A Quarterly Econometric Model for the Brazilian Economy

Suminori Tokunaga

IPEA/JICA Workshop

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1. Introduction

The Brazilian economy was rapidly changes such as exchange rate regime and a new framework for monetary policy from the past structure of the hyperinflation period and had a low growth rate in the 1990s. But how and when the past structure changed? 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.

At IPEA in Brazil, the quarterly econometric model has been developed by the Group of Macroeconomic Analysis and Modeling (Gamma) at IPEA/DIPES. This Gamma model in which is designed to make short-run projections for Brazilian Economy only focus on the Balance of Payments Accounts Block in detail.

Thus we present a prototype quarterly econometric model for the Brazilian economy in this paper. 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.

The structure of this paper is as follows. In section 2, we sketch the structure of the model and briefly report estimation results for each sector. Section 3 reports the results of simulation studies. In section 4, we estimation of reaction function. Finally we conclude with a discussion of the model's improvements to be made in section 5.

2. Estimation of Quarterly Econometric Model

The model is basically Keynesian type. Aggregate demand is given by individually estimated equations for aggregate consumption, aggregate investment, exports of goods and services, while aggregate supply is determined by a production function. The equalization of Aggregate demand and aggregate supply will determined by capacity utilization and price.

The estimated result of this model is as follows. The model contains ten behavioral equations and fifteen identities (see Appendix A and B). The number of endogenous variables is 25. We are estimated by OLS estimations because we do

not contain any current endogenous variables in the explaining variables. The sample period for estimation is from 1994 Q4 to 2000Q2 in order to analyze the Real Plan which introduced on July 1st, 1994. We set the estimation criteria as follows: (1)all explained variables at left-hand side are deflated by suitable variable to eliminate the steady trend; (2) the determination coefficient is higher than 0.90 in order to get a good fitting; (3) all t-values are gigger than 1.0 to secure the explaining power of each explaining variables. Equations can be grouped in six sectors : (A) Final Demand sector, (B) Supply and Capital Stock sector, (C) Income sector, (D) Employment Sector, (E) Price Sector, and (F) Balance of Payments Accounts.

The final demand sector is consisting of private consumption(CP), government consumption (CG), investment for construction (INVC), investment for machinery and equipment (INVM),exports (X), and Imports (IM). GDE is defined by each components of aggregate demand. Due to lack of data, we cannot estimate the investment for inventories.

While the aggregate supply sector is consisting of GDP for primary sector (YAGR) and GDP for non-primary sector (YNAGR) which specifies the production function. The domestic capital stock is determined by definition and the rate of capacity utilization (NUCI) is estimated in this sector. In income sector, we define the disposable income (YD).

The employment sector consists of a real wage rate (AWR), employment (EMP) and unemployment rate (DESA). A real wage rate is determined by a Phillips Curve-type equation. In price sector, a general price index (IGP) is determined by the real exchange rate, wide money supply, the real wage rate, the growth rate of GDE and the capital stock per employment.

The balance of payment sector defines trade balance (TB$), current account balance (CA$), capital account balance (CAP$), balance of payment (BP$), and foreign reserve (RES$). The foreign investments for both direct and portfolio are exogenously specified.

In this model, the main policy variables are nominal exchange rate (ER), nominal interest rate (SELIC), wide money supply (M2), foreign direct investment (FDI$), necessity of financial sector (NFSNO) and government consumption (CG).

2.1 Final Demand Sector

First, we estimated the final demand sector. The final demand is given by individually estimated equation for private consumption, aggregate investment for machinery and construction, exports and imports. The government consumption and net non-factor services (SERNF$) are as exogenous variables in this block.

In equation (1), the real private consumption expenditure per economic active population (CP/PTO) is estimated as a function of real disposable income per economic active population (TD/PTO), nominal interest rate (SELIC), real wide money supply (M2/IGP), necessity of financial sector (NFSNO), nominal exchange rate (ER) and time trend (@TREND). We find that a marginal propensity to consume is close to 0.21 which seems to provide reasonable figure.

The real total private investment expenditure (INV) is divided by for machinery and construction. We estimate the real private investment expenditure for machinery and equipment (INVM) over capital stock (KR) of equation (2) as a function of the growth rate of GDP(GDP), interest rate, capacity utilization rate (NUCI), FDI, imports ration (IM/GDE), rate of unemployment (DESA) and its own lagged value. The positive influence of capacity utilization rate imply the lagged effect of demand growth. Furthermore we estimated the real private investment expenditure for construction (INVC) over capital stock of equation (3) as a function of the growth rate of GDP, interest rate, capacity utilization rate and its

own lagged value. The total investment showed a increasing trend in 1996-98. After the devaluation, however, it still stagnated at low level.

In equation (5), export, which is normalized by lagged GDP, depends positively on the growth rate of GDP of U.S., lagged capacity utilization rate, GDP for primary sector ratio, real exchange rate (ER/IGP) and its own lagged value. As expected, the real exchange rate exerts a strong positive effect on export. While import, which is normalized by lagged GDP, depends positively on the growth rate of GDE, lagged foreign currency holding (RES$) ratio and its own lagged value as expected, but negatively on real interest rate and real exchange rate in equation (6). The exchange rate shows a negative effect as expected. Import in 1995-1999 has a steady increasing trend, but stagnates after the devaluation.

The government consumption and net non-factor services are as exogenous variables in this model. Then, real GDE is determined by summing-up these expenditure items.

2.2 Supply and Capital Stock Sector

Next, we estimated the aggregate supply side. The real GDP is divided by for primary sector and non-primary sector. The production function for GDP of non-primary sector (YNAGR) is mainly estimated by the real capital stock (KR) multiplied by the capacity utilization rate, and the employed labor (EMP) as Cobb-Douglas-type function in equation (9). This equation also includes in money supply ratio, accumulated FDI (SFDIR) ratio and its own lagged value. The domestic capital stock is calculated according to definition in equation (12). Due to the lack of depreciation data, we uses the time trend.

In equation (13), the capacity utilization rate index (NUCI) which there is a cyclical tendency during 1995-2000 except a big devaluation in 1999, is determined based on the growth rate of the GDE, the capital stock over the employed labor, the real interest rate, the growth rate of FDI and its own lagged value. It will vary in order to equalize aggregate demand and supply.

2.3 Income Sector

The disposable income (YD) is defined by the nominal GDP as equation (14).

2.4 Employment Sector

Next, we estimated the unemployment rate function (DESA) of equation (15). The unemployment rate is influenced positively by the real wage rate (AWR), labor productivity (GDE/EMP) and capital intensity of labor (KR/EMP), and negatively by the capacity utilization rate. The employed labor (EMP) is defined by the multiplication of economically active population (PTO) with (1-DESA) in equation (16).

The real wages index (AWR) of equation (17) is determined by the growth rate of employed labor, the capacity utilization rate, the unemployment rate, price growth, real exchange rate and its own lagged value. Thus the real wage rate is determined by a Phillips Curve-type equation.

2.5 Price Sector

Finally, we estimated the general price index (IGP) of equation (18) as a function of the real exchange rate (ER/IGP), money supply (M2), real wages index , GDE, capital intensity of labor (KR/EMP) and the time trend. Especially the influence of exchange rates dominates to explain a steep increase after 1999.

2.5 Balance of Payment Sector

The balance of payment sector defines trade balance (TB$), current account balance (CA$), capital account balance (CAP$), balance of payment (BP$), and foreign reserve (RES$). The foreign investments for both direct and portfolio are exogenously specified.

3. Final Test of the Model

The historical simulations of the final tests is very important to evaluate how well the model can simulate the real economy. The model has been simulated over the period from 1994Q4 to 2000Q2, using the dynamic Gauss-Seidel method. Figure 1 to Figure 14 show the main results of the final test. As the results of this final test suggest that this model is good performance, we will carry some policy simulations.

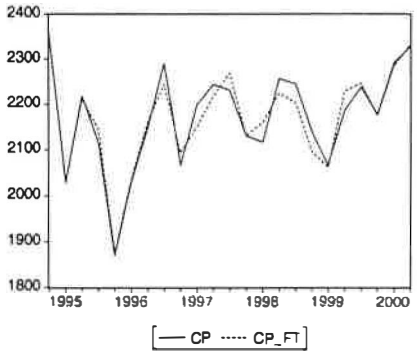
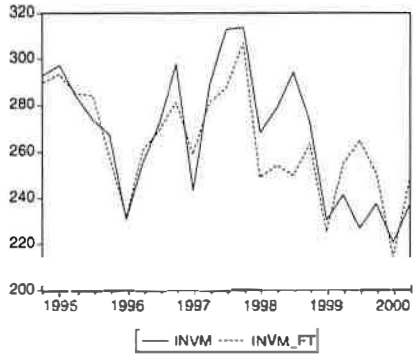


Figure 1



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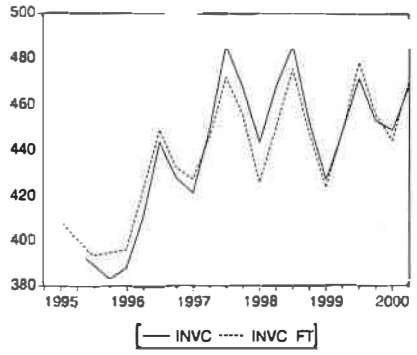

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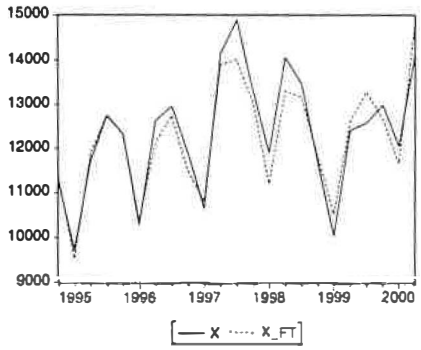

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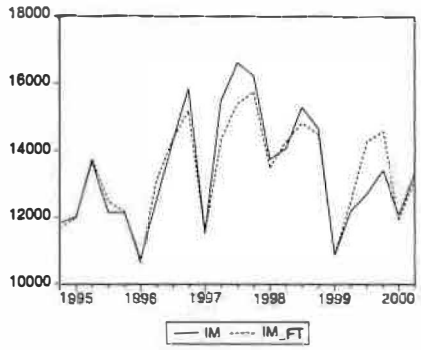

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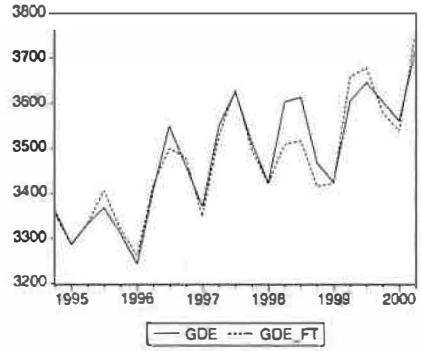

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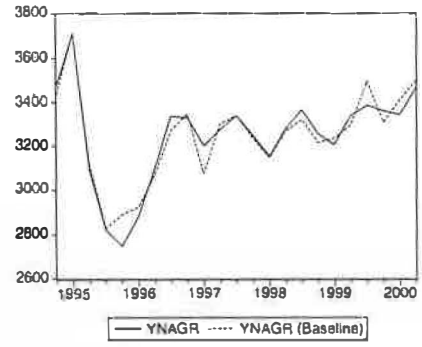

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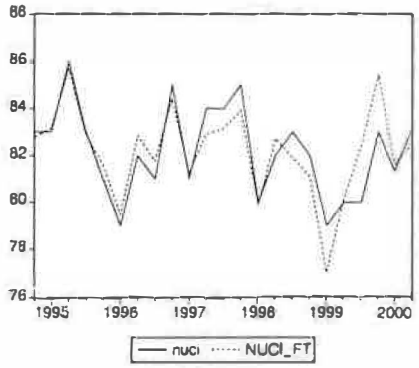

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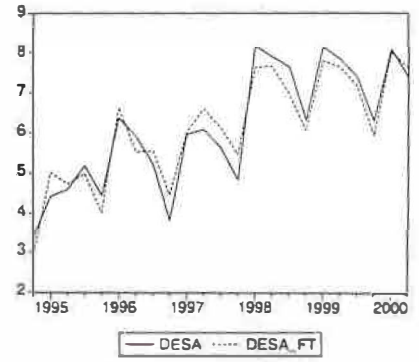
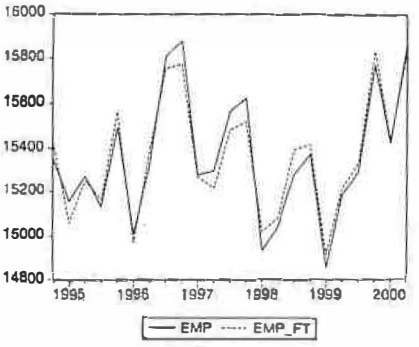


Figure 9



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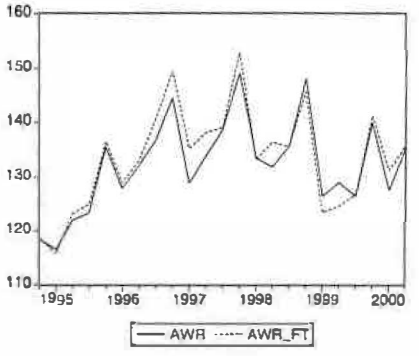

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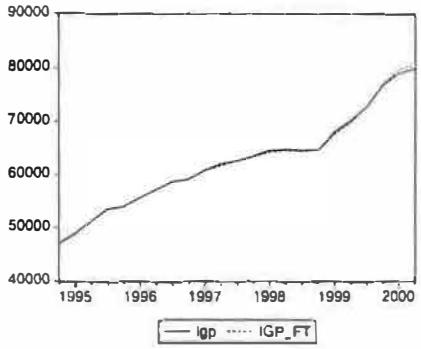

Figure 12

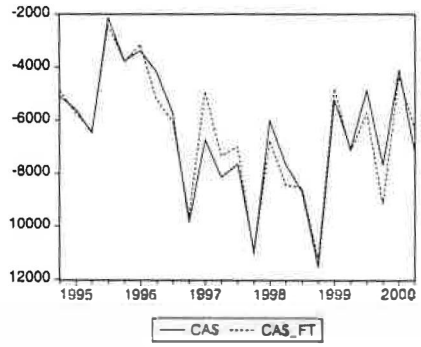

Figure 13

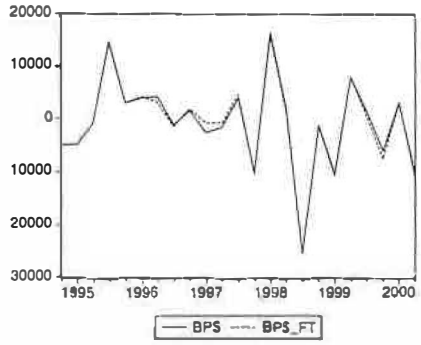

Figure 14

4. Estimation of Reaction Function

In section 3, three variables (SELIC, M2 NFSNO), which are the monetary and fiscal instrument were treated as exogenous. Government changes these instruments to achieve the economic targets, while considering the important restraints. Thus, we estimate the reaction functions like a Monthly Econometric Model in this section.

The interest rate (SELIC) is positively influenced by GDE, necessity of financial sector, FDI ratio and its own lagged value, and negatively influenced by M2, exchange rate and balance-of-payment. Therefore when GDE is increasing, SELIC goes up, and when NFSNO is increasing, SELIC goes up. But when M2 is increasing, SELIC goes down due to the market pressure. These are reasonable reactions of the central bank. The reaction coefficient to balance of payment is negative, so when the surplus of balance-of -payment gets bigger as short-term

capital inflow is increasing, SELIC tends to be lower.

The wide money supply (M2) is positively influenced by current account balance and its own lagged value, and negatively influenced by SELIC growth, GDE growth and price growth. Therefore when GDE is higher, M2 goes down, and when SELIC goes up, M2 goes down. When the inflation occurs, M2 goes down. These are reasonable reactions of the central bank.

The ratio of nominal financial sector requirement (NFSNO) is positively influenced by GDE, SELIC and GDP for non-primary sector growth, and negatively influenced by current balance, price growth, and NUCI. Therefore when the NUCI is down, NFSNO goes up, and when the SELIC goes up, NFSNO goes up. These are reasonable reaction of the government. Figure 15 to Figure 17 show the results of the final test for three variables (SELIC, M2 NFSNO). We find that this model is good performance from these results.

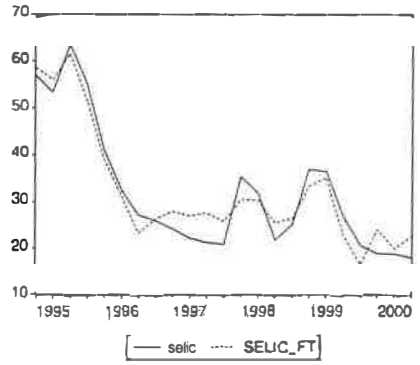

Figure 15

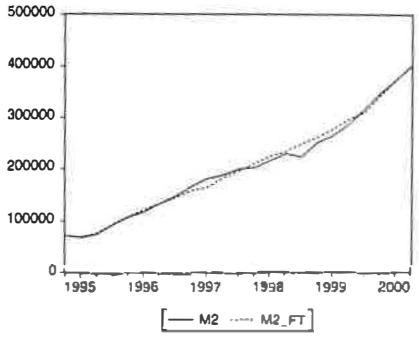

Figure 16

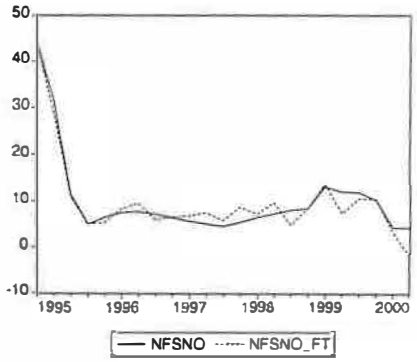

Figure 17

5. Conclusion

In this paper, we have constructed the prototype quarterly econometric model for the Brazilian economy (1994Q4-2000Q2) with 25 endogenous variables and found this model was good performance from a good final test result. Furthermore, we estimated the reaction functions for three variables (SELIC, M2 NFSNO), and found that this model was good performance from the results of the final test.

However, there is something to be improved in this model. It will be necessary not only to estimate for the monetary-fiscal block and the balance of payment block, but also to improve the endogenization of important reaction function such as exchange rate, M2 and SELIC.

Reference

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Appendix A: A Brazilian Quarterly Econometric Model (August, 2001)

A: Final Demand Sector

(1) Private Final Cosumption Expenditure (CP)

CP/PTO = 0.1315 + 0.2112*(YD(-1)/PTO(-1)) - 0.0047*(SELIC(-3)/SELIC(-4))
(5.18) (1.89) (-2.15)
+ 0.0047*(M2(-3)/IGP(-3)) - 0.00023*NFSNO - 0.0117*(ER/ER(-1))
(1.69) (-1.26) (-1.92)
- 0.00044*(@TREND) + 0.0284*D94Q4 - 0.0091*D95Q4
(-1.07) (5.71) (-3.13)
+ 0.0058*(@SEAS(1)) + 0.0103*(@SEAS(2)) + 0.0085*(@SEAS(3))
(2.90) (4.53) (4.85)

$R^2 = 0.9315$ $RA^2 = 0.8631, SE = 0.0023, SD = 0.0063, DW = 2.55, F = 13.6$

(2) Investment of Machinery and equipment (INVM)

INVM/KR(-1) = -0.0214 + 0.0150*(GDP(-1)/GDP(-2)) + 8.16e-05*((NUCI(-3)+NUCI(-

4))/2)

(-3.39) (2.83) (1.69)

- 0.0010*(SELIC(-2)/SELIC(-3)) + 0.0023*(SFDIR(-2)/SFDIR(-3))

(-3.31) (4.23)

+ 0.0005*(IM(-2)/GDE(-2))+ 0.694*(INVM(-1)/KR(-2)) - 0.0018*(DESA(-3)/DESA(-4))

(2.94) (7.83) (-2.46)

+ 0.00081*D95Q1 0.0010*(@SEAS(1)) 2.30e-05*(@SEAS(2)) 0.0012*(@SEAS(3))

(1.92) (-2.64) (-0.06) (-2.22)

$R^2 = 0.9524, RA^2 = 0.9047, SE = 0.0002, SD = 0.0008, DW = 1.96, F = 19.9$

(3) Investment of Construction (INVC)

INVC/KR(-1) = -0.0076 + 0.0052*(GDP(-1)/GDP(-2))

(-1.27) (1.18)

+ 5.734e-05*((NUCI(-1)+NUCI(-2)+NUCI(-3))/3) - 0.00044*(SELIC(-1)/SELIC(-2))

(1.57) (-1.89)

+ 0.7723*(INVC(-1)/KR(-2)) - 0.00069*D95Q2 - 0.00067*D95Q3

(7.57) (-3.50) (-2.85)

+ 0.00021*(@SEAS(1)) + 0.00091*(@SEAS(2)) + 0.00071*(@SEAS(3))

(1.18) (4.46) (4.00)

$R^2 = 0.9288, RA^2 = 0.8794, SE = 0.0002, SD = 0.0005, DW = 2.07, F = 18.8$

(4) Investment (INV)

INV=(INVM+INVC)/(1-0.026)

(5) Exports of Goods (X)

X/GDP(-1) = -13.968 + 11.772*(GDPUS(-1)/GDPUS(-2)) + 2.9611*(NUCI(-3)/NUCI(-4))

(-2.15) (1.83) (1.64)

+ 1.3990*(YAGR/GDP(-1)) + 19397.9*(ER(-2)/IGP(-2))

(2.16) (1.42)

+ 7.3415*((X(-1)+X(-2))/(KR(-1)+KR(-2))) + 0.34362*D97Q2

(2.96) (1.84)

- 0.45004*(@SEAS(1)) + 0.47261*(@SEAS(2)) + 0.4234*(@SEAS(3))

(-3.15) (3.35) (3.15)

$R^2 = 0.9055, RA^2 = 0.8401, SE = 0.1516, SD = 0.3791, DW = 1.61, F = 13.8$

(6) Imports of Goods (IM)

IM/GDP(-1) = -3.9362 + 6.8128*(GDE(-1)/GDE(-4)) - 300.42*(SELIC(-1)/IGP(-1))

(-2.03) (4.76) (-1.95)

+ 3.2558*((IM(-1)+IM(-2))/(KR(-1)+KR(-2))) + 0.5036*(RES$(-2)/KR(-2))

(2.23) (2.39)

- 31966.2*(ER(-1)/IGP(-1)) - 0.6401*D97Q1 - 0.5221*(@SEAS(1))

(-1.52) (-3.42) (-5.26)

+ 0.4834*(@SEAS(2)) + 0.3921*(@SEAS(3))

(3.68) (3.07)

$R^2 = 0.9221, RA^2 = 0.8682, SE = 0.1613, SD = 0.4442, DW = 1.25, F = 17.1$

(7) Net Exports (XMGSNF)

XMGSNF=(X-IM+SERNF$)*ER*1000/IGP

(8) GDE
GDE=CP+CG+INV+XMGSNF

B: Supply and Capital Stock Sector

(9) GDP for Non-primary Sector (YNAGR)
YNAGR/EMP(-1) = 0.0006 + 0.0178*((1+NUCI(-1)/100)*(KR(-1)/EMP(-1)))
(0.008) (1.24)
+ 0.0032*(M2(-1)/KR(-1)) + 0.0519*(SFDIR(-2)/SFDIR(-3))
(2.51) (6.33)
+ 0.1756*(YNAGR(-1)/EMP(-2)) + 0.0479*D95Q1 - 0.0250*D95Q3
(2.01) (7.33) (-4.19)
- 0.0027*(@SEAS(1)) + 0.0097*(@SEAS(2)) + 0.0138*(@SEAS(3))
(-0.79) (3.08) (3.88)
$R^2 = 0.9281, RA^2 = 0.8783, SE = 0.0051, SD = 0.0144, DW = 2.68, F = 18.6$

(10) GDP
GDP=YAGR+YNAGR(=GDE)

(11) Nominal GDP
GDPN=GDP*IGP

(12) Capital Stock
KR=KR(-1)+0.053*INV-10.1@TREND

(13) Rate of Capacity Utilization (NUCI)
NUCI = -32.169 + 53.544*(GDE(-1)/GDE(-4)) + 4.7058*(KR(-1)/EMP(-1))
(-1.51) (7.47) (1.63)
+ 0.5543*NUCI(-1) - 745.75*(SELIC(-1)/IGP(-1)) + 1.0031*(FDIR/FDIR(-1))
(4.48) (-1.46) (3.48)
+ 2.7921*D96Q1 - 2.3708*D99Q3 - 3.5946*(@SEAS(1)) + 3.1609*(@SEAS(2))
(2.71) (-2.77) (-7.97) (5.73)
+ 1.3767*(@SEAS(3))
(2.53)
$R^2 = 0.9356, RA^2 = 0.8819, SE = 0.6588, SD = 1.9171, DW = 2.17, F = 17.4$

C: Income Sector
(14) Disposable Income
YD=(GDPN-TAX)/IGP

D: Labor Sector
(15) Rate of Unemployment (DESA)
DESA = -14.005 + 0.0237*AWR(-2) + 65.186*(GDE(-2)/EMP(-2))
(-2.26) (1.96) (1.71)
+ 5.0720*(KR(-2)/EMP(-2)) - 13.179*(NUCI(-1)/NUCI(-2))
(2.09) (-2.29)
+ 2.2388*(@SEAS(1)) + 1.7215*(@SEAS(2)) + 1.9189*(@SEAS(3))
(7.34) (4.73) (3.94)

$R^2 = 0.9352, RA^2 = 0.9050, SE = 0.4573, SD = 1.4838, DW = 2.05, F = 30.9$

(16) Employment
EMP=PTO*(1-DESA/100)

(17) Wage Rate (AWR)
LOG(AWR/AWR(-1)) = 1.1687 - 0.8679*LOG(EMP(-2)/EMP(-3))
(2.08) (-1.25)
+0.7565*LOG(NUCI(-1)/NUCI(-2)) - 0.0447*LOG((DESA(-3)+DESA(-4))/2)
(2.81) (-1.21)
+ 0.0581*LOG(IGP(-2)/IGP(-3)) + 0.0926*LOG(ER(-2)/IGP(-2))
(2.03) (1.96)
+ 0.4795*LOG(AWR(-2)/AWR(-3)) - 0.0405*D95Q3 + 0.0611*D96Q1
(3.42) (-1.60) (1.96)
- 0.2036*(@SEAS(1)) - 0.0549*(@SEAS(2)) - 0.0711*(@SEAS(3))
(-12.0) (-3.36) (-2.20)
$R^2 = 0.9634, RA^2 = 0.9269, SE = 0.0196, SD = 0.0725, DW = 2.39, F = 26.4$

E: Price Sector
(18) General Price Index (IGP)
IGP/IGP(-1) = 0.6636 + 0.1002*(ER/ER(-1)) + 6169.5*(ER(-1)/IGP(-1))
(5.64) (10.3) (17.1)
+ 0.0517*(M2(-1)/M2(-2)) + 0.0344*(AWR(-3)/AWR(-4)) + 0.3176*(GDE(-3)/GDE(-4))
(2.70) (2.45) (4.53)
-0.0353*(KR(-1)/EMP(-1)) - 0.0021*(@TREND) - 0.0421*D95Q4
(-1.20) (-5.37) (-7.78)
-0.0261*D96Q4 0.0304*(@SEAS(1)) 0.0255*(@SEAS(2))
0.0142*(@SEAS(3))
(-5.60) (-6.17) (-5.27) (-4.17)
$R^2 = 0.9844, RA^2 = 0.9657, SE = 0.0035, SD = 0.0192, DW = 2.48, F = 52.7$

F: Balance of Payment Sector
(19) Trade Balance (TB$)
TB$=X-IM

(20) Current Account Balance (CA$)
CA$=TB$+SER$+TUN$

(21) Capital Account Balance (CAP$)
CAP$=FDI$+FPI$+CAPOTH$

(22) Real Foreign Direct Investment (FDIR)
FDIR=FDI$*ER*1000/IGP

(23) Accumulation of Real Foreign Direct Investment (SFDIR)
SFDIR=SFDIR(-1)+FDIR

(24) Balance of Payment (BP$)
BP$=CA$+CAP$

(25) Foreign Reserve (RES$)
RES$=RES$(-1)+BP$+RESE$

G: Reaction function sector
(26) Nominal interest rate (SELIC)
SELIC = -24.434 - 0.2732*(BP$(-2)/BP$(-3)) - 822486.8*(ER(-1)/IGP(-2))
(-0.33) (-1.31) (-3.71)
- 34.279*(M2(-1)/M2(-2)) + 0.0234*GDE(-2) + 0.3637*NFSNO(-2)
(-1.55) (1.56) (2.60)
+ 34.618*(FDIR(-1)/SFDIR(-1)) + 0.6279*SELIC(-1)
(1.67) (5.45)
- 7.0579*(@SEAS(1)) - 4.9175*(@SEAS(2)) - 2.5570*(@SEAS(3))
(-2.48) (-1.83) (-0.84)

$R^2 = 0.9533, RA^2 = 0.9143, SE = 3.9730, SD = 13.5743, DW = 2.51, F = 24.5$

(27) M2
(M2/IGP(-1))/GDE(-1) = 0.0024 - 0.000104*(IGP(-2)/IGP(-3))
(3.38) (-1.67)
- 0.00043*(SELIC(-2)/IGP(-2)) - 0.0022*(GDE(-1)/GDE(-2))
(-1.74) (-3.03)
+ 4.89e-09*CA$(-1) + 1.0189*((M2(-1)/IGP(-2))/GDE(-2))
(1.16) (31.9)
- 6.01e-05*(@SEAS(1)) - 8.22e-05*(@SEAS(2)) + 1.81e-05*(@SEAS(3))
(-1.63) (-2.32) (0.61)

$R^2 = 0.9917, RA^2 = 0.9869, SE = 3.4E-05, SD = 0.0003, DW = 2.42, F = 208.4$

(28) NFSNO
NFSNO = 8.847 - 0.00028*BP$(-2) - 0.00067*IGP(-2) + 9.0740*(SELIC(-3)/SELIC(-4))
(0.18) (-4.61) (-6.48) (5.43)
- 1.0489*NUCI(-2) + 429.51*(GDE(-2)/EMP(-2))
(-2.92) (2.87)
+ 20.0198*(YNAGR(-1)/YNAGR(-2)) - 0.0928*(@SEAS(1))
(2.48) (-0.06)
+ 3.8259*(@SEAS(2)) - 2.8568*(@SEAS(3))
(1.91)(-1.39)

$R^2 = 0.9591, RA^2 = 0.9308, SE = 2.4249, SD = 9.2168, DW = 2.15, F = 33.9$

Appendix B: Variables List of Brazilian Quarterly Econometric Model

AWR	Wage Rate	1994=100	Endogenous
BP$	Balance of Payment	Millions of US Dollers	Endogenou

CA$	Current Account	Millions of US Dollers	Endogenous
CAP$	Capital Account	Millions of US Dollers	Endogenous
CAPOTH$	Other Foreign Investment (CAP$)	Millions of US Dollers	Exogenous
CG	Government Final consumption	Millions of Reais, 1990 prices	Exogenous
CP	Private Final consumption	Millions of Reais, 1990 prices	Endogenous
DESA	Rate of Unemployment	%	Endogenous
DiQj	Dummy	1(when i year j quarterly), 0(other)	Exogenous
ER	Nominal Exchange Rate	Real per US Dollers	Exogenous
FDI$	Foreign Direct Investment	Millions of US Dollers	Exogenous
FDIR	real Foreign Direct Investment	FDI$*ER*1000/IGP	Endogenous
FPI$	Foreign Portfolio Investment	Millions of US Dollers	Exogenous
GDE	GDE	Millions of Reais, 1990 prices	Endogenous
GDP	GDP	Millions of Reais, 1990 prices	Endogenous
GDPN	nominal GDP	Thousands of Reais	Endogenous
GDPUS	GDP in U.S.	Millions of US Dollers, 1990 prices	Exogenous
IGP	General Price Index	%	Endogenous
IM	Import of Goods	Millions of Reais, 1990 prices	Endogenous
INV	Investment	Millions of Reais, 1990 prices	Endogenous
INVC	Investment of Costruction	Millions of Reais, 1990 prices	Endogenous
INVM	Investment of Machinery and equipment	Millions of Reais, 1990 prices	Endogenous
KR	Capital Stock	Millions of Reais, 1990 prices	Endogenous
M2	Wide Money Supply	Millions of Reais	Exogenous
NFSNO	Nesessity of Financial Sector	%	Exogenous
NUCI	Rate of Capacity Utilization	%	Endogenous
PIM	Prices for Import of Goods	%	Exogenous
PTO	Economic Active Population	Millions of Person	Exogenous
RES$	Foreign Currency Reserve	Millions of US Dollers	Endogenous
RESE$	Error of Foreign Currency Reserve	Millions of US Dollers	Exogenous
SELIC	Nominal Interest Rate	%	Exogenous
SER$	Service balance	Millions of US Dollers	Exogenous
SERNF$	Net Non-Factor Services	Millions of US Dollers	Exogenous
SFDIR	Accumulation of real Foreign Direct	FDIR(94Q1)+....	Endogenou

	Investment	+FDIR(2000Q2)	s
TAX	Tax Revenue	Thousands of Reais	Exogenous
TB$	Trade Balance	Millions of US Dollers	Endogenou s
TUN$	Transfers	Millions of US Dollers	Exogenous
X	Exports of Goods	Millions of US Dollers	Endogenou s
XMGSNF	Net Exports (Exports minus Imports of Goods	Millions of US Dollers	Endogenou s
YAGR	GDP for Primary Sector	Millions of Reais, 1990 prices	Exogenous
YAGRN	Nominal GDP for Primary Sector	Thousands of Reais	Exogenous
YD	Disposable Income	Millions of Reais, 1990 prices	Endogenou s
YNAGR	GDP for Non-Primary Sector	Millions of Reais, 1990 prices	Endogenou s