization rate index (CUTIND4)
Dependent Variable: CUTIND4/PIB4

Method: Least Squares
Date: 03/21/01 Time: 23:47
Sample(adjusted): 1993:2 2000:1
Included observations: 28 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.069911	0.012154	5.752066	0.0000
PIBP4(-2)/PIB4(-2)	-0.017063	0.003908	-4.365684	0.0003
POC4(-2)/ELKT4(-2)	-5.637179	3.097382	-1.819982	0.0838
TJR4(-2)	-2.76E-05	9.72E-06	-2.839103	0.0101
@TREND	-0.000188	2.76E-05	-6.811512	0.0000
@SEAS(1)	-0.000124	0.000173	-0.715647	0.4825
@SEAS(2)	-0.000323	0.000201	-1.607338	0.1237
@SEAS(3)	-0.000831	0.000177	-4.691172	0.0001

R-squared	0.938267	Mean dependent var	0.024005
Adjusted R-squared	0.916661	S.D. dependent var	0.001084
S.E. of regression	0.000313	Akaike info criterion	-13.06685
Sum squared resid	1.96E-06	Schwarz criterion	-12.68622
Log likelihood	190.9359	F-statistic	43.42533
Durbin-Watson stat	1.849243	Prob(F-statistic)	0.000000

(13) Capital stock (ELKT4)

ELKT4 = ELKT4(-1)*0.985+FBKF4

(14) Potential GDP (PIBP4)
Dependent Variable: PIBP4/POC4
Method: Least Squares
Date: 03/21/01 Time: 23:01
Sample(adjusted): 1993:2 1999:3
Included observations: 26 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.967598	2.44E-11	3.67E+11	0.0000
ELKT4(-1)/POC4(-1)	0.061939	7.61E-14	8.13E+11	0.0000
@TREND	-3.81E-13	9.58E-14	-3.977736	0.0007
@SEAS(1)	0.434230	8.76E-13	4.95E+11	0.0000
@SEAS(2)	0.769026	9.17E-13	8.39E+11	0.0000
@SEAS(3)	1.217264	8.69E-13	1.40E+12	0.0000

R-squared	1.000000	Mean dependent var	34.11581
Adjusted R-squared	1.000000	S.D. dependent var	0.841686
S.E. of regression	1.49E-12	Sum squared resid	4.45E-23
F-statistic	1.59E+24	Durbin-Watson stat	0.414425
Prob(F-statistic)	0.000000		

F: Labor Sector

(15) Employed population index (POC4)

Dependent Variable: POC4
Method: Least Squares
Date: 03/20/01 Time: 03:42
Sample: 1992:3 2000:4
Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.73394	6.741909	1.888773	0.0697
SAL4(-2)	-0.041736	0.019628	-2.126364	0.0428
PIB4(-1)	0.003001	0.002220	1.351611	0.1877
POC4(-1)	0.833801	0.132819	6.277734	0.0000
@SEAS(1)	-2.099225	0.462206	-4.541750	0.0001
@SEAS(2)	0.449351	0.446109	1.007266	0.3227
@SEAS(3)	-0.061823	0.358983	-0.172218	0.8646

R-squared	0.972746	Mean dependent var	105.8722
Adjusted R-squared	0.966690	S.D. dependent var	4.078635
S.E. of regression	0.744393	Akaike info criterion	2.428746
Sum squared resid	14.96126	Schwarz criterion	2.742996
Log likelihood	-34.28868	F-statistic	160.6156
Durbin-Watson stat	1.646175	Prob(F-statistic)	0.000000

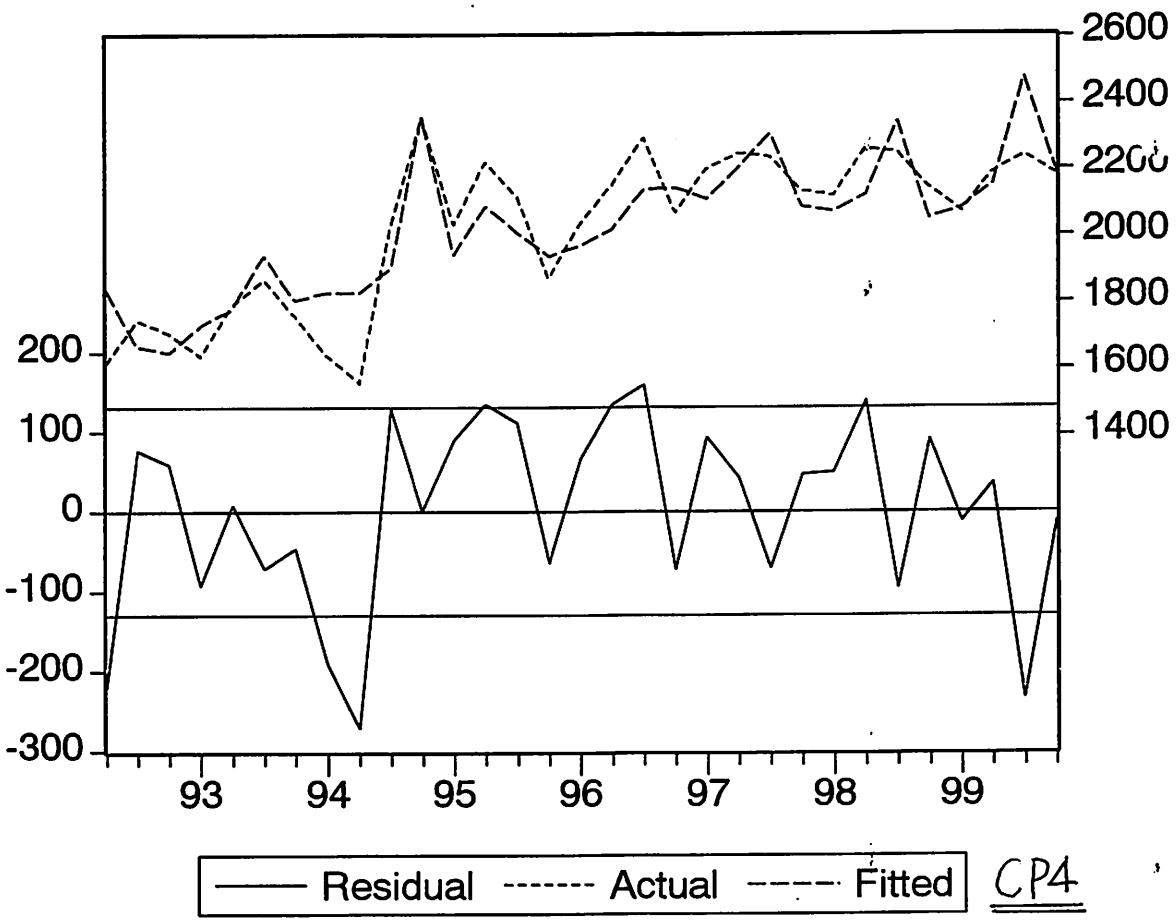
(16) Nominal wage index (SALN4)
Dependent Variable: SALN4/IGP4
Method: Least Squares
Date: 03/20/01 Time: 03:50
Sample(adjusted): 1992:2 2000:3
Included observations: 34 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-17.16379	27.87568	-0.615726	0.5434
PIB4(-1)/POC4(-1)	2.129019	1.016746	2.093955	0.0462
SALN4(-1)/IGP4(-1)	0.784398	0.084222	9.313509	0.0000
@TREND	-0.464829	0.134371	-3.459304	0.0019
D94Q3	-16.80253	2.930565	-5.733546	0.0000
@SEAS(1)	-2.495296	1.829905	-1.363621	0.1844
@SEAS(2)	3.216795	2.084043	1.543536	0.1348
@SEAS(3)	-2.124015	1.474352	-1.440644	0.1616

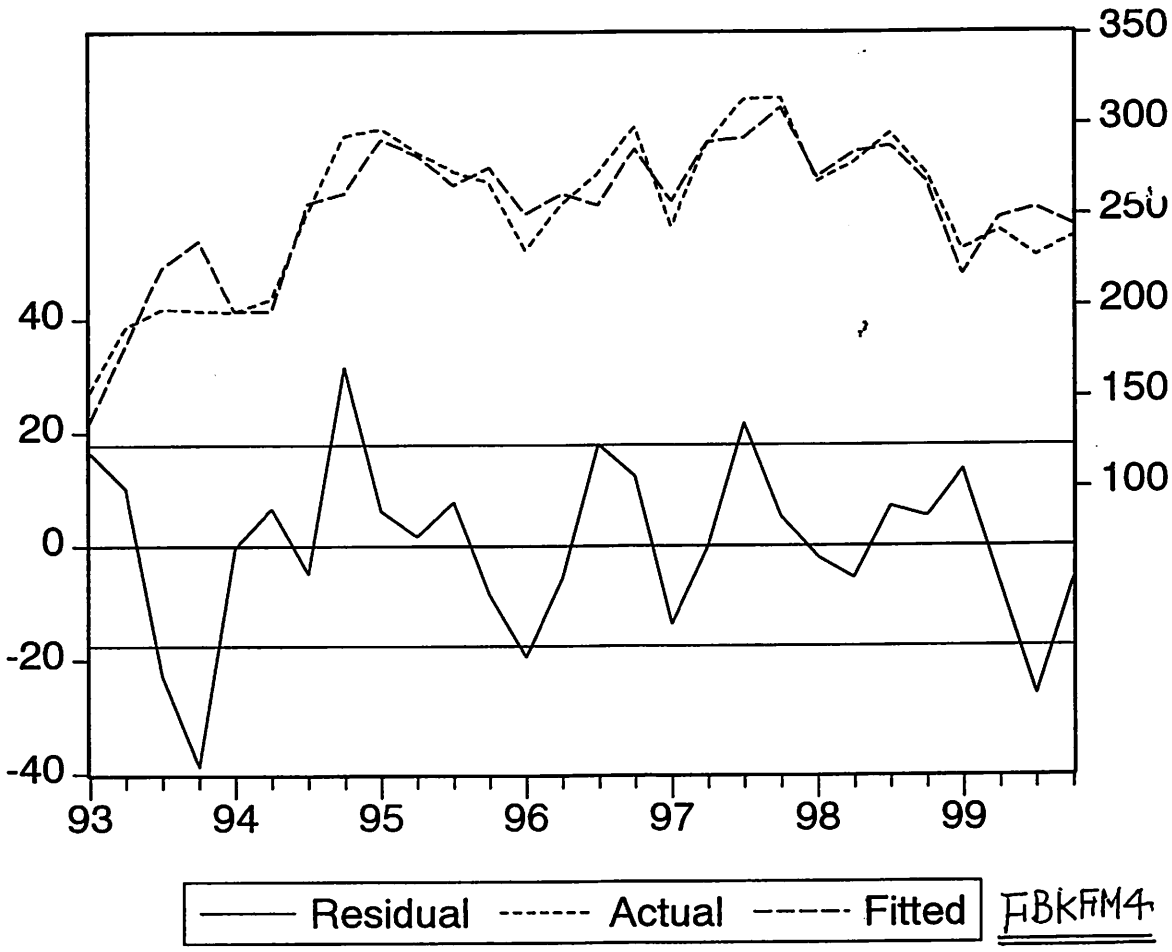
R-squared	0.922866	Mean dependent var	91.17454
Adjusted R-squared	0.902100	S.D. dependent var	8.687680
S.E. of regression	2.718292	Akaike info criterion	5.040208
Sum squared resid	192.1168	Schwarz criterion	5.399352
Log likelihood	-77.68354	F-statistic	44.43962
Durbin-Watson stat	1.536510	Prob(F-statistic)	0.000000

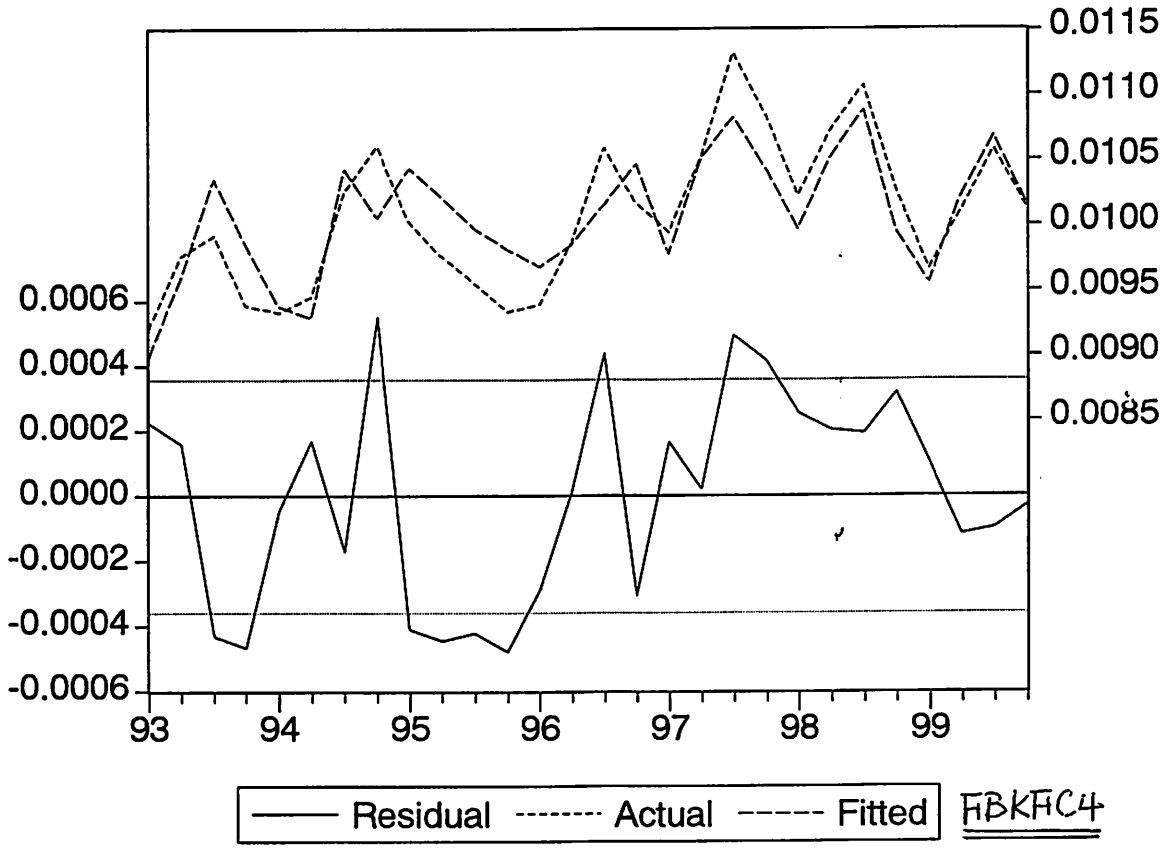
(17) Real wage index (SAL4)
SAL4 = SALN4/IGP4

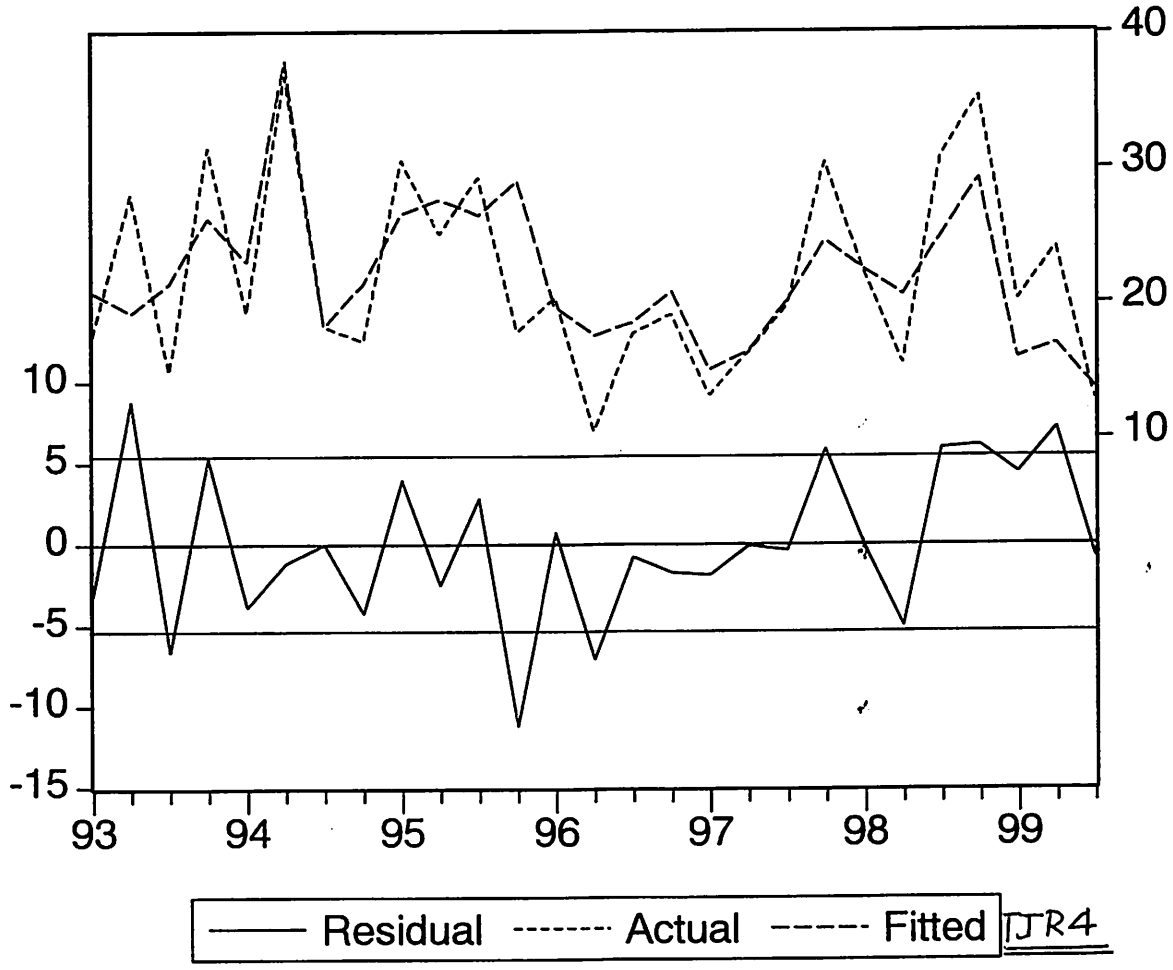
Appendix B: Model of the Brazilian Economy

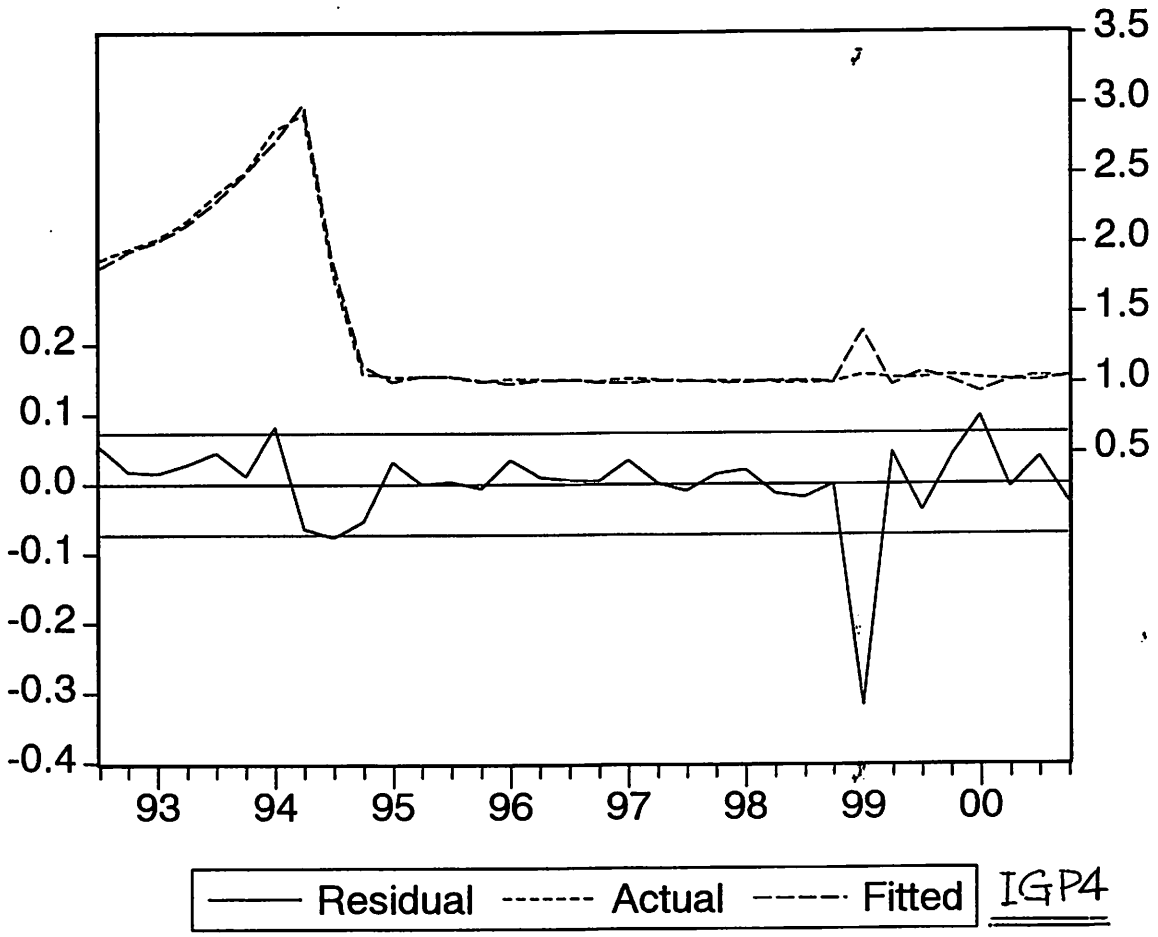

2600
2400
2200
2000
1800
1600
1400
200
100
0
-100
-200
-300
93
94
95
96
97
98
99
Residual
Actual
Fitted

CP4

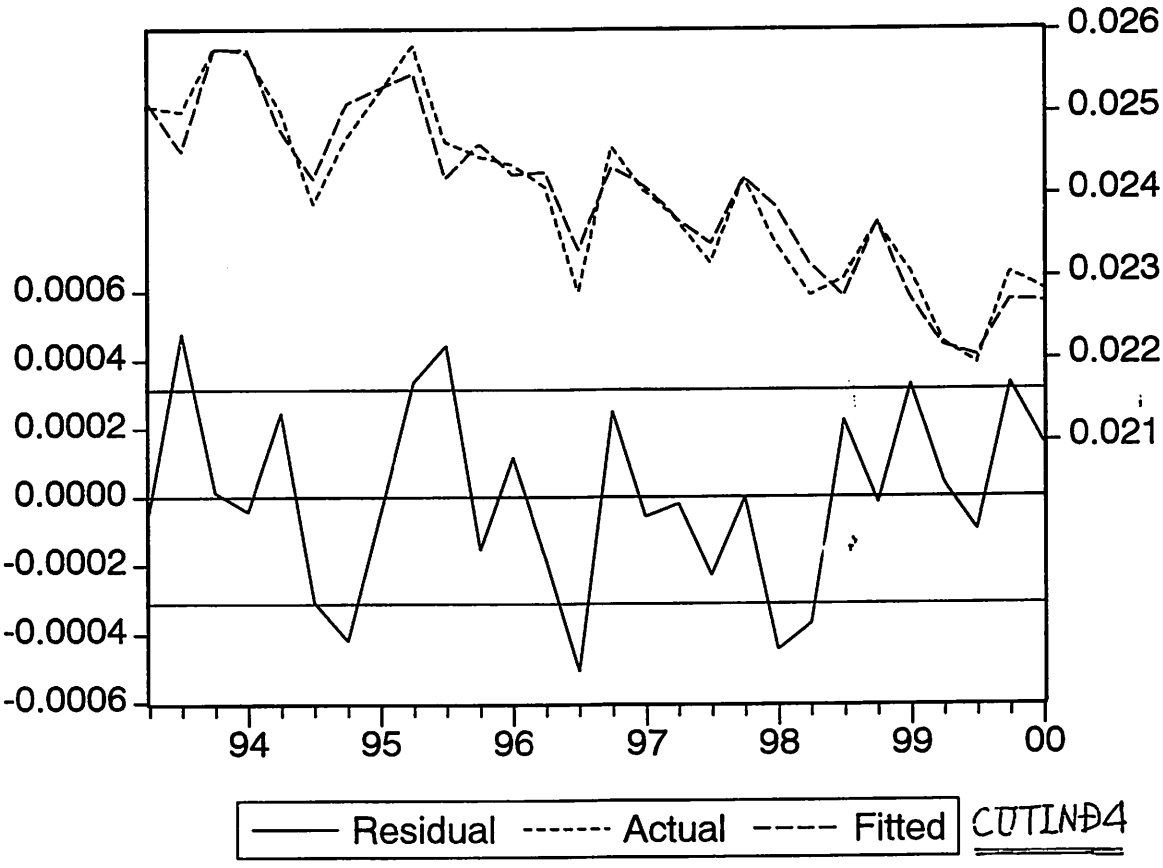

350
300
250
200
150
100
40
20
0
-20
-40
93
94
95
96
97
98
99
Residual
Actual
Fitted
FBKFM4

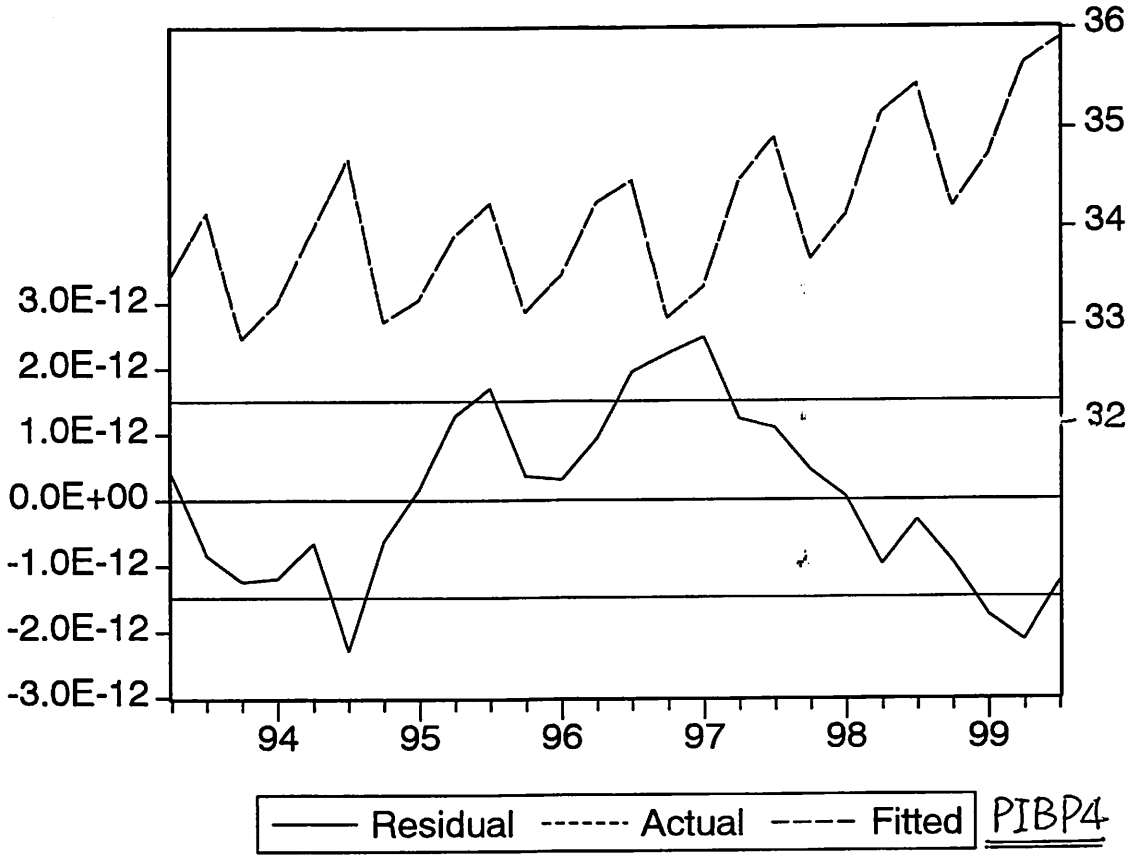

0.0115
0.0110
0.0105
0.0100
0.0095
0.0090
0.0085
0.0006
0.0004
0.0002
0.0000
-0.0002
-0.0004
-0.0006
93
94
95
96
97
98
99
Residual
Actual
Fitted
FBKFIC4

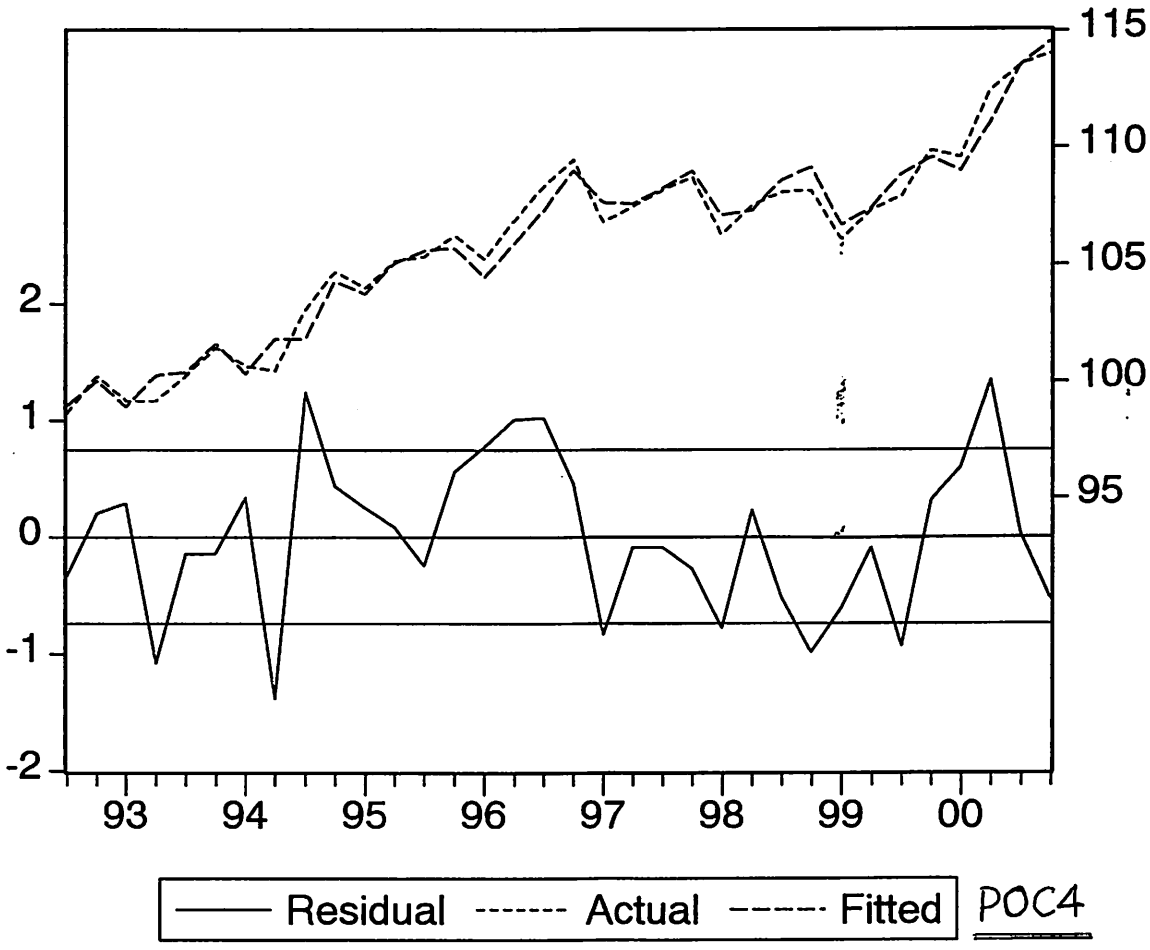

40
30
20
10
10
5
0
-5
-10
-15
93
94
95
96
97
98
99
Residual
Actual
Fitted
TJR4

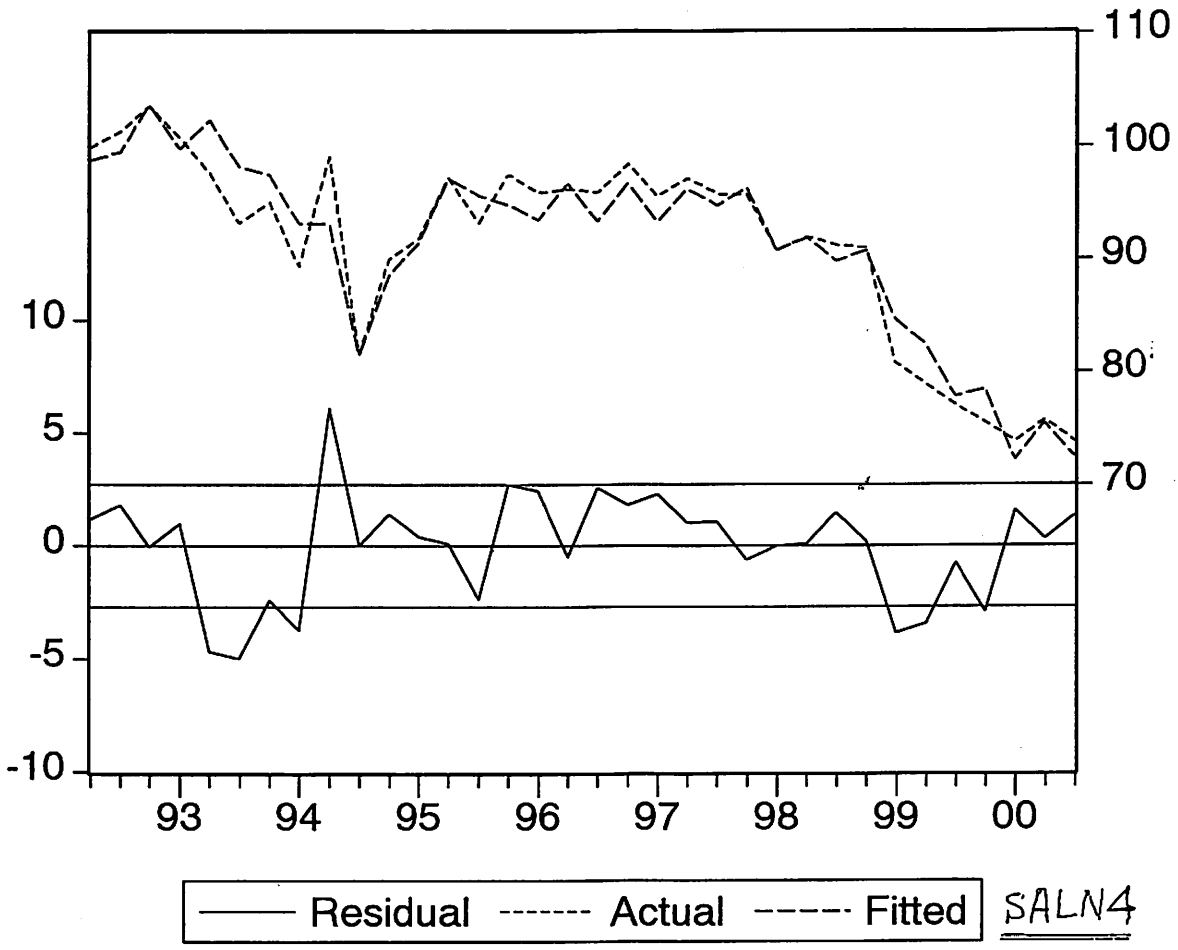

3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.2
0.1
0.0
-0.1
-0.2
-0.3
-0.4
93
94
95
96
97
98
99
00
Residual
Actual
Fitted

IGP4


0.026
0.025
0.024
0.023
0.022
0.021
0.0006
0.0004
0.0002
0.0000
-0.0002
-0.0004
-0.0006
94
95
96
97
98
99
00
Residual
Actual
Fitted
CUTIND4

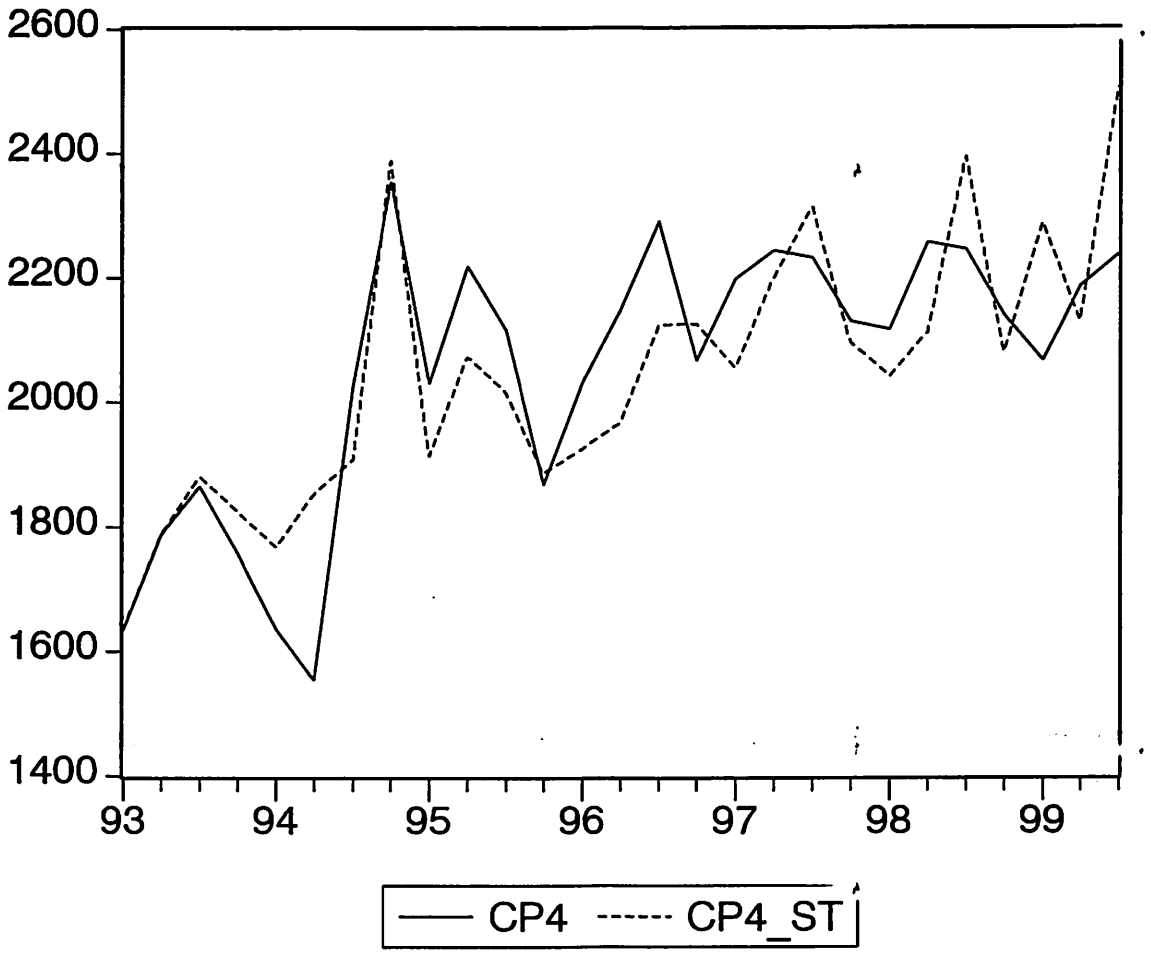

36
35
34
33
32
3.0E-12
2.0E-12
1.0E-12
0.0E+00
-1.0E-12
-2.0E-12
-3.0E-12
94
95
96
97
98
99
Residual
Actual
Fitted
PIBP4

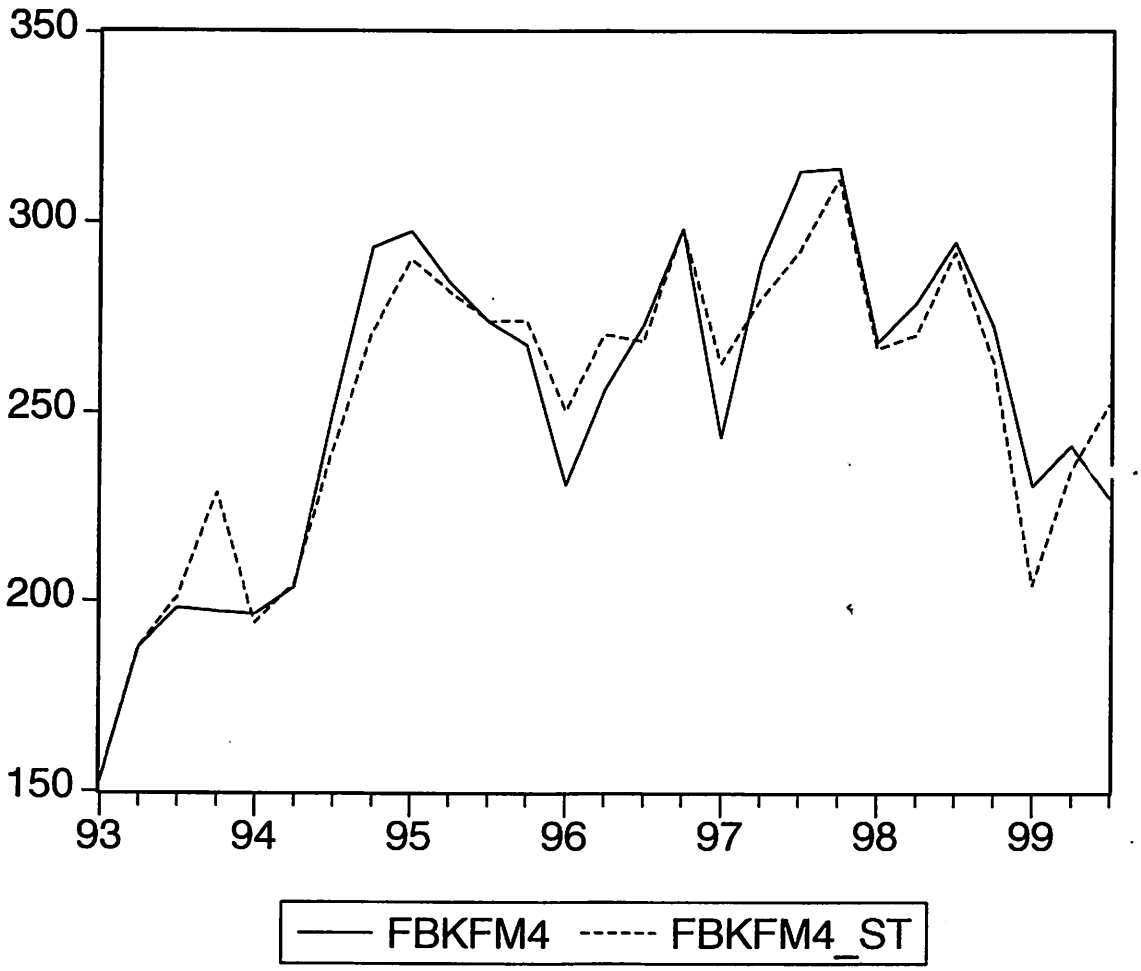

115
110
105
100
95
2
1
0
-1
-2
93
94
95
96
97
98
99
00
Residual
Actual
Fitted
POC4

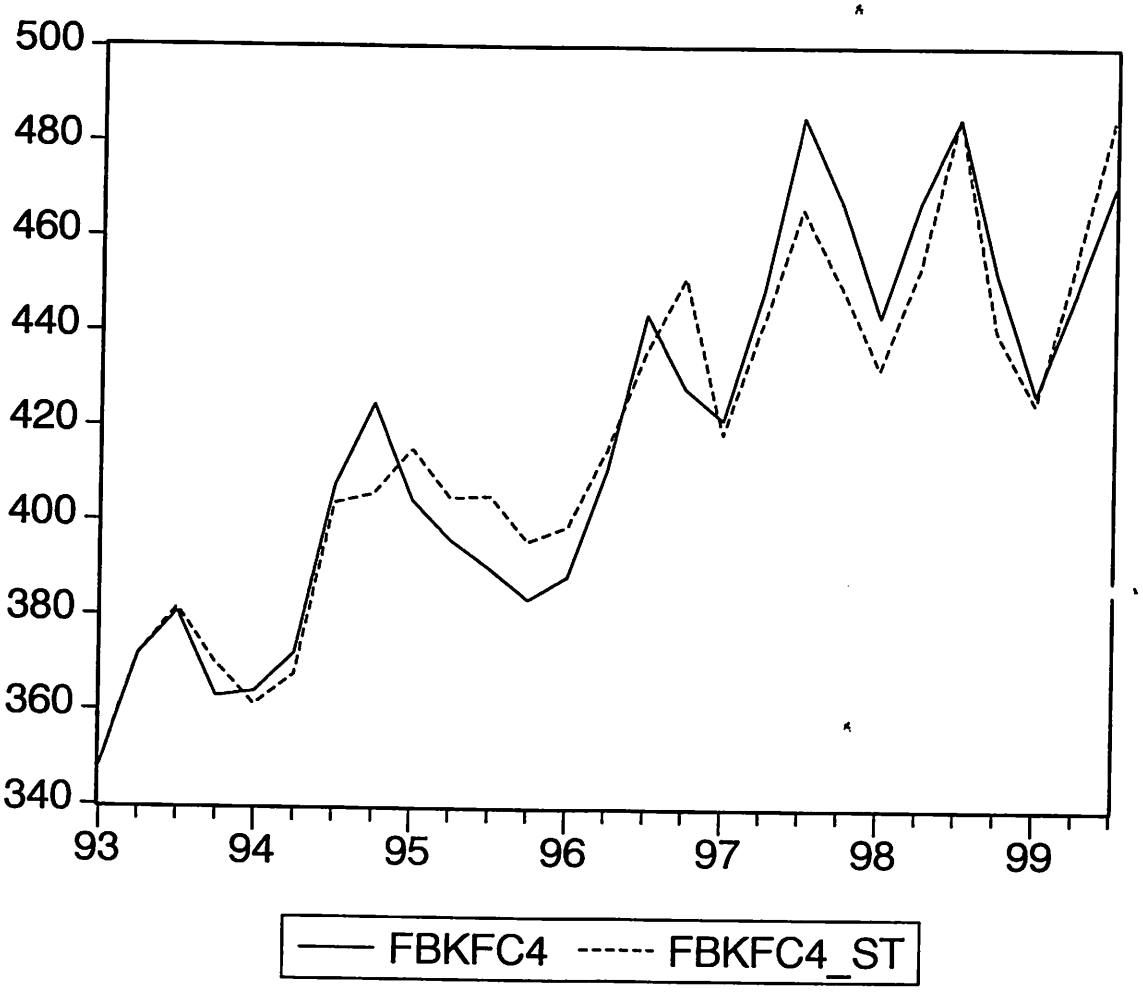

110
100
90
80
70
10
5
0
-5
-10
93
94
95
96
97
98
99
00
Residual
Actual
Fitted
SALN4

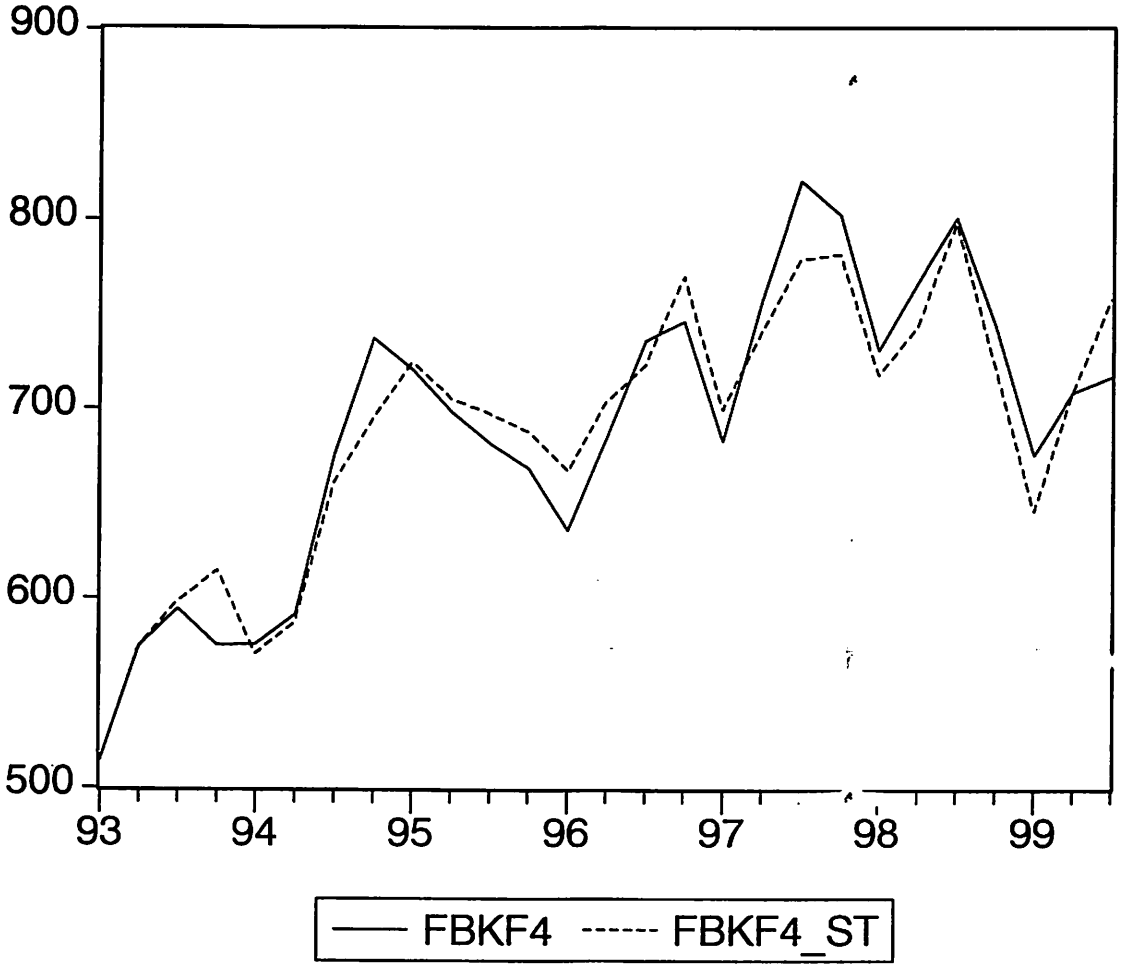
Appendix C: The Total and Final Tests for Model of the Brazilian Economy (GAMMA01-IPEA/JICA, March, 2001, EviewsVer.3.1)

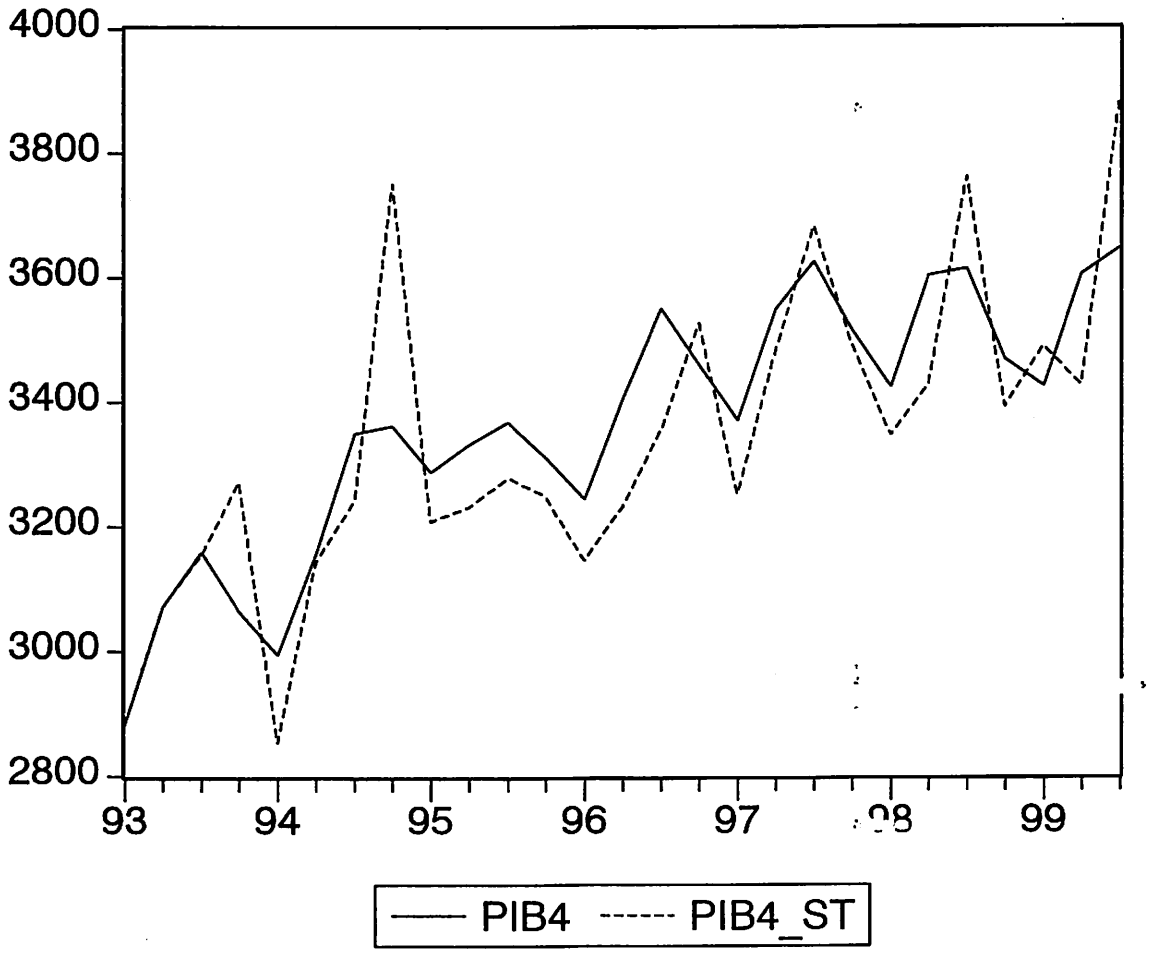
```
ASSIGN @ALL _FT
' BRAZIL QUARTERLY MODEL by Dr. Suminori TOKUNAGA (03/20/01)
'FINAL DEMAND SECTOR
'PRIVATE FINAL CONSUMPTION EXPENDITURE (eqCP4)
CP4 = -1309.813215 + 1.356344058*RD4(-1) - 5.022839558*TJR4 + 444.8962373*D94Q4
      + 161.1283376*(@SEAS(1)) + 335.728138*(@SEAS(2)) + 219.4867796*(@SEAS(3))
'INVESTMENT EXPENDITURE FOR MACHINERY(eqFBKFM4)
FBKFM4 = 1790.268944 - 1425.247614*(PIBP4(-1)/PIB4(-1)) + 4.027478115*CUTIND4(-4)
                - 0.00754174127*ELKT4(-1) - 0.7359888276*TJR4(-4) - 24.79859577*(@SEAS(1))
                + 6.598282508*(@SEAS(2)) - 0.1905616657*(@SEAS(3))
'INVESTMENT EXPENDITURE FOR CONSTRUCTION(eqFBKFC4)
FBKFC4/ELKT4(-1) = 0.04505228163 - 0.0248597609*(PIBP4(-1)/PIB4(-1))
        - 0.0001019606449*CUTIND4(-1) - 9.548279289e-06*TJR4(-4)-0.0003974920373*(@SEAS(1))
        + 0.000117086318*(@SEAS(2))+0.0004609153175*(@SEAS(3))
'INVESTMENT EXPENDITURE
FBKF4=(FBKFM4+FBKFC4)/(1-0.026)
'NET EXPORT (EXPORT-IMPORT)
XLBSNF4 = (XVT4-MVT4+SNF4)*ERV4*1000/IGP4
'REAL GROSS DOMESTIC EXPENDITURE
PIB4=CP4+CG4+FBKF4+XLBSNF4+SD4
'NOMINAL GROSS DOMESTIC EXPENDITURE
PIBN4=PIB4*IGP4
'NOMINAL DISPOSABLE INCOME
RDN4 = PIBN4-CTRIBN4
'REAL DISPOSABLE INCOME
RD4 = RDN4/IGP4
'MONETARY SECTOR
'REAL INTEREST RATE(eqTJR4)
TJR4 = 10.34340549 + 0.5168348889*(((1+TJOVER4/100)/(IGP4/IGP4(-1))^4-1)*100)
        + 49.25991278*D94Q3 + 0.1362841291*(@SEAS(1)) - 0.2905614231*(@SEAS(2))
        + 0.9764420127*(@SEAS(3))
'DEFLATOR SECTOR
'GENERAL PRICE INDEX(eqIGP4)
IGP4/IGP4(-1) = -0.06993804207 + 0.2360057778*(IGP4(-1)/IGP4(-2))
                + 0.8183786624*(ERV4/ERV4(-1)) - 0.005808817873*(@SEAS(1))
                + 0.01266280659*(@SEAS(2)) + 0.0148247467*(@SEAS(3))
'SUPPLY SECTOR
CAPACITY UTILIZATION RATE INDEX(eqCUTIND4)
CUTIND4/PIB4 = 0.06991076381 - 0.01706290586*(PIBP4(-2)/PIB4(-2))
  -5.637178864*(POC4(-2)/ELKT4(-2)) - 2.759780166e-05*TJR4(-2) - 0.0001878147879*(@TREND)
  - 0.0001240446262*(@SEAS(1)) - 0.0003226206001*(@SEAS(2)) - 0.0008308857969*(@SEAS(3))

'CAPITAL STOCK
ELKT4 = ELKT4(-1)*0.985+FBKF4
'POTENTIAL PRODUCTION (GDP)(eqPIBP4)
PIBP4/POC4 = 8.967598172 + 0.0619390742*(ELKT4(-1)/POC4(-1)) - 3.812129942e-13*(@TREND)
             + 0.4342296584*(@SEAS(1)) + 0.7690258777*(@SEAS(2)) + 1.217263558*(@SEAS(3))
'EMPLOYED POPULATION INDEX(eqPOC4)
POC4 = 12.73393841 - 0.04173604027*SAL4(-2) + 0.003001073612*PIB4(-1)
        + 0.8338014046*POC4(-1)- 2.099224893*(@SEAS(1)) + 0.4493507516*(@SEAS(2))
        - 0.06182336989*(@SEAS(3))
'NOMINAL WAGE INDEX(eqSALN4)
SALN4/IGP4 = -17.16378917 + 2.129019062*(PIB4(-1)/POC4(-1))
                + 0.7843980781*(SALN4(-1)/IGP4(-1)) - 0.4648293586*(@TREND)
                - 16.8025315-1*D94Q3 - 2.495296303*(@SEAS(1)) + 3.216795237*(@SEAS(2))
                - 2.124015-161*(@SEAS(3))
'REAL WAGE INDEX(eqSALN4)
SAL4 = SALN4/IGP4
```

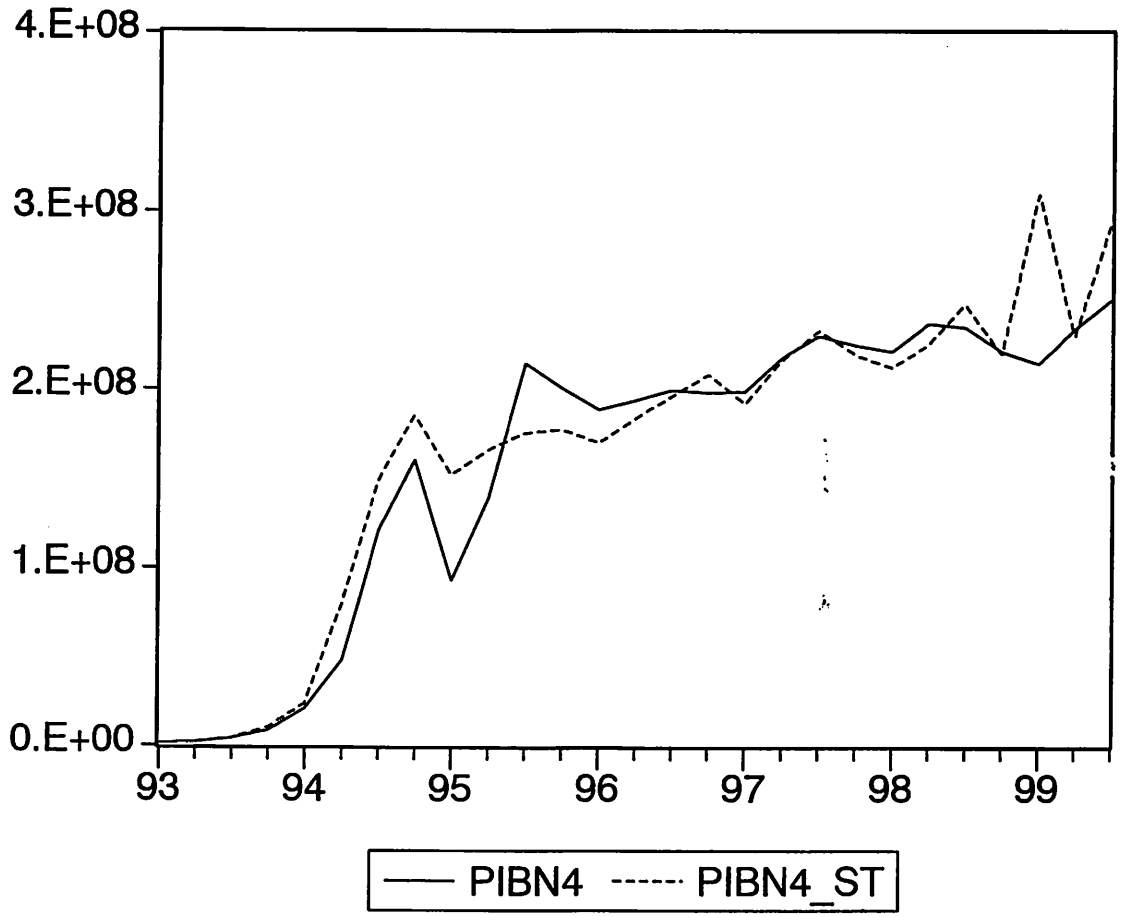

2600
2400
2200
2000
1800
1600
1400
93
94
95
96
97
98
99
CP4
CP4_ST

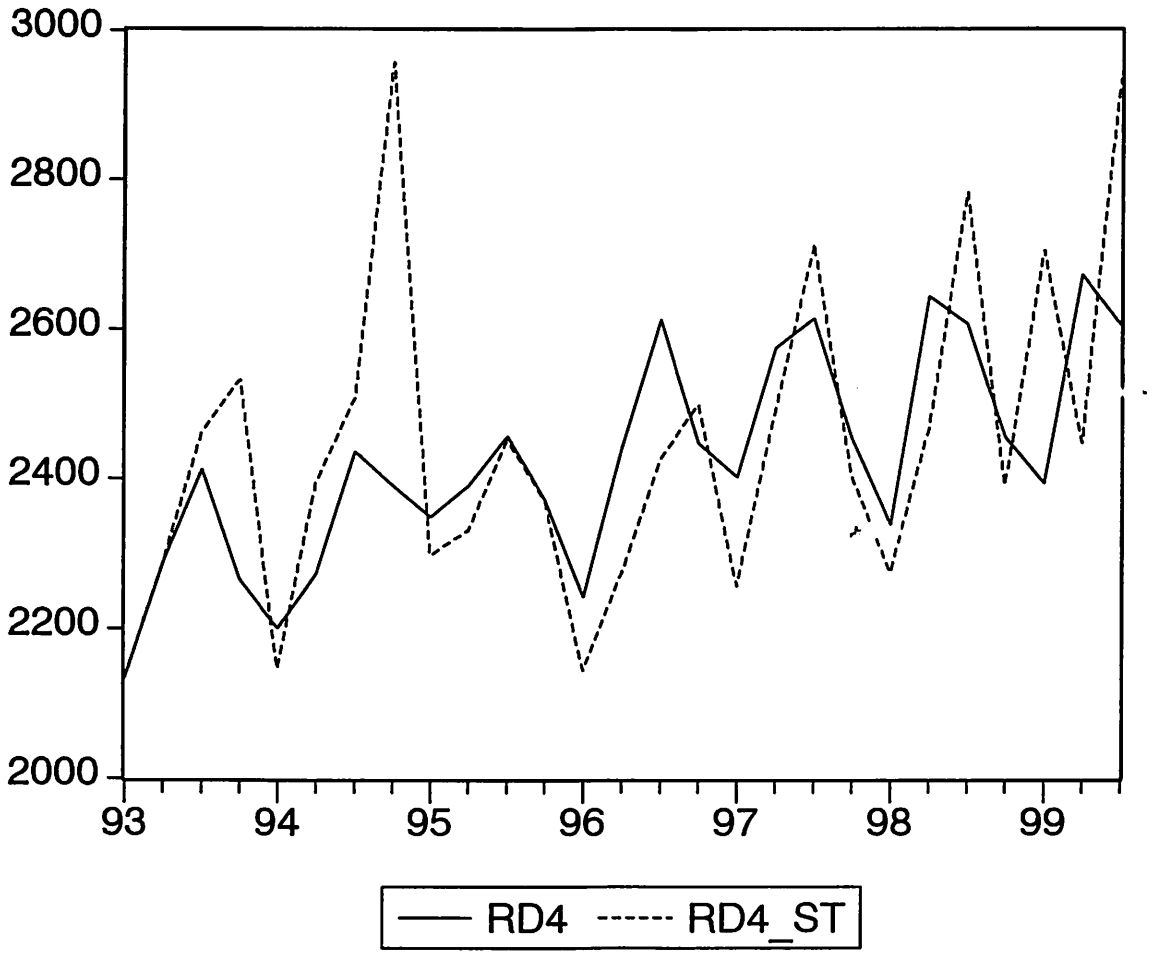

350
300
250
200
150
93
94
95
96
97
98
99
FBKFM4
FBKFM4_ST

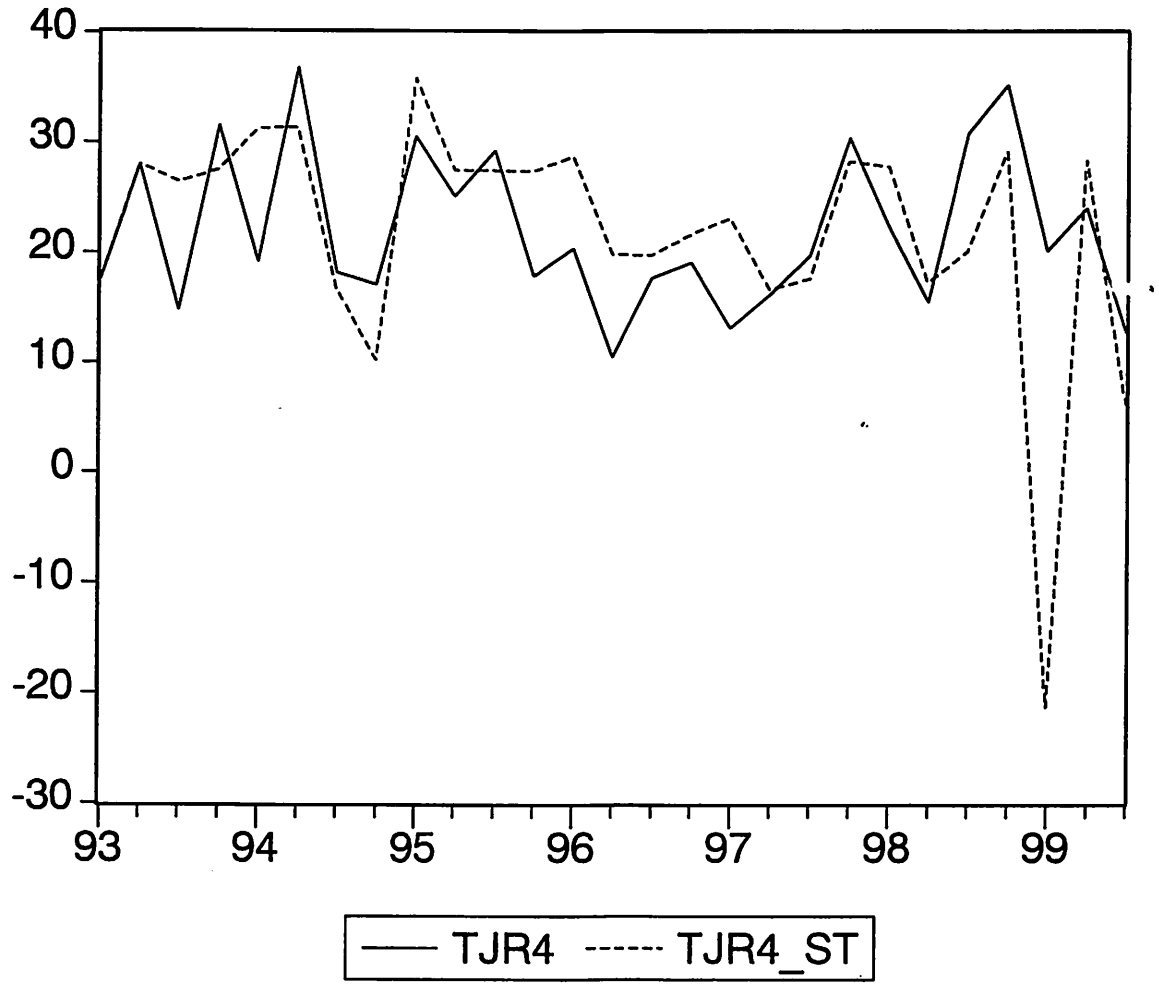

500
480
460
440
420
400
380
360
340
93
94
95
96
97
98
99
FBKFC4
FBKFC4_ST

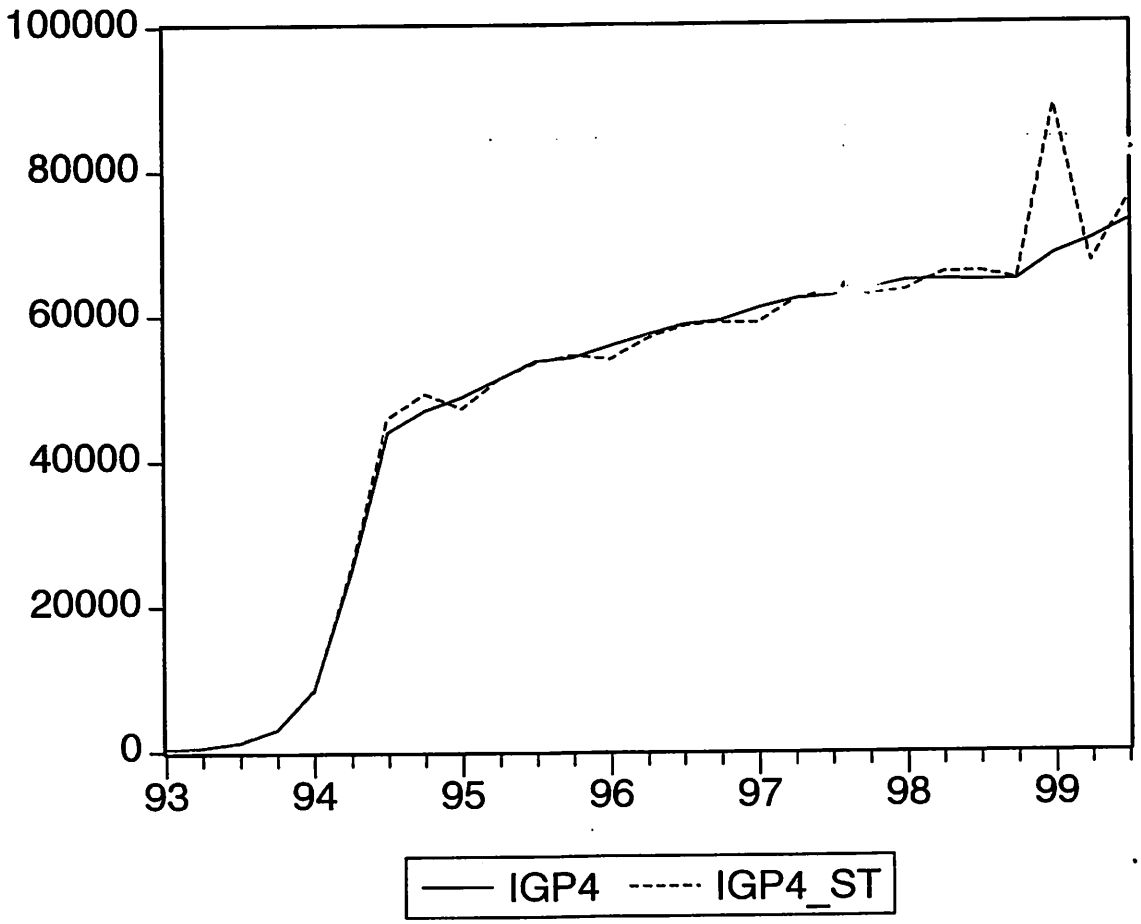

900
800
700
600
500
93
94
95
96
97
98
99
FBKF4
FBKF4_ST

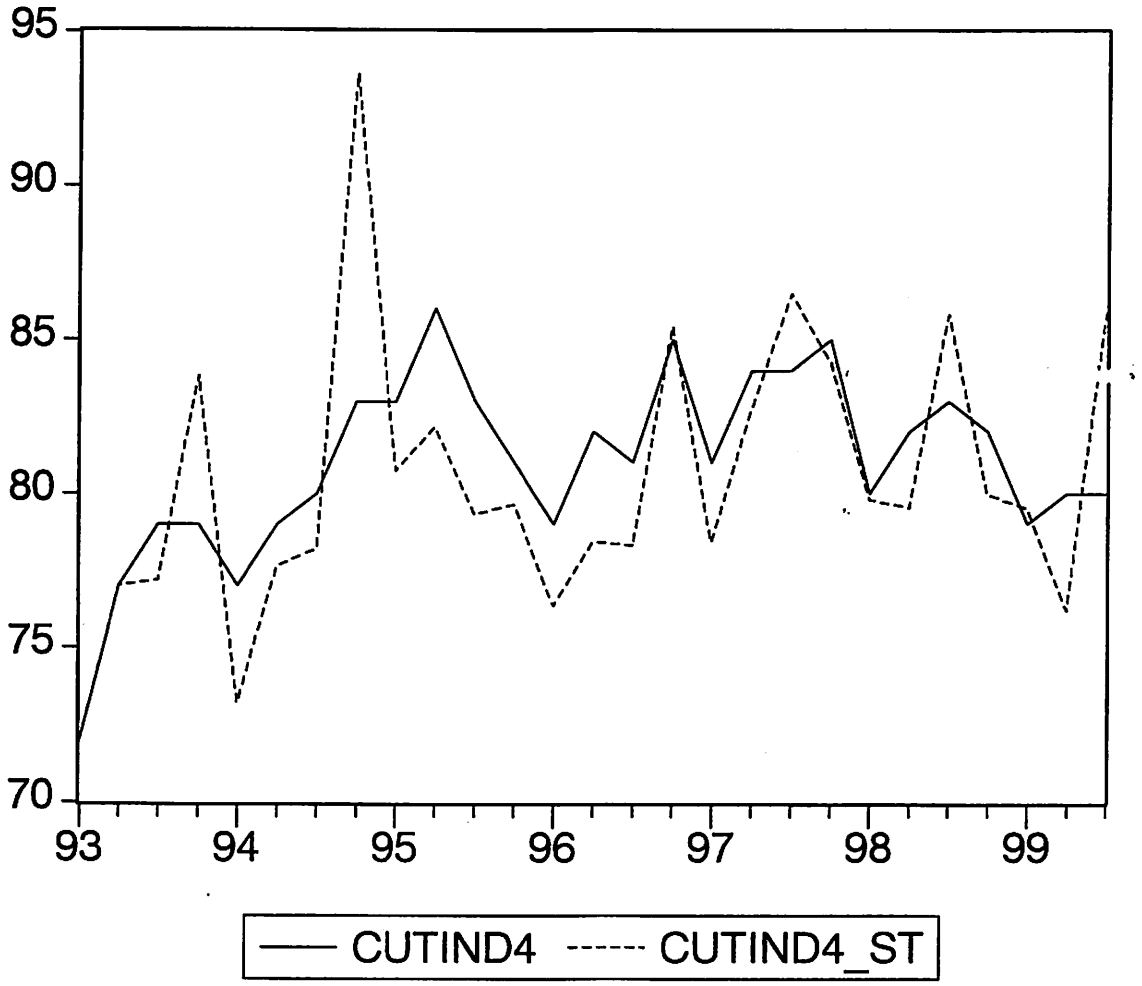

4000
3800
3600
3400
3200
3000
2800
93
94
95
96
97
98
99
PIB4
PIB4_ST

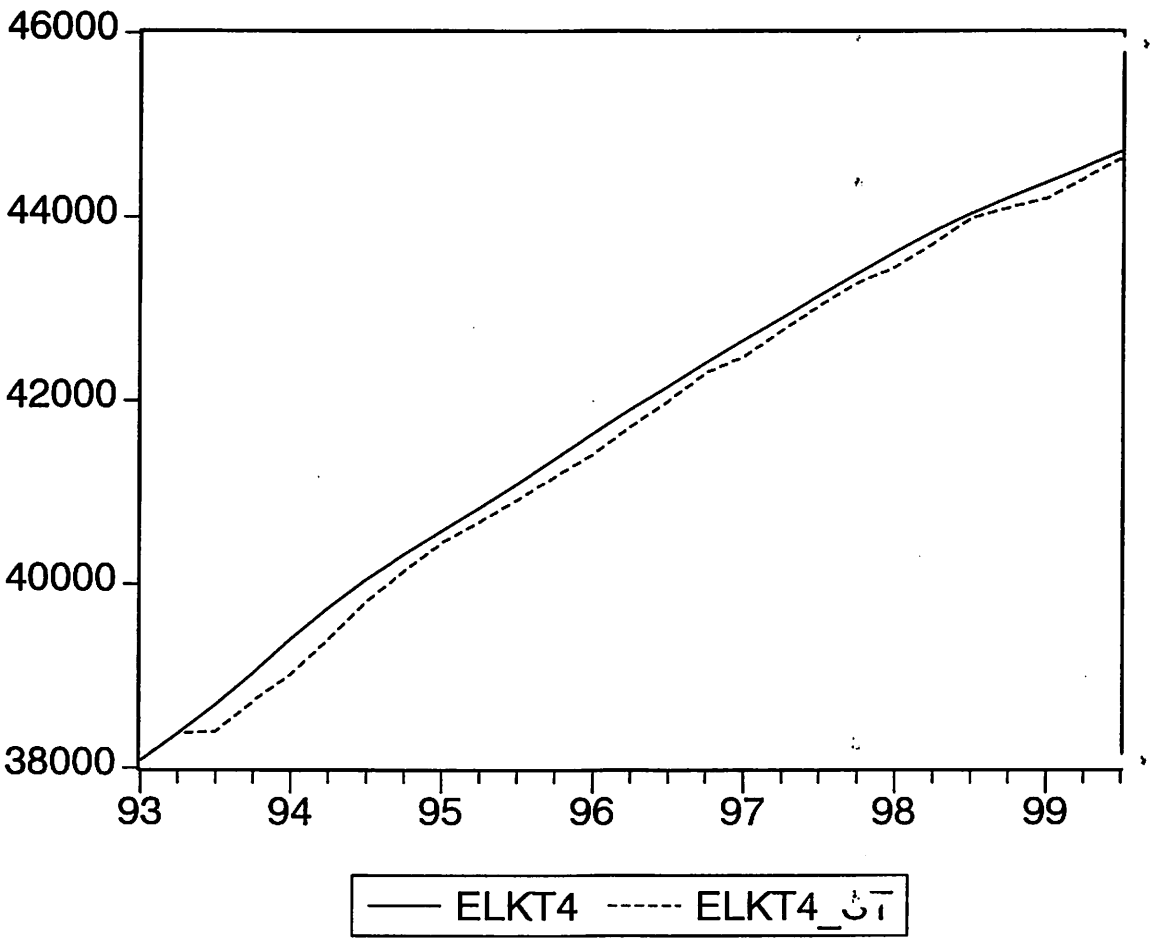

4.E+08
3.E+08
2.E+08
1.E+08
0.E+00
93
94
95
96
97
98
99
PIBN4
PIBN4_ST

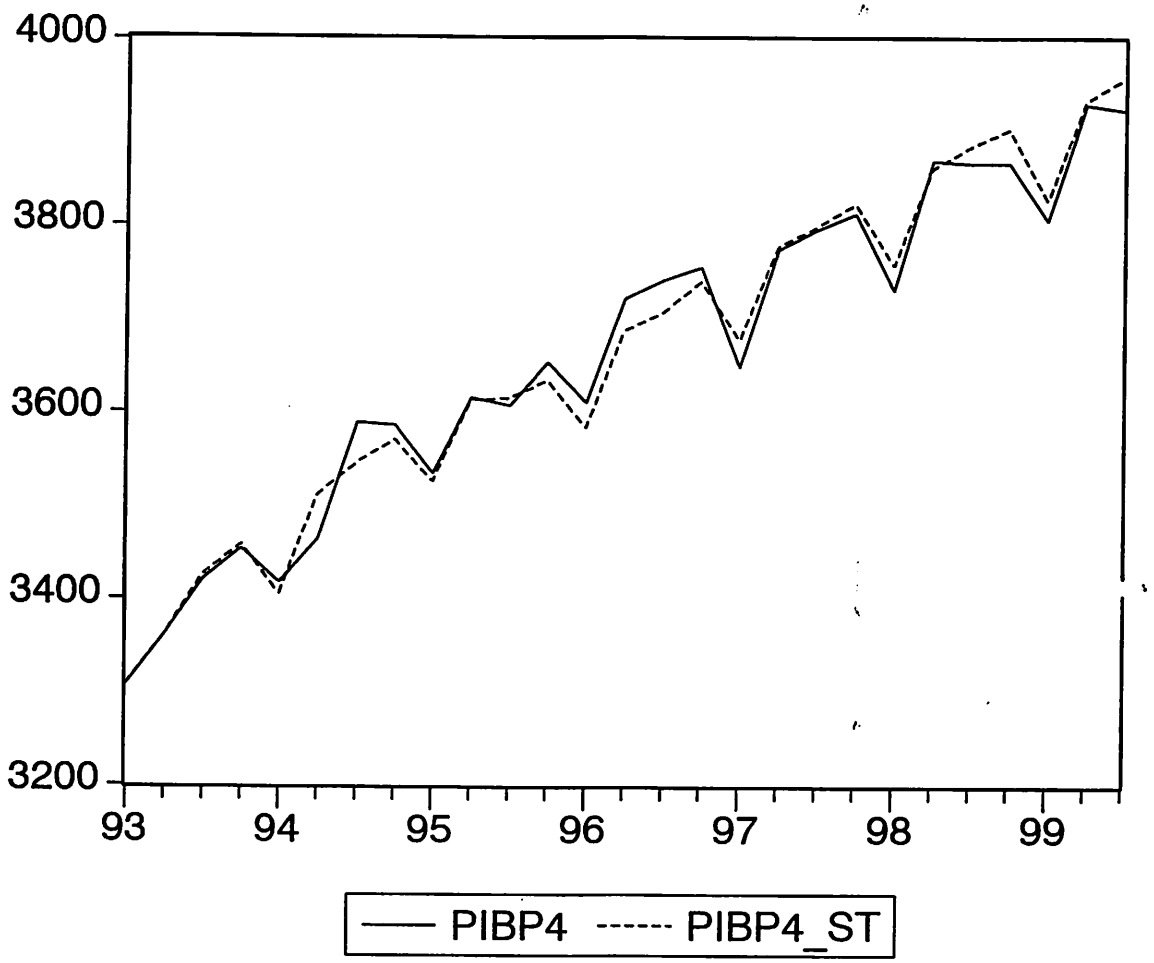

3000
2800
2600
2400
2200
2000
93
94
95
96
97
98
99
RD4
RD4_ST

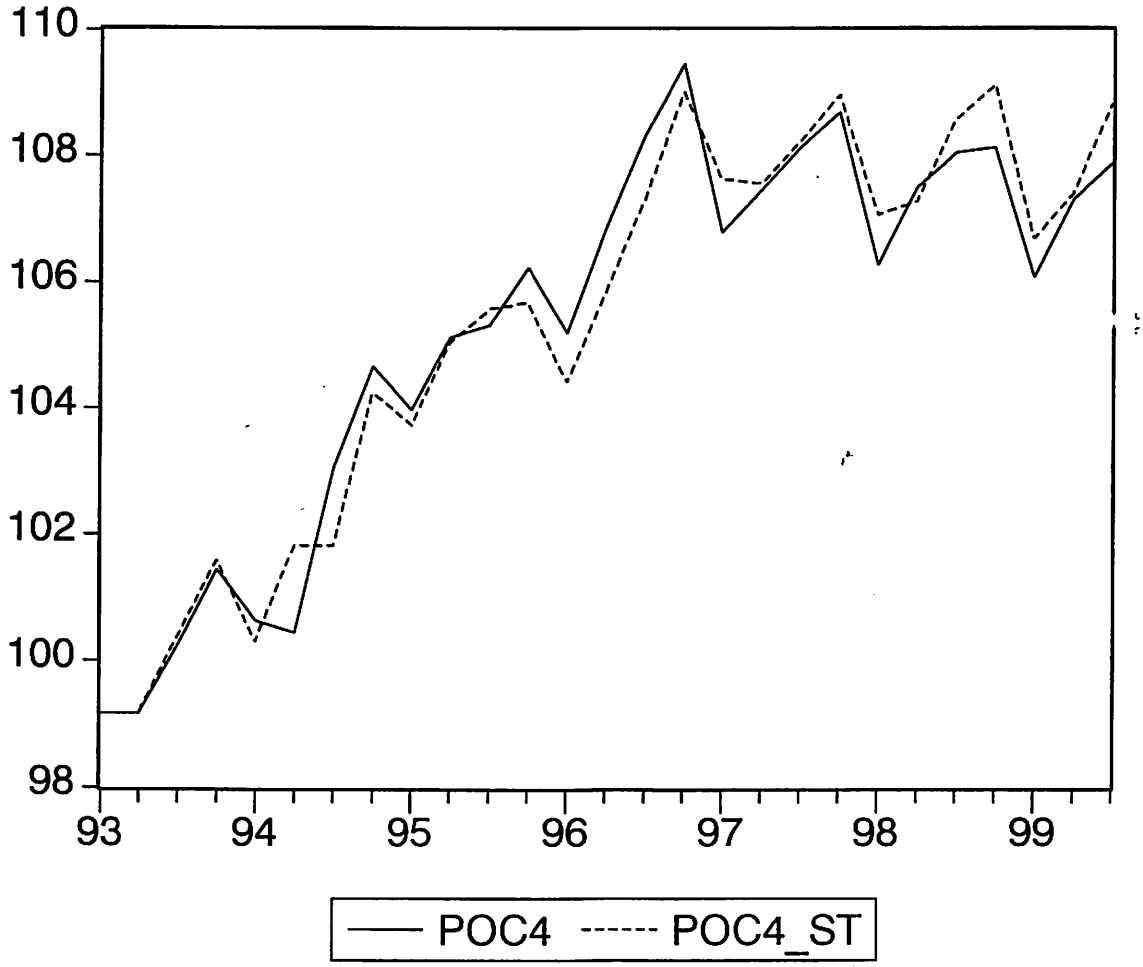

40
30
20
10
0
-10
-20
-30
93
94
95
96
97
98
99
TJR4
TJR4_ST

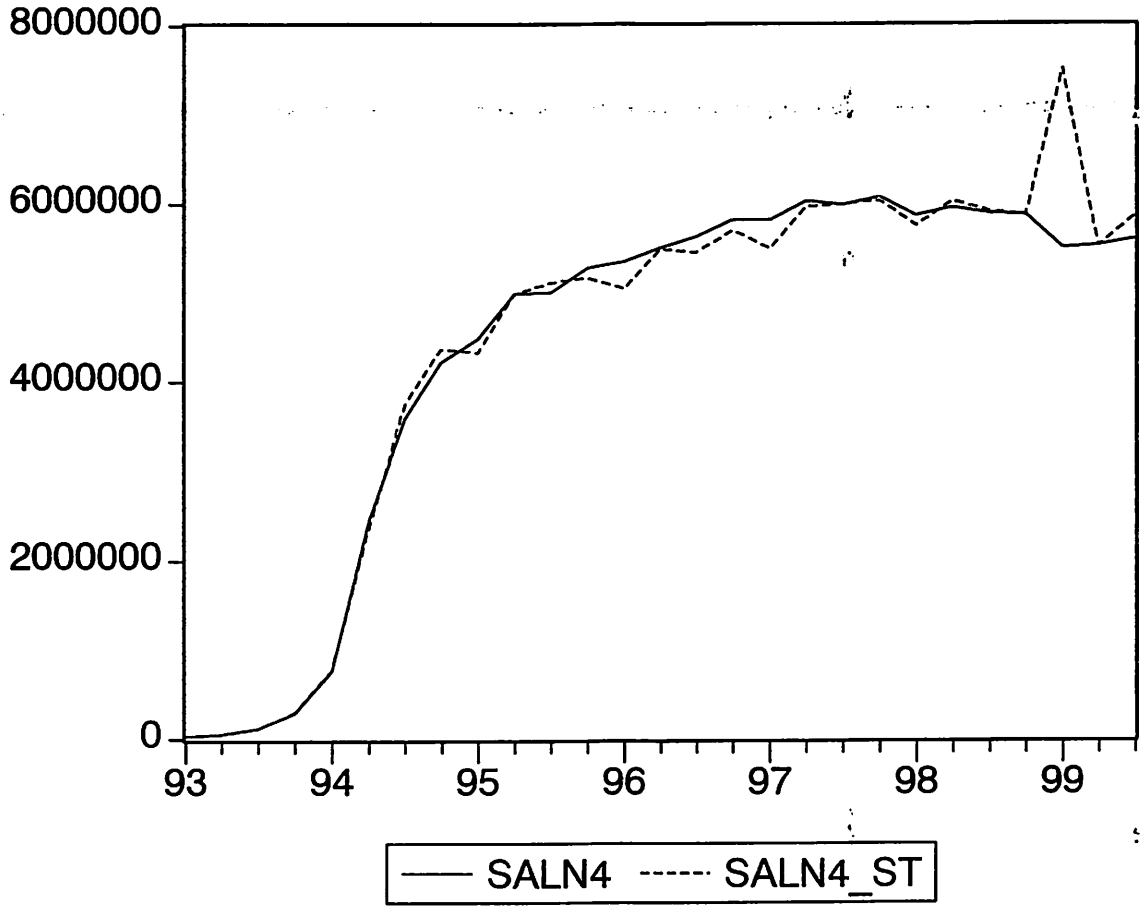

100000
80000
60000
40000
20000
0
93
94
95
96
97
98
99
IGP4
IGP4_ST

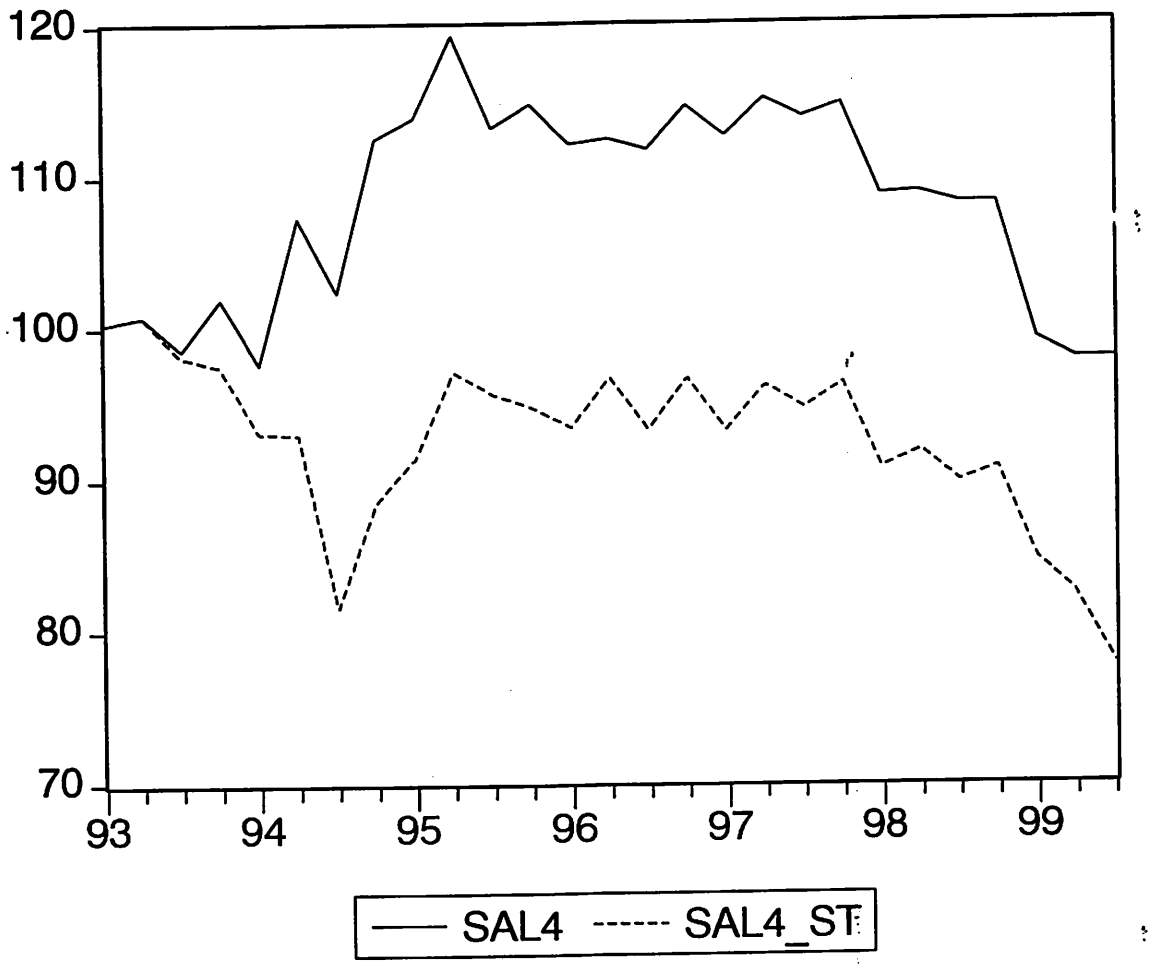

95
90
85
80
75
70
93
94
95
96
97
98
99
CUTIND4
CUTIND4_ST


46000
44000
42000
40000
38000
93
94
95
96
97
98
99
ELKT4
ELKT4_ST


4000
3800
3600
3400
3200
93
94
95
96
97
98
99
PIBP4
PIBP4_ST


110
108
106
104
102
100
98
93
94
95
96
97
98
99
POC4
POC4_ST


8000000
6000000
4000000
2000000
0
93
94
95
96
97
98
99
SALN4
SALN4_ST


120
110
100
90
80
70
93
94
95
96
97
98
99
SAL4
SAL4_ST