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**Working Paper**

## Model for projections and simulations of the Brazilian economy

Discussion Paper, No. 81

**Provided in Cooperation with:**

Institute of Applied Economic Research (ipea), Brasília

*Suggested Citation:* Reis, Eustáquio José et al. (2015) : Model for projections and simulations of the Brazilian economy, Discussion Paper, No. 81, Institute for Applied Economic Research (ipea), Brasília

This Version is available at:

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# 81

**DISCUSSION PAPER**

Originally published by Ipea in January 1999 as number 619 of the series Texto para Discussão.

## **MODEL FOR PROJECTIONS AND SIMULATIONS OF THE BRAZILIAN ECONOMY**

**Eustáquio J. Reis  
Marco Antônio F. H. Cavalcanti  
Alexandre Samy de Castro  
José Luiz Rossi Jr.  
Emerson Rildo de Araújo  
Beatriz Muriel Hernandez**

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**ipea**



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Brasília, January 2015

## MODEL FOR PROJECTIONS AND SIMULATIONS OF THE BRAZILIAN ECONOMY

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Discussion paper / Institute for Applied Economic

Research.- Brasília : Rio de Janeiro : Ipea, 1990-

ISSN 1415-4765

1. Brazil. 2. Economic Aspects. 3. Social Aspects.  
I. Institute for Applied Economic Research.

CDD 330.908

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## RESUMO

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Este texto apresenta a última versão do modelo econométrico anual da economia brasileira desenvolvido pelo Gamma (Grupo de Análise e Modelagem Macroeconômica) do IPEA/DIPES. O modelo destina-se à realização de projeções e simulações de política econômica de médio e longo prazos. A especificação do modelo é basicamente keynesiana. Os procedimentos econométricos incluem diversos métodos de séries temporais, tais como análise de co-integração e modelos com parâmetros variáveis no tempo, bem como estimação por MQO e variáveis instrumentais. O desenvolvimento das equações visou, em geral, à obtenção de propriedades de longo prazo desejáveis do ponto de vista teórico, além de dinâmica de curto prazo consistente com os dados.

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# ABSTRACT

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This paper presents the latest version of the annual econometric model for the Brazilian economy developed by the Group of Macroeconomic Analysis and Modelling (Gamma) at IPEA/DIPES. The model is designed to make medium run projections and policy simulations. The specification of the model is basically Keynesian. Estimation features include the use of various time series methods, such as FIML (full information maximum likelihood) cointegration analysis and time varying parameters, besides OLS and instrumental variables estimation. In general, the development of the model's equations has explicitly tried to ensure desirable long-run properties as well as reasonable short-run dynamics.

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## 1 - INTRODUCTION

This paper presents the latest version of the annual econometric model for the Brazilian economy developed by the Group of Macroeconomic Analysis and Modelling (Gamma) at Research Directorate of the Institute of Applied Economic Research (IPEA/DIPES), in Rio de Janeiro, Brazil.

The model is designed to make medium run projections and policy simulations for the Brazilian economy. It is a large-scale annual model built upon the main identities of the Brazilian National Accounts, Balance of Payments, and Public Sector Budget Accounts.

The specification of the model is basically Keynesian. Estimation features include the use of various time series methods, such as FIML (full information maximum likelihood) cointegration analysis and time varying parameters, besides OLS and instrumental variables estimation. The use of systems methods is not possible due to the lack of sufficiently long data for many variables.

In general, the development of the model's equations has explicitly tried to ensure desirable long-run properties as well as reasonable short-run dynamics.

This paper is organized as follows. The first section sketches the structure of the model. The second section presents the main specification and estimation results for each block. The third section discusses some simulation experiments, showing how the model responds to a few major policy shocks. Finally, the fourth section concludes with a discussion of the model's shortcomings and the next improvements to be made.

## 2 - THE MODEL STRUCTURE

As it stands now, the model is basically Keynesian. Aggregate demand is given by individually estimated equations for aggregate consumption, aggregate investment and net exports of goods and services, while aggregate supply is determined by a Cobb-Douglas constant return production function. The equalization of aggregate demand and supply will determine real output, capacity utilization, employment and prices, and will typically correspond to an equilibrium with under-employment.

Appendix I presents the model's flow diagram, its variables and equations and an overview of its block structure, normalization and contemporaneous relations. The model contains 231 equations out of which 32 are stochastic. The number of endogenous variables is 131; the remaining equations of the model are just identities, which define nominal variables and GDP proportions. Equations can be grouped in five major blocks: Aggregate Demand (equations 1 to 15), Aggregate Supply (16 to 22), Employment and Price Determination (equations 23 to 30), Monetary Sector (31 to 43), Public Sector Accounts (equations 44 to 98) and Balance of Payments Accounts (equations 99 to 131).

The Aggregate Demand block (equations 1 to 15) defines and specifies the determinants of aggregate consumption and major categories of fixed investment (construction and equipment). Lack of reliable data precludes the estimation of investment in inventories, as well as the disaggregation of consumption into durables/non-durables.

The Aggregate Supply block (equations 16 to 22) specifies the economy's production function and the determination of the domestic capital stock, disaggregated into construction and machinery and equipment components.

The Employment and Price Determination block (equations 23 to 30) consists of a labour demand equation, a wage curve, a Phillips Curve-type equation for wholesale prices and a set of equations relating the evolution of other price indices to this "key" price. As a first approximation, all prices are supposed to grow at the same rate, so that the model behaves as if there were just one domestic price.

The Monetary Sector block (equations 31 to 43) also consists of a small set of equations that determine the real money stock, the amount of credit to the private sector, the nominal and real interest rate and the exchange rate.

The Public Sector block (equations 44 to 98) specifies the determinants of major categories of expenditures and revenues of General Government (federal, state and municipal levels), as well as the accumulation of public debt. The Public Sector debt also includes the borrowing requirements of State Enterprises which, for the time being, are exogenously given to the model. Possible improvements here are the specification of expenditure and revenues for the different levels of Brazilian government including state enterprises.

The Balance of Payments block (equations 99 to 131) defines and specifies the determinants of the main categories of exports (manufactured, semi-manufactured, and primary products) and imports (consumer, intermediate, and capital goods), as well as other items of the current accounts, and the external debt dynamics. For now, foreign investments (both equity and portfolio) and reserves are exogenously specified.

The main policy variables in the model are:

- Nominal exchange rate;
- Nominal interest rate;
- General Government Investment;
- General Government Expenditures;
- Tax rates;
- Import tariff rates; and
- Export subsidy rates.

Other important exogenous variables are:

- Net Foreign Investment (Direct and Portfolio);
- Privatization Revenues;
- International reserves;
- State Enterprises' Borrowing Requirements;
- Imports of Fuels and Lubricants;
- United States' Wholesale Price Index;
- Libor rate; and
- World imports.

We will typically simulate the model under exogenously given trajectories for these variables. It should be noted, however, that some of the policy variables may be considered partially endogenous, as most General Government expenditures and revenues depend on current GDP growth and inflation, while the nominal interest rate and the exchange rate may be partially endogenized depending on the particular model closure adopted; e.g. some form of interest or purchasing power parity.

### **3 - SPECIFICATION AND ESTIMATION**

This section discusses the estimation methodology and main results for each block of equations. Appendix 2 shows detailed estimation results and diagnostic tests for most equations.

#### **3.1 - Aggregate Demand**

##### **Private Consumption**

Real private consumption expenditure (CFTPP) — equation 3 — is specified as a function of real disposable income (RDOPP), real interest rates (TJCDB) and total real credit granted to the private sector (EMPTR). The equation is estimated in first differences plus an error-correction mechanism which incorporates the existence of an 1:1 long-run relationship between consumption and income — thus ensuring that these two variables cannot drift permanently away from each other. The equation is estimated by instrumental variables in order to account for the endogeneity of both disposable income and credit, thus providing consistent coefficient estimates.

This is one of the most important equations of the model, as the dynamics of real demand will depend to a large extent on the value of the keynesian multiplier. The estimated coefficient on disposable income is approximately 0.4, which implies a reasonably low short-run multiplier and therefore prevents the model from becoming too unstable.

It should be noted that the effect of interest rate movements on both consumption and investment (as we shall see below) is relatively weak, so that the effect of credit on private consumption is perhaps the main channel through which monetary policy may affect aggregate demand.

### **Private Investment**

Real private investment is disaggregated into two main components: construction and equipment fixed investment.

The demand for investment in construction (FBKCP) is a function of GDP, the real interest rate and inflation acceleration (equation 8). The equation is specified as an error-correction model, in which the cointegrating vector includes a 1:1 relationship between investment and GDP. It is interesting to note that GDP does not enter the equation unlagged, so that its only effect on construction investment operates through the error-correction term. This also means that the equation can be consistently estimated by OLS.

Total demand for machinery and equipment is equal to the sum of capital goods imports and spending on domestic machinery. Capital goods imports are determined within the foreign sector block. Investment in domestic machinery (FBKMPD) depends on the real interest rate and on the rate of capacity utilization (equation 10). It is worth noting that investment in domestic machinery displays a pattern of slow adjustment to exogenous shocks, as no exogenous variable enters the equation contemporaneously. Once again, the absence of unlagged GDP implies that the equation may be consistently estimated by OLS.

## **3.2 - Aggregate Supply**

Aggregate supply (equation 16) is given by a constant returns to scale Cobb-Douglas-type production function whereby domestic capital stock (ELKT), multiplied by the capacity utilization rate (UTIND), is combined with employed labour to produce output. Employed labour is proxied by active urban population (PEAURB) multiplied by the complement of the unemployment rate (TXDES). The equation is specified in terms of growth rates and estimated by OLS. Due to the lack of unemployment data before 1980, the sample period is very short, which may cause estimation biases. Estimation results, however, are quite reasonable: capital and labour account for roughly 70% and 30% of output growth, respectively; although very high compared with international standards, this seems to be consistent with the observed pattern of income distribution. The main problem seems to lie in the negative sign of the estimated constant term, which implies negative productivity growth. This may reflect the stagnation of the Brazilian economy during the estimation period or other estimations problems. For simulation purposes, it is necessary to arbitrarily assume some other value for the constant term (interpreted as an exogenously given rate of growth of total factor productivity - PTF) while ignoring the econometric problems associated with such approach.

The domestic capital stock is calculated according to a perpetual inventory method, where the durability of net capital stock in residential construction (ELKCER), non-residential construction (ELKCENR) and machinery and equipment (ELKM) is assumed to be 50, 40 and 20 years, respectively.<sup>1</sup>

The capacity utilization rate will vary in order to equalize aggregate supply and demand.

### **3.3 - Employment and Price Determination**

Labour supply (PEAURB) is exogenous, whereas labour demand (equation 23) depends on the current real wage (SALR) and GDP growth. This equation was estimated by OLS.

The labour market is assumed to be characterized by rigidities that will typically prevent the equalization of labour supply and demand. A “wage curve” (equation 24) determines the degree of flexibility in real wages and, therefore, the degree to which adjustments in the labour market are accomplished by variations in wages or in the rate of unemployment.<sup>2</sup>

Domestic prices are determined by a Phillips Curve-type equation where current inflation depends on past inflation, variation in foreign prices multiplied by the exchange rate and capacity utilization (equation 25). All parameters are calibrated, subject to the restriction that the coefficients on past inflation and foreign prices (in domestic currency) sum to one. The ad-hoc specification of the price equation derives from the technical difficulties in the estimation of price behavior in an annual model for an economy which has experienced hyperinflation in recent history.

As a first approximation, all prices are supposed to grow at the same rate.

### **3.4 - Monetary Sector**

The evolution of M1 is indirectly given by the variation in the velocity of money (M1PIB), which is a function of the nominal interest rate (equation 32). This equation was estimated by OLS.

M0 is assumed to be a constant proportion of M1, calculated as the observed mean ratio between these variables (equation 33).

Total real credit granted to the private sector (EMPTR) depends on the percent change in M1 (equation 35). This equation was also estimated by OLS.

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<sup>1</sup> This methodology follows Morandi (1998).

<sup>2</sup> The slope coefficient is taken from Barros and Mendonça (1997).

The nominal interest rate is given either by the “desired” rate set exogenously by the authorities (TJCDBND) or by the minimum rate determined by an “ex-post interest parity condition”, according to which the domestic interest rate may not be lower than the international interest rate (LIBOR) corrected by the domestic currency nominal devaluation and a risk premium (RISCO) — equation 36.

Similarly, the nominal exchange rate is determined by the “desired” devaluation rate set exogenously by the authorities (DESVD). In alternative model closures, we might want to specify the exchange rate as a function of past or current inflation so as to keep the real exchange rate under control. It should be noted, however, that given the significant effect of nominal devaluations on current inflation (equation 25), such rules might bring about an upward inflation-devaluation spiral.

### 3.5 - Public Sector

The Public Sector Borrowing Requirements are disaggregated into General Government and Public Enterprises borrowing requirements.

Public Enterprises Borrowing Requirements are basically exogenous, as they depend on exogenously given primary results.

The General Government’s main revenues and expenditures (equations 52-59 and 68-73, respectively), in real terms, are specified as functions of real GDP and inflation. GDP is used as proxy for the tax base in the case of revenues, and as trend in the case of expenditures. Inflation affects the real value of expenditures and revenues through three main effects: *a*) taxes and expenditures are eroded because they are not perfectly indexed to prices; *b*) the time lag between tax collection and generation — the Tanzi effect; and *c*) and last but not least, because inflation tends to introduce a discretionary behavior of government taxation and spending.

The inflation effects described above can be quite significant in a high inflation economy. Furthermore, for modeling purposes, these effects tend to make constant parameter models unsuitable. In order to allow some parameters to vary through time, a state-space form representation was used for most of the equations. Thus, the real GDP coefficient was assumed to be constant, whereas the constant and inflation coefficients were allowed to vary, following a random walk process.

These equations are specified as follows:

$$y(t) = z(t) \gamma(t) + x(t) \beta + d(t) + s(t) w(t) \quad (\text{measurement equation})$$

$$\gamma(t) = \phi(t) \gamma(t-1) + c(t) + \psi(t) v(t) \quad (\text{transition equation})$$

$$E(v_t v_t') = \sigma_v(t)$$

$$E(w_t w_t') = \sigma_w(t)$$

where GDP would be included in the  $x(t)$  vector (with constant coefficient  $\beta$ ) and inflation in the  $z(t)$  vector (with varying coefficient  $\gamma(t)$ ). These equations can be estimated straightforwardly by the Kalman Filter method.<sup>3</sup>

It is worth noting that all of the estimated coefficients have the expected sign and very ‘reasonable’ elasticities. As can be seen from the Table below, in most equations the GDP (constant) coefficient is very close to 1, as we should expect.

### GDP Coefficients in the Revenue and Expenditure Equations

Revenues/Expenditures	Equation	Coefficient	Std Deviation
IR	31	1.0845	0.21246
IPI	33	1.1252	0.29699
ICMS	35	1.1572	0.17002
OTGG	37	1.1105	0.20381
GPGG	40	1.0055	0.17409
TAPGG	42	0.7874	0.23257
ODCCGG	44	1.0912	0.25654

For simulation purposes, we may change the intercept coefficient as a proxy for desired variations in tax revenues/expenditures. The actual variation will depend on GDP growth and inflation.

Nominal interest payments are determined by the amount of public debt, real interest rates on external and internal debt — which depend on international interest rates plus a spread and real interest rates for the economy as a whole, respectively — and monetary correction (equations 74-81).

The variation in public debt is determined by equations 91-98.

## 3.6 - Balance of Payments

### Trade Equations

The import and export equations follow a very standard specification; imports depend on the real exchange rate (corrected by a category-specific tariff index) and real domestic activity (GDP), whereas exports’ performance is determined by the rate of growth of world imports (MW), the real exchange rate (corrected by a sector-specific subsidy index) and domestic capacity utilization (UTIND).

The equations have been estimated by Johansen’s cointegration procedure within an error-correction model framework. It is important to note that all equations except one (consumer goods imports) have passed a battery of diagnostic tests, including Chow structural stability tests. Besides, various exogeneity tests were performed and, in most cases, the equations were found to possess all the

<sup>3</sup> For further details on the estimation methodology, see Hernandez (1998).

desirable properties for making efficient and unbiased forecasts and policy simulations — i.e., strong and superexogeneity of the conditioning variables [see Castro and Cavalcanti (1997)].

Import equations were estimated separately for each category of use, capital, intermediate and consumer goods. Oil imports are exogenous.

The export equations were estimated for primary, semi-manufactured and manufactured products.

### **Services**

The Services accounts' equations (equations 110-125) are disaggregated according to standard classification into non-factor and factor services. Non-factor services (equations 116-125) basically depend on the value of the country's total trade; in the case of tourism expenditure, the real exchange rate is also included as an explanatory variable. Factor services (equations 111-115) depend on the international interest rate plus a spread, the net stock of foreign capital and net external debt. All equations are specified as autoregressive-distributed-lag (ADL) models and estimated by OLS and are usually characterized by well-behaved residuals and constant parameters.

### **External Debt**

The external debt dynamics is determined by the current account balance. Given that flows of foreign direct and portfolio investment (IEDL and IEPL) and changes in international reserves (HACP) are assumed to be exogenous, the Current Account Deficit determines the variation in the country's external debt (equation 129). The equation also captures the changes in the value of non-dollar denominated debt that arise from variations in the exchange rate of the US dollar vis-à-vis other currencies.

## **4 - MODEL SIMULATIONS**

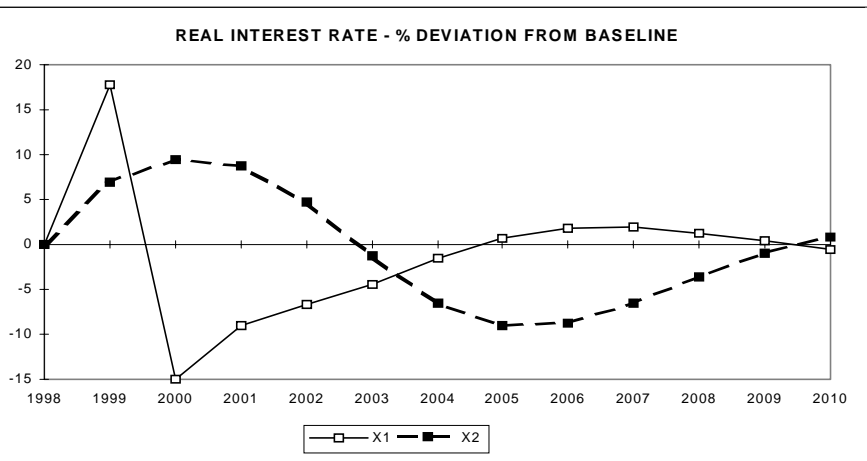
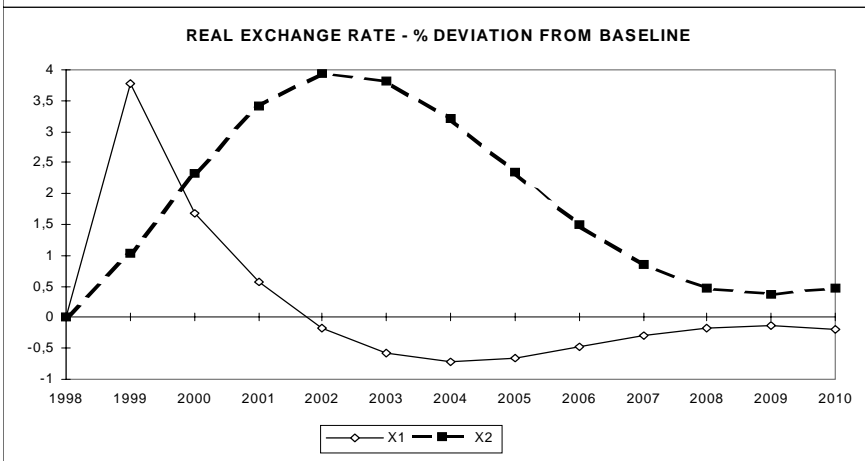
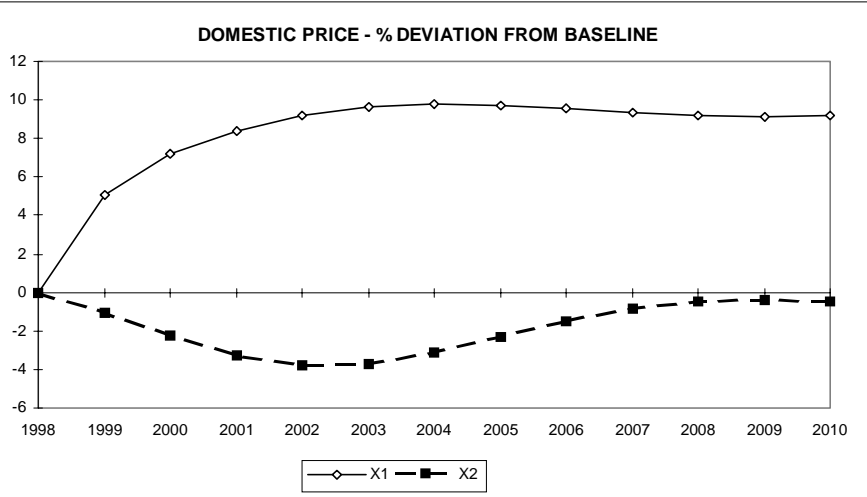
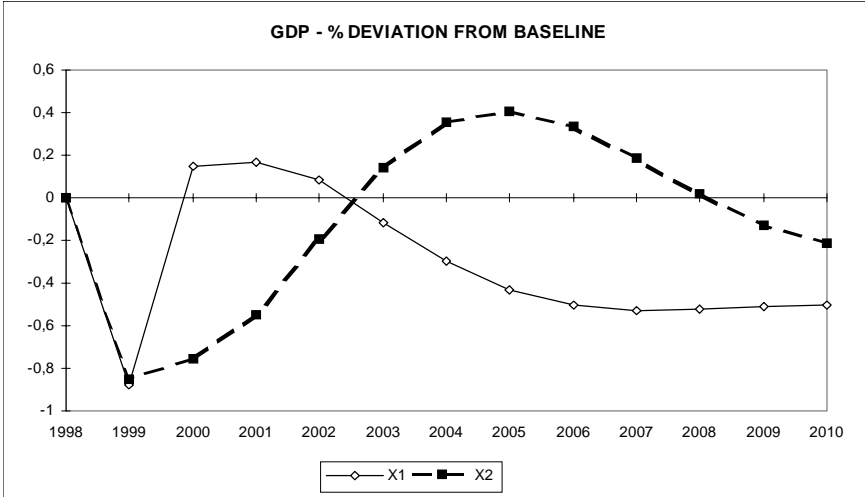
This section illustrates the model's responses to selected simulation experiments.

First, we solve the model under a baseline scenario of exogenous and predetermined variables, in which we assume an unchanged international environment and a smooth path for Brazil's macroeconomic policies – basically, a tight fiscal budget, slowly depreciating exchange rate and declining interest rates.

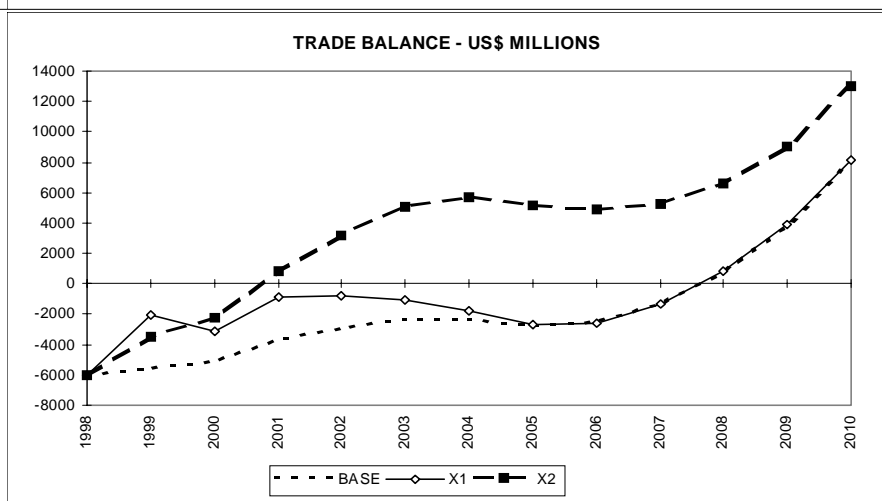
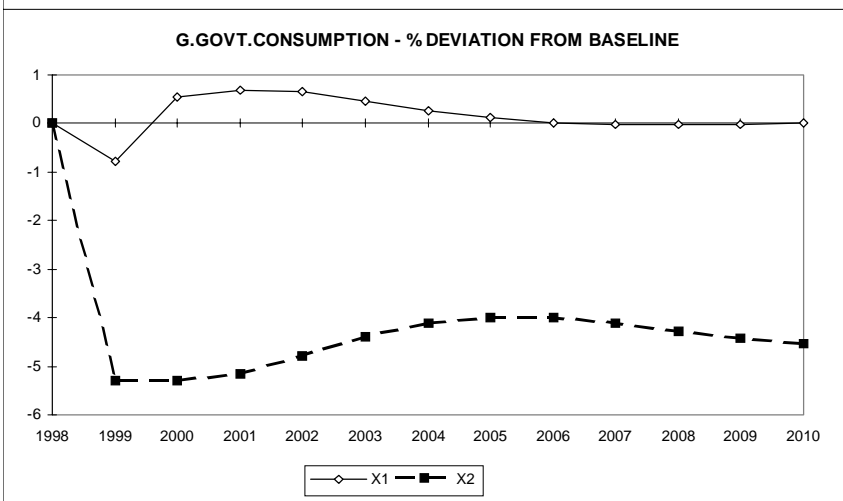
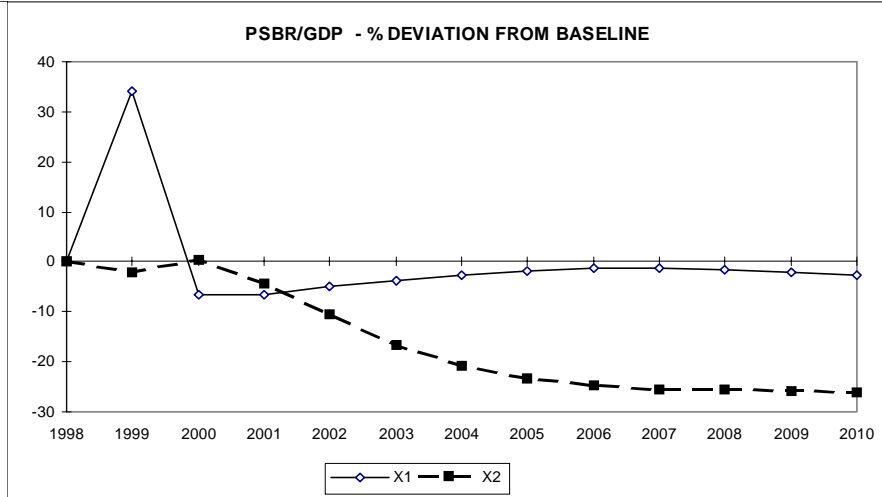
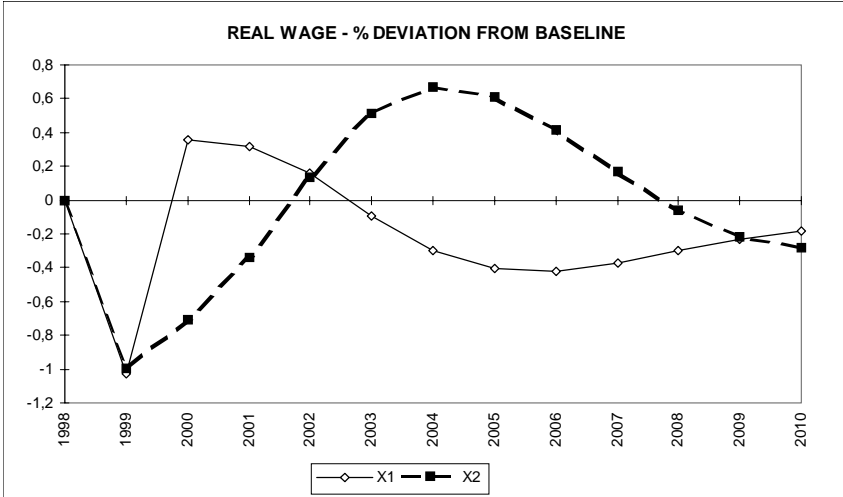
We then perform two experiments: a large exogenous depreciation of the nominal exchange rate, of 20%, in 1999 (Experiment 1 - X1) and a permanent negative shock on General Government consumption, of 5%, in 1999 (Experiment 2 - X2).



**FIGURE 1 - DEVIATIONS FROM BASELINE FOR SELECTED VARIABLES**  
**EXPERIMENT 1 (X1): 20% NOMINAL EXCHANGE RATE DEVALUATION IN 1999**  
**EXPERIMENT 2 (X2): 5% PUBLIC CONSUMPTION REDUCTION IN 1999**



**FIGURE 2 - DEVIATIONS FROM BASELINE FOR SELECTED VARIABLES**  
**EXPERIMENT 1 (X1): 20% NOMINAL EXCHANGE RATE DEVALUATION IN 1999**  
**EXPERIMENT 2 (X2): 5% PUBLIC CONSUMPTION REDUCTION IN 1999**



We report below deviations from the baseline path for some of the main variables in the model. In the case of the trade balance, we show the actual value in US\$ millions.

## **5 - CONCLUSION**

The current version of the model already allows relatively rich projections and simulation exercises, which seem to provide fairly reasonable outcomes. Nonetheless, there still are significant improvements to be made.

Among the main shortcomings of the model we should point out the following:

- 1 - The price equation is specified in an ad-hoc manner, due to the difficulties in estimating price behaviour in an economy with a history of hyperinflation;
- 2 - Wages and labour demand are poorly specified;
- 3 - The monetary sector is also poorly specified and has little effect on real variables;
- 4 - Capital flows are not explicitly modelled, which does not allow us to infer the positive impacts of high domestic interest rates/investment returns on the financing of current account deficits and on the accumulation of international reserves;
- 5 - Inventories are not modelled, due to the lack of reliable data. This considerably constrains the model's investment dynamics — although it should be said that this problem is probably worse in higher frequency models;
- 6 - There is no role played by expectations, so that the model is inherently backward-looking. This problem is especially important in the specification of financial variables; and
- 7 - As a general difficulty, the estimated equations usually require a number of dummy variables to account for the frequent breaks and/or outliers in Brazilian macroeconomic series. It is very hard to avoid such modelling shortcomings that arise in economies with a history of severe structural breaks and policy regime changes.

The next improvements to be made shall focus on overcoming some of these difficulties.

**Endogenous Variables**


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CFT	Total Final Consumption (Millions of Reais,1980 prices)
CFTPP	Total Private Final Consumption (Millions of Reais,1980 prices)
CMEE	Public Enterprises Monetary Correction Payments (Millions of Reais, 1980 prices)
CMEEN	Public Enterprises Monetary Correction Payments (Millions of Reais)
CMEEPIB	Public Enterprises Monetary Correction Payments as proportion of GDP
CMGG	General Government Monetary Correction Payments (Millions of Reais, 1980 prices)
CMGGN	General Government Monetary Correction Payments (Millions of Reais)
CMGGPIB	General Government Monetary Correction Payments as proportion of GDP
CPMF	CPMF Revenue (Millions of Reais,1980 prices)
CPMFN	CPMF Revenue (Millions of Reais)
CR	Real Exchange Rate (US\$/R\$)
CTGG	General Government Final Consumption (Millions of Reais,1980 prices)
CTRIB	Total Gross Tax Revenue (Millions of Reais, 1980 prices)
CTRIBL	Total Net Tax Revenue (Millions of Reais, 1980 prices)
CTRIBLN	Total Net Tax Revenue (Millions of Reais)
CTRIBN	Total Gross Tax Revenue (Millions of Reais)
CTRIBPIB	Total Gross Tax Revenue as a proportion of GDP
DEXEE	Public Enterprises External Debt (Millions of Reais,1980 prices)
DEXEEN	Public Enterprises External Debt(Millions of Reais)
DEXEPIB	Public Enterprises External Debt as proportion of GDP
DEXGG	General Government External Debt (Millions of Reais,1980 prices)
DEXGGN	General Government External Debt(Millions of Reais)
DEXGGPIB	General Government External Debt as proportion of GDP
DEXPR	Private Sector External Debt (Millions of US\$)
DEXT	Total External Debt (Millions of US\$)
DEXTPIB	Total External Debt as a proportion of GDP
DEXTXTV	Total External Debt as a proportion of Total Exports
DINEE	Public Enterprises Internal Debt (Millions of Reais,1980 prices)
DINEEN	Public Enterprises Internal Debt (Millions of Reais)
DINEEPIB	Public Enterprises Internal Debt as proportion of GDP
DINGG	General Government Internal Debt (Millions of Reais,1980 prices)
DINGGN	General Government Internal Debt (Millions of Reais)
DINGGPIB	General Government Internal Debt as proportion of GDP
DIPIB	GDP Implicit Price Deflator, period average (1980=1)
DTCCGG	General Government Current Expenditure (Millions of Reais,1980 prices)
DTCCGGN	General Government Current Expenditure (Millions of Reais)
DTCCGGPIB	General Government Current Expenditure as proportion of GDP
DTEE	Public Enterprises Total Debt (Millions of Reais,1980 prices)
DTEEN	Public Enterprises Total Debt(Millions of Reais)
DTEEPIB	Public Enterprises Total Debt as proportion of GDP
DTGG	General Government Total Debt (Millions of Reais,1980 prices)
DTGGN	General Government Total Debt (Millions of Reais)
DTGGPIB	General Government Total Debt as proportion of GDP
ELKCENR	Net Domestic Capital Stock in Non-Residential Construction (Millions of Reais,1980 prices)
ELKCER	Net Domestic Capital Stock in Residential Construction (Millions of Reais,1980 prices)
ELKM	Net Domestic Capital Stock in Machinery and Equipment (Millions of Reais,1980 prices)
ELKT	Total Net Domestic Capital Stock (Millions of Reais,1980 prices)
EMPTR	Total Credit to Private Sector (Millions of Reais, 1980 prices)
ER	Nominal Exchange Rate, Real/US\$

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(continue)

ERNPT	Nominal Exchange Rate, Real/US\$, corrected for exchange auction
ERV	Nominal Exchange Rate, Real/US\$, period average
ERVF	Nominal Exchange Rate, Real/US\$, end of period
FBKC	Gross Fixed Capital Formation Construction - Total (Millions of Reais,1980 prices)
FBKCENR	Gross Fixed Capital Formation - Non-Residential Construction - Total (Millions of Reais,1980 prices)
FBKCER	Gross Fixed Capital Formation - Residential Construction - Total (Millions of Reais,1980 prices)
FBKCG	Gross Fixed Capital Formation - Construction - General Government (Millions of Reais,1980 prices)
FBKCP	Gross Fixed Capital Formation - Construction - Private Sector (Millions of Reais,1980 prices)
FBKCPN	Gross Fixed Capital Formation - Construction - Private Sector(Thousands of Reais)
FBKCPPIB	Gross Fixed Capital Formation - Construction - Private Sector as proportion of GDP
FBKF	Gross Fixed Capital Formation - Total (Millions of Reais,1980 prices)
FBKFGG	Gross Fixed Capital Formation - General Government (Millions of Reais,1980 prices)
FBKFGGPIB	Gross Fixed Capital Formation - General Government as proportion of GDP
FBKFP	Gross Fixed Capital Formation - Private Sector (Millions of Reais,1980 prices)
FBKFPIB	Gross Fixed Capital Formation - Total as proportion of GDP
FBKFPN	Gross Fixed Capital Formation - Private Sector (Thousands of Reais)
FBKFPIB	Gross Fixed Capital Formation - Private Sector as proportion of GDP
FBKM	Gross Fixed Capital Formation - Machinery - Total (Millions of Reais,1980 prices)
FBKMG	Gross Fixed Capital Formation - Machinery - General Government (Millions of Reais,1980 prices)
FBKMP	Gross Fixed Capital Formation - Machinery and Equipment - Private Sector (Millions of Reais,1980 prices)
FBKMPD	Gross Fixed Capital Formation - Domestic Machinery and Equipment - Private Sector (Millions of Reais,1980 prices)
FBKMPDN	Gross Fixed Capital Formation - Domestic Machinery and Equipment - Private Sector (Thousands of Reais)
FBKMPN	Gross Fixed Capital Formation Machinery and Equipment Private Sector(Thousands of Reais)
FBKMPIB	Gross Fixed Capital Formationem Machinery and Equipment - Private Sector as proportion of GDP
FBKO	Gross Fixed Capital Formation - Other - Private Sector (Millions of Reais,1980 prices)
GPGG	General Government Expenditure - Employees/Contributions Millions of Reais,1980 prices)
GPGGN	General Government Expenditure - Employees/Contributions (Thousands of Reais)
GPGGPIB	General Government Expenditure - Employees/Contributions as proportion of GDP
ICMS	Circulation of Goods and Services Tax Revenue (Millions of Reais,1980 prices)
ICMSN	Circulation of Goods and Services Tax (Millions of Reais)
ICMSPIB	Circulation of Goods and Services Tax Revenue as proportion of GDP
IGP	General Price Index, period average (1980=1)
IGPF	General Price Index, end of period
IINF	Inflationary Tax (Millions of Reais,1980 prices)
IINFN	Inflationary Tax (Millions of Reais)
IINFPIB	Inflationary Taxes as a proportion of GDP
IPA	Wholesale Price Index, period average (1980=1)

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IPC	Consumer Price Index, period average (1990=100)
IPI	Industrialized Product Tax Revenue (Millions of Reais,1980 prices)
IPIN	Industrialized Products Tax (Millions of Reais)
IPIPIB	Industrialized Product Tax Revenue as proportion of GDP
IR	Income Tax Revenue (Millions of Reais,1980 prices)
IRN	Income Tax (Millions of Reais)
IRPIB	Income Tax Revenue as proportion of GDP
JNDTGG	General Government Nominal Interest Payments on Total Debt (Millions of Reais,1980 prices)
JNDTGGN	General Government Nominal Interest Payments on Total Debt (Millions of Reais)
JNDTGGPIB	General Government Nominal Interest Payments on Total Debt as proportion of GDP
JRDEE	Public Enterprises Real Interest Payments on Total Debt (Millions of Reais,1980 prices)
JRDEEN	Public Enterprises Real Interest Payments on Total Debt (Millions of Reais)
JRDEEPIB	Public Enterprises Real Interest Payments on Total Debt as proportion of GDP
JRDEXEE	Public Enterprises Real Interest Payments on External Debt (Millions of Reais, 1980 prices)
JRDEXEEN	Public Enterprises Real Interest Payments on External Debt (Millions of Reais)
JRDEXEPIB	Public Enterprises Real Interest Payments on External Debt as proportion of GDP
JRDEXGG	General Government Real Interest Payments on External Debt (Millions of Reais, 1980 prices)
JRDEXGGN	General Government Real Interest Payments on External Debt (Millions of Reais)
JRDEXGGPIB	General Government Real Interest Payments on External Debt as proportion of GDP
JRDGG	General Government Real Interest Payments on Total Debt (Millions of Reais,1980 prices)
JRDGGN	General Government Real Interest Payments on Total Debt (Millions of Reais)
JRDGGPIB	General Government Real Interest Payments on Total Debt as proportion of GDP
JRDINEE	Public Enterprises Real Interest Payments on Internal Debt (Millions of Reais, 1980 prices)
JRDINEEN	Public Enterprises Real Interest Payments on Internal Debt (Millions of Reais)
JRDINEEPIB	Public Enterprises Real Interest Payments on Internal Debt as proportion of GDP
JRDINGG	General Government Real Interest Payments on Internal Debt (Millions of Reais, 1980 prices)
JRDINGGN	General Government Real Interest Payments on Internal Debt (Millions of Reais)
JRDINGGPIB	General Government Real Interest Payments on Internal Debt as proportion of GDP
JUR	Net Foreign Interest Revenues(Millions of US\$)
JURDES	Foreign Interest Expenditures (Millions of US\$)
JURDESPIB	Foreign Interest Payments as a proportion of GDP
JURPIB	Net Foreign Interest Payments as a proportion of GDP
JURREC	Foreign Interest Revenues (Millions of US\$)
KED	Net Foreign Capital Stock (Millions of Dollars)
M0	Real Monetary Base, Year Average (Millions of Reais,1980 prices)
M0FR	Real Monetary Base, End of Period (Millions of Reais,1980 prices)
M1	Real M1 (Millions of Reais, 1980 prices)
M1PIB	Velocity of Money
MBCV	Imports - Consumption Goods (Millions of US\$)

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MBIV	Imports - Intermediate Goods (Millions of US\$)
MBKV	Imports - Capital Goods (Millions of US\$)
MBSNF	Imports of Goods and Non-Factor Services (Millions of US\$)
MTV	Total Imports (Millions of US\$)
MTVPIB	Total Imports as a proportion of GDP
NFEEN	Public Enterprises Borrowing Requirements, Nominal (Millions of Reais, 1980 prices)
NFEENN	Public Enterprises Borrowing Requirements, Nominal (Millions of Reais)
NFEENPIB	Public Enterprises Borrowing Requirements, Nominal as proportion of GDP
NFEEO	Public Enterprises Borrowing Requirements, Operational (Millions of Reais, 1980 prices)
NFEEOON	Public Enterprises Borrowing Requirements, Operational (Millions of Reais)
NFEEOPIB	Public Enterprises Borrowing Requirements, Operational as proportion of GDP
NFEEPN	Public Enterprises Borrowing Requirements, Primary (Millions of Reais)
NFEPPPIB	Public Enterprises Borrowing Requirements, Primary as proportion of GDP
NFGGN	General Government Borrowing Requirements, Nominal (Millions of Reais, 1980 prices)
NFGGNN	General Government Borrowing Requirements, Nominal (Millions of Reais)
NFGGNPIB	General Government Borrowing Requirements, Nominal as proportion of GDP
NFGGO	General Government Borrowing Requirements, Operational (Millions of Reais, 1980 prices)
NFGGON	General Government Borrowing Requirements, Operational (Millions of Reais)
NFGGOPIB	General Government Borrowing Requirements, Operational as proportion of GDP
NFGGP	General Government Borrowing Requirements, Primary (Millions of Reais, 1980 prices)
NFGGPN	General Government Borrowing Requirements, Primary (Millions of Reais)
NFGGPIB	General Government Borrowing Requirements, Primary as proportion of GDP
NFSPN	Public Sector Borrowing Requirements, Nominal (Millions of Reais, 1980 prices)
NFSPNN	Public Sector Borrowing Requirements, Nominal (Millions of Reais)
NFSPNPIB	Public Sector Borrowing Requirements, Nominal as proportion of GDP
NFSPON	Public Sector Borrowing Requirements, Operational (Millions of Reais)
NFSPONPIB	Public Sector Borrowing Requirements, Operational as proportion of GDP
NFSPPP	Public Sector Borrowing Requirements, Primary (Millions of Reais, 1980 prices)
NFSPPN	Public Sector Borrowing Requirements, Primary (Millions of Reais)
NFSPPIB	Public Sector Borrowing Requirements, Primary as proportion of GDP
ODCCGG	Other General Government Current Expenditures (Millions of Reais, 1980 prices)
ODCCGGN	Other General Government Current Expenditures (Thousands of Reais)
ODCCGGPIB	Other General Government Current Expenditures as proportion of GDP
ORCCGG	Other General Government Current Revenue (Millions of Reais, 1980 prices)
ORCLN	Other General Government Net Current Revenues (Thousands of Reais)
ORCLPIB	Other General Government Net Current Revenues as proportion of GDP
OSNF	Net Other Non-Factor Services (Millions of US\$)
OSNFDES	Other Non-Factor Services Expenditures (Millions of US\$)
OSNFREC	Other Non-Factor Services Revenues (Millions of US\$)
OTGG	Other General Government Taxes (Millions of Reais, 1980 prices)
OTGGN	General Government Revenue from Other Taxes (Millions of Reais)
OTGGPIB	General Government Revenue from Other Taxes as proportion of GDP
PELPIB	Net External Liabilities as a proportion of GDP
PIB	Real Gross Domestic Product (Reais, 1980 prices)
PIBN	Nominal Gross Domestic Product (Thousands of Reais)
POUCCGG	General Government Current Account Surplus (Millions of Reais, 1980 prices)

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POUCCGGN	General Government Current Account Surplus (Millions of Reais)
POUCCGGPIB	General Government Current Account Surplus as proportion of GDP
RDOPP	Private Sector Disposable Income (Millions of Reais,1980 prices)
RES	International Reserves - International Liquidity (Millions of US\$)
RESMTV	International Reserves as a proportion of Total Imports
RESPIB	International Reserves as a proportion of GDP
RLE	Net Factor Income Payments to the Rest of the World (Millions of US\$)
RTCCGG	General Government Current Revenue (Millions of Reais,1980 prices)
RTCCGGN	General Government Current Revenue (Millions of Reais)
RTCCGGPIB	General Government Current Revenue as proportion of GDP
SALN	Nominal Wage Index (Year Average)
SALR	Real Wage Index (Year Average)
SBC	Trade Balance (Millions ofUS\$)
SER	Net Services (Millions of US\$)
SERPIB	Net Services as a proportion of GDP
SF	Net Factor Services (Millions of US\$)
SFEXJ	Net Factor Services less Interest (Millions of US\$)
SFEXJPIB	Net Factor Services less Interest as a proportion of GDP
SFPIB	Net Factor Services as a proportion of GDP
SNF	Net Non-Factor Services (Millions of US\$)
SNFPIB	Net Non-Factor Services as a proportion of GDP
STC	Current Account Balance (Millions of US\$)
STCPIB	Current Account Balance as a proportion of GDP
SUB	Domestic Subsidies (Millions of Reais, 1980 prices)
TAPGG	Transfers to Households (Millions of Reais,1980 prices)
TAPGGN	Transfers to Households(Thousands of Reais)
TAPGGPIB	Transfers to Households as proportion of GDP
TCMEE	Public Enterprises Rate of Monetary Correction
TCMGG	General Government Rate of Monetary Correction
TJCDB	Real Interest Rate - Bank Deposits (% a.a.)
TJCDBN	Nominal Interest Rate - Bank Deposits (% a.a.)
TJOVER	Nominal Interest Rate - Overnight (% per month)
TJRDEXEE	Public Enterprises Foreign Debt Real Interest Rate
TJRDEXGG	General Government Foreign Debt Real Interest Rate
TJRDINEE	Public Enterprises Internal Debt Real Interest Rate
TJRDINGG	General Government Internal Debt Real Interest Rate
TRPSEG	Net Freight and Insurance (Millions of US\$)
TRPSEGD	Freight and Insurance Expenditure (Millions of US\$)
TRPSEGR	Freight and Insurance Revenue (Millions of US\$)
TUNPIB	Unrequited Transfers (Net) as a proportion of GDP
TUR	Net International Travel (Millions of US\$)
TURDES	International Travel Expenditure (Millions of US\$)
TURREC	International Travel Revenue (Millions of US\$)
TXDES	Unemployment Rate
UTIND	Rate of Capacity Utilization
XBSNF	Exports of Goods and Non-Factor Services (Millions of US\$)
XBV	Exports Primary Products (Millions of US\$)
XMV	Exports - Manufactured Products (Millions of US\$)
XSV	Exports - Semi-manufactured Products (Millions of US\$)
XTEV	Exports - Special Transactions (Millions of US\$)
XTV	Total Exports (Millions of US\$)
XTVPIB	Total Exports as a proportion of GDP

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**Exogenous Variables**

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DESVD	“Desired” Nominal Exchange Rate Devaluation
DEXEEPCT	Share of Public Enterprises in Total Foreign Debt
DEXPRPCT	Share of Private Sector in Total Foreign Debt
FBKFGN	Gross Fixed Capital Formation - General Government (Thousands of Reais)
FBKOPCT	Share of Other Gross Fixed Capital Formation in Total Private Investment
GDPUS	United States GDP
HACP	Variation in International Reserves (Millions of US\$)
IEDL	Net Foreign Direct Investment (Millions of US\$)
IEPL	Net Foreign Portfolio Investment (Millions of US\$)
IP AUS	United States' Wholesale Price Index (1980=100)
IPCUS	United States' Consumer Price Index (1990=100)
LIBOR	6-month, US\$, Libor Rate (in %)
MCLV	Imports Fuels and Lubrificants (Millions of US\$)
MW	World Imports (US\$ billions)
NFEFP	Public Enterprises Borrowing Requirements, Primary (Millions of Reais, 1980 prices)
PEAURB	Active Urban Population (Number of Persons)
PND	Privatization Revenues (Millions of US\$)
PNDPCT	Share of Privatization Revenues used in Debt Reduction (Millions of US\$)
PTF	Total Factor Productivity Index
REINV	Reinvestment (Millions of US\$)
RISCO	Risk Premium
SPREAD	Implicit Spread on Foreign Interest Payments
SUBN	Domestic Subsidies (Thousands of Reais)
SXB	Index of Incentives to Exports of Primary Products
SXM	Index of Incentives to Exports of Semi-manufactured Products
SXS	Index of Incentives to Exports of Manufactured Products
TJCDBND	“Desired” Nominal Interest Rate - Bank Deposits (% a.a.)
TLBC	Index of Tariffs for Imports of Consumer Goods
TLBI	Index of Tariffs for Imports of Intermediate Goods
TLBK	Index of Tariffs for Imports of Capital Goods
TREND	Deterministic Trend
TUN	Net Unrequited Transfers (Millions of US\$)
TXCAEAL	Nominal Exchange Rate DM/US\$, end of period
TXCAEJP	Nominal Exchange Rate Yen/US\$, end of period
TXCRFFR	Nominal Exchange Rate FFR/US\$, end of period
TXDEPR	Rate of Foreign Capital Depreciation
XTEVPCT	Share of Special Transactions in Total Exports

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## Notation

The model is written in TROLL language.

- LOG(X)        is the natural logarithm of variable X  
X(-i)         is the i-th lag of variable X  
DEL(i:X)      is the i-th difference of variable X

## EQUATIONS

### 1 - Aggregate Demand

Real Gross Domestic Product (Reais, 1980 prices)

- 1: PIB    PIB = (CFT+FBKF+(XBSNF-MBSNF)\*ERV/DIPIB)\*1000000  
Total Final Consumption (Millions of Reais,1980 prices)
- 2: CFT    CFT = CFTPP+CTGG  
Total Private Final Consumption (Millions of Reais,1980 prices)
- 3: CFTPP    DEL(1: LOG(CFTPP)) = A24.1\*DEL(1:  
LOG(RDOPP))+A24.2\*DEL(1: LOG(EMPTR))+A24.3\*(LOG(CFTPP(-1))-  
LOG(RDOPP(-1)))+A24.4\*DEL(1: TJCDB)  
Private Sector Disposable Income (Millions of Reais,1980 prices)
- 4: RDOPP    RDOPP = PIB/1000000-CTRIBL-(RLE\*ERV)/DIPIB  
General Government Final Consumption (Millions of Reais,1980 prices)
- 5: CTGG    CTGG = GPGG+ODCCGG-SUB  
Gross Fixed Capital Formation - Total (Millions of Reais,1980 prices)
- 6: FBKF    FBKF = FBKFP+FBKFGG  
Gross Fixed Capital Formation - Private Sector (Millions of Reais,1980 prices)
- 7: FBKFP    FBKFP = FBKCP+FBKMP+FBKO  
Gross Fixed Capital Formation - Construction - Private Sector (Millions of Reais,1980 prices)
- 8: FBKCP    DEL(1: LOG(FBKCP)) = A21.0+A21.1\*TJCDB+A21.2\*(LOG(FBKCP(-1))-  
LOG(PIB(-1)))  
Gross Fixed Capital Formation - Machinery and Equipment - Private Sector (Millions of  
Reais,1980 prices)
- 9: FBKMP    FBKMP = FBKMPD+MBKV\*ERV/DIPIB  
Gross Fixed Capital Formation - Domestic Machinery and Equipment - Private Sector (Millions  
of Reais,1980 prices)
- 10: FBKMPD    DEL(1: LOG(FBKMPD)) = A25.1\*UTIND(-1)+A25.2\*DEL(1: UTIND  
(-2))+A25.3\*TJCDB(-1)  
Gross Fixed Capital Formation - Other - Private Sector (Millions of Reais,1980 prices)
- 11: FBKO    FBKO = FBKFP\*FBKOPCT  
Gross Fixed Capital Formation - Machinery - Total  
(Millions of Reais,1980 prices)
- 12: FBKM    FBKM = FBKMG+FBKMP  
Gross Fixed Capital Formation - Machinery - General Government (Millions of Reais,1980  
prices)
- 13: FBKMG    FBKMG = FBKFGG-FBKCG  
Gross Fixed Capital Formation - Construction - Total (Millions of Reais,1980 prices)
- 14: FBKC    FBKC = FBKCG+FBKCP  
Gross Fixed Capital Formation - Construction - General Government (Millions of Reais,1980  
prices)
- 15: FBKCG    FBKCG = 0.85\*FBKFGG

## 2 - Aggregate Supply

Aggregate Production Function

- 16: PROD  $DEL(1: PIB)/PIB(-1) = PTF/PTF(-1)-1+A26.1*DEL(1: ELKT*UTIND)/(ELKT(-1)*UTIND(-1))+(1-A26.1)*DEL(1: PEAURB*(1-TXDES/100))/(PEAURB(-1)*(1-TXDES(-1)/100))$  Total Net Domestic Capital Stock (Millions of Reais,1980 prices)
- 17: ELKT  $ELKT = ELKCER+ELKCENR+ELKM$   
Net Domestic Capital Stock in Residential Construction (Millions of Reais,1980 prices)
- 18: ELKCER  $ELKCER = ELKCER(-1)+FBKCER-1/50*(0.5*(FBKCER+FBKCER(-50))+SUM(I = -49 TO 0: FBKCER(I)))$   
Net Domestic Capital Stock in Non-Residential Construction (Millions of Reais,1980 prices)
- 19: ELKCENR  $ELKCENR = ELKCENR(-1)+FBKCENR-1/40*(0.5*(FBKCENR+FBKCENR(-40))+SUM(I = -39 TO 0: FBKCENR(I)))$   
Gross Fixed Capital Formation - Residential Construction - Total (Millions of Reais,1980 prices)
- 20: FBKCER  $FBKCER = 0.6*FBKC$   
Gross Fixed Capital Formation - Non-Residential Construction - Total (Millions of Reais,1980 prices)
- 21: FBKCENR  $FBKCENR = FBKC-FBKCER$   
Net Domestic Capital Stock in Machinery and Equipment (Millions of Reais,1980 prices)
- 22: ELKM  $ELKM = ELKM(-1)+FBKM-0.05*(0.5*(FBKM+FBKM(-20))+SUM(I = -19 TO 0: FBKM(I)))$

## 3 - Employment and Prices

Labour Demand - Employed Workers Index (Year Average)

- 23: DTRAB  $DEL(1: LOG(PEAURB*(1-TXDES/100))) = A27.0+A27.1*LOG(SALR)+A27.2*DEL(1: LOG(PIB))$   
Wage Curve - Real Wage Index (Year Average)
- 24: SALR  $LOG(SALR) = 6.003-4*TXDES/100$   
Wholesale Price Index, period average (1980=1)
- 25: IPA  $DEL(1: IPA)/IPA(-1) = 0.35*DEL(1: IPA(-1))/IPA(-2)+0.65*DEL(1: ERV*IPAUS)/(ERV(-1)*IPAUS(-1))+1.1*(UTIND-0.835)$   
General Price Index, period average (1980=1)
- 26: IGP  $IGP/IGP(-1) = IPA/IPA(-1)$   
General Price Index, end of period
- 27: IGPF  $IGPF/IGPF(-1) = IGP/IGP(-1)$   
Consumer Price Index, period average (1990=100)
- 28: IPC  $IPC/IPC(-1) = IGP/IGP(-1)$   
GDP Implicit Price Deflator, period average (1980=1)
- 29: DIPIB  $DIPIB/DIPIB(-1) = IGP/IGP(-1)$   
Nominal Wage Index (Year Average)
- 30: SALN  $SALN = SALR*IGP$

## 4 - Monetary Sector

Real M1 (Millions of Reais, 1980 prices)

- 31: M1  $M1 = M1PIB*DIPIB/IGP*PIB/1000000$   
Velocity of Money
- 32: M1PIB  $DEL(1: M1PIB) = A28.1*DEL(1: TJCDBN)/TJCDBN(-1)$   
Real Monetary Base, Year Average (Millions of Reais,1980 prices)
- 33: M0  $M0 = 0.62*M1$   
Real Monetary Base, End of Period (Millions of Reais,1980 prices)
- 34: M0FR  $M0FR/M0FR(-1) = M0/M0(-1)$

- Total Credit to Private Sector (Millions of Reais, 1980 prices)
- 35: EMPTR  $DEL(1: EMPTR)/EMPTR(-1) = A29.1*DEL(1: M1)/M1(-1)$   
Nominal Interest Rate - Bank Deposits (% a.a.)
- 36: TJCDBN  $TJCDBN = MAX(TJCDBND, LIBOR + DEL(1: ERV)/ERV(-1)*100 + RISCO)$  Nominal Interest Rate - Overnight (% per month)
- 37: TJOVER  $TJOVER = ((1 + TJCDBN/100)**(1/12) - 1)*100$   
Real Interest Rate - Bank Deposits (% a.a.)
- 38: TJCDB  $TJCDB = ((1 + TJCDBN/100)/(IGPF/IGPF(-1)) - 1)*100$   
Real Exchange Rate (US\$/R\$)
- 39: CR  $CR = ERV*IPAUS/IPA$   
Nominal Exchange Rate, Real/US\$, period average
- 40: ERV  $DEL(1: ERV)/ERV(-1) = DESVD$   
Nominal Exchange Rate, Real/US\$, end of period
- 41: ERVF  $ERV/ERV(-1) = ERV/ERV(-1)$   
Nominal Exchange Rate, Real/US\$
- 42: ER  $ER/ER(-1) = ERV/ERV(-1)$   
Nominal Exchange Rate, Real/US\$, corrected for exchange auction
- 43: ERNPT  $ERNPT/ERNPT(-1) = ERV/ERV(-1)$

## 5 - Public Sector

Public Sector Borrowing Requirements, Nominal (Millions of Reais, 1980 prices)

- 44: NFSPN  $NFSPN = NFGGN + NFEEN$   
Public Sector Borrowing Requirements, Operational (Millions of Reais, 1980 prices)
- 45: NFSPO  $NFSPO = NFGGO + NFEEO$   
Public Sector Borrowing Requirements, Primary (Millions of Reais, 1980 prices)
- 46: NFSPP  $NFSPP = NFGGP + NFEEP$

### 5.1 - General government

General Government Borrowing Requirements, Nominal (Millions of Reais, 1980 prices)

- 47: NFGGN  $NFGGN*IGP/DIPIB = NFGGO*IGP/DIPIB + CMGG*IGP/DIPIB$   
General Government Borrowing Requirements, Operational (Millions of Reais, 1980 prices)
- 48: NFGGO  $NFGGO*IGP/DIPIB = NFGGP*IGP/DIPIB + JRDGG$   
General Government Borrowing Requirements, Primary (Millions of Reais, 1980 prices)
- 49: NFGGP  $NFGGP*IGP/DIPIB = FBKFGG - POUCCGG - JNDTGG$   
General Government Current Account Surplus (Millions of Reais, 1980 prices)
- 50: POUCCGG  $POUCCGG = RTCCGG - DTCCGG$   
General Government Current Revenue (Millions of Reais, 1980 prices)
- 51: RTCCGG  $RTCCGG = IR + IPI + ICMS + OTGG + CPMF + ORCCGG$   
Income Tax Revenue (Millions of Reais, 1980 prices)
- 52: IR  $LOG(1000*IR) = G1.0 + G1.1*LOG(PIB/1000) + G1.2*LOG(MAX(1.0001, DIPIB/DIPIB(-1)) - 1)$
- 53: G1.0  $= LOG(EXP(G1.0(-1))) + E1.0$   
Industrialized Product Tax Revenue (Millions of Reais, 1980 prices)
- 54: IPI  $LOG(1000*IPI) = G2.0 + G2.1*LOG(PIB/1000) + G2.2*LOG(MAX(1.0001, DIPIB/DIPIB(-1)) - 1)$
- 55: G2.0  $= LOG(EXP(G2.0(-1))) + E2.0$   
Circulation of Goods and Services Tax Revenue (Millions of Reais, 1980 prices)
- 56: ICMS  $LOG(1000*ICMS) = G3.0 + G3.1*LOG(PIB/1000) + G3.2*LOG(MAX(1.0001, DIPIB/DIPIB(-1)) - 1)$
- 57: G3.0  $= LOG(EXP(G3.0(-1))) + E3.0$   
Other General Government Taxes (Millions of Reais, 1980 prices)
- 58: OTGG  $LOG(1000*OTGG) = G4.0 + G4.1*LOG(PIB/1000) + G4.2*LOG(MAX(1.0001, DIPIB/DIPIB(-1)) - 1)$

- 59:  $G4.0 = \text{LOG}(\text{EXP}(G4.0(-1)))+E4.0$   
 CPMF Revenue (Millions of Reais,1980 prices)
- 60:  $\text{CPMF} = \text{CPMF}(-1)*(1+\text{DEL}(1:\text{PIB})/\text{PIB}(-1))$   
 Other General Government Current Revenue (Millions of Reais,1980 prices)
- 61:  $\text{ORCCGG}/\text{PIB} = \text{ORCCGG}(-1)/\text{PIB}(-1)$   
 Inflationary Tax (Millions of Reais,1980 prices)
- 62:  $\text{IINF} = 12*M0*((\text{IGPF}/\text{IGPF}(-1))^{**}(1/12)-1)$   
 Total Gross Tax Revenue (Millions of Reais, 1980 prices)
- 63:  $\text{CTRIB} = \text{IR}+\text{ICMS}+\text{IPI}+\text{OTGG}+\text{CPMF}$   
 Total Net Tax Revenue (Millions of Reais, 1980 prices)
- 64:  $\text{CTRIBL} = \text{CTRIB}-\text{TAPGG}-\text{SUB}$   
 Domestic Subsidies (Millions of Reais, 1980 prices)
- 65:  $\text{SUB} = \text{SUBN}/\text{DIPIB}/1000$   
 Gross Fixed Capital Formation - General Government (Millions of Reais,1980 prices)
- 66:  $\text{FBKFGG} = \text{FBKFGN}/(1000*\text{DIPIB})$   
 General Government Current Expenditure (Millions of Reais,1980 prices)
- 67:  $\text{DTCCGG} = \text{GPGG}+\text{TAPGG}+\text{ODCCGG}+\text{JNDTGG}$   
 General Government Expenditure - Employees/Contributions (Millions of Reais,1980 prices)
- 68:  $\text{LOG}(\text{GPGG}*1000) = G6.0+G6.1*\text{LOG}(\text{PIB}/1000)+G6.2*\text{LOG}(\text{MAX}(1.0001, \text{DIPIB}/\text{DIPIB}(-1))-1)$
- 69:  $G6.0 = \text{LOG}(\text{EXP}(G6.0(-1)))+E6.0$   
 Transfers to Households (Millions of Reais,1980 prices)
- 70:  $\text{LOG}(\text{TAPGG}*1000) = G7.0+G7.1*\text{LOG}(\text{PIB}/1000)+G7.2*\text{LOG}(\text{MAX}(1.0001, \text{DIPIB}/\text{DIPIB}(-1))-1)+G7.3*\text{TREND}$
- 71:  $G7.0 = \text{LOG}(\text{EXP}(G7.0(-1)))+E7.0$   
 Other General Government Current Expenditures (Millions of Reais,1980 prices)
- 72:  $\text{LOG}(\text{ODCCGG}*1000) = G8.0+G8.1*\text{LOG}(\text{PIB}/1000)+G8.2*\text{LOG}(\text{MAX}(1.0001, \text{DIPIB}/\text{DIPIB}(-1))-1)$
- 73:  $G8.0 = \text{LOG}(\text{EXP}(G8.0(-1)))+E8.0$  General Government Nominal Interest Payments on Total Debt (Millions of Reais,1980 prices)
- 74:  $\text{JNDTGG} = \text{JRDGG}+\text{CMGG}*\text{IGP}/\text{DIPIB}$  General Government Real Interest Payments on Total Debt (Millions of Reais,1980 prices)
- 75:  $\text{JRDGG} = (\text{JRDINGG}+\text{JRDEXGG})*\text{IGP}/\text{DIPIB}$  General Government Real Interest Payments on Internal Debt (Millions of Reais, 1980 prices)
- 76:  $\text{JRDINGG} = \text{TJRDINGG}*(\text{DINGG}(-1)-\text{M0FR}(-1))$  General Government Real Interest Payments on External Debt (Millions of Reais, 1980 prices)
- 77:  $\text{JRDEXGG} = \text{TJRDEXGG}*\text{DEXGG}(-1)$   
 General Government Internal Debt Real Interest Rate
- 78:  $\text{TJRDINGG}/\text{TJRDINGG}(-1) = \text{TJCDB}/\text{TJCDB}(-1)$   
 General Government Foreign Debt Real Interest Rate
- 79:  $\text{LOG}(1+\text{TJRDEXGG}) = G14.1*\text{LOG}(1+\text{LIBOR}(-1)/100)$   
 General Government Monetary Correction Payments (Millions of Reais, 1980 prices)
- 80:  $\text{CMGG} = \text{TCMGG}*(\text{DINGG}(-1)-\text{M0FR}(-1))$   
 General Government Rate of Monetary Correction
- 81:  $\text{TCMGG} = \text{IGPF}/\text{IGPF}(-1)-1$

## 5.2 - Public enterprises

Public Enterprises Borrowing Requirements, Operational (Millions of Reais, 1980 prices)

- 82:  $\text{NFEEO} = \text{NFEEO}*\text{IGP}/\text{DIPIB} = \text{NFEEP}*\text{IGP}/\text{DIPIB}+\text{JRDEE}$   
 Public Enterprises Borrowing Requirements, Nominal (Millions of Reais, 1980 prices)
- 83:  $\text{NFEEN} = \text{NFEEN}*\text{IGP}/\text{DIPIB} = \text{NFEEO}*\text{IGP}/\text{DIPIB}+\text{CMEE}*\text{IGP}/\text{DIPIB}$   
 Public Enterprises Real Interest Payments on Total Debt (Millions of Reais,1980 prices)
- 84:  $\text{JRDEE} = (\text{JRDINEE}+\text{JRDEXEE})*\text{IGP}/\text{DIPIB}$   
 Public Enterprises Real Interest Payments on Internal Debt (Millions of Reais, 1980 prices)

- 85: JRDINEE JRDINEE = TJRDINEE\*DINEE(-1)  
Public Enterprises Real Interest Payments on External Debt (Millions of Reais, 1980 prices)
- 86: JRDEXEE JRDEXEE = TJRDEXEE\*DEXEE(-1)  
Public Enterprises Internal Debt Real Interest Rate
- 87: TJRDINEE TJRDINEE/TJRDINEE(-1) = TJCDB/TJCDB(-1)  
Public Enterprises Foreign Debt Real Interest Rate
- 88: TJRDEXEE LOG(1+TJRDEXEE) = G15.1\*LOG(1+LIBOR(-1)/100)  
Public Enterprises Monetary Correction Payments (Millions of Reais, 1980 prices)
- 89: CMEE CMEE = TCMEE\*DINEE(-1)  
Public Enterprises Rate of Monetary Correction
- 90: TCMEE TCMEE = IGP/IGP(-1)-1

### 5.3 - Public debt

General Government Total Debt (Millions of Reais, 1980 prices)

- 91: DTGG DTGG = DINGG+DEXGG  
General Government Internal Debt (Millions of Reais, 1980 prices)
- 92: DINGG DEL(1: DINGG) = NFGGN-DEL(1: DEXGG)-DEL(1: M0FR)-  
PNDPCT\*PND\*ERV/IGP-IINF General Government External Debt (Millions of Reais, 1980 prices)
- 93: DEXGG DEL(1: DEXGG) = DEL(1: DEXT\*ERV/IGP)-DEL(1: DEXEE)-  
DEL(1: DEXPR\*ERV/IGP)-DEL(1: RES\*ERV/IGP)  
Private Sector External Debt (Millions of US\$)
- 94: DEXPR DEL(1: DEXPR) = DEXPRPCT\*DEL(1: DEXT)  
Public Enterprises External Debt (Millions of Reais)
- 95: DEXEEN DEL(1: DEXEEN) = DEXEEPCT\*DEL(1: DEXT)\*ERV  
Public Enterprises External Debt (Millions of Reais, 1980 prices)
- 96: DEXEE DEXEE = DEXEEN/IGP  
Public Enterprises Total Debt (Millions of Reais, 1980 prices)
- 97: DTEE DTEE = DINEE+DEXEE  
Public Enterprises Internal Debt (Millions of Reais, 1980 prices)
- 98: DINEE DEL(1: DINEE) = -(DEL(1: DEXEE))+NFEEN

## 6 - Foreign Sector

Current Account Balance (Millions of US\$)

- 99: STC STC = SBC+SER+TUN  
Trade Balance (Millions of US\$)
- 100: SBC SBC = XTV-MTV  
Total Exports (Millions of US\$)
- 101: XTV XTV = XMV+XSV+XBV+XTEV  
Exports - Manufactured Products (Millions of US\$)
- 102: XMV DEL(1: LOG(XMV/IPAUS)) = A3.0+A3.1\*DEL(1: LOG(XMV(-1)/IPAUS  
(-1)))+A3.2\*DEL(1: LOG(MW/IPAUS))+A3.3\*DEL(1:  
LOG(ER\*SXM/IPAUS/IPA))+A3.4\*DEL(1: LOG(ER(-1)\*SXM(-  
1)\*IPAUS(-1)/IPA(-1)))+A3.5\*(LOG(XMV(-1)/IPAUS(-1))-  
1.613\*LOG(ER(-1)\*IPAUS(-1)\*SXM(-1)/IPA(-1))-2.118\*LOG(MW(-  
1)/IPAUS(-1))+1.986\*UTIND(-1))+A3.6\*D5563 Exports - Semi-manufactured Products  
(Millions of US\$)
- 103: XSV DEL(1: LOG(XSV/IPAUS)) = A4.0+A4.1\*DEL(1: LOG(XSV(-  
1)/IPAUS(-1)))+A4.2\*DEL(1: LOG(XSV(-2)/IPAUS(-2)))+A4.3\*DEL(1:  
LOG(MW/IPAUS))+A4.4\*DEL(1: LOG(MW(-1)/IPAUS(-  
1)))+A4.5\*DEL(1: LOG(ER(-2)\*SXS(-2)\*IPAUS(-2)/IPA(-  
2)))+A4.6\*(LOG(XSV(-3)/IPAUS(-3))-0.1365\*LOG(ER(-3)\*IPAUS(-  
3)\*SXS(-3)/IPA(-3))-1.392\*LOG(MW(-3)/IPAUS(-3)))+A4.7\*D82  
Exports - Primary Products (Millions of US\$)
- 104: XBV DEL(1: LOG(XBV/IPAUS)) = A5.0+A5.1\*DEL(1:

- $\text{LOG}(\text{MW}/\text{IPAUS}) + \text{A5.2} * (\text{LOG}(\text{XBV}(-1)/\text{IPAUS}(-1)) - 0.7747 * \text{LOG}(\text{ER}(-1) * \text{IPAUS}(-1) * \text{SXB}(-1)/\text{IPA}(-1)) - 0.2806 * \text{LOG}(\text{MW}(-1)/\text{IPAUS}(-1))) + \text{A5.3} * \text{D62} + \text{A5.4} * \text{D7273}$  Exports - Special Transactions (Millions of US\$)
- 105: XTEV  $\text{XTEV} = (\text{XMV} + \text{XSV} + \text{XBV}) * \text{XTEVPCT}$   
 Total Imports (Millions of US\$)
- 106: MTV  $\text{MTV} = \text{MBKV} + \text{MBIV} + \text{MBCV} + \text{MCLV}$   
 Imports - Capital Goods (Millions of US\$)
- 107: MBKV  $\text{DEL}(1: \text{LOG}(\text{MBKV}/\text{IPAUS})) = \text{A30.0} + \text{A30.1} * \text{DEL}(1: \text{LOG}(\text{PIB})) + \text{A30.2} * \text{DEL}(1: \text{LOG}(\text{ERNPT} * \text{TLBK} * \text{IPAUS}/\text{IPA})) + \text{A30.3} * (\text{LOG}(\text{MBKV}(-1)/\text{IPAUS}(-1)) + 3.452 * \text{LOG}(\text{ERNPT}(-1) * \text{IPAUS}(-1) * \text{TLBK}(-1)/\text{IPA}(-1)) - 0.5333 * \text{LOG}(\text{PIB}(-1))) + \text{A30.4} * \text{D73} + \text{A30.5} * \text{D86}$  Imports - Intermediate Goods (Millions of US\$)
- 108: MBIV  $\text{DEL}(1: \text{LOG}(\text{MBIV}/\text{IPAUS})) = \text{A31.0} + \text{A31.1} * \text{DEL}(1: \text{LOG}(\text{PIB})) + \text{A31.2} * \text{DEL}(1: \text{LOG}(\text{ERNPT} * \text{TLBI} * \text{IPAUS}/\text{IPA})) + \text{A31.3} * (\text{LOG}(\text{MBIV}(-1)/\text{IPAUS}(-1)) + 1.437 * \text{LOG}(\text{ERNPT}(-1) * \text{IPAUS}(-1) * \text{TLBI}(-1)/\text{IPA}(-1)) - 0.7546 * \text{LOG}(\text{PIB}(-1))) + \text{A31.4} * \text{D74}$   
 Imports - Consumption Goods (Millions of US\$)
- 109: MBCV  $\text{DEL}(1: \text{LOG}(\text{MBCV}/\text{IPAUS})) = \text{A32.0} + \text{A32.1} * \text{DEL}(1: \text{LOG}(\text{PIB})) + \text{A32.2} * \text{DEL}(1: \text{LOG}(\text{ERNPT} * \text{TLBC} * \text{IPAUS}/\text{IPA})) + \text{A32.3} * (\text{LOG}(\text{MBCV}(-1)/\text{IPAUS}(-1)) + 1.714 * \text{LOG}(\text{ERNPT}(-1) * \text{IPAUS}(-1) * \text{TLBC}(-1)/\text{IPA}(-1)) - 0.9231 * \text{LOG}(\text{PIB}(-1))) + \text{A32.4} * \text{D86} + \text{A32.5} * \text{D80} + \text{A32.6} * \text{D95}$  Net Services (Millions of US\$)
- 110: SER  $\text{SER} = \text{SF} + \text{SNF}$   
 Net Factor Services (Millions of US\$)
- 111: SF  $\text{SF} = \text{JUR} + \text{SFEXJ}$   
 Net Foreign Interest Revenues (Millions of US\$)
- 112: JUR  $\text{JUR} = \text{JURREC} - \text{JURDES}$   
 Foreign Interest Revenues (Millions of US\$)
- 113: JURREC  $\text{JURREC}/\text{RES}(-1) = \text{JURDES}/\text{DEXT}(-1) - \text{SPREAD}$   
 Foreign Interest Expenditures (Millions of US\$)
- 114: JURDES  $\text{JURDES}/\text{DEXT}(-1) = \text{A19.1} + \text{A19.2} * \text{LIBOR}/100$   
 Net Factor Services less Interest (Millions of US\$)
- 115: SFEXJ  $\text{LOG}(-\text{SFEXJ}) = \text{A18.0} * \text{LOG}(-\text{SFEXJ}(-1)) + \text{A18.1} * \text{LOG}(\text{PIB}) + \text{A18.2} * \text{LOG}(\text{KED}) + \text{A18.3} * \text{D78}$  Net Non-Factor Services (Millions of US\$)
- 116: SNF  $\text{SNF} = \text{TUR} + \text{TRPSEG} + \text{OSNF}$   
 Net International Travel (Millions of US\$)
- 117: TUR  $\text{TUR} = \text{TURREC} - \text{TURDES}$   
 International Travel Revenue (Millions of US\$)
- 118: TURREC  $\text{LOG}(\text{TURREC}+1) = \text{A10.0} + \text{A10.1} * \text{LOG}(\text{TURREC}(-1)+1) + \text{A10.2} * \text{LOG}(\text{GDPUS}(-1)) + \text{A10.3} * \text{D82}$  International Travel Expenditure (Millions of US\$)
- 119: TURDES  $\text{LOG}(\text{TURDES}) = \text{A9.0} + \text{A9.1} * \text{LOG}(\text{TURDES}(-1)) + \text{A9.2} * \text{LOG}(\text{ER} * \text{IPCUS}/\text{IPC}) + \text{A9.3} * \text{LOG}(\text{ER}(-1) * \text{IPCUS}(-1)/\text{IPC}(-1)) + \text{A9.4} * \text{LOG}(\text{RDOPP}) + \text{A9.6} * \text{D77} + \text{A9.7} * \text{D82} + \text{A9.8} * \text{D87}$   
 Net Freight and Insurance (Millions of US\$)
- 120: TRPSEG  $\text{TRPSEG} = \text{TRPSEGR} - \text{TRPSEGD}$  Freight and Insurance Revenue (Millions of US\$)
- 121: TRPSEGR  $\text{LOG}(\text{TRPSEGR}) = \text{A16.0} + \text{A16.1} * \text{LOG}(\text{TRPSEGR}(-1)) + \text{A16.2} * \text{LOG}(\text{MTV}(-1)) + \text{A16.3} * \text{LOG}(\text{MTV}(-2)) + \text{A16.4} * \text{LOG}(\text{XTV}) + \text{A16.5} * \text{LOG}(\text{XTV}(-2)) + \text{A16.6} * \text{D58}$   
 Freight and Insurance Expenditure (Millions of US\$)
- 122: TRPSEGD  $\text{LOG}(\text{TRPSEGD}) = \text{A15.0} + \text{A15.1} * \text{LOG}(\text{TRPSEGD}(-1)) + \text{A15.2} * \text{LOG}(\text{MTV}) + \text{A15.3} * \text{LOG}(\text{MTV}(-1))$

- 1)) + A15.4 \* LOG(XTV) + A15.5 \* LOG(XTV(-2)) + A15.6 \* D65  
 Net Other Non-Factor Services (Millions of US\$)
- 123: OSNF OSNF = OSNFREC - OSNFDES  
 Other Non-Factor Services Revenues (Millions of US\$)
- 124: OSNFREC LOG(OSNFREC) = A13.0 + A13.1 \* LOG(OSNFREC(-1)) + A13.2 \* LOG(MTV + XTV) + A13.3 \* LOG(MTV(-2) + XTV(-2)) + A13.4 \* D90 + A13.5 \* D96  
 Other Non-Factor Services Expenditures (Millions of US\$)
- 125: OSNFDES LOG(OSNFDES) = A12.0 + A12.1 \* LOG(OSNFDES(-1)) + A12.2 \* LOG(MTV + XTV) + A12.3 \* LOG(MTV(-1) + XTV(-1)) + A12.4 \* D90 + A12.5 \* D93 + A12.6 \* D72 Exports of Goods and Non-Factor Services (Millions of US\$)
- 126: XBSNF XBSNF = XTV + TURREC + OSNFREC + TRPSEGR  
 Imports of Goods and Non-Factor Services (Millions of US\$)
- 127: MBSNF MBSNF = MTV + TURDES + OSNFDES + TRPSEGD  
 International Reserves - International Liquidity (Millions of US\$)
- 128: RES RES = RES(-1) - HACP  
 Total External Debt (Millions of US\$)
- 129: DEXT DEXT = -STC - (IEDL + IEPL) - HACP + DEXT(-1) \* (1 + 0.048 \* (TXCAEJP(-1) / TXCAEJP - 1) + 0.044 \* (TXCAEAL(-1) / TXCAEAL - 1) + 0.029 \* (TXCRFFR(-1) / TXCRFFR - 1))  
 Net Foreign Capital Stock (Millions of Dollars)
- 130: KED KED = KED(-1) \* (1 - TXDEPR) + IEDL + REINV  
 Net Factor Income Payments to the Rest of the World (Millions of US\$)
- 131: RLE RLE = -(SF + TUN)

## 7 - Variables as Proportion of GDP

- Public Enterprises Monetary Correction Payments as proportion of GDP
- 132: CMEEPIB CMEEPIB = CMEEN / (PIBN / 1000)  
 General Government Monetary Correction Payments as proportion of GDP
- 133: CMGGPIB CMGGPIB = CMGGN / (PIBN / 1000)  
 Total Gross Tax Revenue as a proportion of GDP
- 134: CTRIBPIB CTRIBPIB = CTRIBN / (PIBN / 1000)  
 Public Enterprises External Debt as proportion of GDP
- 135: DEXEPIB DEXEPIB = DEXEEN / (PIBN / 1000)  
 General Government External Debt as proportion of GDP
- 136: DEXGGPIB DEXGGPIB = DEXGGN / (PIBN / 1000)  
 Total External Debt as a proportion of GDP
- 137: DEXTPIB DEXTPIB = DEXT \* ERV / (PIBN / 1000)  
 Total External Debt as a proportion of Total Exports
- 138: DEXTXTV DEXTXTV = DEXT / XTV  
 Public Enterprises Internal Debt as proportion of GDP
- 139: DINEPIB DINEPIB = DINEEN / (PIBN / 1000)  
 General Government Internal Debt as proportion of GDP
- 140: DINGPIB DINGPIB = DINGGN / (PIBN / 1000)  
 General Government Current Expenditure as proportion of GDP
- 141: DTCCGGPIB DTCCGGPIB = DTCCGGN / (PIBN / 1000)  
 Public Enterprises Total Debt as proportion of GDP
- 142: DTEEPIB DTEEPIB = DTEEN / (PIBN / 1000)  
 General Government Total Debt as proportion of GDP
- 143: DTGGPIB DTGGPIB = DTGGN / (PIBN / 1000)  
 Gross Fixed Capital Formation - Construction - Private Sector as proportion of GDP
- 144: FBKCPPIB FBKCPPIB = FBKCPN / PIBN  
 Gross Fixed Capital Formation - General Government as proportion of GDP
- 145: FBKFGGPIB FBKFGGPIB = FBKFGN / PIBN  
 Gross Fixed Capital Formation - Total as proportion of GDP



- 146: FBKFPIB FBKFPIB = FBKF/PIB\*1000000  
Gross Fixed Capital Formation - Private Sector as proportion of GDP
- 147: FBKFPPIB FBKFPPIB = FBKFPIB/PIBN  
Gross Fixed Capital Formation - Machinery and Equipment - Private Sector as proportion of GDP
- 148: FBKMPPIB FBKMPPIB = FBKMPN/PIBN  
General Government Expenditure - Employees/Contributions as proportion of GDP
- 149: GPGGPIB GPGGPIB = GPGGN/PIBN  
Circulation of Goods and Services Tax Revenue as proportion of GDP
- 150: ICMSPIB ICMSPIB = ICMSN/(PIBN/1000)  
Inflationary Taxes as a proportion of GDP
- 151: IINFPIB IINFPIB = IINFN/(PIBN/1000)  
Industrialized Product Tax Revenue as proportion of GDP
- 152: IPIPIB IPIPIB = IPIN/(PIBN/1000)  
Income Tax Revenue as proportion of GDP
- 153: IRPIB IRPIB = IRN/(PIBN/1000)  
General Government Nominal Interest Payments on Total Debt as proportion of GDP
- 154: JNDTGGPIB JNDTGGPIB = JNDTGGN/(PIBN/1000)  
Public Enterprises Real Interest Payments on Total Debt as proportion of GDP
- 155: JRDEEPIB JRDEEPIB = JRDEEN/(PIBN/1000)  
Public Enterprises Real Interest Payments on External Debt as proportion of GDP
- 156: JRDEXEPIB JRDEXEPIB = JRDEXEEN/(PIBN/1000)  
General Government Real Interest Payments on External Debt as proportion of GDP
- 157: JRDEXGGPIB JRDEXGGPIB = JRDEXGGN/(PIBN/1000)  
General Government Real Interest Payments on Total Debt as proportion of GDP
- 158: JRDGGPIB JRDGGPIB = JRDGGN/(PIBN/1000)  
Public Enterprises Real Interest Payments on Internal Debt as proportion of GDP
- 159: JRDINEPIB JRDINEPIB = JRDINEEN/(PIBN/1000)  
General Government Real Interest Payments on Internal Debt as proportion of GDP
- 160: JRDINGPIB JRDINGPIB = JRDINGGN/(PIBN/1000)  
Foreign Interest Payments as a proportion of GDP
- 161: JURDESPIB JURDESPIB = JURDES\*ERV/(PIBN/1000)  
Net Foreign Interest Payments as a proportion of GDP
- 162: JURPIB JURPIB = JUR\*ERV/(PIBN/1000)  
Total Imports as a proportion of GDP
- 163: MTVPIB MTVPIB = MTV\*ERV/(PIBN/1000)  
Public Enterprises Borrowing Requirements, Nominal as proportion of GDP
- 164: NFEENPIB NFEENPIB = NFEENN/(PIBN/1000)  
Public Enterprises Borrowing Requirements, Operational as proportion of GDP
- 165: NFEEOPIB NFEEOPIB = NFEEON/(PIBN/1000)  
Public Enterprises Borrowing Requirements, Primary as proportion of GDP
- 166: NFEEPPIB NFEEPPIB = NFEEPN/(PIBN/1000)  
General Government Borrowing Requirements, Nominal as proportion of GDP
- 167: NFGGNPIB NFGGNPIB = NFGGNN/(PIBN/1000)  
General Government Borrowing Requirements, Operational as proportion of GDP
- 168: NFGGOPIB NFGGOPIB = NFGGON/(PIBN/1000)  
General Government Borrowing Requirements, Primary as proportion of GDP
- 169: NFGGPPIB NFGGPPIB = NFGGPN/(PIBN/1000)  
Public Sector Borrowing Requirements, Nominal as proportion of GDP
- 170: NFSPNPIB NFSPNPIB = NFSPNN/(PIBN/1000)  
Public Sector Borrowing Requirements, Operational as proportion of GDP
- 171: NFSPOPIB NFSPOPIB = NFSPON/(PIBN/1000)  
Public Sector Borrowing Requirements, Primary as proportion of GDP
- 172: NFSPPPPIB NFSPPPPIB = NFSPPN/(PIBN/1000)  
Other General Government Current Expenditures as proportion of GDP
- 173: ODCCGGPIB ODCCGGPIB = ODCCGGN/PIBN

- Other General Government Net Current Revenues as proportion of GDP  
 174: ORCLPIB  $ORCLPIB = ORCLN/PIBN$   
 General Government Revenue from Other Taxes as proportion of GDP  
 175: OTGGPIB  $OTGGPIB = OTGGN/(PIBN/1000)$   
 Net External Liabilities as a proportion of GDP  
 176: PELPIB  $PELPIB = (DEXT+KED)*ERV/(PIBN/1000)$   
 General Government Current Account Surplus as proportion of GDP  
 177: POUCCGGPIB  $POUCCGGPIB = POUCCGGN/(PIBN/1000)$   
 International Reserves as a proportion of Total Imports  
 178: RESMTV  $RESMTV = RES/MTV$   
 International Reserves as a proportion of GDP  
 179: RESPIB  $RESPIB = RES*ERV/(PIBN/1000)$   
 General Government Current Revenue as proportion of GDP  
 180: RTCCGGPIB  $RTCCGGPIB = RTCCGGN/(PIBN/1000)$   
 Net Services as a proportion of GDP  
 181: SERPIB  $SERPIB = SER*ERV/(PIBN/1000)$   
 Net Factor Services less Interest as a proportion of GDP  
 182: SFEXJPIB  $SFEXJPIB = SFEXJ*ERV/(PIBN/1000)$   
 Net Factor Services as a proportion of GDP  
 183: SFPIB  $SFPIB = SF*ERV/(PIBN/1000)$   
 Net Non-Factor Services as a proportion of GDP  
 184: SNFPIB  $SNFPIB = SNF*ERV/(PIBN/1000)$   
 Current Account Balance as a proportion of GDP  
 185: STCPIB  $STCPIB = STC*ERV/(PIBN/1000)$   
 Transfers to Households as proportion of GDP  
 186: TAPGGPIB  $TAPGGPIB = TAPGGN/PIBN$   
 Unrequited Transfers (Net) as a proportion of GDP  
 187: TUNPIB  $TUNPIB = TUN*ERV/(PIBN/1000)$   
 Total Exports as a proportion of GDP  
 188: XTVPIB  $XTVPIB = XTV*ERV/(PIBN/1000)$

## 8 - Variables in Nominal Terms

- Public Enterprises Monetary Correction Payments (Millions of Reais)  
 189: CMEEN  $CMEEN = CMEE*IGP$   
 General Government Monetary Correction Payments (Millions of Reais)  
 190: CMGGN  $CMGGN = CMGG*IGP$   
 CPMF Revenue (Millions of Reais)  
 191: CPMFN  $CPMFN = CPMF*DIPIB$   
 Total Net Tax Revenue (Millions of Reais)  
 192: CTRIBLN  $CTRIBLN = CTRIBL*DIPIB$   
 Total Gross Tax Revenue (Millions of Reais)  
 193: CTRIBN  $CTRIBN = CTRIB*DIPIB$   
 General Government External Debt(Millions of Reais)  
 194: DEXGGN  $DEXGGN = DEXGG*IGPF$   
 Public Enterprises Internal Debt (Millions of Reais)  
 195: DINEEN  $DINEEN = DINEE*IGPF$   
 General Government Internal Debt (Millions of Reais)  
 196: DINGGN  $DINGGN = DINGG*IGPF$   
 General Government Current Expenditure (Millions of Reais)  
 197: DTCCGGN  $DTCCGGN = DTCCGG*DIPIB$   
 Public Enterprises Total Debt(Millions of Reais)  
 198: DTEEN  $DTEEN = DTEE*IGPF$   
 General Government Total Debt (Millions of Reais)  
 199: DTGGN  $DTGGN = DTGG*IGPF$   
 Gross Fixed Capital Formation - Construction - Private Sector(Thousands of Reais)  
 200: FBKCPN  $FBKCPN/1000 = FBKCP*DIPIB$

- Gross Fixed Capital Formation - Private Sector (Thousands of Reais)
- 201:  $FBKFPN \quad FBKFPN/1000 = FBKFP*DIPIB$   
 Gross Fixed Capital Formation - Domestic Machinery and Equipment - Private Sector  
 (Thousands of Reais)
- 202:  $FBKMPDN \quad FBKMPDN = FBKMPD*1000*DIPIB$   
 Gross Fixed Capital Formation - Machinery and Equipment - Private Sector(Thousands of  
 Reais)
- 203:  $FBKMPN \quad FBKMPN/1000 = FBKMP*DIPIB$   
 General Government Expenditure - Employees/Contributions (Thousands of Reais)
- 204:  $GPGGN \quad GPGGN = GPGG*1000*DIPIB$   
 Circulation of Goods and Services Tax Revenue (Millions of Reais)
- 205:  $ICMSN \quad ICMSN = ICMS*DIPIB$   
 Inflationary Tax (Millions of Reais)
- 206:  $IINFN \quad IINFN = IINF*IGP$   
 Industrialized Products Tax (Millions of Reais)
- 207:  $IPIN \quad IPIN = IPI*DIPIB$   
 Income Tax (Millions of Reais)
- 208:  $IRN \quad IRN = IR*DIPIB$   
 General Government Nominal Interest Payments on Total Debt (Millions of Reais)
- 209:  $JNDTGGN \quad JNDTGGN = JNDTGG*DIPIB$   
 Public Enterprises Real Interest Payments on Total Debt (Millions of Reais)
- 210:  $JRDEEN \quad JRDEEN = JRDEE*DIPIB$   
 Public Enterprises Real Interest Payments on External Debt (Millions of Reais)
- 211:  $JRDEXEEN \quad JRDEXEEN = JRDEXEE*DIPIB$   
 General Government Real Interest Payments on External Debt (Millions of Reais)
- 212:  $JRDEXGGN \quad JRDEXGGN = JRDEXGG*IGP$   
 General Government Real Interest Payments on Total Debt (Millions of Reais)
- 213:  $JRDGGN \quad JRDGGN = JRDGG*DIPIB$   
 Public Enterprises Real Interest Payments on Internal Debt (Millions of Reais)
- 214:  $JRDINEEN \quad JRDINEEN = JRDINEE*DIPIB$   
 General Government Real Interest Payments on Internal Debt (Millions of Reais)
- 215:  $JRDINGGN \quad JRDINGGN = JRDINGG*IGP$   
 Public Enterprises Borrowing Requirements, Nominal (Millions of Reais)
- 216:  $NFEENN \quad NFEENN = NFEEN*IGP$   
 Public Enterprises Borrowing Requirements, Operational (Millions of Reais)
- 217:  $NFEEON \quad NFEEON = NFEEO*IGP$   
 Public Enterprises Borrowing Requirements, Primary (Millions of Reais)
- 218:  $NFEEPN \quad NFEEPN = NFEEP*IGP$   
 General Government Borrowing Requirements, Nominal (Millions of Reais)
- 219:  $NFGGNN \quad NFGGNN = NFGGN*IGP$   
 General Government Borrowing Requirements, Operational(Millions of Reais)
- 220:  $NFGGON \quad NFGGON = NFGGO*IGP$   
 General Government Borrowing Requirements, Primary (Millions of Reais)
- 221:  $NFGGPN \quad NFGGPN = NFGGP*IGP$   
 Public Sector Borrowing Requirements, Nominal (Millions of Reais)
- 222:  $NFSPNN \quad NFSPNN = NFSPN*IGP$   
 Public Sector Borrowing Requirements, Operational (Millions of Reais)
- 223:  $NFSPON \quad NFSPON = NFSPO*IGP$   
 Public Sector Borrowing Requirements, Primary (Millions of Reais)
- 224:  $NFSPPN \quad NFSPPN = NFSPP*IGP$   
 Other General Government Current Expenditures(Thousands of Reais)
- 225:  $ODCCGGN \quad ODCCGGN = ODCCGG*1000*DIPIB$   
 Other General Government Net Current Revenues (Thousands of Reais)
- 226:  $ORCLN \quad ORCLN = ORCCGG*1000*DIPIB$   
 General Government Revenue from Other Taxes (Millions of Reais)
- 227:  $OTGGN \quad OTGGN = OTGG*DIPIB$   
 Nominal Gross Domestic Product(Thousands of Reais)

- 228: PIBN  $PIBN = PIB/1000*DIPIB$   
General Government Current Account Surplus (Millions of Reais)
- 229: POUCCGGN  $POUCCGGN = POUCCGG*DIPIB$   
General Government Current Revenue (Millions of Reais)
- 230: RTCCGGN  $RTCCGGN = RTCCGG*DIPIB$   
Transfers to Households(Thousands of Reais)
- 231: TAPGGN  $TAPGGN = TAPGG*1000*DIPIB$

**COEFFICIENTS\***


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A3.0: -2.731	A10.0: -33.69	A22.3: -0.026	G1.0: -2.834 (1996)
A3.1: 0.182	A10.1: 0.72	A22.4: -0.088	G1.1: 1.084
A3.2: 1.496	A10.2: 1.208	A22.5: -0.056	G1.2: -0.008 (1996)
A3.3: 0.352	A10.3: -1.297	A22.6: 0.04	G1.3: -0.008
A3.4: -0.593	A12.0: -3.453	A23.1: -0.006	G2.0: -3.234 (1996)
A3.5: -0.826	A12.1: 0.443	A23.2: -0.003	G2.1: 1.125
A3.6: -0.474	A12.2: 1.413	A23.3: -1.104	G2.2: 0.011 (1996)
A3.7: -0.703	A12.3: -0.775	A23.4: 0.399	G3.0: -1.827 (1996)
A3.8: -0.504	A12.4: 0.889	A23.5: -0.386	G3.1: 1.157
A4.0: -0.529	A12.5: 0.499	A23.6: -0.325	G3.2: 0.007 (1996)
A4.1: -0.243	A12.6: 0.567	A23.7: -0.319	G4.0: -1.356 (1996)
A4.2: -0.664	A13.0: -2.176	A24.1: 0.397	G4.1: 1.11
A4.3: 1.186	A13.1: 0.686	A24.2: 0.111	G4.2: 0.027 (1996)
A4.4: 0.659	A13.2: 0.828	A24.3: -0.131	G6.0: -2.216 (1996)
A4.5: -0.28	A13.3: -0.484	A24.4: -0.001	G6.1: 1.006
A4.6: -0.489	A13.4: 1.078	A25.1: 0.071	G6.2: -0.021 (1996)
A4.7: -0.308	A13.5: 0.337	A25.2: 2.539	G7.0: -5.526 (1996)
A5.0: 0.514	A15.0: -0.744	A25.3: -0.006	G7.1: 0.787
A5.1: 0.397	A15.1: 0.663	A26.1: 0.7	G7.2: -0.017 (1996)
A5.2: 0.325	A15.2: 0.536	A27.0: 0.281	G7.3: 0.051
A5.3: -0.153	A15.3: -0.324	A27.1: -0.048	G8.0: -2.166 (1996)
A5.4: 0.212	A15.4: 0.366	A27.2: 0.302	G8.1: 1.091
A5.5: -0.254	A15.5: -0.238	A28.1: -0.007	G8.2: 0.029 (1996)
A5.6: -0.178	A15.6: -0.305	A29.1: 0.342	G9.0: -13.471
A6.0: 1.58	A16.0: -0.828	A30.0: 5.42	G9.1: 0.471
A6.1: 3.242	A16.1: 0.726	A30.1: 2.956	G9.2: 0.439
A6.2: -0.586	A16.2: 0.349	A30.2: -0.756	G9.3: -0.613
A6.3: -0.25	A16.3: -0.384	A30.3: -0.156	G9.4: 0.48
A6.4: 0.172	A16.4: 0.511	A30.4: -0.189	G10.1: -0.642
A7.0: 1.061	A16.5: -0.204	A30.5: 0.25	G10.2: 0.374
A7.1: 2.907	A16.6: -0.462	A31.0: 3.55	G10.3: -1.651
A7.2: -0.581	A16.7: -0.322	A31.1: 2.574	G10.4: -1.819
A7.3: -0.173	A18.0: 0.491	A31.2: -0.453	G10.5: 1.508
A7.4: 0.56	A18.1: 1.061	A31.3: -0.224	G10.6: 0.683
A7.5: 0.123	A18.2: 0.224	A31.4: 0.552	G10.7: -0.456
A8.0: 1.001	A18.3: 0.842	A32.0: 3.602	G11.0: 1.623
A8.1: 2.368	A19.1: 0.02	A32.1: 2.882	G11.1: 0.237
A8.2: -0.647	A19.2: 0.967	A32.2: -0.687	G12.1: 0.165
A8.3: -0.239	A20.0: -5.017	A32.3: -0.21	G13.1: 0.109
A8.4: 0.737	A20.1: 0.364	A32.4: 0.687	G14.1: 1.278
A8.5: 0.252	A20.2: -0.003	A32.5: -0.378	G15.1: 1.198
A9.0: 17.034	A20.3: -0.514	A32.6: 0.365	
A9.1: 0.658	A20.4: -0.301		
A9.2: -1.65	A21.0: -7.242		
A9.3: 1.215	A21.1: -0.003		
A9.4: 0.788	A21.2: -0.456		
A9.6: -0.659	A22.0: 0.02		
A9.7: 0.691	A22.1: 0.389		
A9.8: -0.925	A22.2: -0.123		

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\* For time-varying coefficients we present the latest estimated value (1996).

## MODEL ANALYSIS

### Block Structure and Normalization

The model has 172 blocks, including 1 simultaneous block.  
The largest block has 60 equations and the next largest has 1.

Block	Size	Eqn	Variable Solved For	Block	Size	Eqn	Variable Solved For
1	1	53	G1.0	28		IPC	
2	1	40	ERV	29		DIPIB	
3	1	36	TJCDBN	31		M1	
4	1	10	FBKMPD	35		EMPTR	
5	1	42	ER	38		TJCDB	
6	1	57	G3.0	52		IR	
7	1	55	G2.0	54		IPI	
8	1	59	G4.0	56		ICMS	
9	1	71	G7.0	58		OTGG	
10	1	114	JURDES	60		CPMF	
11	1	113	JURREC	63		CTRIB	
12	1	112	JUR	64		CTRIBL	
13	1	130	KED	65		SUB	
14	1	32	M1PIB	66		FBKFGG	
15	1	69	G6.0	68		GPGG	
16	1	73	G8.0	70		TAPGG	
17	1	103	XSV	72		ODCCGG	
18	1	104	XBV	101		XTV	
19	1	118	TURREC	102		XMV	
20	60	1	PIB	105		XTEV	
		2	CFT	106		MTV	
		3	CFTPP	107		MBKV	
		4	RDOPP	108		MBIV	
		5	CTGG	109		MBCV	
		6	FBKF	111		SF	
		7	FBKFP	115		SFEXJ	
		8	FBKCP	119		TURDES	
		9	FBKMP	121		TRPSEGR	
		11	FBKO	122		TRPSEG	
		12	FBKM	124		OSNFREC	
		13	FBKMG	125		OSNFDES	
		14	FBKC	126		XBSNF	
		15	FBKCG	127		MBSNF	
		16	UTIND	131		RLE	
		17	ELKT	21	1	30	SALN
		18	ELKCER	22	1	33	M0
		19	ELKCENR	23	1	34	M0FR
		20	FBKCER	24	1	37	TJOVER
		21	FBKCENR	25	1	39	CR
		22	ELKM	26	1	41	ERVF
		23	TXDES	27	1	43	ERNPT
		24	SALR	28	1	61	ORCCGG
		25	IPA	29	1	51	RTCCGG
		26	IGP	30	1	78	TJRDINGG
		27	IGPF	31	1	76	JRDINGG

(continue)

Block	Size	Eqn	Variable Solved For	Block	Size	Eqn	Variable Solved For
32	1	79	TJRDEXGG	84	1	38	DEXTXTV
33	1	77	JRDEXGG	85	1	195	DINEEN
34	1	75	JRDGG	86	1	139	DINEEPIB
35	1	81	TCMGG	87	1	196	DINGGN
36	1	80	CMGG	88	1	140	DINGGPIB
37	1	74	JNDTGG	89	1	197	DTCCGGN
38	1	67	DTCCGG	90	1	141	DTCCGGPIB
39	1	50	POUCCGG	91	1	198	DTEEN
40	1	49	NFGGP	92	1	142	DTEEPIB
41	1	48	NFGGO	93	1	199	DTGGN
42	1	47	NFGGN	94	1	143	DTGGPIB
43	1	87	TJRDINEE	95	1	200	FBKCPN
44	1	85	JRDINEE	96	1	144	FBKCPPIB
45	1	88	TJRDEXEE	97	1	145	FBKFGGPIB
46	1	86	JRDEXEE	98	1	146	FBKFPIB
47	1	84	JRDEE	99	1	201	FBKFPN
48	1	82	NFEEO	100	1	147	FBKFPIB
49	1	90	TCMEE	101	1	203	FBKMPN
50	1	89	CMEE	102	1	148	FBKMPPPIB
51	1	83	NFEEN	103	1	204	GPGGN
51	1	83	NFEEN	104	1	149	GPGGPIB
52	1	44	NFSPN	105	1	205	ICMSN
53	1	45	NFSPO	106	1	150	ICMSPIB
54	1	46	NFSPP	107	1	206	IINFN
55	1	62	IINF	108	1	151	IINFPIB
56	1	100	SBC	109	1	207	IPIN
57	1	117	TUR	110	1	152	IPIPIB
58	1	120	TRPSEG	111	1	208	IRN
59	1	123	OSNF	112	1	153	IRPIB
60	1	116	SNF	113	1	209	JNDTGGN
61	1	110	SER	114	1	154	JNDTGGPIB
62	1	99	STC	115	1	210	JRDEEN
63	1	129	DEXT	116	1	155	JRDEEPIB
64	1	95	DEXEEN	117	1	211	JRDEXEEN
65	1	96	DEXEE	118	1	156	JRDEXEPIB
66	1	94	DEXPR	119	1	212	JRDEXGGN
67	1	128	RES	120	1	157	JRDEXGGPIB
68	1	93	DEXGG	121	1	213	JRDGGN
69	1	92	DINGG	122	1	158	JRDGGPIB
70	1	91	DTGG	123	1	214	JRDINEEN
71	1	98	DINEE	124	1	159	JRDINEEPIB
72	1	97	DTEE	125	1	215	JRDINGGN
73	1	189	CMEEN	126	1	160	JRDINGGPIB
74	1	228	PIBN	127	1	161	JURDESPIB
75	1	132	CMEEPIB	128	1	162	JURPIB
76	1	190	CMGGN	129	1	163	MTVPIB
77	1	133	CMGGPIB	130	1	216	NFEENN
78	1	193	TRIBN	131	1	164	NFEENPIB
79	1	134	TRIBPIB	132	1	217	NFEEON
79	1	134	TRIBPIB	133	1	165	NFEEPIB
80	1	135	DEXEPIB	134	1	218	NFEENPN
81	1	194	DEXGGN	135	1	166	NFEPPPIB
82	1	136	DEXGGPIB	136	1	219	NFGGNN
83	1	137	DEXTPIB	137	1	167	NFGGNPIB

(continue)

Block	Size	Eqn	Variable Solved For	Block	Size	Eqn	Variable Solved For
138	1	220	NFGGON	156	1	177	POUCCGGPIB
139	1	168	NFGGOPIB	157	1	178	RESMTV
140	1	221	NFGGPN	158	1	179	RESPIB
141	1	169	NFGPPPIB	159	1	230	RTCCGGN
142	1	222	NFSPNN	160	1	180	RTCCGGPIB
143	1	170	NFSPNPIB	161	1	181	SERPIB
144	1	223	NFSPON	162	1	182	SFEXJPIB
145	1	171	NFSPOPIB	163	1	183	SFPIB
146	1	224	NFSPPN	164	1	184	SNFPIB
147	1	172	NFSPPPIB	165	1	185	STCPIB
148	1	225	ODCCGGN	166	1	231	TAPGGN
149	1	173	ODCCGGPIB	167	1	186	TAPGGPIB
150	1	226	ORCLN	168	1	187	TUNPIB
151	1	174	ORCLPIB	169	1	188	XTVPIB
152	1	227	OTGGN	170	1	191	CPMFN
153	1	175	OTGGPIB	170	1	191	CPMFN
154	1	176	PELPIB	171	1	192	CTRIBLN
155	1	229	POUCCGGN	172	1	202	FBKMPDN



**USE OF CONTEMPORANEOUS VARIABLES**

Variable	Used	Unlagged in Equations	Variable	Used	Unlagged in Equations
CFT	1	2	DTGGPIB	143	
CFTPP	2	3	ELKCENR	17	19
CMEE	83	89 189	ELKCER	17	18
CMEEN	132	189	ELKM	17	22
CMEEPIB	132		ELKT	16	17
CMGG	47	74 80 190	EMPTR	3	35
CMGGN	133	190	ER	42	102 107 108 109 119
CMGGPIB	133		ERNPT	43	
CPMF	51	60 63 191	ERV	1	4 9 25 36* 39
				40	41 42 43 92 137
				161	162 163 179 181 182
				183	184 185 187 188
CPMFN	191		ERVF	41	93 95 176
CR	39		FBKC	14	20 21
CTGG	2	5	FBKCENR	19	21
CTRIB	63	64 193	FBKCER	18	20 21
CTRIBL	4	64 192	FBKCG	13	14 15
CTRIBLN	192		FBKCP	7	8 14 200
CTRIBN	134	193	FBKCPN	44	200
CTRIBPIB	134		FBKCPPIB	44	
DEXEE	93	96 97 98	FBKF	1	6 146
DEXEE	93	96 97 98	FBKFGG	6	13 15 49 66
DEXEEN	95	96 135	FBKFGGPIB	145	
DEXEPIB	135		FBKFP	6	7 11 201
DEXGG	91	92 93 194	FBKFPPIB	146	
DEXGGN	136	194	FBKFPN	147	201
DEXGGPIB	136		FBKFPPIB	147	
DEXGGPIB	136		FBKM	12	22
DEXPR	93	94	FBKMG	12	13
DEXT	93	94 95 129 137 138 176	FBKMP	7	9 12 203
DEXTPIB	137		FBKMPD	9	10 202
DEXTXTV	138		FBKMPDN	202	
DINEE	97	98 195	FBKMPN	148	203
DINEEN	139	195	FBKMPPIB	148	
DINEEPIB	139		FBKO	7	11
DINGG	91	92 196	G1.0	52	53
DINGGN	140	196	G2.0	54	55
DINGGPIB	140		G3.0	56	57
DIPIB	1	4 9 29 31 47 48	G4.0	58	59
		49 49 52* 54* 56* 58* 65			
		66 68* 70* 72* 74 75 82			
		83 84 191 192 193 197 200			
		201 202 203 204 205 207 208			
		209 210 211 213 214 225 226			
		227 228 229 230 231			
DTCCGG	50	67 197	G6.0	68	69
DTCCGGN	141	197	G7.0	70	71
DTCCGGPIB	141		G8.0	72	73
DTEE	97	198	GPGG	5	67 68 204
DTEEN	142	198	GPGGN	149	204
DTEEPIB	142		GPGGPIB	149	
DTGG	91	199	ICMS	51	56 63 205
DTGGN	143	199	ICMSN	150	205

(continue)

MODEL FOR PROJECTIONS AND SIMULATIONS OF THE BRAZILIAN ECONOMY

Variable	Used	Unlagged in Equations	Variable	Used	Unlagged in Equations
ICMSPIB	150		JURDES	112	113 114 161
IGP	26 27 28 29 30 31		JURDESPIB	161	
	47 48 49 74 75 82				
	83 84 92 189 190 206				
	212 215 216 217 218 219				
	220 221 222 223 224				
IGPF	27 38 62 81 90 93		JURPIB	162	
	96 194 195 196 198 199				
IINF	62 92 206		JURREC	112	113
IINFN	151 206		KED	115	130 176
IINFPIB	151		M0	33	34 62
IPA	25 26 39 102 107 108		M0FR	34	92
	109				
IPC	28 119		M1	31	33 35
IPI	51 54 63 207		M1PIB	31	32
IPIN	152 207		MBCV	106	109
IPIPIB	152		MBIV	106	108
IR	51 52 63 208		MBKV	9	106 107
IRN	153 208		MBSNF	1	127
IRPIB	153		MTV	100	106 122 124 125 127
				163	178
JNDTGG	49 67 74 209		MTVPIB	163	
JNDTGGN	154 209		NFEEN	44	83 98 216
JNDTGGPIB	154		NFEENN	164	216
JRDEE	82 84 210		NFEENPIB	164	
JRDEEN	155 210		NFEEO	45	82 83 217
JRDEEPIB	155		NFEEON	165	217
JRDEXEE	84 86 211		NFEEOPIB	165	
JRDEXEEN	156 211		NFEEPN	166	218
JRDEXEPIB	156		NFEPPPIB	166	
JRDEXGG	75 77 212		NFGGN	44	47 92 219
JRDEXGGN	157 212		NFGGNN	167	219
JRDEXGGPIB	157		NFGGNPIB	167	
JRDGG	48 74 75 213		NFGGO	45	47 48 220
JRDGGN	158 213		NFGGON	168	220
JRDGGPIB	158		NFGGOPIB	168	
JRDINEE	84 85 214		NFGGP	46	48 49 221
JRDINEEN	159 214		NFGGPN	169	221
JRDINEEPIB	159		NFGPPPIB	169	
JRDINGG	75 76 215		NFSPN	44	222
JRDINGGN	160 215		NFSPNN	170	222
JRDINGGPIB	160		NFSPNPIB	170	
JRDINGGPIB	160		NFSPO	45	223
JUR	111 112 162		NFSPON	171	223

(continue)

Variable	Used	Unlagged in Equations	Variable	Used	Unlagged in Equations
NFSPOPIB	171		SF	110 111 131 183	
NFSPP	46 224		SFEXJ	111 115 182	
NFSPPN	172 224		SFEXJPIB	182	
NFSPPPIB	172		SFPIB	183	
ODCCGG	5 67 72 225		SNF	110 116 184	
ODCCGGN	173 225		SNFPIB	184	
ODCCGGPIB	173		STC	99 129 185	
ORCCGG	51 61 226		STCPIB	185	
ORCLN	174 226		SUB	5 64 65	
ORCLPIB	174		TAPGG	64 67 70 231	
OSNF	116 123		TAPGGN	186 231	
OSNFDES	123 125 127		TAPGGPIB	186	
OSNFREC	123 124 126		TCMEE	89 90	
OTGG	51 58 63 227		TCMGG	80 81	
OTGG	51 58 63 227		TJCDB	3 8 38 78 87	
OTGGN	175 227		TJCDBN	32 36 37 38	
OTGGPIB	175		TJOVER	37	
PELPIB	176		TJRDEXEE	86 88	
PIB	1 4 16 23 31 52 54 56 58 60 61 68 70 72 107 108 109 115 146 228		TJRDEXGG	77 79	
PIBN	132 133 134 135 136 137 139 140 141 142 143 144 145 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 179 180 181 182 183 184 185 186 187 188 228		TJRDINEE	85 87	
POUCCGG	49 50 229		TJRDINGG	76 78	
POUCCGGN	177 229		TRPSEG	116 120	
POUCCGGPIB	177		TRPSEGD	120 122 127	
RDOPP	3 4 119		TRPSEGR	120 121 126	
RES	93 128 178 179		TUNPIB	187	
RESMTV	178		TUR	116 117	
RESPIB	179		TURDES	117 119 127	
RLE	4 131		TURREC	117 118 126	
RTCCGG	50 51 230		TXDES	16 23 24	
RTCCGGN	180 230		UTIND	16 25	
RTCCGGPIB	180		XBSNF	1 25	
SALN	30		XBV	101 104 105	
SALR	23 24 30		XMV	101 102 105	
SBC	99 100		XSV	101 103 105	
SER	99 110 181		XTEV	101 105	
SERPIB	181		XTV	100 101 121 122 124 125 126 138 188	
			XTVPIB	188	

\*This equation cannot be solved for that variable.

**RANGE OF TIME-SUBSCRIPT (“HORIZON”) FOR EACH VARIABLE**

HORIZON:			
Min	Max	Symboltype	Symbolname
0	0	ENDOGENOUS	CFT
-1	0	ENDOGENOUS	CFTPP
0	0	ENDOGENOUS	CMEE
0	0	ENDOGENOUS	CMEEN
0	0	ENDOGENOUS	CMEEPIB
0	0	ENDOGENOUS	CMGG
0	0	ENDOGENOUS	CMGGN
0	0	ENDOGENOUS	CMGGPIB
-1	0	ENDOGENOUS	CPMF
0	0	ENDOGENOUS	CPMFN
0	0	ENDOGENOUS	CR
0	0	ENDOGENOUS	CTGG
0	0	ENDOGENOUS	CTRIB
0	0	ENDOGENOUS	CTRIBL
0	0	ENDOGENOUS	CTRIBLN
0	0	ENDOGENOUS	CTRIBN
0	0	ENDOGENOUS	CTRIBPIB
0	0	EXOGENOUS	DESVD
-1	0	ENDOGENOUS	DEXEE
-1	0	ENDOGENOUS	DEXEEN
0	0	EXOGENOUS	DEXEEPCT
0	0	ENDOGENOUS	DEXEPIB
-1	0	ENDOGENOUS	DEXGG
0	0	ENDOGENOUS	DEXGGN
0	0	ENDOGENOUS	DEXGGPIB
-1	0	ENDOGENOUS	DEXPR
0	0	EXOGENOUS	DEXPRPCT
-1	0	ENDOGENOUS	DEXT
0	0	ENDOGENOUS	DEXTPIB
0	0	ENDOGENOUS	DEXTXTV
-1	0	ENDOGENOUS	DINEE
0	0	ENDOGENOUS	DINEEN
0	0	ENDOGENOUS	DINEEPIB
-1	0	ENDOGENOUS	DINGG
0	0	ENDOGENOUS	DINGGN
0	0	ENDOGENOUS	DINGGPIB
-1	0	ENDOGENOUS	DIPIB
0	0	ENDOGENOUS	DTCCGG
0	0	ENDOGENOUS	DTCCGGN
0	0	ENDOGENOUS	DTCCGGPIB
0	0	ENDOGENOUS	DTEE
0	0	ENDOGENOUS	DTEEN
0	0	ENDOGENOUS	DTEEPIB
0	0	ENDOGENOUS	DTGG
0	0	ENDOGENOUS	DTGGN
0	0	ENDOGENOUS	DTGGPIB
-1	0	ENDOGENOUS	ELKCENR
-1	0	ENDOGENOUS	ELKCER
-1	0	ENDOGENOUS	ELKM
-1	0	ENDOGENOUS	ELKT

(continue)

HORIZON:			
Min	Max	Symboltype	Symbolname
-1	0	ENDOGENOUS	EMPTR
-3	0	ENDOGENOUS	ER
-1	0	ENDOGENOUS	ERNPT
-1	0	ENDOGENOUS	ERV
-1	0	ENDOGENOUS	ERVF
0	0	ENDOGENOUS	FBKC
-40	0	ENDOGENOUS	FBKCENR
-50	0	ENDOGENOUS	FBKCER
0	0	ENDOGENOUS	FBKCG
-1	0	ENDOGENOUS	FBKCP
0	0	ENDOGENOUS	FBKCPN
0	0	ENDOGENOUS	FBKCPPIB
0	0	ENDOGENOUS	FBKF
0	0	ENDOGENOUS	FBKFGG
0	0	ENDOGENOUS	FBKFGGPIB
0	0	EXOGENOUS	FBKFGN
0	0	ENDOGENOUS	FBKFP
0	0	ENDOGENOUS	FBKFPIB
0	0	ENDOGENOUS	FBKFPN
0	0	ENDOGENOUS	FBKFPIB
-20	0	ENDOGENOUS	FBKM
0	0	ENDOGENOUS	FBKMG
0	0	ENDOGENOUS	FBKMP
-1	0	ENDOGENOUS	FBKMPD
0	0	ENDOGENOUS	FBKMPDN
0	0	ENDOGENOUS	FBKMPN
0	0	ENDOGENOUS	FBKMPIB
0	0	ENDOGENOUS	FBKO
0	0	EXOGENOUS	FBKOPCT
-1	-1	EXOGENOUS	GDPUS
0	0	ENDOGENOUS	GPGG
0	0	ENDOGENOUS	GPGGN
0	0	ENDOGENOUS	GPGGPIB
0	0	EXOGENOUS	HACP
0	0	ENDOGENOUS	ICMS
0	0	ENDOGENOUS	ICMSN
0	0	ENDOGENOUS	ICMSPIB
0	0	EXOGENOUS	IEDL
0	0	EXOGENOUS	IEPL
-1	0	ENDOGENOUS	IGP
-1	0	ENDOGENOUS	IGPF
0	0	ENDOGENOUS	IINF
0	0	ENDOGENOUS	IINFN
0	0	ENDOGENOUS	IINFPIB
-3	0	ENDOGENOUS	IPA
-3	0	EXOGENOUS	IPAUS
-1	0	ENDOGENOUS	IPC
-1	0	EXOGENOUS	IPCUS
0	0	ENDOGENOUS	IPI
0	0	ENDOGENOUS	IPIIN
0	0	ENDOGENOUS	IPIPIB
0	0	ENDOGENOUS	IR

(continue)

HORIZON:			
Min	Max	Symboltype	Symbolname
0	0	ENDOGENOUS	IRN
0	0	ENDOGENOUS	IRPIB
0	0	ENDOGENOUS	JNDTGG
0	0	ENDOGENOUS	JNDTGGN
0	0	ENDOGENOUS	JNDTGGPIB
0	0	ENDOGENOUS	JRDEE
0	0	ENDOGENOUS	JRDEEN
0	0	ENDOGENOUS	JRDEEPIB
0	0	ENDOGENOUS	JRDEXEE
0	0	ENDOGENOUS	JRDEXEEN
0	0	ENDOGENOUS	JRDEXEPIB
0	0	ENDOGENOUS	JRDEXGG
0	0	ENDOGENOUS	JRDEXGGN
0	0	ENDOGENOUS	JRDEXGGPIB
0	0	ENDOGENOUS	JRDGG
0	0	ENDOGENOUS	JRDGGN
0	0	ENDOGENOUS	JRDGGPIB
0	0	ENDOGENOUS	JRDINEE
0	0	ENDOGENOUS	JRDINEEN
0	0	ENDOGENOUS	JRDINEEPIB
0	0	ENDOGENOUS	JRDINGG
0	0	ENDOGENOUS	JRDINGGN
0	0	ENDOGENOUS	JRDINGGPIB
0	0	ENDOGENOUS	JUR
0	0	ENDOGENOUS	JURDES
0	0	ENDOGENOUS	JURDESPIB
0	0	ENDOGENOUS	JURPIB
0	0	ENDOGENOUS	JURREC
-1	0	ENDOGENOUS	KED
-1	0	EXOGENOUS	LIBOR
-1	0	ENDOGENOUS	M0
-1	0	ENDOGENOUS	M0FR
-1	0	ENDOGENOUS	M1
-1	0	ENDOGENOUS	M1PIB
-1	0	ENDOGENOUS	MBCV
-1	0	ENDOGENOUS	MBIV
-1	0	ENDOGENOUS	MBKV
0	0	ENDOGENOUS	MBSNF
0	0	EXOGENOUS	MCLV
-2	0	ENDOGENOUS	MTV
0	0	ENDOGENOUS	MTVPIB
-3	0	EXOGENOUS	MW
0	0	ENDOGENOUS	NFEEN
0	0	ENDOGENOUS	NFEENN
0	0	ENDOGENOUS	NFEENPIB
0	0	ENDOGENOUS	NFEEON
0	0	ENDOGENOUS	NFEEON
0	0	ENDOGENOUS	NFEEPIB
0	0	EXOGENOUS	NFEEN

(continue)

HORIZON:			
Min	Max	Symboltype	Symbolname
0	0	ENDOGENOUS	NFEEPN
0	0	ENDOGENOUS	NFEPPIB
0	0	ENDOGENOUS	NFGGN
0	0	ENDOGENOUS	NFGGNN
0	0	ENDOGENOUS	NFGGNPIB
0	0	ENDOGENOUS	NFGGO
0	0	ENDOGENOUS	NFGGON
0	0	ENDOGENOUS	NFGGOPIB
0	0	ENDOGENOUS	NFGGP
0	0	ENDOGENOUS	NFGGPN
0	0	ENDOGENOUS	NFGGPIB
0	0	ENDOGENOUS	NFSPN
0	0	ENDOGENOUS	NFSPNN
0	0	ENDOGENOUS	NFSPNPIB
0	0	ENDOGENOUS	NFSPON
0	0	ENDOGENOUS	NFSPON
0	0	ENDOGENOUS	NFSPPIB
0	0	ENDOGENOUS	NFSPPN
0	0	ENDOGENOUS	NFSPPIB
0	0	ENDOGENOUS	ODCCGG
0	0	ENDOGENOUS	ODCCGGN
0	0	ENDOGENOUS	ODCCGGPIB
-1	0	ENDOGENOUS	ORCCGG
0	0	ENDOGENOUS	ORCLN
0	0	ENDOGENOUS	ORCLPIB
0	0	ENDOGENOUS	OSNF
-1	0	ENDOGENOUS	OSNFDES
-1	0	ENDOGENOUS	OSNFREC
0	0	ENDOGENOUS	OTGG
0	0	ENDOGENOUS	OTGGN
0	0	ENDOGENOUS	OTGGPIB
-1	0	EXOGENOUS	PEAURB
0	0	ENDOGENOUS	PELPIB
-1	0	ENDOGENOUS	PIB
0	0	ENDOGENOUS	PIBN
0	0	EXOGENOUS	PND
0	0	EXOGENOUS	PNDPCT
0	0	ENDOGENOUS	POUCCGG
0	0	ENDOGENOUS	POUCCGGN
0	0	ENDOGENOUS	POUCCGGPIB
-1	0	EXOGENOUS	PTF
-1	0	ENDOGENOUS	RDOPP
0	0	EXOGENOUS	REINV
-1	0	ENDOGENOUS	RES
0	0	ENDOGENOUS	RESMTV
0	0	ENDOGENOUS	RESPIB
0	0	EXOGENOUS	RISCO
0	0	ENDOGENOUS	RLE
0	0	ENDOGENOUS	RTCCGG
0	0	ENDOGENOUS	RTCCGGN
0	0	ENDOGENOUS	RTCCGGPIB

(continue)

HORIZON:			
Min	Max	Symboltype	Symbolname
0	0	ENDOGENOUS	SALN
0	0	ENDOGENOUS	SALR
0	0	ENDOGENOUS	SBC
0	0	ENDOGENOUS	SER
0	0	ENDOGENOUS	SERPIB
0	0	ENDOGENOUS	SF
-1	0	ENDOGENOUS	SFEXJ
0	0	ENDOGENOUS	SFEXJPIB
0	0	ENDOGENOUS	SFPIB
0	0	ENDOGENOUS	SNF
0	0	ENDOGENOUS	SNFPIB
0	0	EXOGENOUS	SPREAD
0	0	ENDOGENOUS	STC
0	0	ENDOGENOUS	STCPIB
0	0	ENDOGENOUS	SUB
0	0	EXOGENOUS	SUBN
-1	-1	EXOGENOUS	SXB
-2	0	EXOGENOUS	SXM
-3	-2	EXOGENOUS	SXS
0	0	ENDOGENOUS	TAPGG
0	0	ENDOGENOUS	TAPGGN
0	0	ENDOGENOUS	TAPGGPIB
0	0	ENDOGENOUS	TCMEE
0	0	ENDOGENOUS	TCMGG
-1	0	ENDOGENOUS	TJCDB
-1	0	ENDOGENOUS	TJCDBN
0	0	EXOGENOUS	TJCDBND
0	0	ENDOGENOUS	TJOVER
0	0	ENDOGENOUS	TJRDEXEE
0	0	ENDOGENOUS	TJRDEXGG
-1	0	ENDOGENOUS	TJRDINEE
-1	0	ENDOGENOUS	TJRDINGG
-1	0	EXOGENOUS	TLBC
-1	0	EXOGENOUS	TLBI
-1	0	EXOGENOUS	TLBK
0	0	EXOGENOUS	TREND
0	0	ENDOGENOUS	TRPSEG
-1	0	ENDOGENOUS	TRPSEGD
-1	0	ENDOGENOUS	TRPSEGR
0	0	EXOGENOUS	TUN
0	0	ENDOGENOUS	TUNPIB
0	0	ENDOGENOUS	TUR
-1	0	ENDOGENOUS	TURDES
-1	0	ENDOGENOUS	TURREC
-1	0	EXOGENOUS	TXCAEAL
-1	0	EXOGENOUS	TXCAEJP
-1	0	EXOGENOUS	TXCRFFR
0	0	EXOGENOUS	TXDEPR
-1	0	ENDOGENOUS	TXDES
-3	0	ENDOGENOUS	UTIND
0	0	ENDOGENOUS	XBSNF
-1	0	ENDOGENOUS	XBV

(continue)



HORIZON:			
Min	Max	Symboltype	Symbolname
-2	0	ENDOGENOUS	XMV
-3	0	ENDOGENOUS	XSV
0	0	ENDOGENOUS	XTEV
0	0	EXOGENOUS	XTEVPCT
-2	0	ENDOGENOUS	XTV
0	0	ENDOGENOUS	XTVPIB

## APPENDIX 2

### ESTIMATION RESULTS

#### TOTAL PRIVATE FINAL CONSUMPTION (Millions of R\$,1980 Prices)

#### IV Estimation (1964 to 1996): DEL(LOG(CFTPP))

Variable	Coefficient	Std.Error	t-value	t-prob
DEL(LOG(RDOPP))	0.39663	0.17195	2.307	0.0293
DEL(LOG(EMPTR))	0.11134	0.056937	1.956	0.0613
DEL(TJCDB)	-0.0013847	0.00060100	-2.304	0.0295
VCCF(-1)	-0.13083	0.046012	-2.843	0.0086
D88	-0.10229	0.041265	-2.479	0.0200
D93	-0.11110	0.050704	-2.191	0.0376
D94	0.06846	0.0019956	1.616	0.1181

where  $VCCF = \text{LOG}(CFTPP) - \text{LOG}(RDOPP)$

Endogenous: DEL(LOG(CFTPP)) DEL(LOG(RDOPP)) DEL(LOG(EMPTR))  
 Additional Instruments used: DEL(TJCDB(-1)) DEL(TJCDB(-2)) D81 Constant  
 DEL(LOG(RDOPP(-1)))

$\hat{a} = 0.037377$  DW = 2.56

RSS = 0.03632312218 for 7 variables and 33 observations

3 endogenous and 5 exogenous variables with 10 instruments

Reduced Form  $\hat{a} = 0.0475696$

Specification  $\text{Chi}^2(3) = 4.7167$  [0.1938]

Testing  $\hat{a} = 0$ :  $\text{Chi}^2(7) = 33.443$  [0.0000] \*\*

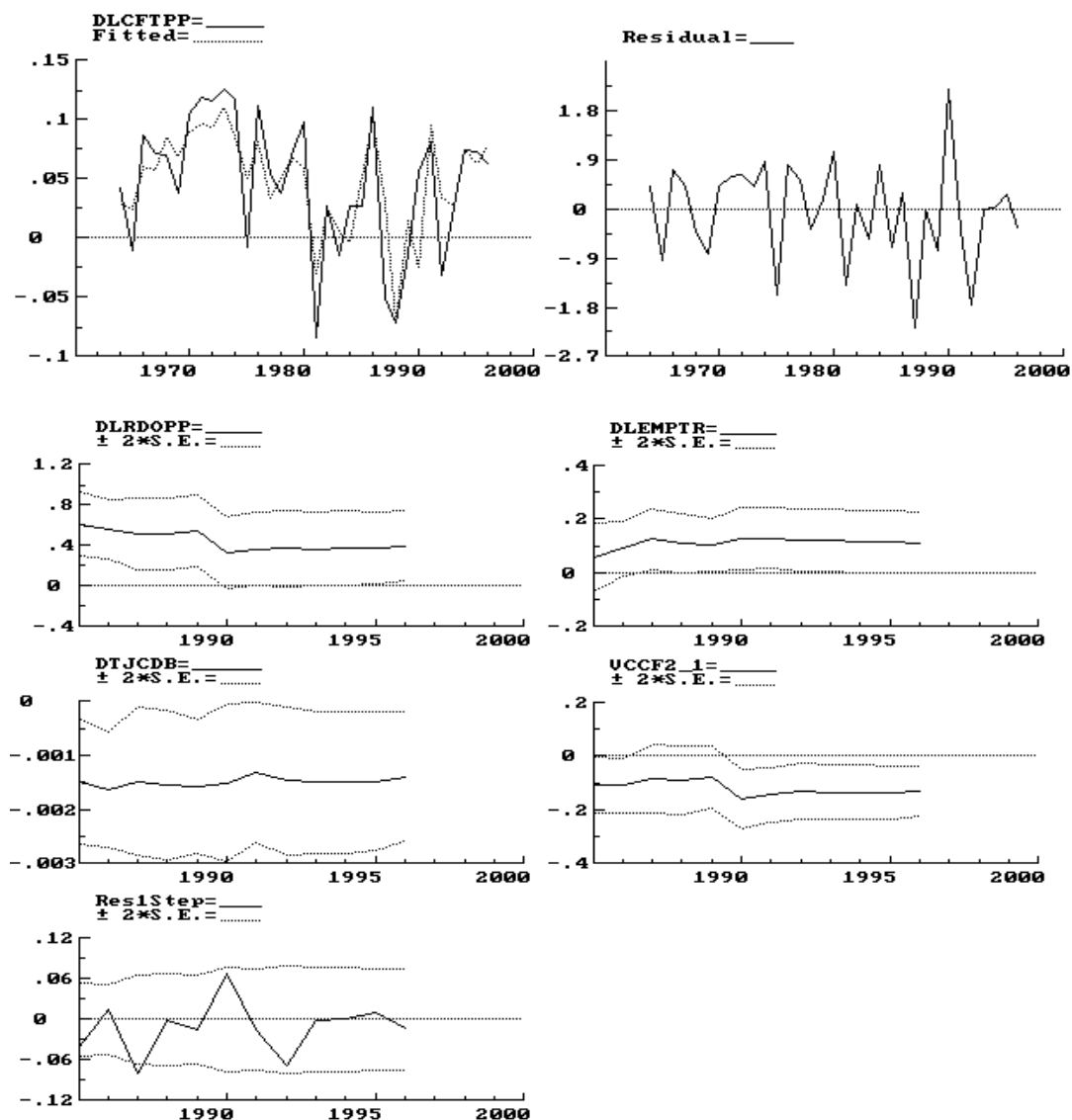
Testing for Error Autocorrelation from lags 1 to 2

$\text{Chi}^2(2) = 4.6149$  [0.0995]

ARCH 1  $F(1, 24) = 0.79215$  [0.3823]

Normality  $\text{Chi}^2(2) = 2.1244$  [0.3457]

$\text{Xi}^2$   $F(14, 11) = 0.71412$  [0.7273]



**GROSS FIXED CAPITAL FORMATION — MACHINERY AND EQUIPMENT — DOMESTIC PRIVATE SECTOR**  
(Millions of R\$, 1980 Prices)

**OLS Estimation (1972 to 1996): DEL(LOG(FBKMPD))**

Variable	Coefficient	Std.Error	t-value	t-prob	PartR <sup>2</sup>
DEL(UTIND(2))	2.5393	0.66318	3.829	0.0010	0.4230
UTIND(1)	0.070901	0.027540	2.574	0.0181	0.2489
TJCDB(1)	0.0054535	0.0014649	3.723	0.0013	0.4093
D96	0.26718	0.11061	2.416	0.0254	0.2259
D81	0.21750	0.11214	1.939	0.0667	0.1583

$R^2 = 0.645018$   $\hat{\sigma} = 0.100274$   $DW = 1.76$

\*  $R^2$  does NOT allow for the mean \*

RSS = 0.2010964182 for 5 variables and 25 observations

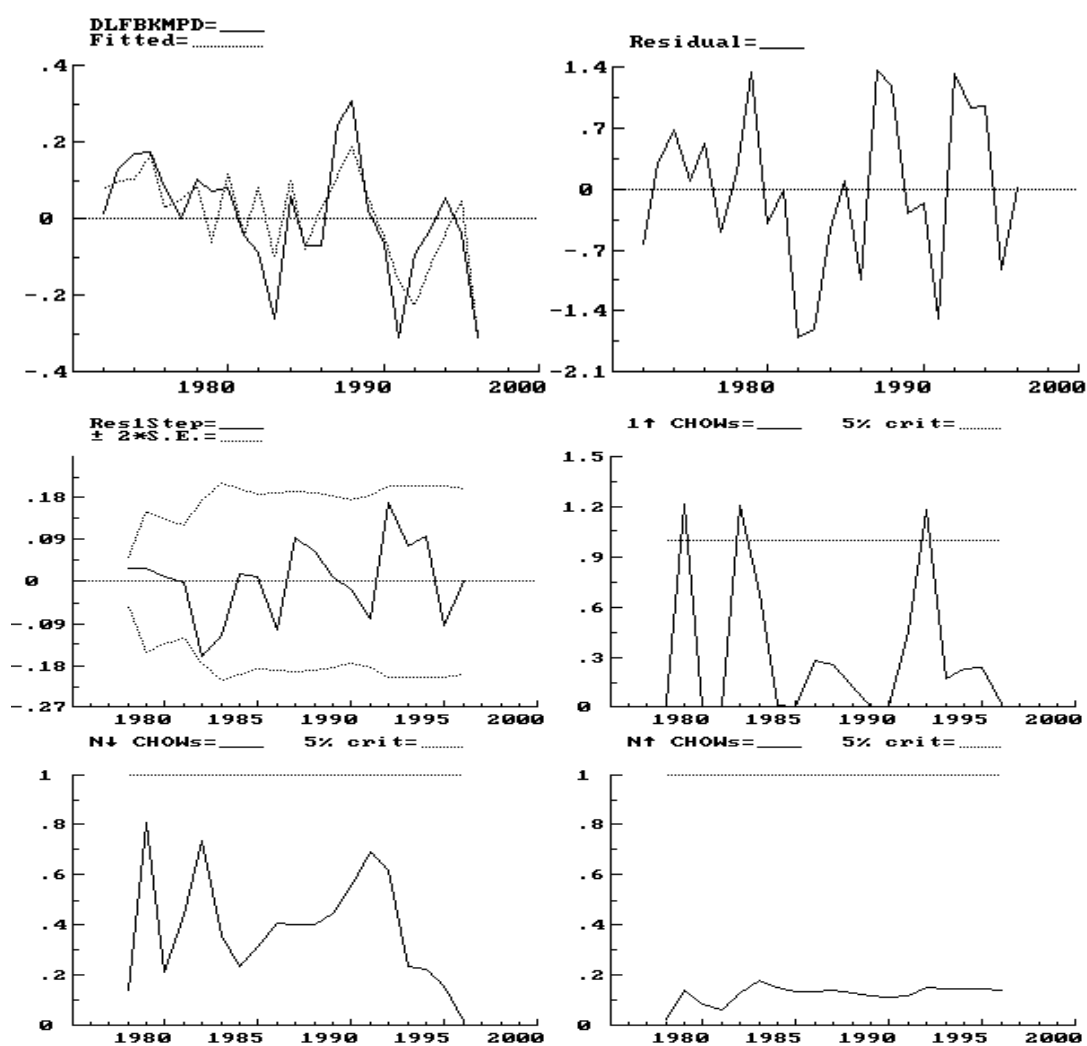
AR 1- 2F( 2, 18) = 0.26169 [0.7726]

ARCH 1 F( 1, 18) = 0.68597 [0.4184]

Normality  $\chi^2(2) = 0.51388$  [0.7734]

$\chi^2$  F(10, 9) = 0.65757 [0.7389]

RESET F( 1, 19) = 1.6894 [0.2092]



**GROSS FIXED CAPITAL FORMATION - CONSTRUCTION —  
PRIVATE SECTOR**  
(Millions of R\$, 1980 Prices)

**OLS Estimation (1971 to 1996): DEL(LOG(FBKCP))**

Variable	Coefficient	Std.Error	t-value	t-prob	PartR <sup>2</sup>
Constant	-5.9286	1.2443	-4.764	0.0001	0.5444
TCE(-1)	-0.37444	0.077428	-4.836	0.0001	0.5517
TJCDB	-0.0027444	0.00086693	-3.166	0.0051	0.3453
D83	-0.20603	0.063422	-3.248	0.0042	0.3571
D87	0.15876	0.058270	2.725	0.0135	0.2809
D89	0.26907	0.061828	4.352	0.0003	0.4992
D90	-0.23525	0.077350	-3.041	0.0067	0.3274

where TCE=LOG(FBKCP)-LOG(PIB)

$R^2 = 0.880189$   $F(6, 19) = 23.264$  [0.0000]  $\hat{\sigma} = 0.0562415$   $DW = 1.84$

RSS = 0.06009891702 for 7 variables and 26 observations

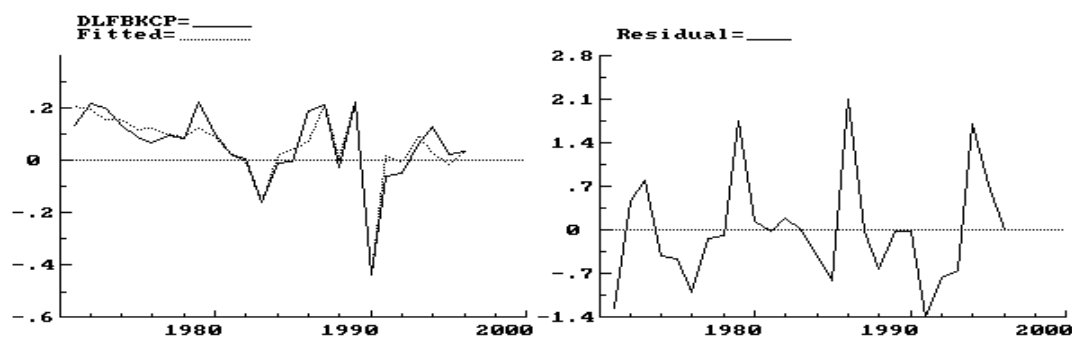
AR 1- 2F( 2, 17) = 0.69733 [0.5116]

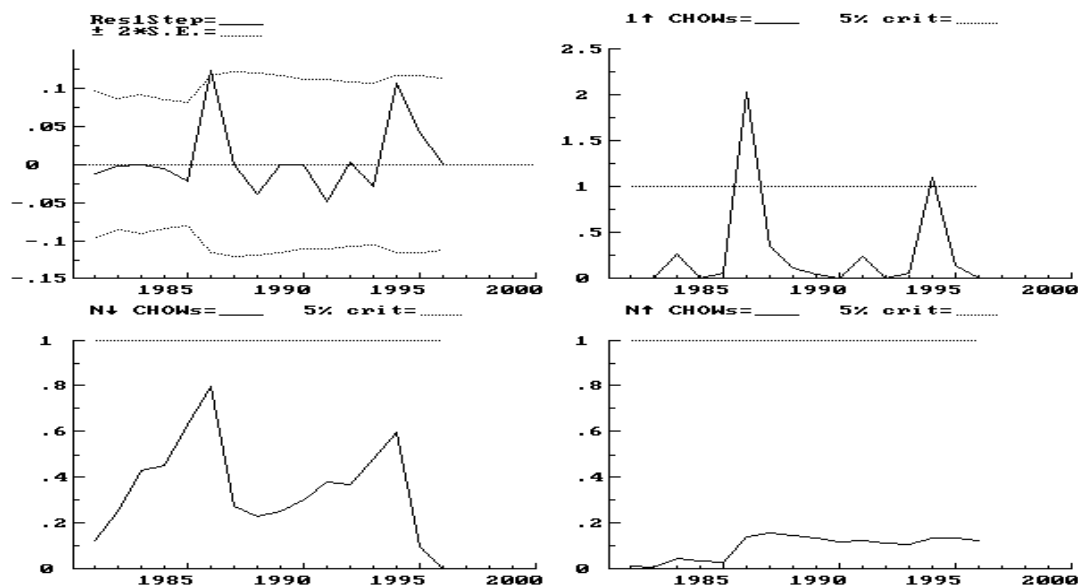
ARCH 1 F( 1, 17) = 0.45044 [0.5111]

Normality Chi<sup>2</sup>(2) = 3.8227 [0.1479]

Xi<sup>2</sup> F(12, 6) = 0.095328 [0.9996]

RESET F( 1, 18) = 0.83134 [0.3739]





## AGGREGATE PRODUCTION FUNCTION

### OLS Estimation (1981 to 1996): DEL(PIB)/PIB(-1)-DEL(LD)/LD(-1)

Variable	Coefficient	Std.Error	t-value	t-prob	PartR <sup>2</sup>
Constant	-0.020212	0.0057491	-3.516	0.0034	0.4689
X	0.70868	0.14607	4.852	0.0003	0.6271

where LD = PEAURB\*(1-TXDES/100)

$$X = \text{DEL}(\text{ELKT} * \text{UTIND}) / (\text{ELKT}(-1) * \text{UTIND}(-1)) - \text{DEL}(\text{LD}) / \text{LD}(-1)$$

R<sup>2</sup> = 0.627055 F(1, 14) = 23.539 [0.0003]  $\hat{\alpha}$  = 0.0218883 DW = 1.61

RSS = 0.0067073848 for 2 variables and 16 observations

AR 1- 2F(2, 12) = 0.28861 [0.7544]

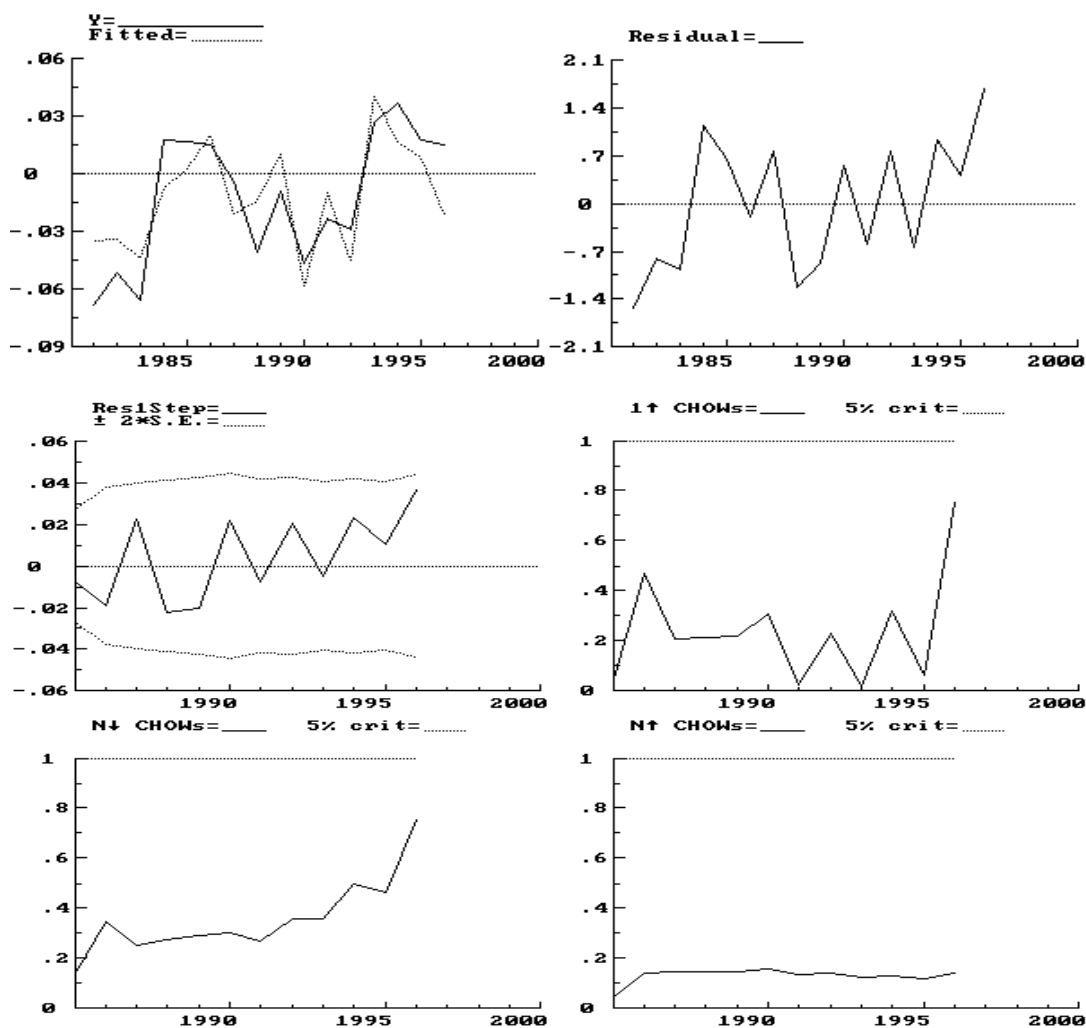
ARCH 1 F(1, 12) = 0.40361 [0.5372]

Normality Chi<sup>2</sup>(2) = 1.476 [0.4781]

Xi<sup>2</sup> F(2, 11) = 1.3193 [0.3065]

Xi\*Xj F(2, 11) = 1.3193 [0.3065]

RESET F(1, 13) = 0.141 [0.7133]



**LABOUR DEMAND — Employed Workers Index (Year Average)**

**OLS Estimation (1981 to 1997): DEL(LOG(LD))**

Variable	Coefficient	Std.Error	t-value	t-prob	PartR <sup>2</sup>
Constant	0.28116	0.063819	4.406	0.0006	0.5809
LOG(SALR)	-0.047873	0.012037	-3.977	0.0014	0.5305
DEL(LOG(PIB))	0.30234	0.078039	3.874	0.0017	0.5174

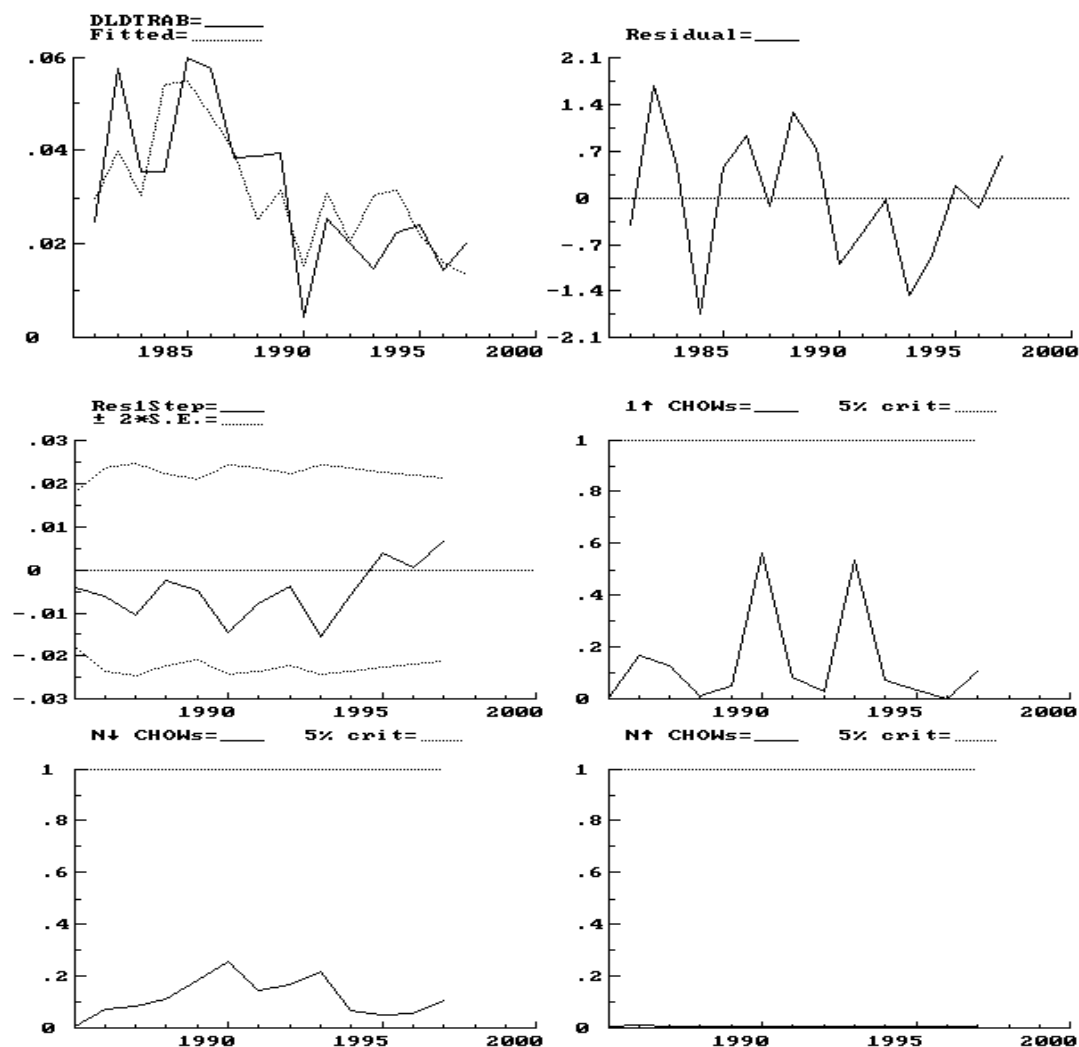
where  $LD = PEAURB \cdot (1 - TXDES / 100)$

$R^2 = 0.614119$   $F(2, 14) = 11.14$  [0.0013]  $\hat{\sigma} = 0.010646$   $DW = 1.90$   
 RSS = 0.001586725418 for 3 variables and 17 observations

AR 1-  $2F(2, 12) = 0.79653$  [0.4734]

ARCH 1  $F(1, 12) = 2.2282$  [0.1613]

Normality Chi<sup>2</sup>(2) = 0.11318 [0.9450]  
 Xi<sup>2</sup> F(4, 9) = 0.74667 [0.5842]  
 Xi\*Xj F(5, 8) = 0.62847 [0.6841]  
 RESET F(1, 13) = 0.26317 [0.6166]



## VELOCITY OF MONEY

### OLS Estimation (1974 to 1997): DEL(M1PIB)

Variable	Coefficient	Std.Error	t-value	t-prob	PartR <sup>2</sup>
X	-0.0071575	0.00047357	-15.114	0.0000	0.9307
D7584	-0.0078725	0.00082175	-9.580	0.0000	0.8437
D86	0.041890	0.0025893	16.178	0.0000	0.9390
D88	-0.0098002	0.0026480	-3.701	0.0018	0.4462
D90	0.0089500	0.0025684	3.485	0.0028	0.4167
D91	-0.0079539	0.0025853	-3.077	0.0068	0.3577
D97	0.012316	0.0025664	4.799	0.0002	0.5753



where  $X = \text{DEL}(\text{TJCDBN})/\text{TJCDBN}(-1)$

$R^2 = 0.979546$   $\hat{\sigma} = 0.00256623$   $DW = 1.76$

\*  $R^2$  does NOT allow for the mean \*

RSS = 0.0001119538106 for 7 variables and 24 observations

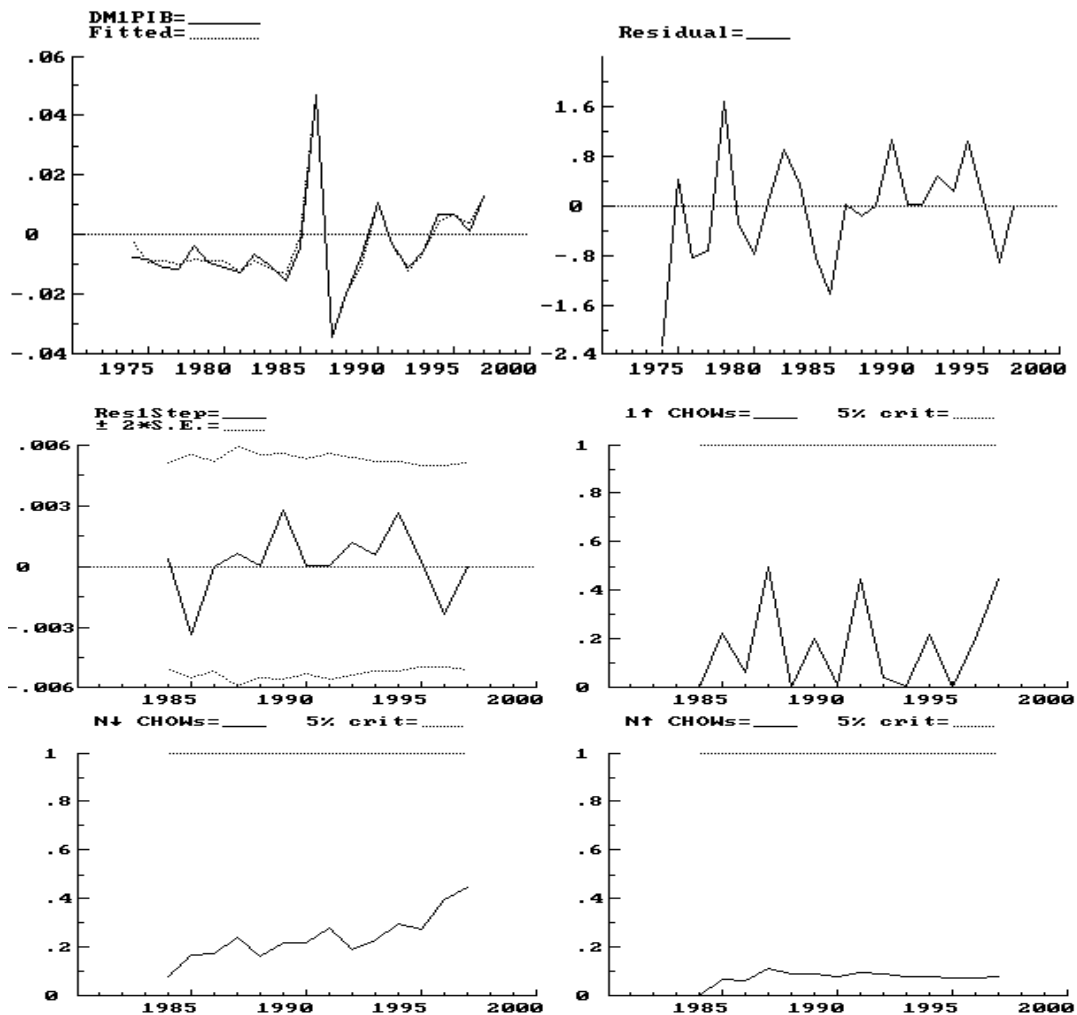
AR 1-  $2F(2, 15) = 0.47478$  [0.6311]

ARCH 1  $F(1, 15) = 0.71335$  [0.4116]

Normality  $\chi^2(2) = 2.7718$  [0.2501]

$\chi^2$   $F(13, 3) = 0.82608$  [0.6551]

RESET  $F(1, 16) = 0.052935$  [0.8209]



**TOTAL CREDIT TO PRIVATE SECTOR**  
(Millions of R\$,1980 Prices)

**OLS Estimation (1975 to 1997): DEL(EMPTR)/EMPTR(-1)**

Variable	Coefficient	Std.Error	t-value	t-prob	PartR <sup>2</sup>
DEL(M1)/M1(-1)	0.34160	0.052129	6.553	0.0000	0.6933
D93	0.50421	0.097243	5.185	0.0001	0.5859
D92	0.38015	0.098223	3.870	0.0010	0.4408
D94	-0.30524	0.099878	-3.056	0.0065	0.3296

R<sup>2</sup> = 0.789976     $\hat{\sigma}$  = 0.0964723    DW = 1.43

\* R<sup>2</sup> does NOT allow for the mean \*

RSS = 0.176831176 for 4 variables and 23 observations

AR 1- 2F( 2, 17) = 0.37759 [0.6911]

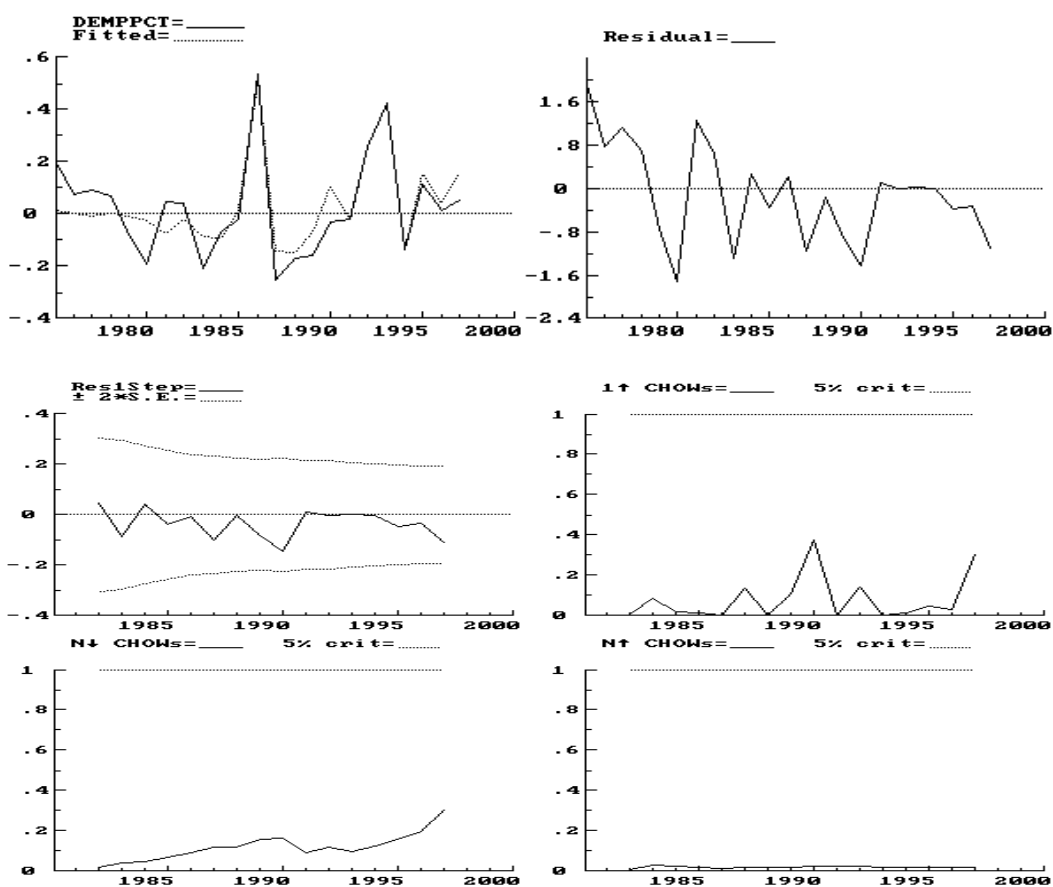
ARCH 1 F( 1, 17) = 0.04261 [0.8389]

Normality Chi<sup>2</sup>(2) = 0.2563 [0.8797]

Xi<sup>2</sup> F( 8, 10) = 1.017 [0.4802]

Xi\*Xj F( 9, 9) = 0.96547 [0.5204]

RESET F( 1, 18) = 0.040866 [0.8421]



**MANUFACTURED PRODUCTS EXPORTS**

(Millions of US\$)

**Cointegration analysis (Johansen): 1957 to 1997**

Endogenous: LXM LERM LMW UTIND

Number of lags: 2; Variables unrestricted: Constant D64S

Ho:rank=p	-Tlog(1- $\alpha$ )	using T-nm	95%	-T $\lambda$ g(1- $\alpha$ )	using T-nm	95%
p == 0	48.1**	38.71**	27.1	77.85**	62.66**	47.2
p <= 1	21.36*	17.2	21.0	9.75*	23.95	29.7
p <= 2	7.95	6.399	14.1	8.388	6.751	15.4
p <= 3	0.4375	0.3522	3.8	0.4375	0.3522	3.8

**Weak exogeneity test: 1957 to 1997**

standardized  $\beta'$  eigenvectors

LXM	LERM	LMW	UTIND
1.000	-1.613	-2.118	1.986

standardized  $\alpha$  coefficients

LXM	LERM	LMW	UTIND
-0.8274	0.0000	0.0000	0.0000

LR-test, rank=1:  $\chi^2(3) = 1.2964 [0.7300]$

**Error Correction Model (1957 to 1997): DLXM**

Variable	Coefficient	Std.Error	t-value	t-prob	PartR $\hat{y}$
Constant	-3.2050	0.36955	-8.673	0.0000	0.6887
DLXM_1	0.18202	0.085170	2.137	0.0399	0.1184
DLERM_1	0.35194	0.12568	2.800	0.0084	0.1874
DLERM_1	-0.59307	0.15357	-3.862	0.0005	0.3049
DLMW	1.4962	0.24722	6.052	0.0000	0.5186
TCEM_1	-0.82605	0.094080	-8.780	0.0000	0.6940
D64S	0.47401	0.066395	7.139	0.0000	0.5999

where TCEM = LXM -1.613 LERM -2.118 LMW +1.986 UTIND

R $\hat{y}$  = 0.767929 F(6, 34) = 18.751 [0.0000]  $\hat{\alpha}$  = 0.101644 DW = 2.07  
 RSS = 0.3512695196 for 7 variables and 41 observations

AR 1- 2F( 2, 32) = 0.097007 [0.9078]

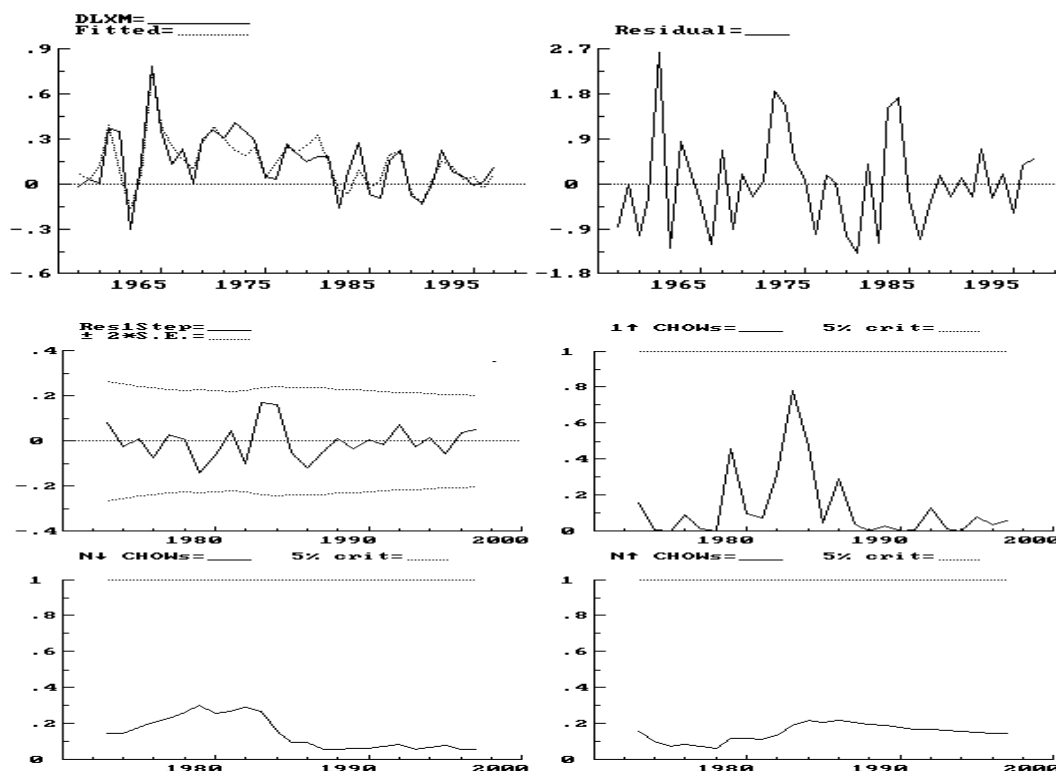
ARCH 1 F( 1, 32) = 0.4637 [0.5008]

Normality  $\chi^2(2)$  = 4.3753 [0.1122]

$\chi^2$  F(11, 22) = 0.76661 [0.6680]

$\chi^2$  F(26, 7) = 0.77431 [0.7067]

RESET F( 1, 33) = 0.21835 [0.6434]



**SEMIMANUFACTURED PRODUCTS EXPORTS**  
(Millions of US\$)

**Cointegration analysis (Johansen): 1958 to 1997**

Endogenous: LXS LERS LMW

Number of lags: 3; Variables unrestricted: Constant D82

Ho:rank=p	-Tlog(1- $\alpha$ )	using T-nm	95%	-T $\lambda$ g(1- $\alpha$ )	using T-nm	95%
p = 0	29.48**	22.85*	21.0	36.26**	28.1	29.7
p ≤ 1	6.346	4.918	14.1	6.779	5.254	15.4
p ≤ 2	0.4332	0.3357	3.8	0.4332	0.3357	3.8

**Weak exogeneity test: 1958 to 1997**

standardized  $\beta'$  eigenvectors

LXS	LERS	LMW
1.000	-0.1136	-1.397

standardized  $\alpha$  coefficients

LXS	LERS	LMW
-0.5326	0.0000	0.0000

LR-test, rank=1:  $\chi^2(2) = 1.1938 [0.5505]$

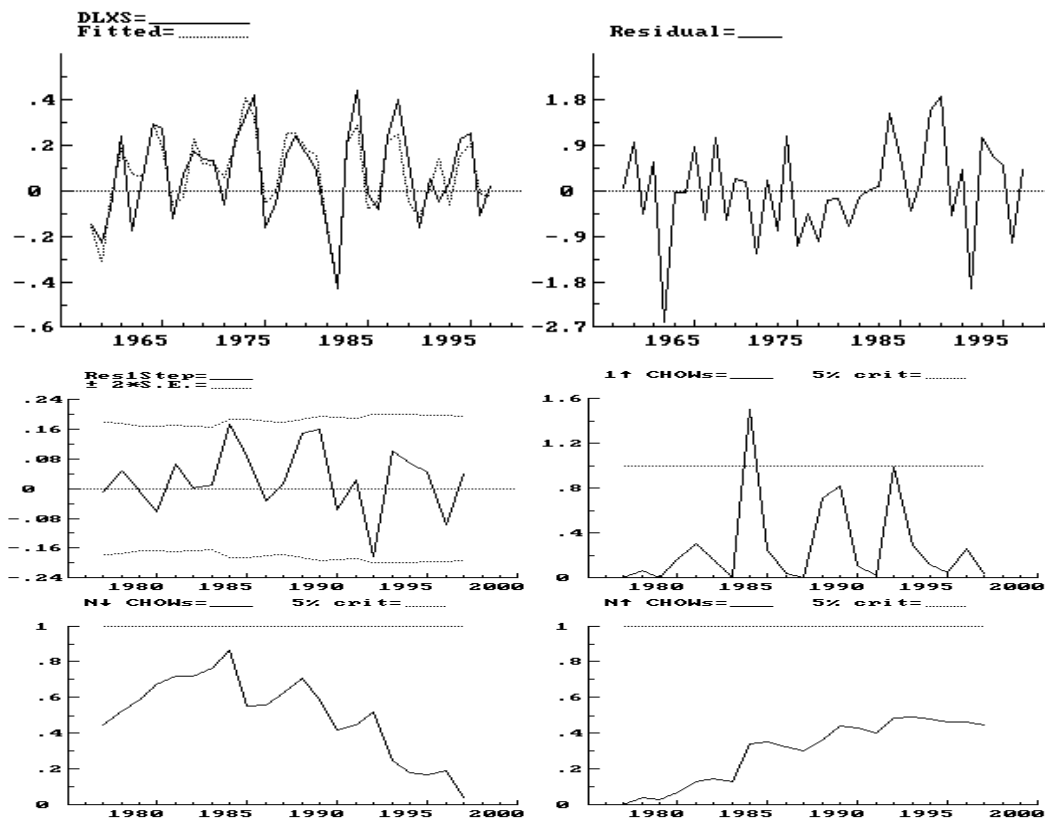
**Error Correction Model (1958 to 1997): DLXS**

Variable	Coefficient	Std.Error	t-value	t-prob	PartR <sup>2</sup>
Constant	-0.57349	0.10858	-5.282	0.0000	0.4581
DLXS_1	0.18655	0.082584	2.259	0.0306	0.1339
DLXS_2	-0.29410	0.077040	-3.818	0.0006	0.3063
DLERS_2	-0.27094	0.11937	-2.270	0.0299	0.1350
DLMW	1.2609	0.24475	5.152	0.0000	0.4458
TCES_1	-0.50727	0.091295	-5.556	0.0000	0.4834
D82	-0.31160	0.10752	-2.898	0.0066	0.2029

where  $TCES = LXS - 0.1136 LERS - 1.397 LMW$

$R^2 = 0.796941$   $F(6, 33) = 21.586$  [0.0000]  $\hat{\alpha} = 0.0965281$   $DW = 2.29$   
 RSS = 0.3074830048 for 7 variables and 40 observations

AR 1- 2F( 2, 31) = 0.96705 [0.3914]  
 ARCH 1 F( 1, 31) = 0.19776 [0.6596]  
 Normality  $\chi^2(2) = 2.5261$  [0.2828]  
 $\chi^2$  F(12, 20) = 0.83977 [0.6129]  
 $\chi^2$  F(23, 9) = 0.41984 [0.9550]  
 RESET F( 1, 32) = 1.5632 [0.2203]



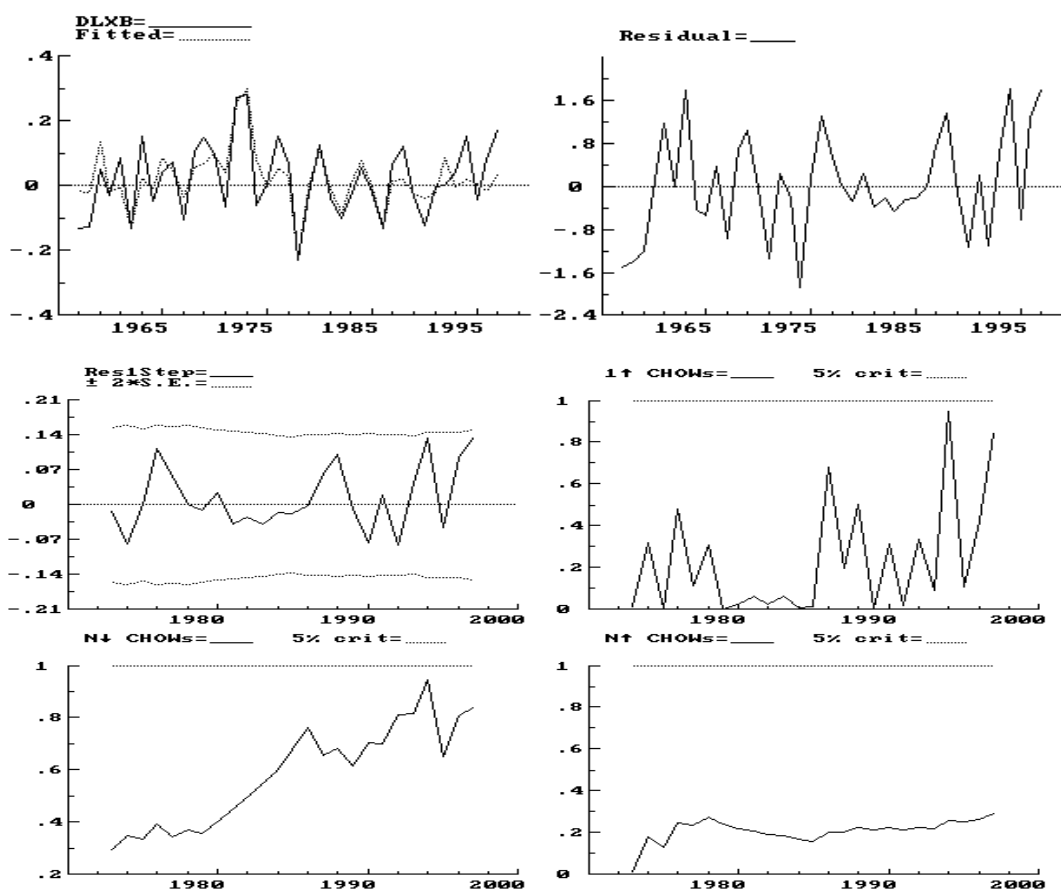
**PRIMARY PRODUCTS EXPORTS**  
(Millions of US\$)

**OLS Estimation (1957 to 1997): DLXB**

Variable	Coefficient	Std.Error	t-value	t-prob	PartR <sup>2</sup>
DLERB_1	0.32516	0.092480	3.516	0.0012	0.2610
DLMW	0.39657	0.14599	2.716	0.0102	0.1741
D7273	0.21219	0.058377	3.635	0.0009	0.2740
D86	-0.17806	0.077630	-2.294	0.0279	0.1307
D62	-0.15317	0.076021	-2.015	0.0517	0.1039
D78	-0.25390	0.076386	-3.324	0.0021	0.2399

R<sup>2</sup> = 0.629805     $\hat{\sigma}$  = 0.0756884    DW = 1.57  
 RSS = 0.2005054926 for 6 variables and 41 observations

AR 1- 2F( 2, 33) = 0.78459 [0.4646]  
 ARCH 1 F( 1, 33) = 0.79476 [0.3791]  
 Normality Chi<sup>2</sup>(2)= 0.24588 [0.8843]  
 Xi<sup>2</sup> F(10, 24) = 1.0766 [0.4165]  
 Xi\*Xj F(12, 22) = 0.85591 [0.5984]  
 RESET F( 1, 34) = 3.4457 [0.0721]



**CAPITAL GOODS IMPORTS**  
(Millions of US\$)

**Cointegration analysis (Johansen): 1956 to 1997**

Endogenous: LMBKV LPIB LERBK

Number of lags: 1; Variables unrestricted: Constant

Ho:rank=p	-Tlog(1- $\alpha$ )	using T-nm	95%	-T $\lambda$ g(1- $\alpha$ )	using T-nm	95%
p == 0	38.45**	35.71**	21.0	55.82**	51.83**	29.7
p <= 1	16.02*	14.87*	14.1	17.37*	16.13*	15.4
p <= 2	1.35	1.254	3.8	1.35	1.254	3.8

**Weak exogeneity test: 1956 to 1997**

standardized  $\alpha'$  eigenvectors

LMBKV	LPIB	LERBK
1.000	-0.5333	3.452

standardized  $\alpha$  coefficients

LMBKV	LPIB	LERBK
-0.1552	0.0000	0.0000

LR-test, rank=1:  $\chi^2(2) = 2.0883 [0.3520]$

**Error Correction Model (1956 to 1997): DLMBKV**

Variable	Coefficient	Std.Error	t-value	t-prob	PartR $\hat{y}$
Constant	5.4138	0.69391	7.802	0.0000	0.6284
DLPIB	2.9562	0.41741	7.082	0.0000	0.5822
DLERBK	-0.75588	0.10859	-6.961	0.0000	0.5737
TCEBK_1	-0.15547	0.019699	-7.892	0.0000	0.6337
D73	-0.18850	0.10877	-1.733	0.0917	0.0770
D86	0.24995	0.10399	2.404	0.0215	0.1383

where  $TCEBK = LMBKV - 0.5333 * LPIB + 3.452 * LERBK$ ;

$R\hat{y} = 0.784735$   $F(5, 36) = 26.247 [0.0000]$   $\hat{\alpha} = 0.102226$   $DW = 2.34$   
 $RSS = 0.3762043444$  for 6 variables and 42 observations

AR 1-  $2F(2, 34) = 1.7896 [0.1824]$

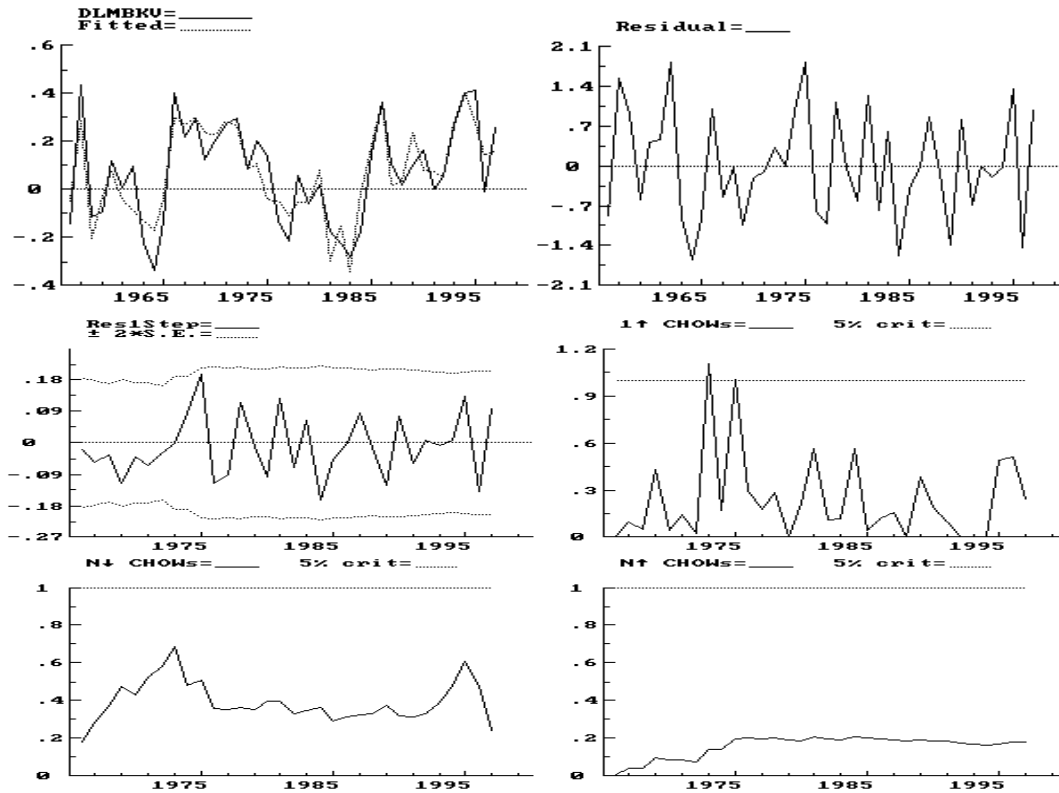
ARCH 1  $F(1, 34) = 0.0023683 [0.9615]$

Normality  $\chi^2(2) = 1.6339 [0.4418]$

$\chi^2$   $F(10, 25) = 0.77553 [0.6509]$

$\chi^2 * X_j$   $F(15, 20) = 0.51991 [0.8998]$

RESET  $F(1, 35) = 1.2214 [0.2766]$



**INTERMEDIATE GOODS IMPORTS  
(Millions of US\$)**

**Cointegration analysis (Johansen): 1956 to 1997**

Endogenous: LMBIV LPIB LERBI

Number of lags: 1; Variables unrestricted: Constant

Ho:rank=p	-Tlog(1- $\alpha$ )	using T-nm	95%	-T $\lambda$ g(1- $\alpha$ )	using T-nm	95%
p = 0	28.5**	26.47**	21.0	41.89**	38.89**	29.7
p ≤ 1	10.08	9.36	14.1	13.38	12.43	15.4
p ≤ 2	3.301	3.065	3.8	3.301	3.065	3.8

**Weak exogeneity test: 1956 to 1997**

standardized  $\alpha'$  eigenvectors

LMBIV	LPIB	LERBI
1.000	-0.7546	1.437
LMBIV	LPIB	LERBI
-0.2239	0.0000	0.0000



LR-test, rank=1:  $\text{Chi}^2(2) = 2.7218 [0.2564]$

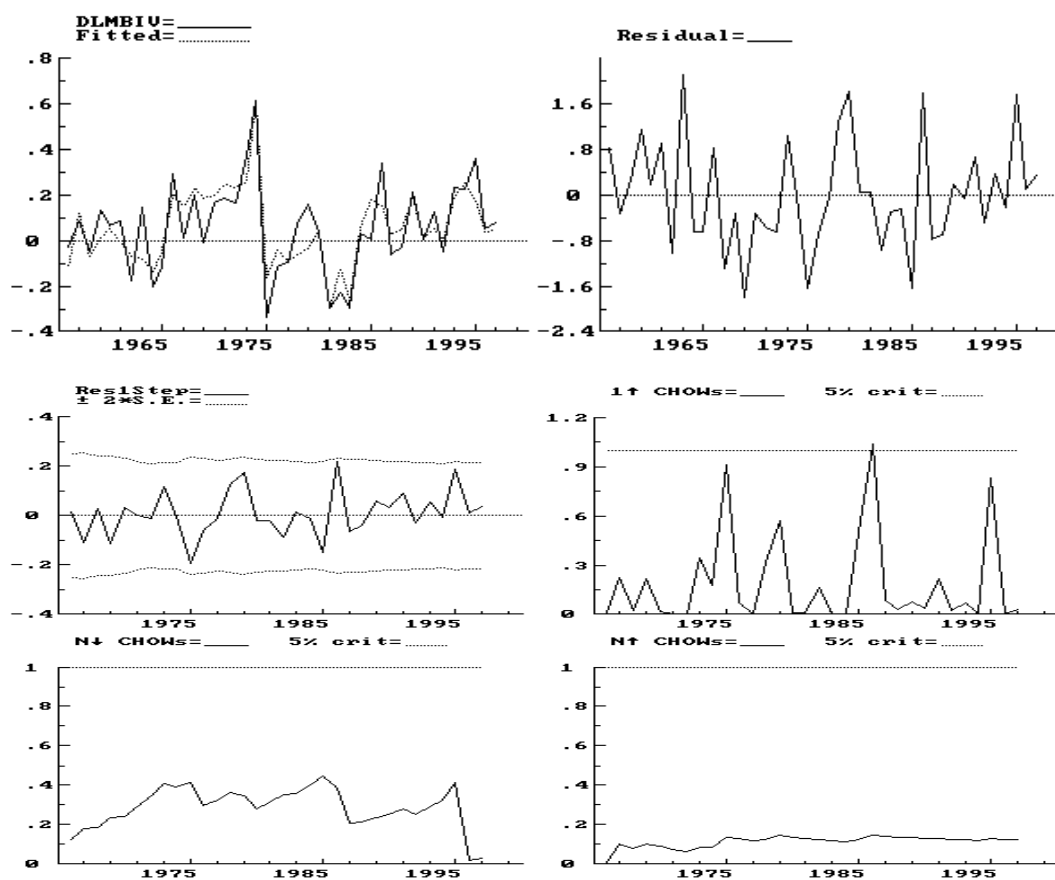
**Error Correction Model (1956 to 1997): DLMBKI**

Variable	Coefficient	Std.Error	t-value	t-prob	PartR <sup>2</sup>
Constant	3.5482	0.64795	5.476	0.0000	0.4477
DLPIB	2.5746	0.41293	6.235	0.0000	0.5124
DLERBI	-0.45371	0.11853	-3.828	0.0005	0.2837
TCEBI_1	-0.22388	0.039981	-5.600	0.0000	0.4587
D74	0.55161	0.10880	5.070	0.0000	0.4099

where  $\text{TCEBI} = \text{LMBIV} - 0.7546 * \text{LPIB} + 1.437 * \text{LERBI}$ ;

$R^2 = 0.727914$   $F(4, 37) = 24.747 [0.0000]$   $\hat{\alpha} = 0.106811$   $DW = 2.21$   
 RSS = 0.4221156694 for 5 variables and 42 observations

AR 1-  $2F(2, 35) = 0.47976 [0.6229]$   
 ARCH 1  $F(1, 35) = 0.20003 [0.6574]$   
 Normality  $\text{Chi}^2(2) = 0.94439 [0.6236]$   
 $\text{Xi}^2$   $F(8, 28) = 0.40446 [0.9084]$   
 $\text{Xi} * \text{Xj}$   $F(14, 22) = 0.40647 [0.9569]$   
 RESET  $F(1, 36) = 0.51514 [0.4776]$



**CONSUMER GOODS IMPORTS**  
(Millions of US\$)

**Cointegration analysis (Johansen): 1956 to 1997**

Endogenous: LMBIC LPIB LERBC

Number of lags: 1; Variables unrestricted: Constant

Ho:rank=p	-Tlog(1- $\alpha$ )	Using T-nm	95%	-T $\lambda$ g(1- $\alpha$ )	using T-nm	95%
p == 0	26.11**	24.25*	21.0	38.53**	35.77**	29.7
p <= 1	9.835	9.132	14.1	12.41	11.53	15.4
p <= 2	2.579	2.394	3.8	2.579	2.394	3.8

**Weak exogeneity test: 1956 to 1997**

standardized  $\alpha'$  eigenvectors

LMBICV	LPIB	LERBC
1.000	-0.9231	1.714
LMBICV	LPIB	LERBC
-0.3444	0.0000	0.0000

LR-test, rank=1:  $\text{Chi}^2(2) = 6.1091 [0.0471]$  \*

**Error Correction Model (1956 to 1997): DLMBKC**

Variable	Coefficient	Std.Error	t-value	t-prob	PartR $\hat{y}$
Constant	3.6030	1.0927	3.297	0.0022	0.2370
DLPIB	2.8835	0.60278	4.784	0.0000	0.3953
DLERBC	-0.68722	0.13862	-4.958	0.0000	0.4125
TCEBC_1	-0.21001	0.062293	-3.371	0.0018	0.2451
D86	0.68711	0.15990	4.297	0.0001	0.3454
D80	-0.37800	0.15864	-2.383	0.0227	0.1396
D95	0.36471	0.15910	2.292	0.0280	0.1305

where TCEBC = LMBICV-0.9231\*LPIB+1.714\*LERBC

R $\hat{y}$  = 0.74432 F(6, 35) = 16.982 [0.0000]  $\hat{\alpha}$  = 0.150513 DW = 1.84

RSS = 0.7928915583 for 7 variables and 42 observations

AR 1- 2F( 2, 33) = 0.63359 [0.5370]

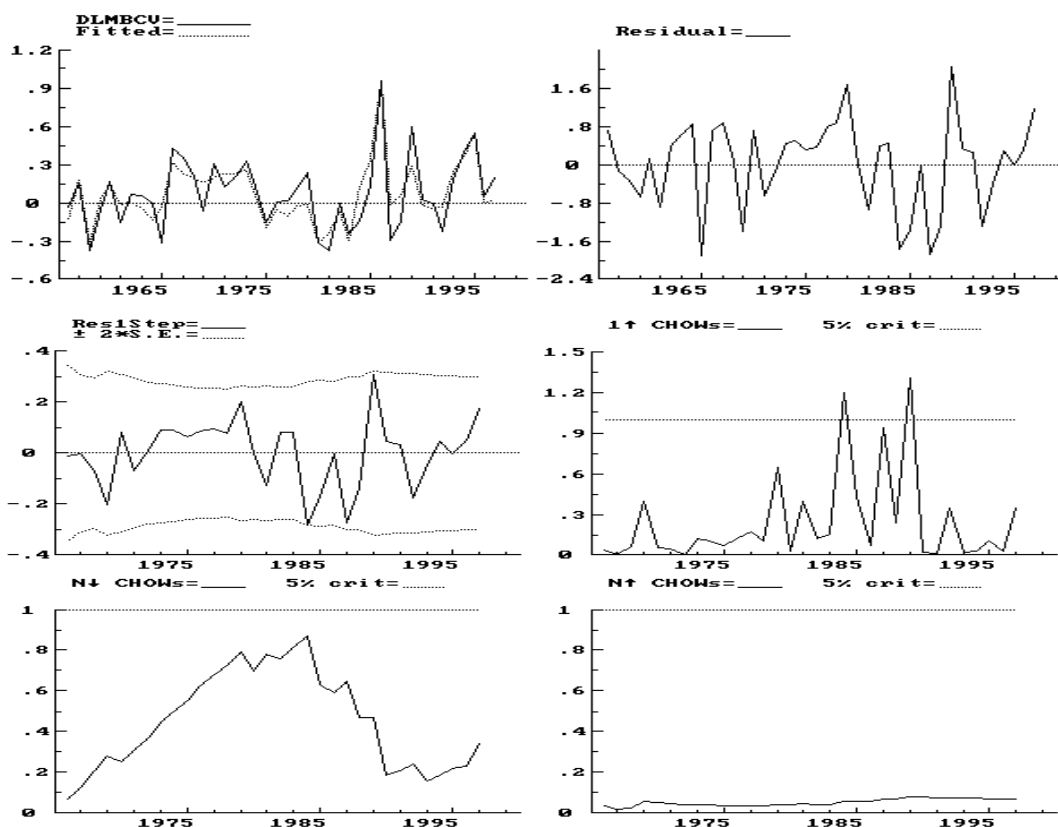
ARCH 1 F( 1, 33) = 0.027759 [0.8687]

Normality  $\text{Chi}^2(2) = 1.2364 [0.5389]$

Xi $\hat{y}$  F(12, 22) = 0.80598 [0.6419]

Xi\*Xj F(16, 18) = 0.61429 [0.8338]

RESET F( 1, 34) = 0.27224 [0.6052]



**FREIGHT AND INSURANCE REVENUE**  
(Millions of US\$)

**OLS Estimation (1949 to 1997): LOG(TRPSEGR)**

Variable	Coefficient	Std.Error	t-value	t-prob	PartR <sup>2</sup>
Constant	0.50512	0.47969	1.053	0.2984	0.0257
LOG(TRPSEGR(-1))	0.84928	0.095703	8.874	0.0000	0.6522
LOG(MTV(-1))	0.37478	0.15068	2.487	0.0169	0.1284
LOG(MTV(-2))	0.31778	0.16406	1.937	0.0595	0.0820
LOG(XTV(-1))	0.55809	0.25085	2.225	0.0315	0.1054
LOG(XTV(-2))	0.45662	0.22620	2.019	0.0499	0.0884
D58	0.48482	0.20061	2.417	0.0201	0.1221

R<sup>2</sup> = 0.988229 F(6, 42) = 587.68 [0.0000]  $\hat{\alpha}$  = 0.189886 DW = 2.02  
RSS = 1.514379444 for 7 variables and 49 observations

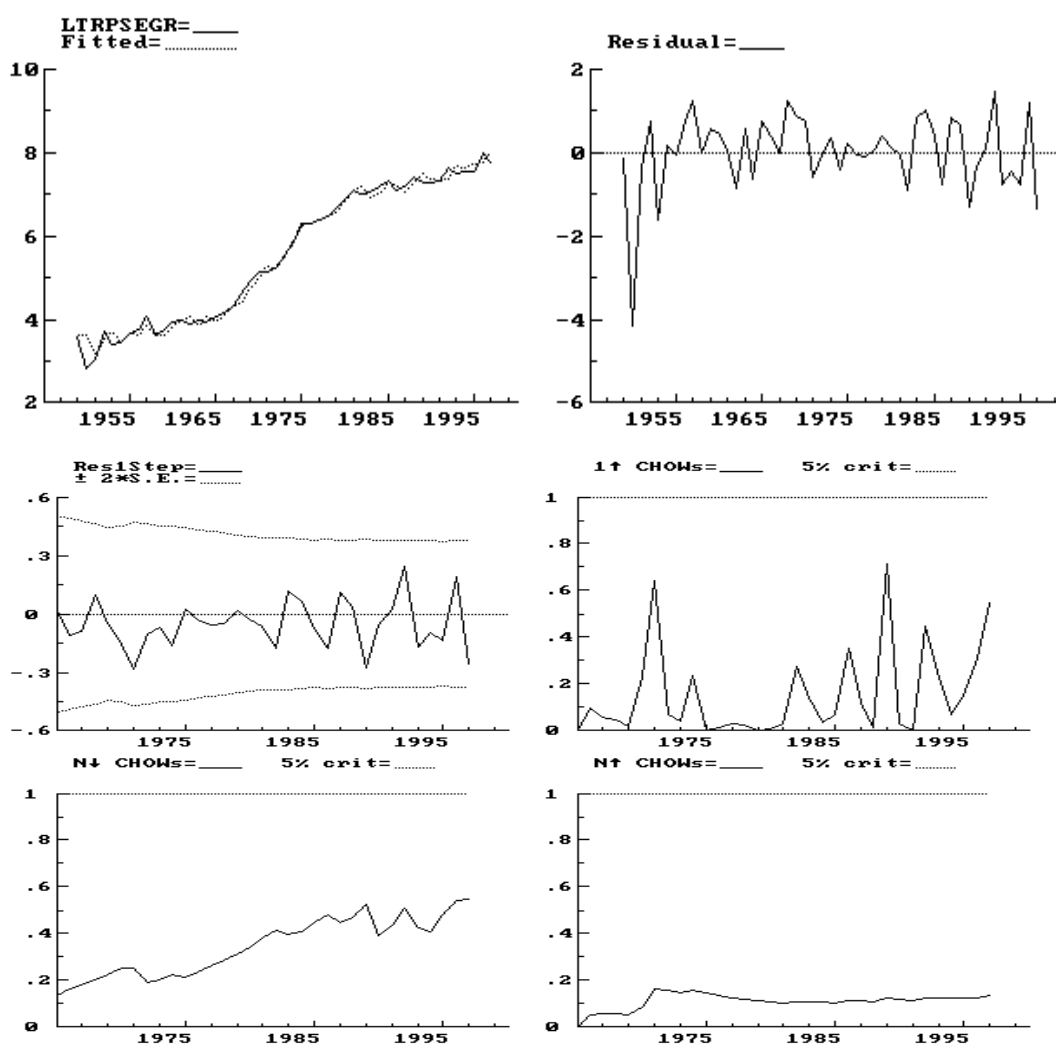
AR 1- 2F(2, 40) = 0.52686 [0.5945]  
ARCH 1 F(1, 40) = 0.17631 [0.6768]  
Normality Chi<sup>2</sup>(2) = 18.682 [0.0001] \*\*

$\chi^2$   $F(11, 30) = 0.60043 [0.8133]$   
 $\chi^2 \cdot X_j$   $F(21, 20) = 0.3402 [0.9911]$   
 RESET  $F(1, 41) = 7.349 [0.0098]$  \*\*

Solved Static Long Run equation

$\text{LOG}(\text{TRPSEGR}) = -3.351 + 0.3782 \text{LOG}(\text{MTV}) + 0.6733 \text{LOG}(\text{XTV}) - 3.217 \text{D58}$   
 (SE) (1.448) (0.7532) (0.7234) (2.581)

WALD test  $\chi^2(3) = 71.642 [0.0000]$  \*\*



**FREIGHT AND INSURANCE EXPENDITURE**  
(Millions of US\$)

**OLS Estimation (1949 to 1997): LOG(TRPSEGD)**

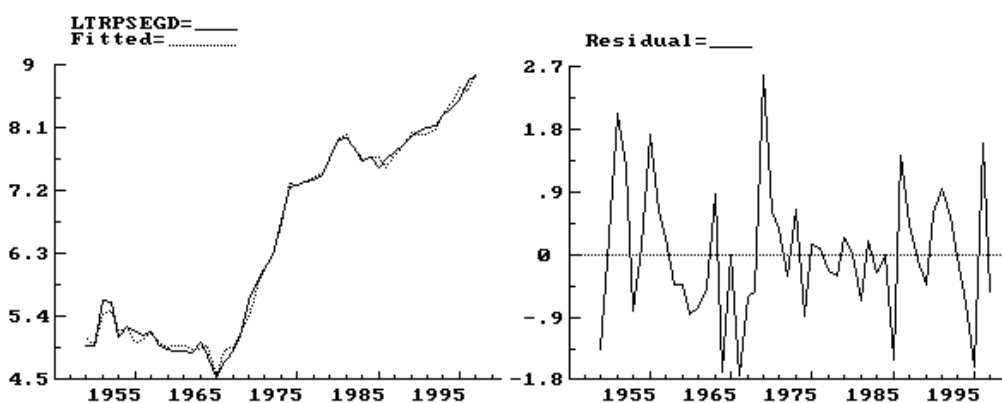
Variable	Coefficient	Std.Error	t-value	t-prob	PartR <sup>2</sup>
Constant	-0.78748	0.19269	-4.087	0.0002	0.2845
LOG(TRPSEGD(-1))	0.63159	0.080102	7.885	0.0000	0.5968
LOG(MTV)	0.56424	0.088265	6.393	0.0000	0.4931
LOG(MTV(-1))	-0.35192	0.10507	-3.349	0.0017	0.2108
LOG(XTV)	0.42352	0.10326	4.101	0.0002	0.2860
LOG(XTV(-2))	-0.26786	0.083319	-3.215	0.0025	0.1975
D65	-0.31467	0.10154	-3.099	0.0035	0.1861

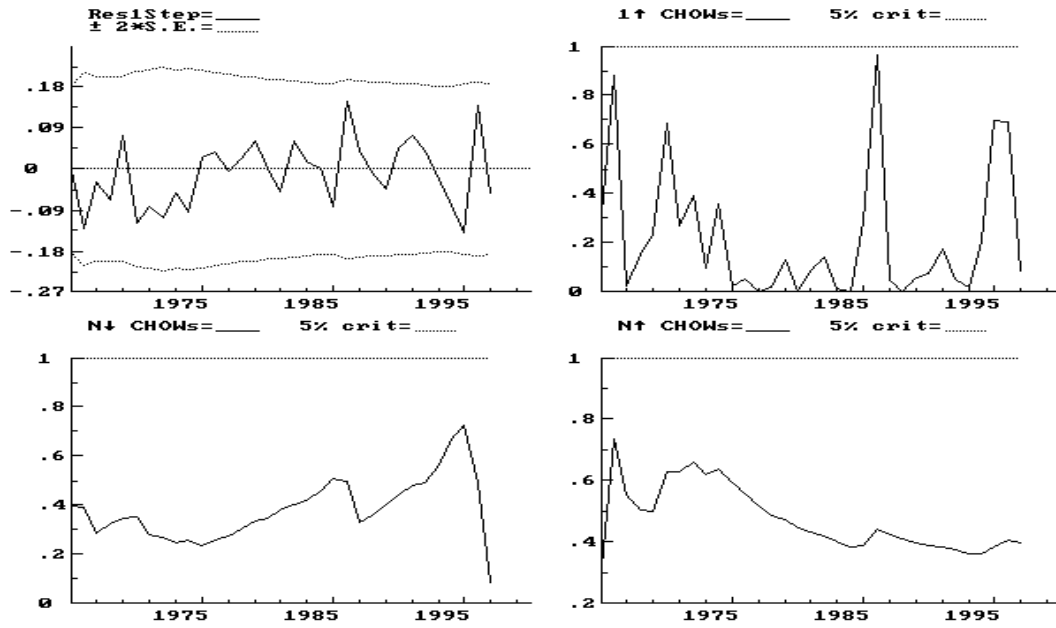
R<sup>2</sup> = 0.996088 F(6, 42) = 1782.4 [0.0000]  $\hat{\alpha}$  = 0.0944259 DW = 1.94  
RSS = 0.3744826884 for 7 variables and 49 observations

AR 1- 2F( 2, 40) = 0.086864 [0.9170]  
ARCH 1 F( 1, 40) = 0.048761 [0.8264]  
Normality Chi<sup>2</sup>(2) = 2.1469 [0.3418]  
Xi<sup>2</sup> F(12, 29) = 1.8231 [0.0914]  
Xi\*Xj F(23, 18) = 2.5551 [0.0232]\*  
RESET F( 1, 41) = 3.3012 [0.0765]

Solved Static Long Run equation

LOG(TRPSEGD) = -2.137 + 0.5763 LOG(MTV) + 0.4225 LOG(XTV) - 0.8541 D65  
(SE) (0.2427) (0.155) (0.1476) (0.3071)  
WALD test Chi<sup>2</sup>(3) = 1339.3 [0.0000] \*\*





**INTERNATIONAL TRAVEL REVENUE  
(Millions of US\$)**

**OLS Estimation (1955 to 1997): LOG(TURREC)**

Variable	Coefficient	Std.Error	t-value	t-prob	PartR <sup>2</sup>
Constant	-18.285	9.8783	-1.851	0.0720	0.0827
LOG(TURREC(-1))	0.81915	0.078737	10.404	0.0000	0.7401
LOG(GDPUS(-1))	0.66014	0.35086	1.881	0.0676	0.0852
D82	-1.2775	0.37409	-3.415	0.0015	0.2348
D89	2.2068	0.38476	5.736	0.0000	0.4640

R<sup>2</sup> = 0.953054 F(4, 38) = 192.86 [0.0000]  $\hat{\alpha}$  = 0.365343 DW = 2.11  
 RSS = 5.072057136 for 5 variables and 43 observations

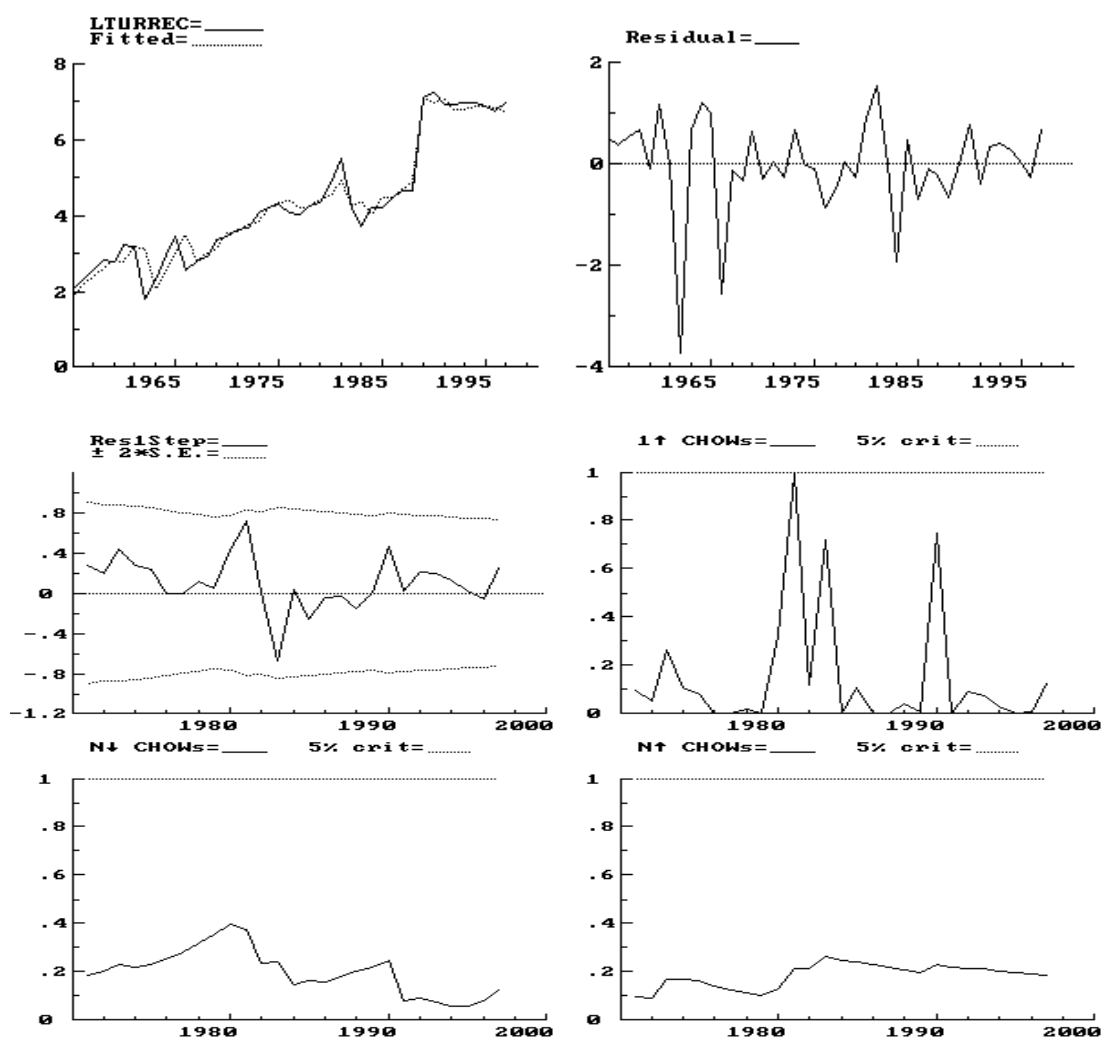
AR 1- 2F( 2, 36) = 2.717 [0.0796]  
 ARCH 1 F( 1, 36) = 0.13355 [0.7169]  
 Normality Chi<sup>2</sup>(2) = 19.548 [0.0001]\*\*  
 Xi<sup>2</sup> F( 8, 29) = 0.73391 [0.6610]  
 Xi\*Xj F(10, 27) = 0.69538 [0.7201]  
 RESET F( 1, 37) = 5.8462 [0.0207]\*

Solved Static Long Run equation

$$\text{LOG(TURREC)} = -101.1 + 3.65 \text{ LOG(GDPUS)} - 7.064 \text{ D82} + 12.2 \text{ D89}$$

(SE) (25.9) (0.8927) (3.917) (6.142)

WALD test  $\chi^2(3) = 25.05 [0.0000] **$



## INTERNATIONAL TRAVEL EXPENDITURE (Millions of US\$)

OLS Estimation (1957 to 1996): LOG(TURDES)

Variable	Coefficient	Std.Error	t-value	t-prob	PartR <sup>2</sup>
Constant	19.788	5.0129	3.947	0.0004	0.3143
LOG(TURDES(-1))	0.71352	0.10587	6.740	0.0000	0.5719
LOG(CR)	-0.96972	0.24933	-3.889	0.0004	0.3079
LOG(RDOPP)	0.56026	0.22758	2.462	0.0191	0.1513
D82	0.76010	0.34999	2.172	0.0369	0.1218
D85	0.90575	0.38255	2.368	0.0237	0.1415

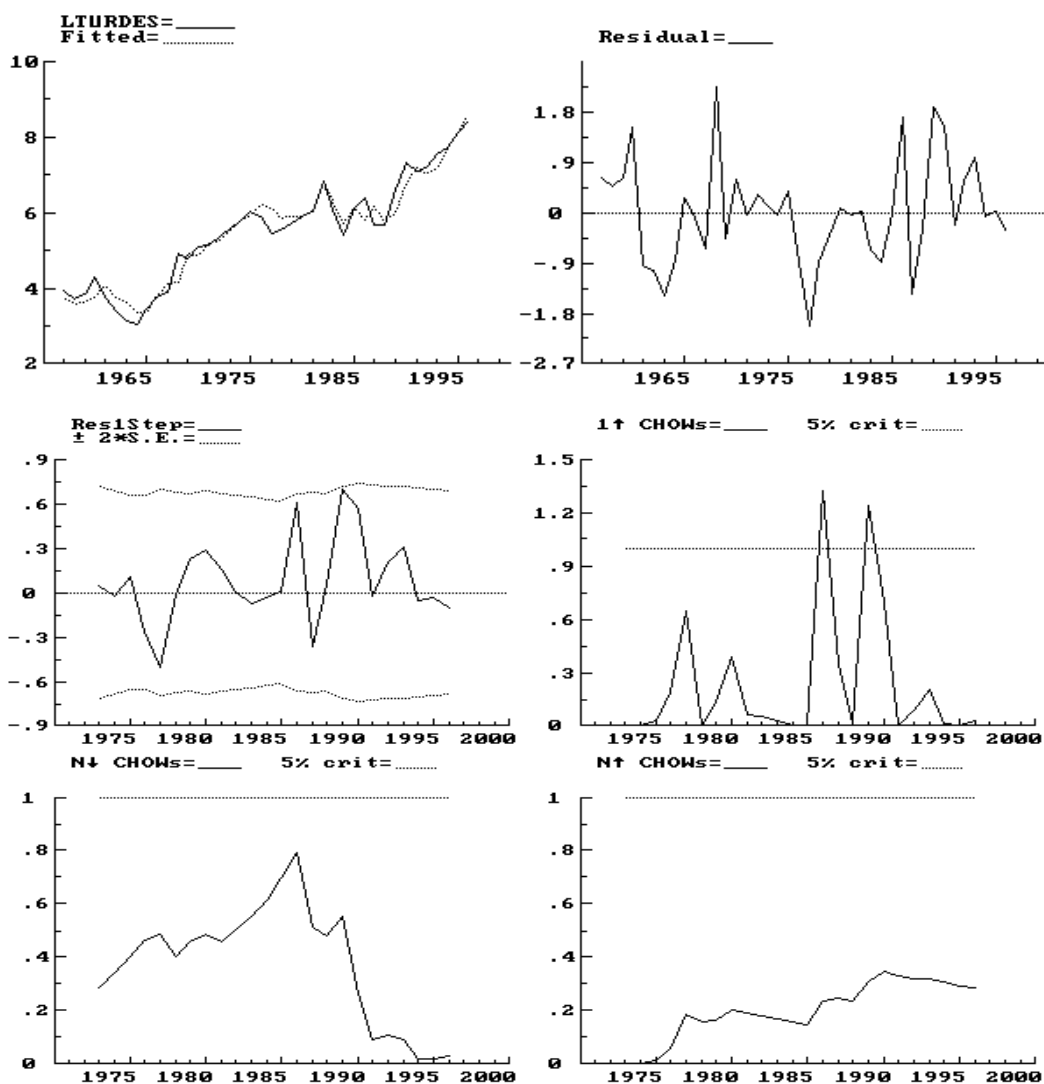
$R^2 = 0.949225$   $F(5, 34) = 127.12$  [0.0000]  $\hat{\alpha} = 0.34248$   $DW = 1.67$   
 RSS = 3.987947258 for 6 variables and 40 observations

AR 1- 2F( 2, 32) = 0.6664 [0.5205]  
 ARCH 1 F( 1, 32) = 0.21371 [0.6470]  
 Normality Chi $\chi^2$ (2) = 1.396 [0.4976]  
 Xi $\chi^2$  F(10, 23) = 0.40119 [0.9324]  
 Xi\*Xj F(15, 18) = 0.36376 [0.9733]  
 RESET F( 1, 33) = 0.0065107 [0.9362]

Solved Static Long Run equation

LOG(TURDES) = +69.07 -3.385 LOG(CR) +1.956 LOG(RDOPP) +2.65 D82 +3.16 D85  
 (SE) (14.56) (1.273) (0.3122) (1.59) (1.905)

WALD test Chi $\chi^2$ (4) = 50.678 [0.0000] \*\*





**OTHER NON-FACTOR SERVICES REVENUES  
(Millions of US\$)**

**OLS Estimation (1972 to 1997): LOG(OSNFR)**

Variable	Coefficient	Std.Error	t-value	t-prob	PartR <sup>2</sup>
Constant	-1.6126	0.82772	-1.948	0.0656	0.1595
LOG(OSNFR(-1))	0.60780	0.11151	5.451	0.0000	0.5977
LOG(COM)	0.76165	0.20617	3.694	0.0014	0.4056
LOG(COM(-2))	-0.43642	0.15487	-2.818	0.0106	0.2842
D90	1.0955	0.18873	5.804	0.0000	0.6275
D96S	0.48934	0.16048	3.049	0.0063	0.3174

where COM = XTV+MTV

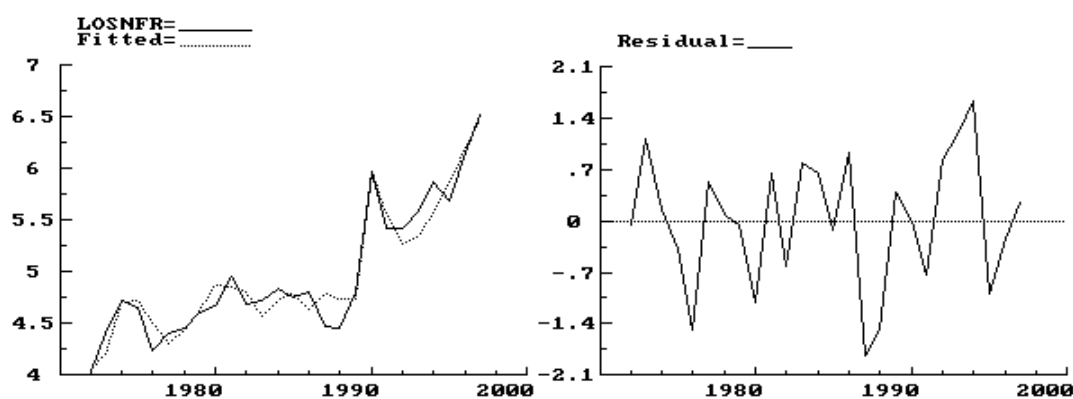
R<sup>2</sup> = 0.936966 F(5, 20) = 59.458 [0.0000]  $\hat{\alpha}$  = 0.180315 DW = 2.00  
RSS = 0.6502696945 for 6 variables and 26 observations

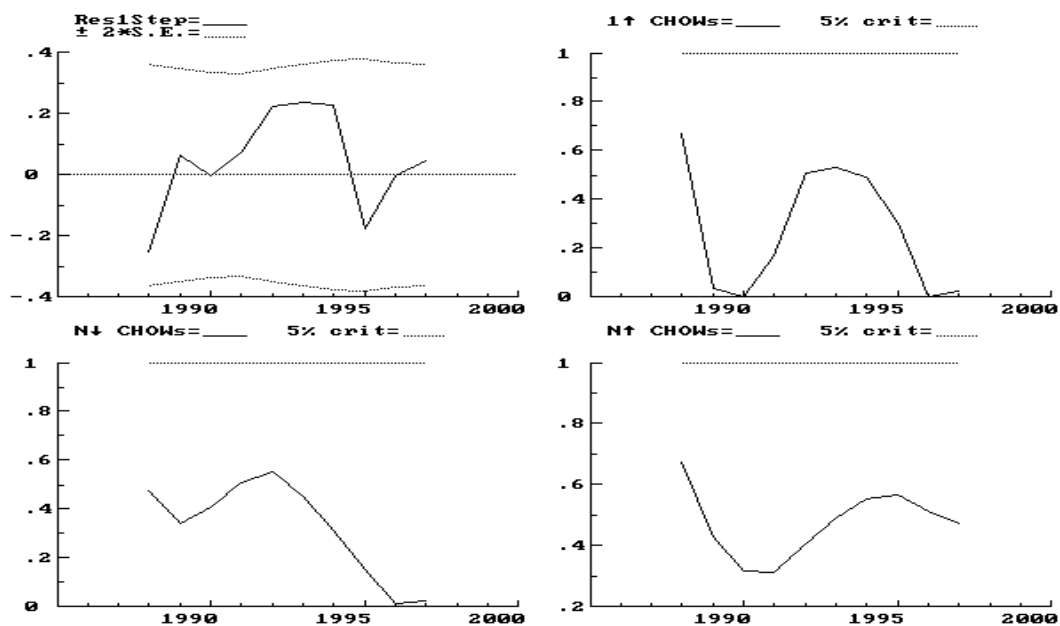
AR 1- 2F(2, 18) = 0.34204 [0.7148]  
ARCH 1 F(1, 18) = 0.99939 [0.3307]  
Normality Chi<sup>2</sup>(2) = 0.80779 [0.6677]  
Xi<sup>2</sup> F(10, 9) = 0.41481 [0.9066]  
RESET F(1, 19) = 0.34547 [0.5636]

Solved Static Long Run equation

LOG(OSNFR) = -4.112 +0.8293 LOG(COM) +2.793 D90 +1.248 D96S  
(SE) (2.057) (0.1912) (0.989) (0.4696)

WALD test Chi<sup>2</sup>(3) = 36.799 [0.0000] \*\*





**OTHER NON-FACTOR SERVICES EXPENDITURES  
(Millions of US\$)**

**OLS Estimation (1972 to 1997): LOG(OSNFD)**

Variable	Coefficient	Std.Error	t-value	t-prob	PartR <sup>2</sup>
Constant	-2.1881	0.78769	-2.778	0.0116	0.2784
LOG(OSNFD(-1))	0.53588	0.11286	4.748	0.0001	0.5299
LOG(COM)	1.3182	0.31488	4.186	0.0005	0.4670
LOG(COM(-1))	-0.85090	0.27553	-3.088	0.0058	0.3229
D90	0.87692	0.19697	4.452	0.0002	0.4977
D93	0.52772	0.19469	2.711	0.0135	0.2687

where COM = XTV+MTV

R<sup>2</sup> = 0.934749 F(5, 20) = 57.302 [0.0000]  $\hat{\alpha}$  = 0.18759 DW = 1.52  
 RSS = 0.7038015188 for 6 variables and 26 observations

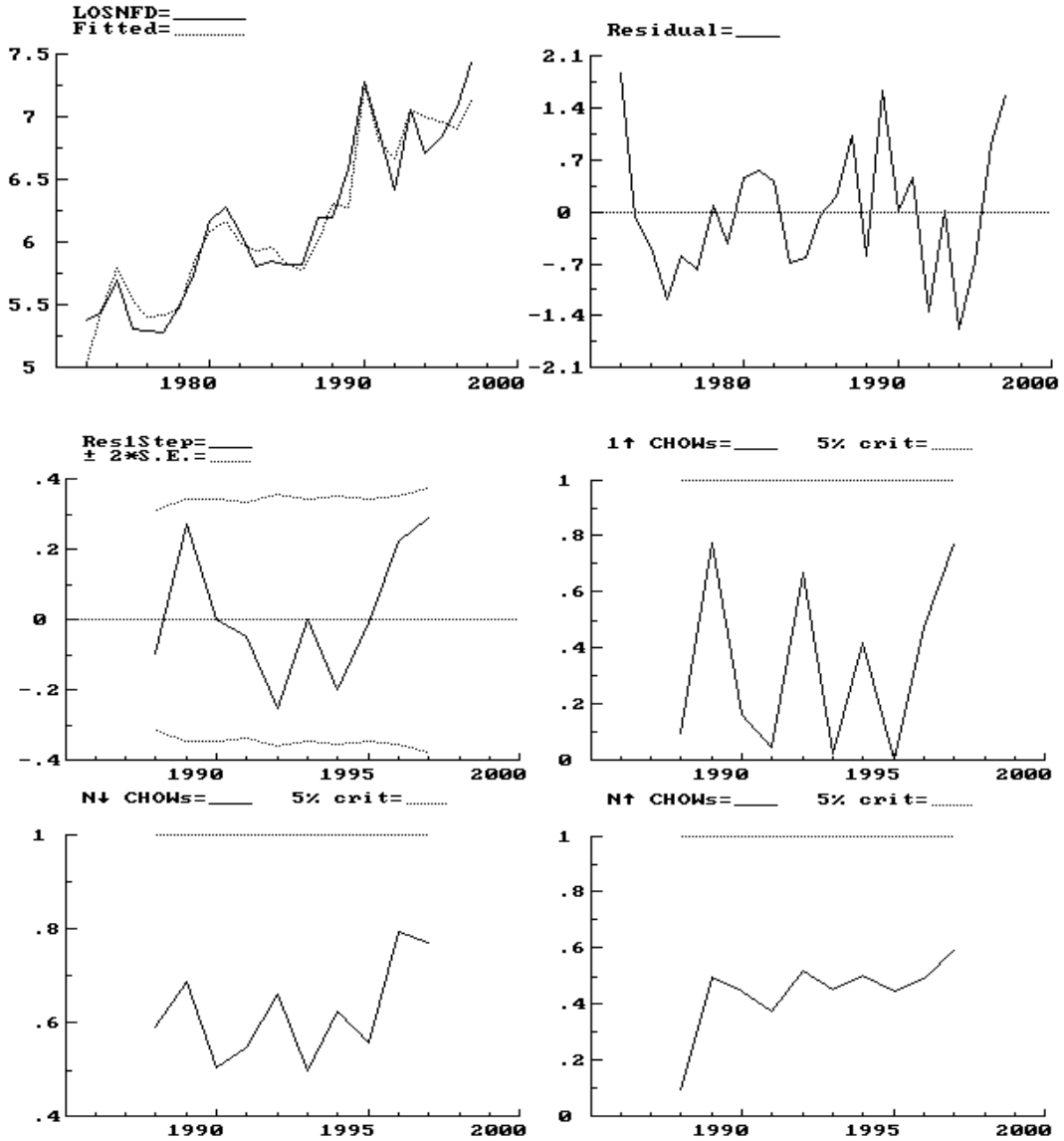
AR 1- 2F( 2, 18) = 0.28468 [0.7556]  
 ARCH 1 F( 1, 18) = 1.4247 [0.2481]  
 Normality Chi<sup>2</sup>(2) = 0.94417 [0.6237]  
 Xi<sup>2</sup> F(10, 9) = 1.0037 [0.5024]  
 RESET F(1, 19) = 0.82961 [0.3738]

Solved Static Long-Run Equation

$$\text{LOG(OSNFD)} = -4.714 + 1.007 \text{ LOG(COM)} + 1.889 \text{ D90} + 1.137 \text{ D93}$$

(SE) (1.582) (0.1468) (0.5747) (0.51)

WALD test  $\text{Chi}^2(3) = 54.717 [0.0000] **$



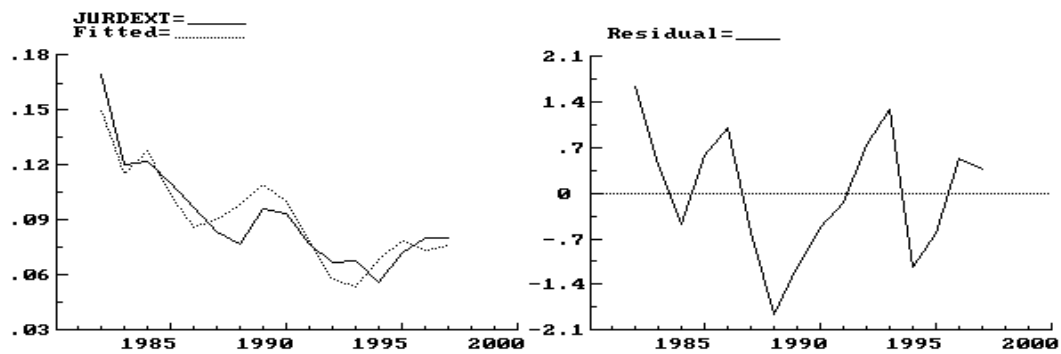
**FOREIGN INTEREST EXPENDITURES**  
(Millions of US\$)

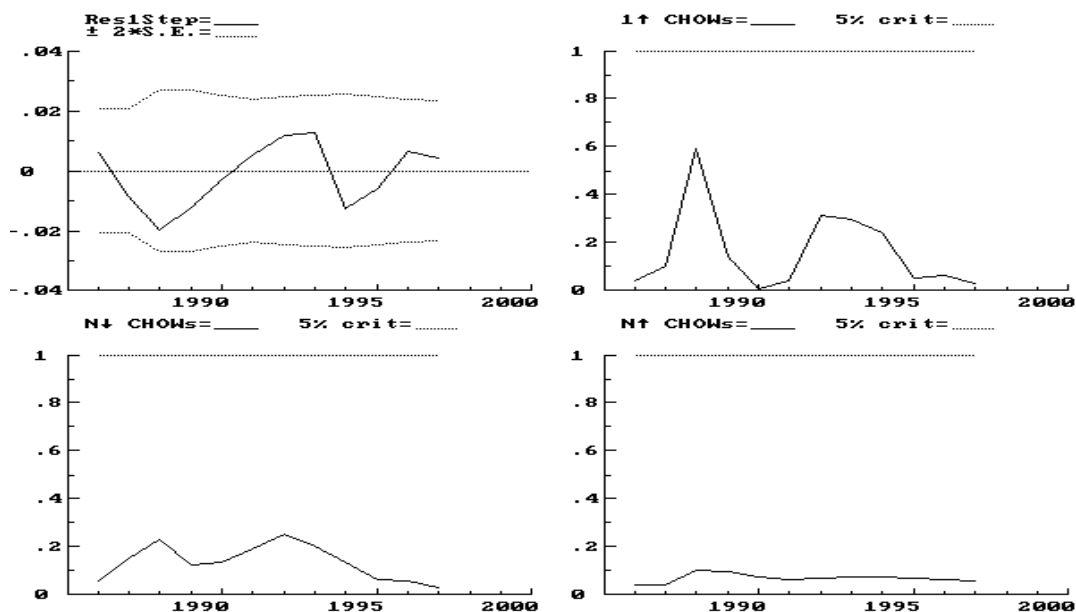
**OLS Estimation (1982 to 1997): JURDES/DEXT(-1)**

Variable	Coefficient	Std.Error	t-value	t-prob	PartR <sup>2</sup>
Constant	0.020467	0.0088209	2.320	0.0359	0.2777
LIBOR	0.0095963	0.0011178	8.585	0.0000	0.8404

R<sup>2</sup> = 0.840369 F(1, 14) = 73.702 [0.0000]  $\hat{\sigma}$  = 0.0116238 DW = 1.23  
RSS = 0.0018915703 for 2 variables and 16 observations

AR 1- 2F( 2, 12) = 2.2872 [0.1440]  
ARCH 1 F( 1, 12) = 0.0092894 [0.9248]  
Normality Chi<sup>2</sup>(2) = 0.10955 [0.9467]  
Xi<sup>2</sup> F( 2, 11) = 1.1425 [0.3541]  
Xi\*Xj F( 2, 11) = 1.1425 [0.3541]  
RESET F( 1, 13) = 7.8465 [0.0150] \*





**NET FACTOR SERVICES LESS INTEREST  
(Millions of US\$)**

**OLS Estimation (1972 to 1996): LOG(-SFEXJ)**

Variable	Coefficient	Std.Error	t-value	t-prob	PartR <sup>2</sup>
LOG(-SFEXJ(-1))	0.49093	0.14502	3.385	0.0028	0.3531
LOG(KED)	0.22409	0.073960	3.030	0.0064	0.3042
LOG(PIB)	1.0612	0.54754	1.938	0.0662	0.1517
D78	0.84186	0.25319	3.325	0.0032	0.3449

R<sup>2</sup> = 0.999062     $\hat{\alpha}$  = 0.247402    DW = 1.92

\* R<sup>2</sup> does NOT allow for the mean \*

RSS = 1.285361917 for 4 variables and 25 observations

AR 1- 2F( 2, 19) = 2.2457 [0.1332]

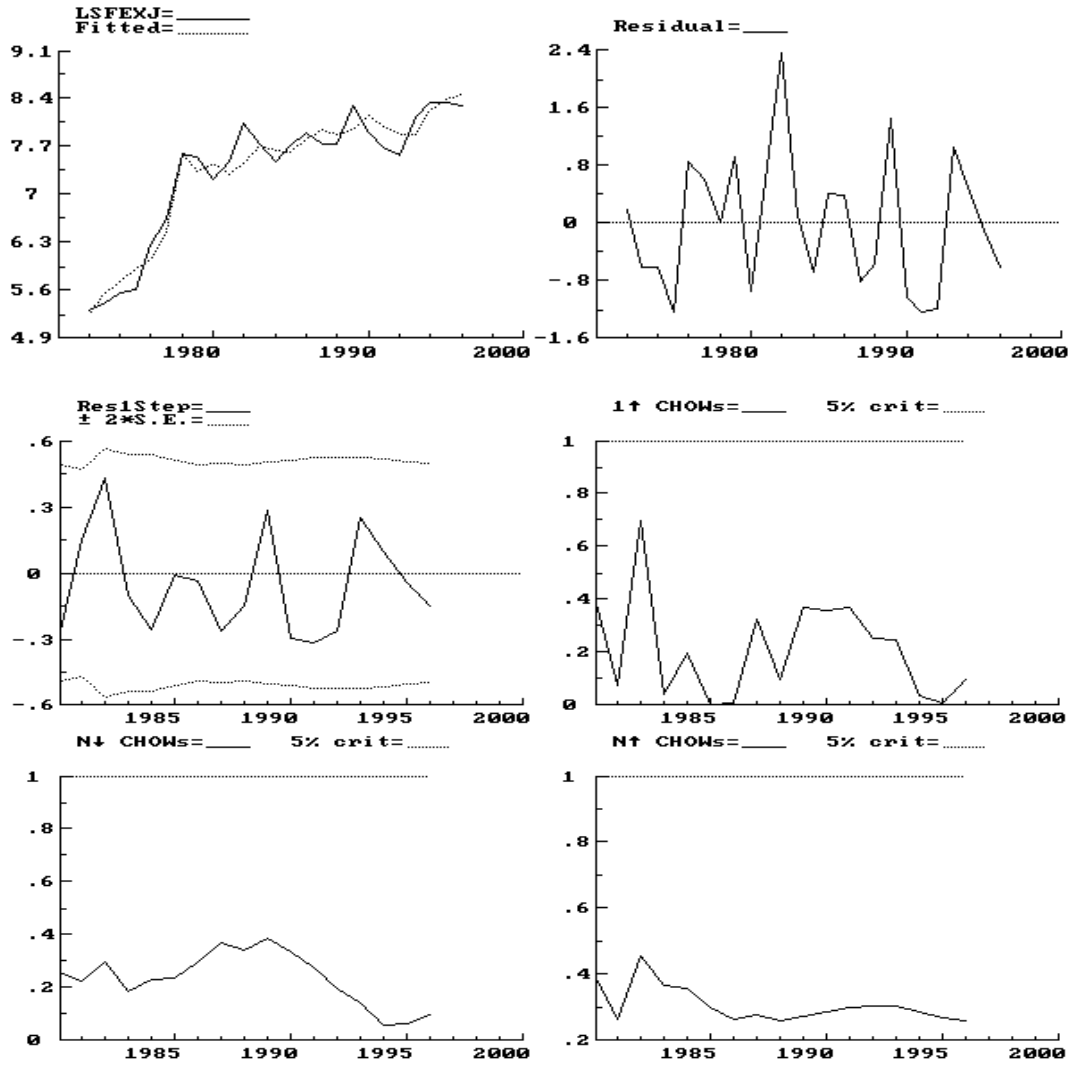
ARCH 1 F( 1, 19) = 0.082554 [0.7770]

Normality Chi<sup>2</sup>(2) = 1.8183 [0.4029]

Xi<sup>2</sup> F( 7, 13) = 0.37145 [0.9031]

Xi\*Xj F(10, 10) = 0.33602 [0.9499]

RESET F( 1, 20) = 0.47736 [0.4976]



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published herein have not been proofread.*

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