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An Annual Macroeconometric Model of the Philippines

by

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ABSTRACT

This paper presents the estimation and dynamic historical simulation results of a demand- driven macro model of the Philippines. The model covers the period 1967 to 1988 using annual data. The model has four main parts. A core model describes the real behavior of the economy while three sub-blocks represent the balance of payments (BOP), the government and the monetary accounts. The IS-LM framework is modified to include the portfolio balance approach to exchange rate determination.

The first section makes an introduction. The second section gives a rough sketch of the main theoretical basis of the model. The last section shows the estimation and historical simulation results and the simulation statisitics.

An Annual Macroeconometric Model of the Philippines

Carlos C. Bautista[1]

1. Introduction

This paper presents the estimation and dynamic historical simulation results of a macro model of the Philippines. Ex-ante forecasts of key macro variables are yet to be done. The model covers the period 1967 to 1988 using annual data. The data were gathered from the National Statistical Coordinating Board, the Central Bank of the Philippines (CB) and the Department of Finance.

The model has four main parts. A core model describes the real behavior of the economy while three sub-blocks represent the balance of payments (BOP), the government and the monetary accounts.

The model is small compared to other existing Philippine models, e.g., the PIDS model (See Constantino and Yap). The model has 31 equations, 24 are behavioral and 7 are identities. The behavioral equations were estimated usng ordinary least squares (OLS). There are 47 variables 31 of which are endogenous and 16 are exogenous. The

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exogenous variables are US GNP, three dummies, two statistical discrepancy variables, a time variable and the items on the capital account of the BOP. The model was constructed to analyze Philippine foreign debt.

The next section gives a rough sketch of the main theoretical basis of the model. The last section shows the empirical results.

2. Framework

The model is demand-driven, i.e., total output is determined on the demand side and is the sum of its components, $y = c + i + g + x - m$.

The IS-LM framework is modified to include the portfolio balance approach to exchange rate determination.[2] Instead of the money-bond financial system, three assets including foreign exchange/asset are assumed to comprise private financial wealth. Thus

$$1) \qquad Z = TL + B + F$$

where Z is private wealth, TL is money (or total liquidity), B are domestic (bonds) asset holdings and F are foreign

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[2]A managed floating rate regime is assumed in the model. Moving from this to a fixed rate regime is quite easily done in empirical implementation. The literature on exchange rate determination is quite vast. An excellent survey was done by Krueger (1983). Classic are articles are Kouri (1976) and Dornbusch (1976).

assets held by the private sector.

2.1 *Asset Demands*

Asset holdings follow the usual gross substitution assumptions. The demand functions are:

2) $TL = TL(TBR91, XINF, GNPR)$; $TL_1<0$, $TL_2<0$, $TL_3>0$

3) $B = B(TBR91, XINF, GNPR)$; $B_1>0$, $B_2<0$, $B_3<0$

4) $F = F(TBR91, XINF, GNPR)$; $F_1>0$, $F_2>0$, $F_3<0$

where TBR91 is the 91-day treasury bills rate, XINF is the actual depreciation rate of the domestic currency.[3] The former is the rate of return on domestic earning assets while the latter is considered as the rate of return on foreign assets. GNPR is real gross national product.

Because of the wealth constraint, equilibrium in two markets makes the system determinate by Walras' Law. For example, equating demand and supply in the domestic earning asset and foreign asset markets yields two equilibrium conditions which determine TBR91 and XINF. Given GNPR, money demand is determined by using the equilibrium rates of

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[3]The usual specification is that the rate of return on foreign assets is the foreign interest rate plus the expected rate of depreciation. Because of the imperfect substitution assumption between assets, the interest parity condition ($r=r'+\pi$) is assumed away. The simplification in this paper is the use of the actual depreciation as the sole return to holding foreign assets.

can influence private foreign asset holdings through IRESCB.

2.3 Demand for Reserves

When its desired reserve level differs from the actual, the CB is assumed to make adjustments in the following manner:

$$10)\quad IRESCB - IRESCB_{t-1} = \alpha(IRESCB^* - IRESCB_{t-1}) \;:\; 0< \alpha <1$$

where α is the coefficient of adjustment. The CB desires reserves to facilitate adjustments in the BOP and for financing import requirements. The desired demand for reserves is therefore[5]:

$$11)\qquad IRESCB^* = a_0 + a_1 BOP + a_2 APM + a_3 ML$$

where APM is the ratio of real imports to income and proxies for the marginal propensity to import. The inverse of the latter measures the amount of domestic adjustment required to hit the target reserve level. ML is the dollar value of imports. Substituting (11) in (10) gives the estimating equation for reserve demand:

$$12)\quad IRESCB = \alpha a_0 + \alpha a_1 BOP + \alpha a_2 APM + \alpha a_3 MD + (1-\alpha) IRESCB_{t-1}$$

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[5]Levy's (1983) empirical work is followed in this regard.

2.4 *Aggregate Demand*

The goods market is described by the identity:

13) $$GNPR = CPR + IR + CGR + XR - MR + NFIAR + STATDR$$

where CPR is private consumption, IR is investment, CGR is government consumption, XR and MR are exports and imports of goods and services, NFIAR is net factor income from abroad, and STATDR is the statistical discrepancy. All of these are in real terms.

Keynesian equations are specified for the standard components of demand and are shown in the next section. Substitution of these equations in (13) yields the downward sloping IS equation. Regression results are shown in the next section. The link between the demand side and the monetary sector is through investment.

2.5 *Aggregate Supply*

Two price equations describe the supply side of the economy. Wage inflation is related to unemployment as follows:

14) $$(W_t - W_{t-1})/W_{t-1} = -\sigma U$$

where U is the unemployment rate and σ measures is a measure of wage response. In turn, Okun's Law states that the

unemployment rate is proportional to the GNP gap:

15) $U = \delta GAP$

Substituting (15) in (14), gives the the equation that can be estimated:

16) $W_t = W_t(GAP, W_{t-1})$

where GAP is computed as the ratio of GNPR's trend to its actual value.[6]

The general price level equation is the inverted aggregate supply function:

17) $PGNP = PGNP(W, EXR, TBR91, GNPR)$

This function arises from profit maximization of firms. EXR proxies for the cost of imported intermediate inputs. The presence of TBR91 in the equation allows some structuralist flavor in the model to account for the supply effects of monetary movements.[7]

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[6]The model was intentionally kept small. This specification does not permit a direct assessment of the labor market. It is however desirable to endogenize the wage rate although some can argue that the wage rate is fixed and institutionally determined.

[7]One of the first to implement this was Cavallo (1979).

2.5 BOP and Government Accounts

The BOP identity and the government balance are as follows:

18) BOP = XD - MD + OXD - OMD + NTRANS + (LTLIN - LTLOUT + DIIN - DIOUT + STKA + EROM + NGOLD + ADJ)

19) DEFG = TXR + NTXR - (GPEXP + CAPOUT) + NETL

Variable definitions are given in Appendix A. In equation (18), the BOP is the sum of the current account (first five terms on the right hand side) and the capital account. Estimating equations for XD, MD, OXD and NTRANS. OMD is held exogenous so that simulations on interest payments can be done. All BOP components are in dollars.

Equation (19), an identity, simply states that the government deficit is the difference between revenues and expenditures. All right hand side variables are specified and the results are shown in the next section.

3. Estimation and Dynamic Historical Simulation Results

3.1 OLS Estimates

Twenty-four equations were estimated using ordinary least squares. The above framework was used as a guide in

the estimation process. The estimation of course presented problems.[8]

The results are presented in Table 1 below. The third column shows the T statistics and the fourth gives the 2-tail significance. The other statistics are the Durbin-Watson and the adjusted R-squared. Corrections for serial correlation were done using Cochrane and Orcutt's procedure. In the estimation process, these statistics were used in choosing the equations to be included in the simulations. For some equations, a search for the proper lagged variables was done to improve fit and significance. Dummies were also used extensively.[9]

3.2 Historical Simulation

After the estimation, a dynamic historical simulation covering the period 1977 to 1988 was conducted. The identities involved in the simulation are equations 5, 6, 13, 18 and 19. Other identities are GNPN = GNPR*PGNP/100

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[8]The usual problem that arises is the matching of the data from different sources e.g., the current account of the BOP which is in foreign currency and the foreign trade sector of the National Accounts which is in domestic currency. In this case one has to resort to bridge equations which are estimated econometrically.

[9]The variables computed from the data gathered and used in the estimation are:

YDR	- real disposable income
TTD	- total trade in dollars
DOPP	- BOP in domestic currency
TLR	- real liquidity
DUMG	- slope dummy in wage equation
OPEXPR	- real operating expenses

and $EXR_t = EXR_{t-1} * (XINF/100+1)$. GNPN is nominal gross national product. The results are shown in Table 2. Variables starting with starting with the letter "s" are results of the simulation.

Table 3 presents the three simulation statistics, the root mean-square percent error (RMSPE), the root mean square error (RMSE) and Theil's inequality coefficient (U). These statistics are useful in evaluating simulation models and are measures of goodness of fit or deviations of simulated values from actual values through time. They are defined as follows:

$$RMSPE = \{\Sigma_t [(x_t^s - x_t^a)/x_t^a]^2/t\}^{1/2}$$

$$RMSE = [\Sigma_t (x_t^s - x_t^a)^2/t]^{1/2}$$

$$U = RMSE/\{[\Sigma_t (x_t^s)^2/t]^{1/2} + [\Sigma_t (x_t^a)^2/t]^{1/2}\}$$

where x_t^s is the simulated value of variable x, x_t^a is the actual value and t is the number of periods in the simulation. A value of 10 percent or less for RMSPE is deemed reasonable. For the inequality coefficient, U = 0 denotes perfect fit. Graphic representations of important variables are shown in Appendix B.

Table 1
OLS estimates

Sample: 1976 - 1988
Dependent Variable is CPR

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	17382.399	3.0844428	0.001
YDR	0.2923961	5.6882806	0.000
TIME	1660.1409	5.8825468	0.000
CPR(-1)	-0.0020904	-0.5364039	0.603
Adj. R-squared	0.99388	D.W.	1.67003

Sample: 1970 - 1988
Dependent Variable is IR

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	-8046.1444	-1.1097943	0.287
TBR91	-592.18651	-3.0960986	0.008
DUM1	5432.3561	2.0140599	0.065
TIME	-1195.4331	-2.3125354	0.038
GNPR	0.5156378	2.6149404	0.021
IR(-1)	0.4335834	2.1749774	0.049
Adj. R-squared	0.97707	D.W.	1.58033

Sample: 1972 - 1988
Dependent Variable is MR

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	-17802.341	-3.4272237	0.006
EXR(-1)	-1152.2466	-2.6352846	0.025
EXR(-2)	1363.5161	3.5087343	0.006
PGNP	40.876854	4.5202559	0.001
GNPR	0.7417265	5.5480100	0.000
IRESCB	-1.2970750	-3.1859198	0.010
TIME	-2946.2910	-4.2698601	0.002
Adj. R-squared	0.96829	D.W.	2.17504

Table 1. continued

Sample: 1971 - 1988
Dependent Variable is XR

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	2291.1365	0.9397604	0.366
EXR(-1)	533.43561	1.3704886	0.196
PGNP(-1)	-29.499981	-1.7273503	0.110
USGNP	9.4088197	3.8500563	0.002
DUM1	-2599.8777	-2.8990878	0.013
XR(-1)	-0.4727135	-1.6027169	0.135
Adj. R-squared	0.97099	D.W.	1.89811

Sample: 1970 - 1988
Dependent Variable is XD

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	-1165.9366	-2.6352621	0.019
XR	0.2793659	2.8609052	0.012
EXR	-193.17410	-5.0824083	0.000
TIME	202.71040	2.2170479	0.042
Adj. R-squared	0.94033	D.W.	1.68484

Sample: 1971 - 1988
Dependent Variable is MD

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	-1132.7405	-1.9729320	0.069
MR	0.2003059	3.5215245	0.003
DUM1	-875.10098	-1.7821904	0.096
MD(-1)	0.6456327	5.6774517	0.000
Adj. R-squared	0.94874	D.W.	1.63800

Sample: 1971 - 1988
Dependent Variable is OXD

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	-298.20583	-1.0682176	0.303
EXR	46.364119	1.4562904	0.167
TTD(-1)	0.1161979	2.4071187	0.030
OXD(-1)	0.4563073	1.8345480	0.088
Adj. R-squared	0.94649	D.W.	2.06109

Sample: 1976 - 1988
Dependent Variable is NTXR

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	-15544.773	-0.8837236	0.400
GNPN	0.0414726	3.6822857	0.005
DUM1	-5560.6546	-5.2264827	0.001
RHO	0.9059277	5.3023856	0.000
Adj. R-squared	0.97951	D.W.	2.06227

Sample: 1976 - 1987
Dependent Variable is OPEXP

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	54870.168	5.0239108	0.001
GNPN	0.2720972	11.715420	0.000
TIME	-7275.6647	-5.9555834	0.000
DUM1	-24120.867	-8.9534830	0.000
Adj. R-squared	0.98666	D.W.	2.11919

Table 1, continued

Sample: 1976 - 1987
Dependent Variable is CAPOUT

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	-19344.726	-2.1447235	0.069
IR(-1)	1.3202765	1.5140597	0.174
IR(-2)	-0.8150974	-0.9999260	0.351
CAPOUT(-1)	0.6494992	4.4071923	0.003
TBR9i(-1)	1008.3580	2.3336112	0.052
Adj. R-squared	0.83896	D.W.	2.75488

Sample: 1976 - 1987
Dependent Variable is NETL

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	-1634.0814	-2.2079271	0.058
GNPN	0.0123678	6.2597971	0.000
BOPP(-1)	0.1289532	5.0303615	0.001
RHO	-0.6690173	-2.3542766	0.046
Adj. R-squared	0.84519	D.W.	2.39483

Sample: 1976 - 1988
Dependent Variable is NDA

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	-3740.4362	-0.9961912	0.345
NFA	-1.0130203	-17.031384	0.000
GNPN	0.0734759	4.5126292	0.001
DEFG(-1)	-0.2428403	-1.3483895	0.210
Adj. R-squared	0.99758	D.W.	1.61197

Table 1, continued

Sample: 1971 - 1988
Dependent Variable is TL

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	217815.67	0.2633146	0.796
RM	1.5509217	2.0776680	0.055
RHO	0.9741017	7.8828610	0.000
Adj. R-squared	0.98421	D.W.	1.31557

Sample: 1971 - 1988
Dependent Variable is XINF

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	20.593639	2.5436372	0.024
TBR91	-0.5951091	-1.8238100	0.091
IRESCB	0.0062439	2.6475651	0.020
GNPR(-1)	-0.0004981	-2.4745605	0.028
TIME	0.7894818	1.4101400	0.182
Adj. R-squared	0.68143	D.W.	2.64262

Sample: 1971 - 1988
Dependent Variable is IRESCB

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	2621.3632	2.4523593	0.032
BOP	0.6391367	4.2574735	0.001
APM	-11019.146	-1.8711381	0.088
MD	0.6060750	3.2094139	0.008
DUM1	-1675.0761	-3.5133643	0.005
TIME	-114.50346	-2.4148819	0.034
IRESCB(-1)	-0.1014696	-0.3113602	0.761
Adj. R-squared	0.77297	D.W.	2.14886

Sample: 1970 - 1988
Dependent Variable is NFIAR

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	1633.8889	2.7136445	0.017
TBR91	-182.15167	-3.3592383	0.005
EXR	35.405632	1.5272712	0.149
DUM1	1825.4811	2.0442117	0.060
NFIAR(-1)	0.5703668	3.1822879	0.007
Adj. R-squared	0.78341	D.W.	1.63679

Sample: 1971 - 1988
Dependent Variable is TBR91

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	5.9846836	4.6502360	0.000
XINF	-0.1470257	-4.1914117	0.001
TLR	-0.0002664	-2.2334492	0.044
GNPR	0.0001342	3.4853526	0.004
DUM1	12.831503	12.331108	0.000
Adj. R-squared	0.97331	D.W.	2.14042

Sample: 1971 - 1988
Dependent Variable is NTRANS

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	40.006791	0.9985460	0.336
USGNP	0.1694988	2.3490607	0.033
DUM1	-146.57576	-4.0145989	0.001
TIME	-28.385313	-1.5414472	0.147
NTRANS(-1)	0.8280774	3.8472921	0.002
Adj. R-squared	0.91401	D.W.	1.57643

Sample: 1968 - 1987
Dependent Variable is W

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	72.077782	1.9271481	0.075
GAP	-65.337244	-1.8129078	0.091
DUMG	309.87528	3.9590124	0.001
DUM1	-243.01092	-3.4719504	0.004
TIME	2.5462251	2.0092478	0.064
W(-1)	0.8242848	8.2078821	0.000
Adj. R-squared	0.99823	D.W.	2.694100

Sample: 1976 - 1988
Dependent Variable is TXR

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	488.27006	0.2063600	0.841
GNPN	0.1118683	24.733378	0.000
DUMTA	-7675.1406	-2.8432673	0.019
DUMSAL	5657.8454	1.9176480	0.087
Adj. R-squared	0.98356	D.W.	2.66893

Sample: 1972 - 1988
Dependent Variable is STFL

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	36132.333	2.5155048	0.027
BOPP(-1)	-0.3086734	-1.9498558	0.075
TIME	-4098.0148	-4.7574842	0.000
DUM1	-9550.4201	-1.4482566	0.173
RHO	0.6072566	2.5902012	0.024
Adj. R-squared	0.93750	D.W.	2.22414

Table 1, continued

Sample: 1972 - 1988
Dependent Variable is MLTFL

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	20103.174	1.8903897	0.081
BOPP	-0.4249665	-1.8878733	0.082
TIME	-2277.2329	-2.5490273	0.024
MLTFL(-1)	0.7629446	6.2612986	0.000
Adj. R-squared	0.94666	D.W.	1.47684

Sample: 1971 - 1988
Dependent Variable is PGNP

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	-314.52274	-13.037675	0.000
W(-1)	1.4255020	3.6091243	0.003
EXR	15.243332	2.6857578	0.019
TBR91	5.0301937	3.1908534	0.007
GNPR	0.0022595	4.2730704	0.001
Adj. R-squared	0.99560	D.W.	1.46583

Sample: 1976 - 1987
Dependent Variable is CGR

VARIABLE	COEFFICIENT	T-VALUE	SIG. LEVEL
C	2933.8575	3.4548097	0.009
GNPR	0.0617243	8.9698704	0.000
OPEXPR	0.0731950	1.6184811	0.144
OPEXPR(-1)	-0.1002917	-1.1429309	0.286
Adj. R-squared	0.88627	D.W.	2.073374

Table 2
Simulation Results

year	GNPR	SGNPR	IR	SIR
1977	77983.00	76161.95	21121.00	20544.55
1978	82478.00	80771.35	22928.00	21433.97
1979	88158.00	85397.66	25493.00	22487.48
1980	92532.00	88772.45	26609.00	23482.28
1981	95722.00	92666.01	27220.00	24386.06
1982	97539.00	95906.07	26267.00	24571.84
1983	98619.00	99527.90	24923.00	24774.28
1984	91931.00	88035.23	15851.00	14521.29
1985	87867.00	87492.25	11124.00	9670.728
1986	89504.00	90484.02	10111.00	11122.13
1987	94797.00	92842.75	13171.00	11672.04
1988	101186.0	99617.09	15705.00	13785.27

year	CPR	SCPR	CGR	SCGR
1977	51416.00	50817.73	7485.000	7413.457
1978	54098.00	53498.33	7710.000	7639.366
1979	56718.00	56337.65	7995.000	7998.556
1980	59270.00	58596.30	8294.000	8161.669
1981	61617.00	61042.39	8598.000	8465.243
1982	63335.00	63300.40	9145.000	8686.653
1983	65348.00	65676.02	8690.000	8920.031
1984	66033.00	64396.31	8255.000	7735.748
1985	65977.00	65965.46	8221.000	8316.926
1986	66597.00	67934.87	8187.000	8541.123
1987	70409.00	70025.62	8774.000	8365.848
1988	74646.00	73251.85	9769.000	8880.291

year	DEFG	SDEFG	XINF	SXINF
1977	-2852.000	-4121.817	0.506564	-2.847552
1978	-2167.000	-2452.458	0.502324	-2.239507
1979	-342.0000	-4441.524	-0.159947	-5.135902
1980	-3387.000	-4452.404	-1.781293	-4.301723
1981	-12145.00	-5365.036	-4.915376	-5.622766
1982	-14404.00	-8197.305	-7.497656	-10.68247
1983	-6422.000	-10974.98	-23.15099	-13.64245
1984	-8325.000	-2273.077	-33.45170	-29.90536
1985	-11749.00	-15377.92	-10.25726	-14.73323
1986	-34428.00	-31992.63	-8.723764	-2.823938
1987	-19362.00	-19687.73	-0.884879	-3.927295
1988	-24421.00	-19699.26	-2.498260	-2.646138

Table 2, continued

year	PGNP	SPGNP	TBR91	STBR91
1977	196.5200	211.0854	10.90100	11.30891
1978	214.6300	236.0520	10.88800	11.36673
1979	247.3200	268.8451	12.25400	12.24855
1980	285.8800	293.7872	12.14100	12.25987
1981	317.2000	326.7713	12.60600	12.83368
1982	343.9000	371.1206	13.81100	13.98443
1983	384.0500	424.9884	14.17300	14.91344
1984	572.4900	567.1585	30.53400	29.52294
1985	680.2800	696.5413	26.80600	27.71515
1986	686.7900	705.7955	14.43300	13.12601
1987	741.9700	741.5237	11.39000	13.29547
1988	814.1100	787.9929	14.40600	14.00938

year	EXR	SEXR	IRESCB	SIRESC
1977	7.402800	7.658376	1525.090	1783.071
1978	7.365800	7.833815	1882.720	1984.967
1979	7.377600	8.257935	2422.920	1846.386
1980	7.511400	8.629136	3155.370	2223.678
1981	7.899700	9.143239	2573.960	2209.581
1982	8.540000	10.23678	1711.380	1693.115
1983	11.11270	11.85395	864.7000	1439.641
1984	16.69870	16.91135	886.0600	389.8884
1985	18.60730	19.83346	1061.140	1604.225
1986	20.38570	20.40982	2458.980	1951.335
1987	20.56770	21.24414	1958.690	1903.042
1988	21.09470	21.82157	2058.880	2237.970

year	W	SW	TL	STL
1977	132.9000	134.3285	43931.10	42104.91
1978	138.4000	142.3531	51837.20	51260.66
1979	145.8000	150.4917	57360.00	60045.11
1980	151.5000	159.9367	67803.20	69132.15
1981	169.1200	170.1589	82091.30	78646.23
1982	174.2900	181.6353	95268.80	89709.34
1983	187.6400	193.9507	112962.1	102606.3
1984	265.5000	260.7043	121215.2	117152.8
1985	312.6500	307.7741	132882.5	130917.8
1986	328.6000	319.5808	141139.5	143468.5
1987	335.5100	332.7470	159527.5	159338.5
1988	NA	344.4901	194940.0	169324.6

Table 2, continued

year	XR	SXR	MR	SMR
1977	14120.00	13181.21	14274.00	13904.85
1978	14657.00	14278.18	16116.00	15147.28
1979	15650.00	15505.60	18765.00	17247.86
1980	17741.00	16196.77	19377.00	17085.41
1981	17947.00	18365.67	18854.00	18544.27
1982	17486.00	18035.34	19510.00	20397.91
1983	19262.00	20038.19	21746.00	22109.60
1984	20846.00	19429.31	18175.00	17439.48
1985	19351.00	20528.90	13995.00	14181.46
1986	23560.00	22465.12	15802.00	16911.47
1987	23245.00	24203.71	19987.00	20558.27
1988	26675.00	26063.19	27378.00	23926.13

year	BOP	SBOP	RM	SRM
1977	137.0000	275.4823	9814.000	8706.801
1978	-91.00000	419.2351	12093.00	11450.82
1979	-576.0000	-32.96152	14629.00	14036.88
1980	-353.0000	132.3916	16192.00	16897.82
1981	-547.0000	-65.72156	17798.00	20112.00
1982	-1671.000	-1185.565	18644.00	24401.22
1983	-2118.000	-2102.413	27958.00	29945.55
1984	243.0000	-186.7031	33632.00	36624.34
1985	2301.000	2506.952	38447.00	42868.67
1986	1242.000	785.6874	31029.00	48401.02
1987	264.0000	560.8308	57738.00	56140.27
1988	650.0000	307.9686	67282.00	60276.34

year	NDA	SNDA	NFA2	SNFA2
1977	5362.000	13645.84	4452.000	-4939.041
1978	6086.000	25361.64	6007.000	-13910.83
1979	8979.000	38047.55	5650.000	-24010.66
1980	12686.00	47392.59	3506.000	-30494.78
1981	21821.00	60222.73	-4023.000	-40110.73
1982	36714.00	73383.91	-18070.00	-48982.68
1983	89073.00	77238.84	-61115.00	-47343.30
1984	121290.0	114454.8	-87658.00	-77830.44
1985	156480.0	141211.2	-118033.0	-98342.52
1986	184316.0	162330.7	-133287.0	-113929.6
1987	189990.0	173392.8	-132252.0	-117252.5
1988	188863.0	180031.1	-121581.0	-119754.8

Table 2, continued

year	TXR	SIXR	NTXR	SNTXR
1977	16955.00	18472.97	3004.000	2665.128
1978	20445.00	21817.40	3628.000	2819.169
1979	25956.00	24154.32	3514.000	3449.788
1980	30533.00	27646.43	4198.000	3853.188
1981	30062.00	32343.36	4538.000	4787.897
1982	33800.00	38288.14	4406.000	6259.676
1983	33848.00	45789.31	6793.000	8377.996
1984	50895.00	48668.73	7032.000	5382.103
1985	60476.00	60987.18	7708.000	9405.111
1986	65491.00	71930.83	13754.00	13684.88
1987	85923.00	77504.27	17291.00	17304.82
1988	90352.00	88302.06	22509.00	20903.56

year	NETL	SNETL	NTRANS	SNTRAN
1977	45.00000	-171.5791	260.0000	275.6708
1978	238.0000	1246.423	312.0000	294.4383
1979	853.0000	1461.415	355.0000	324.6297
1980	675.0000	1668.421	434.0000	357.5010
1981	929.0000	2183.307	472.0000	410.9821
1982	2218.000	2740.640	486.0000	462.8000
1983	2393.000	1998.698	472.0000	517.9528
1984	3749.000	1349.821	386.0000	449.5635
1985	1509.000	5480.839	379.0000	406.1246
1986	15003.00	12686.17	441.0000	526.4306
1987	8907.000	8941.689	573.0000	644.8565
1988	NA	9615.211	789.0000	773.8107

year	CAPOUT	SCAP	OPEXP	SOPEXP
1977	5047.000	6849.439	17719.00	18582.06
1978	6772.000	6401.563	19230.00	19441.04
1979	8351.000	7827.784	20608.00	22756.63
1980	12927.00	10309.27	24516.00	23974.34
1981	20760.00	12387.10	25056.00	28127.89
1982	19412.00	14697.64	30980.00	35306.84
1983	16146.00	16867.31	34522.00	46276.27
1984	19630.00	19329.13	42873.00	35644.96
1985	23149.00	21957.91	55275.00	58331.45
1986	26358.00	23795.51	72312.00	83126.66
1987	16510.00	16147.87	97159.00	89407.27
1988	NA	10894.61	NA	108395.1

Table 2, continued

year	OXD	SOXD	XD	SXD
1977	1085.000	1175.669	3151.000	3266.656
1978	1484.000	1445.712	3425.000	3742.134
1979	1655.000	1700.104	4601.000	4205.815
1980	2222.000	1972.500	5788.000	4529.908
1981	2896.000	2209.536	5722.000	5239.225
1982	2983.000	2517.857	5021.000	5306.034
1983	3127.000	2827.717	5005.000	5588.231
1984	2626.000	3332.025	5391.000	4643.893
1985	3288.000	3439.266	4629.000	4589.285
1986	3791.000	3336.777	4842.000	5221.600
1987	3454.000	3436.473	5720.000	5748.862
1988	3606.000	3719.077	7074.000	6359.493

year	MD	SMD	NFIAR	SNFIAR
1977	3915.000	3998.713	-484.0000	-489.1367
1978	4732.000	4483.049	-306.0000	-438.1969
1979	6142.000	5216.510	196.0000	-554.7594
1980	7727.000	5657.318	-36.00000	-610.1654
1981	7946.000	6234.464	-485.0000	-728.0809
1982	7667.000	6978.236	-1460.000	-966.2061
1983	7487.000	7801.333	-1301.000	-1213.997
1984	6070.000	6522.185	-2283.000	-2011.960
1985	5111.000	5043.724	-2037.000	-2034.376
1986	5044.000	5511.121	-1676.000	-1194.767
1987	6737.000	6543.361	-666.0000	-717.1809
1988	8159.000	7884.412	-348.0000	-354.3983

year	MLTFL	SMLTFL	STFL	SSTFL
1977	-2756.000	-7808.298	-4229.000	-10933.23
1978	-3374.000	-14576.67	-4725.000	-15122.28
1979	-3820.000	-20506.38	-8676.000	-19022.29
1980	-3637.000	-27908.79	-16466.00	-21682.15
1981	-4457.000	-35092.82	-20689.00	-26010.12
1982	-5226.000	-37949.05	-28538.00	-29444.49
1983	-36949.00	-36971.99	-36274.00	-29905.59
1984	-53792.00	-47752.74	-51552.00	-39561.19
1985	-85160.00	-80726.67	-53334.00	-50349.22
1986	-116963.0	-93845.95	-67744.00	-61202.07
1987	-120001.0	-104381.4	-54129.00	-54891.81
1988	-113582.0	-112489.0	-53040.00	-57711.37

Table 3
Simulation Statistics

	RMSPE	RMSE	U-Coef
GNPR	0.0251	2298.03	0.0125
CPR	0.0127	835.08	0.0066
IR	0.0956	1893.95	0.0470
CGR	0.0411	372.92	0.0223
NFIAR	4.7438	361.89	0.1377
PGNP	0.0610	20.50	0.0201
TBR91	0.0618	0.84	0.0232
EXR	0.0987	0.90	0.0313
W	0.0292	3.57	0.0117
TL	0.0552	8338.80	0.0373
XR	0.0515	975.35	0.0250
MR	0.0651	1405.13	0.0376
BOP	1.8463	400.01	0.1824
IRESCB	0.3245	463.24	0.1207
DEFG	3.4838	4085.65	0.1402
NDA	1.6963	23390.40	0.1033
NFA	4.2872	22465.62	0.1469
RM	0.1196	3316.39	0.0468
TXR	0.0883	4063.95	0.0394
NTXR	0.1898	1252.04	0.0611
CAPOUT	0.1935	3184.72	0.0967
OPEXP	0.1428	6110.00	0.0582
NETL	2.1962	1687.47	0.1474
XD	0.1017	556.98	0.0353
MD	0.1190	878.01	0.0694
OXD	0.1292	364.19	0.0657
XINF	9.1599	4.36	0.1792
STFL	3.7027	17943.49	0.1396
MLTFL	0.8684	6928.92	0.0887

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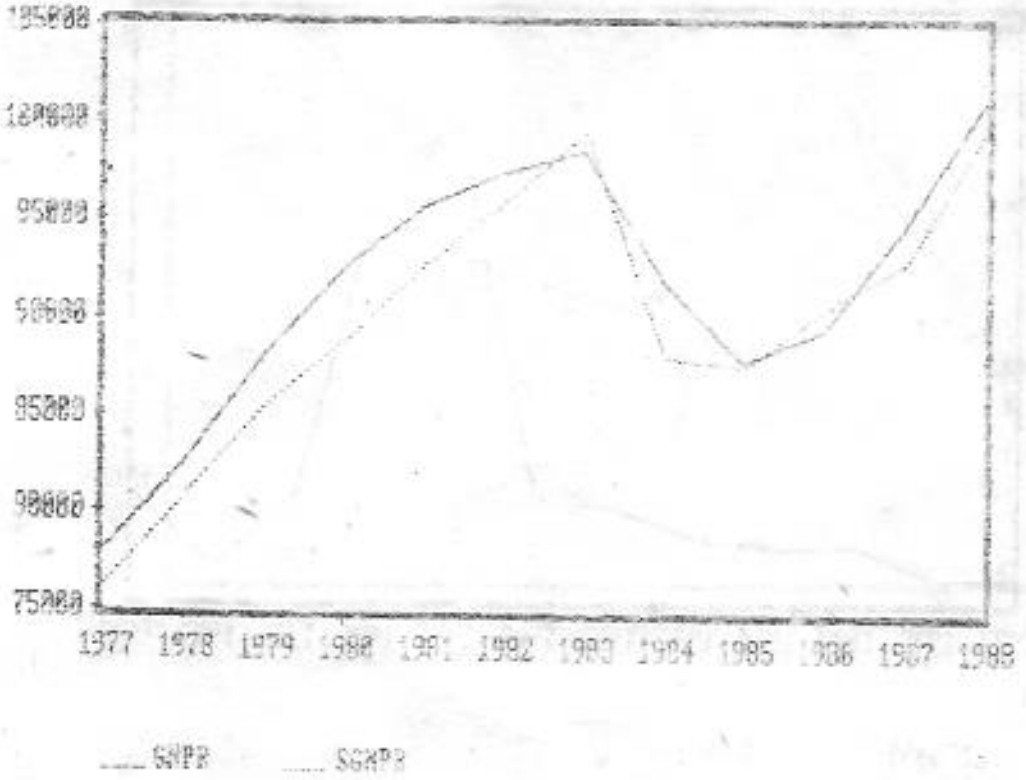
endogenous variables

CPR	- REAL PRIVATE CONSUMPTION
IR	- REAL PRIVATE INVESTMENT
CGR	- REAL GOVERNMENT CONSUMPTION
XR	- REAL EXPORTS OF GOODS AND SERVICES
MR	- REAL IMPORTS OF GOODS AND SERVICES
GNPR	- GROSS NATIONAL PRODUCT, REAL
GNPN	- GROSS NATIONAL PRODUCT, NOMINAL
XD	- MERCHANDISE EXPORTS IN DOLLARS
MD	- MERCHANDISE IMPORTS IN DOLLARS
OXD	- OTHER INFLOWS (CURRENT ACCOUNT) IN DOLLARS
BOP	- BALANCE OF PAYMENTS IN DOLLARS
TXR	- TAX REVENUES
NTXR	- NON-TAX REVENUES
OPEXP	- GOVERNMENT OPERATING EXPENSES
CAPOUT	- GOVERNMENT CAPITAL OUTLAY
NETL	- GOVERNMENT NET LENDING
DEFG	- GOVERNMENT DEFICIT
NFA	- NET FOREIGN ASSETS OF THE CENTRAL BANK
NDA	- NET DOMESTIC ASSETS OF THE CENTRAL BANK
RM	- RESERVE MONEY
TL	- TOTAL LIQUIDITY
TBR91	- TREASURY BILLS RATE, 91 DAYS
IRESCB	- INTERNATIONAL RESERVES OF THE CB IN DOLLARS
EXR	- NOMINAL EXCHANGE RATE
XINF	- DEPRECIATION RATE
PGNP	- GNP Deflator, (1972 = 100)
W	- WAGE RATE OF THE UNSKILLED WORKER, (1972 = 100)
NTRANS	- NET TRANSFERS IN DOLLARS
NFIAR	- NET FACTOR INCOME FROM ABROAD
STFL	- SHORT TERM FOREIGN LIABILITIES
MLTFL	- MEDIUM AND LONG TERM LIABILITIES

exogenous variables

USGNP	- US NOMINAL GNP, IN DOLLARS
TIME	- TIME DUMMY
DUM1	- CRISIS DUMMY, 1984-85 = 1; 0 otherwise
DUMTA	- TAX AMNESTY DYMMY
DUMSAL	- STRUCTURAL ADJUSTMENT LOAN DUMMY
TIME	- TIME DUMMY
STATDR	- STATISTICAL DISCREPANCY (NATIONAL ACCOUNTS)
RMER	- STATISTICAL DISCREPANCY (RESERVE MONEY)
ADJ	- REVALUATION ADJUSTMENTS IN DOLLARS
LTLIN	- LONG TERM LOANS (INFLOW) IN DOLLARS
LTLOUT	- LONG TERM LOANS (OUTFLOW) IN DOLLARS
DIIN	- DIRECT INVESTMENT (INFLOW) IN DOLLARS
DIOUT	- DIRECT INVESTMENT (OUTFLOW) IN DOLLARS
STKA	- SHORT TERM CAPITAL IN DOLLARS
EROM	- ERRORS AND OMISSIONS
OMD	- OTHER OUTFLOWS (CURRENT ACCOUNT) IN DOLLARS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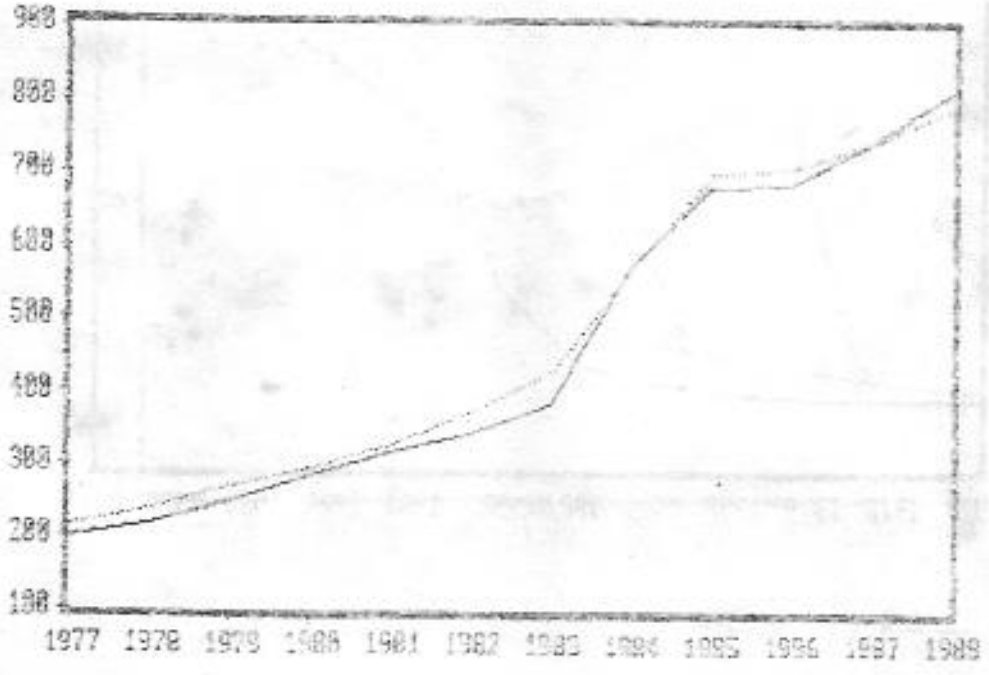
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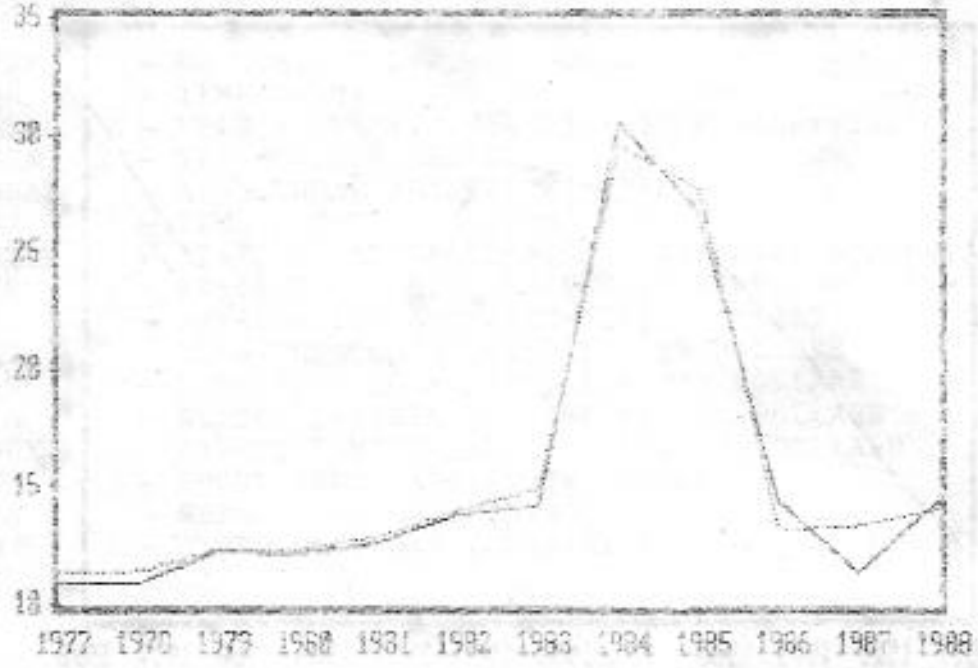
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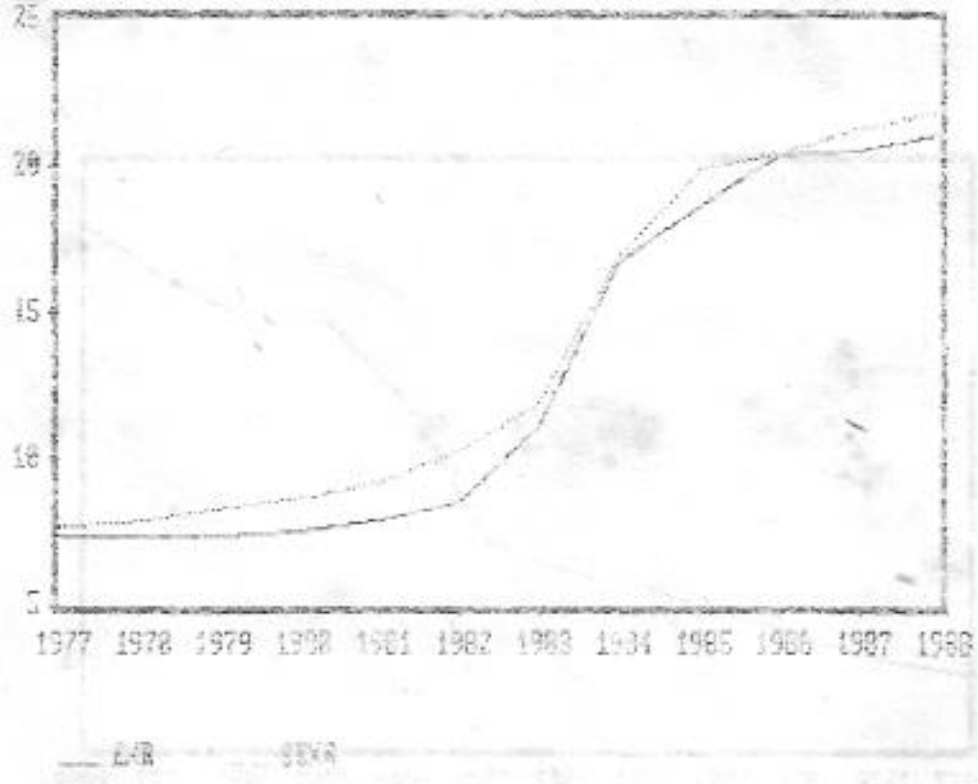
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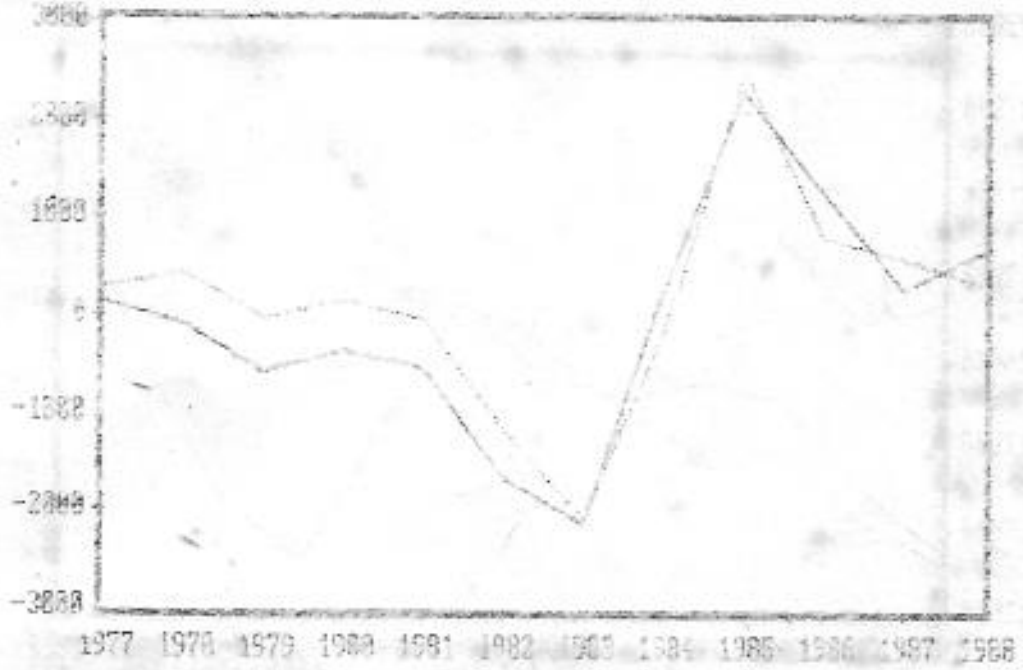
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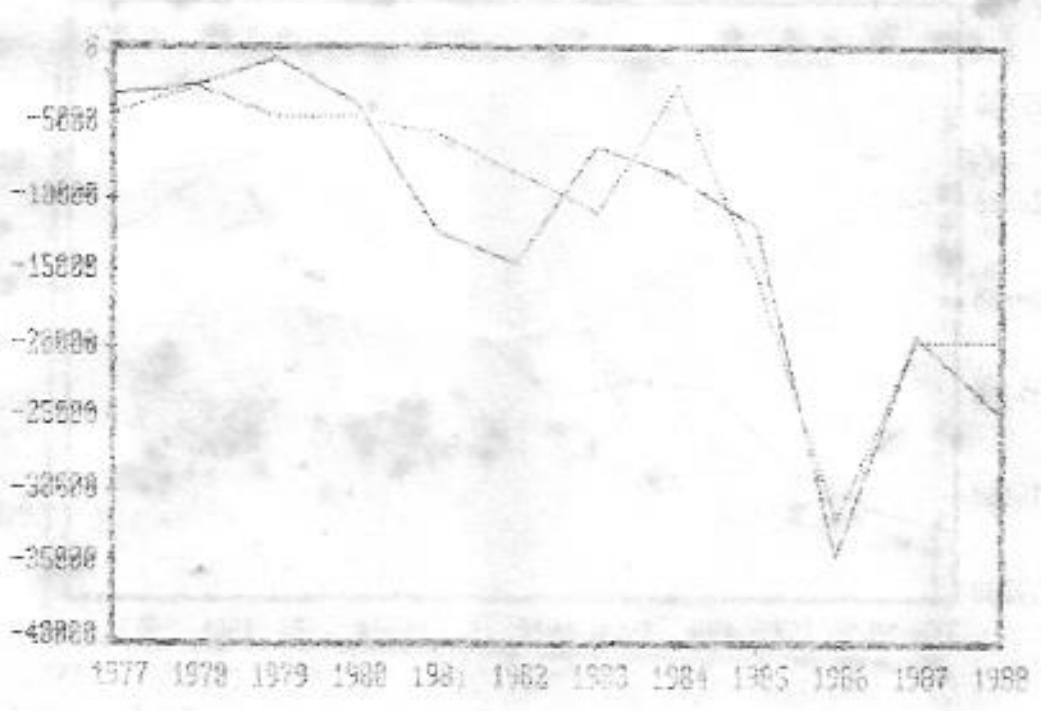
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