Stabilization Policies and Equity in Brazil: A Counter-Factual Analysis; 1981-1983

André Urani

ipea

INSTITUTO DE PESQUISA ECONÔMICA APLICADA

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First draft - please don't quote

1. Introduction

Like most other Latin American countries, Brazil had to implement, during the first half of the 1980's, severe stabilization policies in order to cope with its foreign sector crisis.

While effective from a balance of payments standpoint (Brazil is the only indebted country which succeeded to clear its current account during this period), these policies have provoked a strong deterioration of domestic macroeconomic and social indicators: for the first time after WW-II, GDP growth has been negative between 1981 and 1983, investment rate fell from 22,8% in 1980 to 17,9% in 1983, inequality (measured by theil-L) increased more than 5% and the proportion of poors reached 46,91% in 1983 (against 32,38% in 1981).[3]

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[1]This paper summarizes some results of chapters 6 and 7 of my Phd dissertation, which is going to be defended in october 1992.

[2]Financial support from CNPq is gratefully aknowledged. I would like to thank Ricardo Barros, François Bourguignon, Antonio Fiorencio, Akiko Suwa, Carlos Winograd and Alain Zantman for their helpful comments. All remaining errors are mine.

[3]Poverty and inequality are obtained from PNAD (annual household surveys made by IBGE). The poverty line is established at one real minimum wage of 1980 (deflating by INPC).

This paper seeks to underscore the links existing between the different policies which have been implemented during the period 1981-1983, the balance of payments path and the evolution of the main domestic indicators. To do this, we apply the well-known Bourguignon, Branson and de Melo (1989) CGE model - BBM - to realize some counter-factual simulations with a software named MAQM, developed by Bourguignon, Sastre-Descals and Suwa.[4] The main qualities of this micro-macro framework, for what concerns our purposes, are to allow keynesian equilibria in the different markets and to include a financial sector: inflation and interest rates, in fact, play important roles both in stabilization and in the path of income distribution.[5]

We start, in the next section, by presenting the stylized facts of the performance of the Brazilian economy during this period. Our version of BBM is presented in section 3. The social accounting matrix that we have constructed and the base run are exposed in section 4, and counter-factual analysis is in section 5. The sixth, finally, is the one of our conclusions.

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[4]This model has already been applied to several countries, like Côte d'Ivoire (see Lambert, Schneider and Suwa (1991)) and Morocco (see Bourguignon, Morrisson and Suwa (1990)).

[5]The main characteristics of this kind of model are pointed out in Robinson's survey (1991).

2. Stylized facts

In the beginning of the eightie's, Brazil had practically achieved its process of industrialisation by import substitution: GDP per capita was more than four times bigger than after WW-II, the share of industrial sector in GDP was similar to most OECD countries and about two thirds of its exports were composed by manufactured goods. Unlike the majority of the others indebted countries of the third world, external debt had a real counter-part: the structural adjustment program implemented during the second half of the 1970's, in response to the first oil shock.

This program seemed to be able to clear the current account of the balance of payments by the end of the 1970's. The second oil shock and the raise in international interest rates of 1979, however, changed this scenario completely.

The first reaction of the Brazilian gorvernment to this new deterioration of the international environment has been to carry on with its development plan: the social and political conditions didn't allow a recessive adjustment. Income inequality and the proportion of poors were already too high and it was the first year of a militar government which promised to implement a transition process to democracy and to give back power to civilians.

At the end of 1979, and for the first time since 1968, he decided to devaluate domestic currency in real terms. This devaluation had an important effect on inflation and on expectations.

Nevertheless, the maintanance of high growth rates implied, in such conditions, the deepening of the external desiquilibrium:[6] by the end of 1980, current account deficit reached almost 13 US$ billions.

From 1981, international creditors required the government to reduce the excess demand for foreign currency and Brazil became a huge laboratory for stabilization policies of all kind.

The first reaction of the government to this fall in capital inflows, in 1981, has been to try to combine the achievement of the balance of payments targets with the continuation of the structural adjustment program started in the mid-1970's. Public investment continued to grow but monetary policy became very restrictive and public current expenditures and civil servants wages were sharply reduced. As the rate of inflation was already beatting historical levels (above 100% a year), real exchange rate was kept fixed through crawling-peg.

The effects of such a policy in an economy where the contract indexation was already generalized have been essentially on the quantities. For the first time in its history, Brazil recorded a negative growth rate of its GDP - thanks to what imports have been drastically reduced and trade balance cleared - but the rate of inflation, despite a fall of 15%, continued close to 100% a year.

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[6]Even because to avoid still higher inflation rates, the government had pre-determined the evolution of nominal exchange rate for 1980, abolishing in this way the real devaluation of the end of 1979.

Exchange-rate and monetary policies have been maintained, but fiscal policy changed completely in 1982, because of the important political elections at the end of the year. Public investment felt more than 40%, but current expenditures (which were more important for the budget) and government employment increased more than 35% and 10% respectively. In other terms, monetary policy was still restrictive but global fiscal policy became expansionist.

The result has been a weaker recession than in 1981[7] with a little bit more of inflation and a bigger current account deficit, caused by the heavier amount of services.

Table 1

Macroeconomic and social indicators; 1981-1983

	1981	1982	1983
GDP (1980=100)	95,6	96,3	93,0
I/GDP (%)	22,8	21,3	17,9
TB (US$ billions)	+0,8	+0,5	+6,2
CA (US$ billions)	-11,7	-16,5	-6,8
Inflation rate (%)	95,2	99,7	211,0
Inequality (Theil-L)	0,589	0,598	0,621
Poverty (Headcount - %)	32,38	34,41	46,91

Sources: Anuário Estatístico do IBGE, 1985
PNAD/IBGE.

[7]With a small growth of GDP but a fall of per capita GDP.

By the end of 1982, after the Mexican moratorium and the elections, international creditors required the government to submit its stabilization program to IMF. In 1983, all the traditional stabilization tools have been used together: domestic currency has been strongly devaluated, monetary policy became even narrower and all the items of government expenditures were drastically cut. Current account deficit has been cut to half, thanks especially to a trade surplus due as well to a reduction of imports as to an increase of manufactured exports, but inflation rate has doubled in annual terms and GDP growth rate has been negative again, as in 1981.

The recovery of growth rates and the clearing of current account would come one year later, but not on a stable path because of the exacerbation of domestic desequilibria.

3. Analytical framework

3.1. Disaggregation

BBM is a CGE composed by four different markets: goods and factors, labor, financial and currency.

In our application, we distinguish three factors: land (T), capital (K) and labor (N).[8]

The MAQM version that we have being using doesn't allow us to work with more than seven sectors and six socioeconomic groups, as in the original BBM model. Nevertheless, the specificities of Brazilian economy led us to disaggregate the economy in a different way that in BBM. Our sectors are:

a) agriculture (AGR),

b) private manufacturing (MAN),

c) building industry (BUI),

d) state-owned enterprises (STA), defined as the set of sectors where the participation of these firms in GDP is more than 50%,

e) government (GOV),

f) private services (PRS),

g) informal sector (INF).

The six socioeconomic groups that we distinguish are:

a) employers in agriculture (PA),

b) workers in agriculture (TA), which are as well the employees as the independent workers in this sector,

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[8]Instead of four in the original version of BBM: we are not considering the specific primary export factor.

c) capitalists (K), defined as the urban employers with a real revenue greater than five minimum wages of 1980,[9]

d) urban skilled workers (Q) - employees and independents with more than 11 years of education in urban activities,

e) urban unskilled employees (NQ) - employees with 11 or less years of education in urban activities,

f) informal workers (INF): independents with 11 or less years of education and employers with a revenue smaller than 5 minimum wages of 1980 in urban activities.

There are four labor categories: agricultural, skilled urban, unskilled urban and informal.

Households' portfolios are composed by money, equities and domestic bonds.[10] Their wealth is allocated first to money via a transaction-based interest-elastic money demand. The remainder of wealth is distributed to domestic bonds and capital by the portfolio demand equation. As in Tobin (1969), the demands for each asset depends on the real returns of all assets.[11]

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[9]Deflating by the INPC (Indice Nacional de Preços ao Consumidor).

[10]We don't consider this possibility of holding foreign assets because of the difficulties of modelling a dual exchange market. In fact, foreign assets are

[11]Which means that because of the wealth constraint, the three portfolio demand functions contain only two independent relationships, implying adding-up constraints across the partial derivatives of the demand functions.

Figure 1 illustrates the mapping of household income. Table 2 shows the main characteristics of each socioeconomic group, estimated by special tabulations of PNAD.[12]

Figure 1

Mapping household income

	PA	TA	K	Q	NQ	INF
Agricultural labor	■	■				
Skilled urban labor			■	■		
Unskilled urban labor					■	
Informal labor						■
Land	■	■				
Capital	■		■			
Portfolio	■	■	■	■	■	■

Note: ■ indicates that a household receives income from the corresponding item.

[12]The data related to the average income of richer groups (and overall inequality) are here underestimate: they don't include - or underestimate - the income of capital and of portfolio, that we consider in our CGE analysis.

Table 2
Main characteristics of each socioeconomic group; 1981

	Participation in total employment (%)	Average income	intra inequality (Theil-L)	Headcount
PA	1,13	259,19	0,205	7,95
TA	22,03	48,05	0,626	56,19
K	1,39	510,54	0,398	0,00
Q	6,21	326,36	0,308	2,51
NQ	53,50	84,99	0,456	26,97
INF	15,74	86,66	0,538	33,85
TOT	100,00	100,00	0,589	32,38

Source: PNAD/IBGE.

Firm's financial requirements are for investment expenditures, working capital and interest payments on their accumulated debt. Their borrowing decisions are made analogously to household decision on asset holdings. In our simulations, we assume that they have a stock of foreign debt but that they can't borrow abroad anymore, as a consequence of the foreign constraint. Figure 2 shows the sectoral factor endowment.

Figure 2

Sectoral factor endowment

	AGR	MAN	BUI	STA	PRS	GOV	INF
Agricultural labor	■						
Skilled urban labor		■	■	■	■	■	
Unskilled urban labor		■	■	■	■		
Informal labor							■
Land	■						
Capital	■	■	■	■	■	■	

3.2. Model Outline

To simplify notation, the presentation is for a one-sector model, but the reader should think of accompanying subscripts for goods markets, labor markets, household consumption and financial decisions. Lagged values are indicated by a subscript (-1) and exogenous expectations about inflation, devaluation and the foreign interest rate by $\hat{p}^e$, $\hat{e}^e$ and i^{*e}. A superscript asterisk denotes a variable denominated in foreign currency units. Finally, a bar on a variable indicates that it is exogenous.

a. Firms

Supply: $q^s=F(uk,p,w)$ (1)

Labor demand: $N^d=\lambda(w/p)q^s$ (2)

Investment demand: $I=(g+\delta)k+I(ru/(\delta+i_I-\hat{p}^e))$ (3)

where: $i_I\equiv\bar{i}.(1-g_0)+i^{*e}g_0$

$r\equiv(\partial F/\partial k)/p_k$

Profits: $\pi\equiv p.q^s-w.N^d-e.i^*_{-1}.L^*_{w,-1}-i_{-1}.L_{b,-1}$ (4)

Working capital: $H_f=H\left[\frac{g_0(1+\bar{i})+(1-g_0)(1+i^{*e})}{1+\hat{p}^e}\right]^{\gamma}pq^s$ (5)

Investment financing: $\Delta B=p_k I+\Delta H_f-\alpha\Pi-S_k-\rho(L_{b,-1}+eL^*_{w,-1})$ (6)

Firm's debt: $B=L_{b,-1}+eL^*_{w,-1}+\Delta B$ (7)

Borrowing allocation: $\Delta L_b=g_0\Delta B$ (8)

with $g_0=\psi_0\left[\frac{1+\bar{i}}{1+i^{*e}.\hat{e}^e}\right]^{\varepsilon_0}$

b. Households

Income constraint: $Y=wL^{d}+\bar{w}_{G}\bar{N}_{G}+(1-\alpha)\pi+.i.B_{h,-1}$ (9)

Wealth constraint: $W=H_{h}+B_{h}/i+p_{a}E$ (10)

New wealth: $W=W_{-1}+S$ (11)

Wealth gain: $WG\equiv(H_{h,-1}+B_{h,-1}/i+p_{a}.E_{-1})-W_{-1}$ (12)

Consumption: $C=[(1-s)Y+\phi WG]/p_{c}$ (13)

Savings: $S=sY-\phi WG$ (14)

Money demand: $\ln(H_{h}/\bar{p})=a\ln(Y/\bar{p})-z_{i}i-z_{p}\hat{p}^{e}$ (15)

Demand for equity: $p_{a}E=g_{1}(W_{-1}+S-H_{h})$ (16)

$$\text{with } g_{1}=\psi_{1}\left[\frac{1+r-\delta+\hat{p}^{e}}{g_{2}(1+i)+(1-g_{2})(1+i^{*e}.\hat{e}^{e})}\right]^{\varepsilon_{1}}$$

Demand for domestic bonds: $B_{h}/i=(1-g_{1})(W_{-1}+S-H_{h})$ (17)

Price of equity: $p_{a}=[k(p_{k}(1-\delta)-p_{k,-1})+\pi+\Delta H_{f}+Ep_{a,-1}]/E$ (18)

Net increases in equities: $S_{k}=p_{k}(E-E_{-1})$ (19)

Price of composite good: $p_c = dp(1+t_l) + (1-d)\bar{e}\bar{p}_m(1+t_m)$ (20)

c. Government

Tax revenue: $GR = t_l pq^s + \bar{e}\bar{p}_m t_m M$ (21)

Spending: $GE = p_c \bar{G} + \bar{w}_G \bar{N}_G + p_c \bar{I}_G + iB_{h,-1} + i^* eB^*_{w,-1}$ (22)

Deficit: $GD = GE - GR$ (23)

Deficit financing: $GD = B_h/i - (B_{h,-1}/i_{h,-1}) + e\Delta B^*_w + \Delta B_b$ (24)

d. Balance of payments

Current account: $CA = p^*_x/e.X - p_m.M - i^*(B^*_{w,-1} + L^*_{w,-1})$ (25)

Capital acount: $KA = \Delta L^*_w + \Delta B^*_w$ (26)

e. Market equilibria

i) Goods market

Walrasian regime: $q^s = q^d$ (27)

Keynesian regime: $p^v = (1+m)\lambda w$ (28)

3.3. Notation

u = capacity utilization

k = stock of capital

p = deflator/GDP

λ = inverse of labor productivity

w = nominal wage

$\bar{p}$ = cost of living

N^s = labor supply

N^d = labor demand

N_G = government employment

n = demographic growth rate

q^s = goods supply

q^d = goods demand

I = investment

C = consumption

X = exports

M = imports

p_c = price of composite good

p^v = price of value added

e = exchange rate

p_c = price of composite good

s = saving rate

ρ = repayment rate

t_i = indirect taxes

t_m = tarifs

g = capital stock growth rate

δ = depreciation rate

π = profits

p_k = price of capital goods

r = gross marginal revenue of capital

i = interest rate

L = liabilities

B = bonds

H = money

E = equities

p_a = price of equity

Y = income

W = wealth

WG= wealth gain

ϕ = propensity to consume wealth gain

a = income-elasticity of the demand for money

z_i = interest-elasticity of the demand for money

z_p = expectef inflation-elasticity of the demand for money

GR= government receipts

GE= government expenditures

GD= public deficit

θ_0= wage drift

θ_1= degree of indexation

$(1-\vartheta)$= degree of sterilisation of capital inflows

4. Base run

Two steps are required to calibrate the model. First, the parameters of the behaviour functions are adjusted to replicate the base year (1980). The structure of the Brazilian economy is summarized in the social accounting matrix (SAM) that appears in table 3.[13] Then, the exogenous anual variables describing economic policy and the international environment determine the dynamics in the period 1981-1983.

In the base run we try to reproduce the main features of the Brazilian economy behaviour during the period. Our main assumptions are summarized in figure 3.

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[13]This SAM combines data from the input-output matrix of 1980, from a household survey (PNAD/IBGE) of 1981 and from a consuption survey (ENDEF) made in 1974. For more details about the construction of this SAM, see the appendix 1 of chapter 6 of my Phd. thesis (1992).

Table 3
Social Accounting Matrix
1980

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
ACTIVITIES																													
AGR								1890.12						1890.12															1890.12
MAN									7254.00					7254.00															7254.00
BUI										1668.38				1668.38															1668.38
STA											4215.40			4215.40															4215.40
PRS												6342.68		6342.68															6342.68
INF													2460.98	2460.98															2460.98
TOTAL								1890.12	7254.00	1668.38	4215.40	6342.68	2460.98	23831.56															23831.56
COMMODITIES																													
AGR	250.37	919.20	0.53	18.97	17.44	64.84	1271.35												28.99	27.71	61.40	86.72	132.30	45.31	381.43	68.89	210.40	48.58	1960.03
MAN	309.91	2277.53	370.78	237.30	430.34	565.48	4190.34												200.65	133.95	409.36	471.20	673.31	196.35	1904.82	245.10	680.53	669.09	7760.68
BUI	0.07		71.11	4.02	112.93	98.13	286.26																			283.18	1069.38	9.56	1668.38
STA	66.81	826.25	160.28	1874.62	273.63	328.53	3529.97												61.74	60.06	143.28	160.84	229.50	75.52	721.93	158.51	326.96	156.97	4934.36
PRS	104.63	852.12	169.72	254.04	1040.82	716.25	3237.58												162.07	106.24	409.36	408.10	485.11	166.14	1737.02	449.61	854.45	240.28	6518.94
INF																			187.73	110.86	614.04	671.48	727.66	249.21	2460.98				2460.98
TOTAL	730.59	4875.10	772.42	2480.95	1875.21	1773.23	12515.50												641.19	438.81	1637.44	1697.34	2138.88	732.53	7205.18	1205.29	3151.74	1164.48	25333.17
FACTORS																													
LAND	615.93						615.93																						615.93
CAPITAL	76.99	308.67	61.82	123.31	650.70		1241.49																						1241.49
LABOF	220.44	852.38	318.75	478.47	1311.96	667.75	3867.75																			734.76			4602.51
TOTAL	913.36	1161.05	400.57	599.78	1962.65	667.75	5725.16																			734.76			6459.93
HOUSEHOLDS																													
PA															431.15	76.99	10.75	518.89								252.65			771.74
TA															184.78		209.70	394.48								67.43			461.91
K																1164.50	208.05	1372.55								674.26			2046.81
Q																	1483.51	1483.51								421.41			1904.92
NQ																	2002.75	2002.75								202.28			2205.03
INF																	667.75	667.75								87.43			755.18
TOTAL															615.93	1241.49	4602.51	6459.93								1685.60			8145.69
GOVERN.	15.19	291.85	249.94	755.74	552.73		1866.45	0.44	41.85		9.97	13.91		66.17					40.84	5.53	142.05	93.12	25.12		306.66				2239.28
K ACCOUNT	230.96	926.00	245.45	369.93	1952.09		3724.45												89.72	17.67	267.32	114.46	41.03	22.65	552.75	-1662.04		777.14	3392.30
RW								10.07	474.03		706.99	162.36		1435.44												275.61	230.68		1941.60
TOTAL	1890.12	7254.00	1668.38	4215.40	6342.68	2460.98	23831.56	1900.63	7769.86	1668.38	4934.36	6518.94	2460.98	25333.17	815.93	1241.49	4602.51	6459.93	771.74	461.91	2046.81	1904.82	2205.03	755.18	8145.69	2239.28	3392.29	1941.60	

Figure 3

Main assumptions of the base-run

a. goods market

- AGR: mark-up = 0,50
- MAN and STA: mark-up = 0,95
- BUI and PRS: mark-up = 0,90
- INF: competitive

b. labor market

- INF: competitive
- other sectors: indexation; the degree varies from sector to sector and from year to year

c. currency market

- 1980-1982: fixed real exchange rate with import rationing
- 1983: flexible real exchange rate
- import elasticities:
  - AGR, BUI, PRS, INF: 0,40
  - MAN, STA: 1,00
- export elasticities:
  - AGR: 1,00
  - other sectors: 2,5

d. financial market

- household's portfolios divided between money and domestic public debt
- firms indebted abroad but foreign exchange control from 1981
- interest-elasticity of the demand for money: -2,00
- income-elasticity of the demand for money: 1,32
- expected inflation elasticity of the demand for money: -0,007

e. expectations

- "perfect".

Some observations have to be done:

a) the "mark-up" is an indicator of the rigidity (or of the speed of adjustment) of a sector. A mark-up = x ($0 < x < 1$) indicates that the firms of that sector adopt a keynesian closure and accept, from one year to the following, a decrease of $((1-x)x100)\%$ of their profits;

b) we assume keynesian closures for all the sectors except the informal: prices are determined at the beginning of each period, based on expected inflation. Unexpected changes in costs are absorbed by profit rates;

c) foreign-trade elasticities are those estimated by Zini (1990);

d) the demand for money function is the one estimated by Rossi; we have however re-estimated it, using the same data-bank, for a shorter period;

e) the choice of working with "perfect expectations" is due to the strong increase in inflation during this period.[14]

Table 4
Evolution of main policy and foreign environment parameters; 1980-1983

	1980	1981	1982	1983
Government employment	100,0	106,5	117,2	116,7
Real wage/civil servants	100,0	88,0	77,0	70,5
Government consumption	100,0	96,4	130,8	124,4
Government investment	100,0	125,1	71,5	62,2
Money supply growth (%)	70,6	75,3	85,7	135,9
Expected inflation (%)	110,2	104,0	105,0	208,0
Expected devaluation (%)	100,0	95,0	100,0	250,0
Vol. exports/AGR & STA	100,0	111,6	95,8	93,0
Vol. exports/MAN, BUI & PRS	100,0	132,1	103,4	136,3
Import prices	100,0	108,2	99,9	87,9

[14]Nethertheless, expectations are not endogenous: in practice, they are determined exogenously from year to year, in the levels effectively occured.

Table 4 synthetizes the evolution of the main policy and foreign environment parameters during the period.

Figures 4 to 11 illustrate our main results[15]. Some remarks are necessary:

a) the GDP estimated path corresponds, *grosso modo*, to the actual. Nevertheless, we overestimate the decrease of investment rate and the increase in exports produced by the devaluation of 1983.[16] At an aggregated level, one phenomenon compensates the other, but it implies distortions that could be relevant: the fact is that we are overestimating the GDP of the sectors that export more (private manufacturing and state-owned enterprises) and underestimating those where investment is fundamental in the determination of final demand (like the building sector);[17]

b) according to our simulation, there is only one sector growing - in absolute levels - during this period: the informal. Its share in global GDP increases from 5,64% in 1980 to 6,82% in 1983;

c) we estimate higher inequality and inequality increasing than using household survey (PNAD) data. The reason is that we are including capital and portfolio income that are widely underestimate in surveys like PNAD;[18]

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[15]Some sensibility tests are made in appendix 3 of chapter 6 of Urani (1992).

[16]We work with an export-elasticity which inbodies intertemporal lags that we cannot consider in MAQM. So, we are catching in 1983 a part of the export increase that actually happened in 1984.

[17]We estimate a drop of over 40% in the GDP of this sector.

[18]Note that we employ an inequality measure (the Theil-L) that is very sensitive to transfers to the top of the distribution, and that this sensivity is proportional to the initial level of inequality.

d) public debt grows continuosly, because of the expansive fiscal policy and of the high interest rates produced by the reduction in real money supply. Public debt bonds are bought mainly by capitalist, who sell progressively physical capital to the banking sector. In other terms, gross marginal revenue of physical capital is smaller than the one of financial capital. By the end of the period, more than the half of capitalist income comes from portfolio;

e) the estimated path of relative incomes between urban workers corresponds to the one resulting from households surveys. When the stabilization policy is concentrated on demand reduction, real wages resist better than real income of informal workers; on the other hand, the opposite happens when there is a devaluation, because of its inflationary impact. Beyond this behaviour, there are important differences in indexation: nominal wages are determined by past inflation while the competitiveness of the informal market implies that the per capita income of its workers is established in function of the current level of prices;[19]

f) the taking into account of the drought of 1983 explains a diminution of about 1% in global GDP and an increase of 7% in inflation. However, we are not able to reproduce the actual increase in agricultural prices, which implies an underestimation of the real income of the two classes belonging to this sector.

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[19]For more details about it, see Urani and Winograd (1992).

Figure 4
Evolution of GDP
1980 - 1983

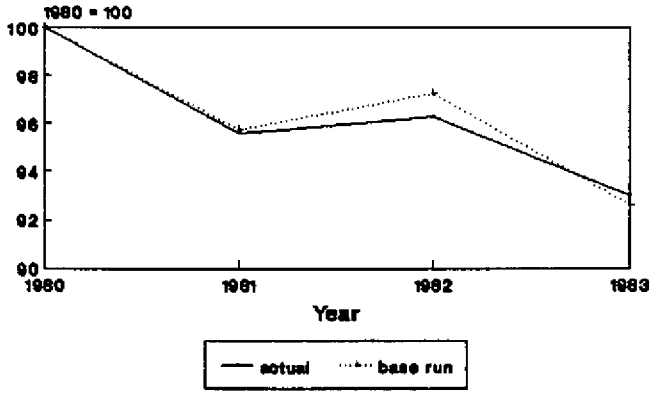


Figure 5
Evolution of inflation rate
1981 - 1983

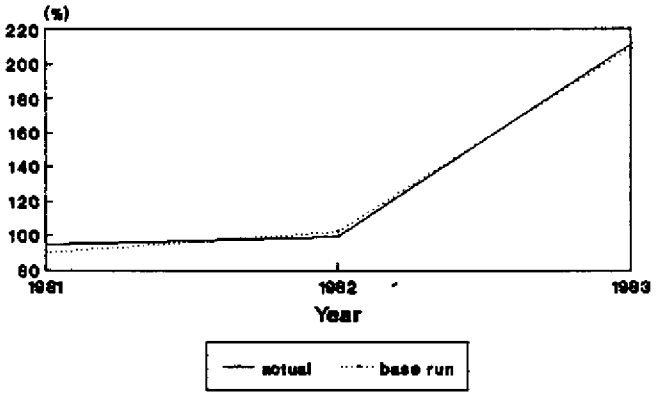


Figure 6
Evolution of investment rate (I/GDP)
1980 - 1983

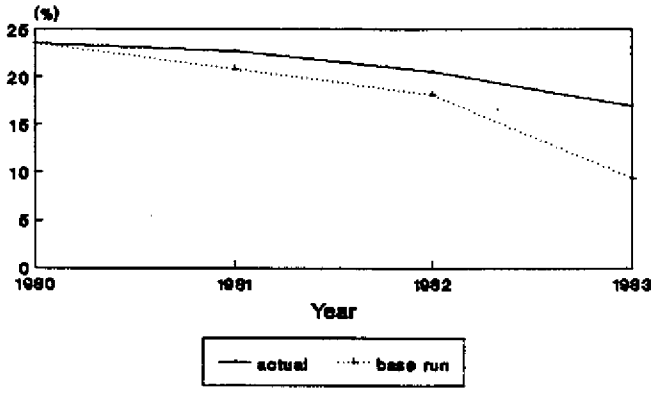


Figure 7
Evolution of real exchange rate
1980 - 1983

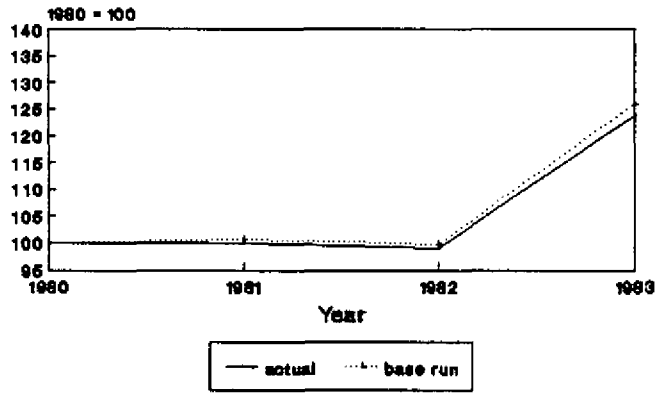


Figure 8
Evolution of exports
1980 - 1983

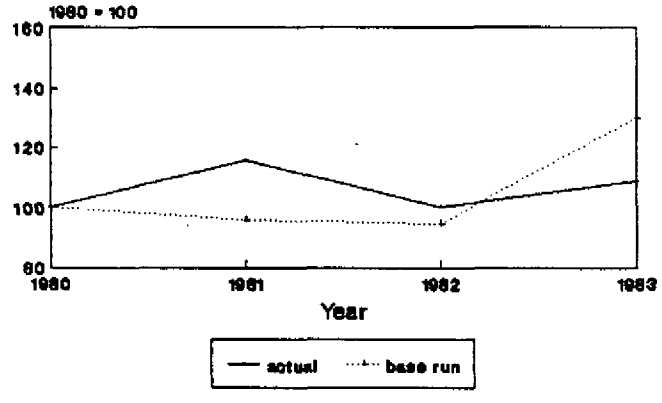


Figure 9
Evolution of imports
1980 - 1983

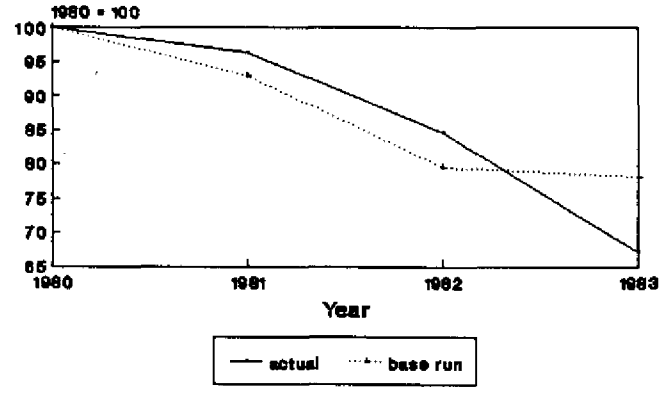


Figure 10
Evolution of inequality
1981 - 1983

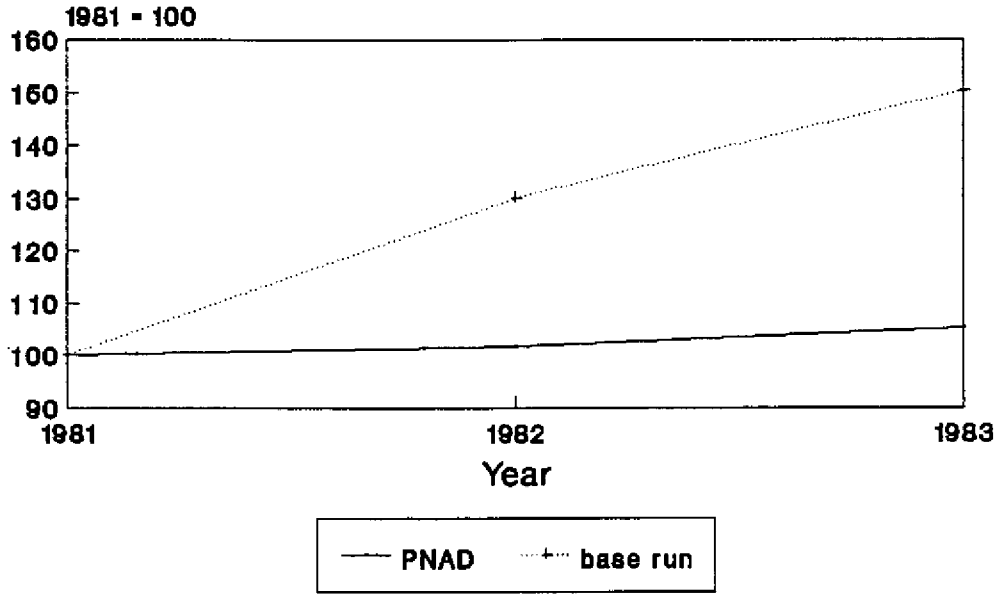
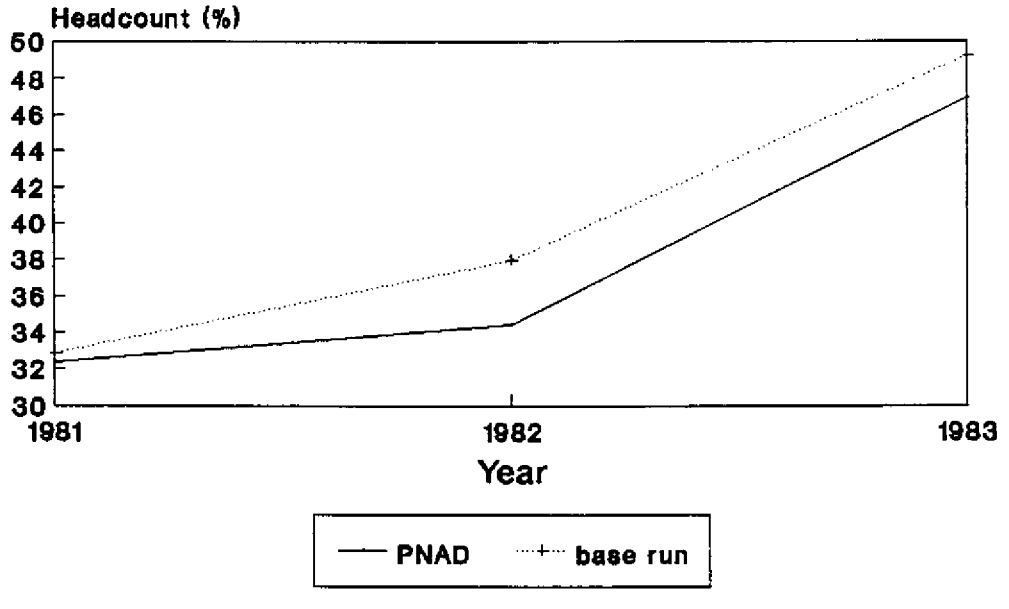


Figure 11
Evolution of poverty
1981 - 1983



5. Counter-factual analysis

Table 5 illustrate the main results of our simulations, expressed in terms of deviations from the base run in 1983.[20]

Table 5

Main results of counter-factual simulations

	DEV	WGO	EGO	CGO	IGO	FIS	MON	ABS
GDP	+2,7	+7,3	-3,1	-5,6	+0,7	-3,4	+9,2	+6,2
I/GDP	+2,1	-2,3	+0,8	+1,6	+0,5	+1,2	+5,7	+7,4
TB/GDP	-4,5	-0,6	-0,2	+0,4	0,0	0,0	-0,4	-0,4
CA/GDP	-3,9	+0,2	-0,1	-0,1	0,0	0,0	+0,2	+0,1
Inflation	-48,1	+25,9	-5,1	-13,4	+1,8	-1,8	+4,2	+1,6
RER	-26,0	-9,6	+3,1	+4,0	+0,2	0,0	-0,5	+0,1
Int. rate	-27,6	+43,1	-9,1	-19,9	+1,7	-5,9	-51,1	-55,0
Theil-L	-8,1	-11,9	-8,6	+5,8	0,0	-12,5	-13,1	-28,8
HC	-5,0	-6,7	-1,5	+2,3	+0,5	-3,4	-5,5	-7,8

[20] For what concerns GDP, the investment rate and those related to balance of payments (Trade Balance/GDP and Current Accont/GDP), these deviations are expressed in terms of % of actual GDP. For those concerning prices (rate of inflation, real exchange rate and interest rate) and headcount (HC - the percentage of poors), the deviations are the simple difference between the two results. Poverty-line is established at 1 minimum wage of 1980, in real terms (deflating by INPC). For inequality, finally, the deviation is computed as a percentage of the base run result. A sign "+" means that the result of the alternative simulation is bigger that in the base run.

5.1. Devaluation

From a theoretical point of view, a devaluaton is justified by the need to increase the relative prices of the tradeable goods, so as to redirect production to export and import-substitution activities and to reduce domestic consumption, favouring investment.

If the condition of Marshall-Lerner is satisfied and if there are flex wages and prices, as is usually assumed by IMF, a devaluation is always expansionist. Nevertheless, as soon as imperfections (price-rigidity, wage indexation, non-validity of the Marshall-Lerner condition, etc.) are introduced into the analytical framework, its effect become dubious.[21]

In simulation DEV, we suppose that capital inflows in 1983 continued at the same level that in 1982 and that real exchange rate has been kept fixed: currency market is cleared by import rationing, just like in 1981/82. This simulation allows us to analyse the joint impact of devaluation and of the fall of capital inflows.[22]

Results in table 5 show that devaluation produces a significant growth of inflation rate, which reduces real wages (and then final consumption) and the investment rate. The export increase is not sufficient to compensate these two movements: the global impact on GDP is negative.

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[21] Diaz-Alejandro (1963), Fiorencio and Urani (1990), Krugman and Taylor (1978), Suwa (1992), just to cite a few of them, present models where a devaluation can be contractionist.

[22] Our software is not able to generate a stable equilibrium for 1983 if we maintain the actual reduction of capital inflows without devaluation. A possible interpretation is that such a fall in capital inflows made devaluation indispensable.

However, this measure is very powerful for reducing current account deficit: it stimulates industrial exports and provokes an import decrease (reducing global demand and inducing substitution).

Inequality raises because of the lowering of real wages and of the capacity of owner-classe to preserve their real income, because they hold as well physical capital (or land) as important financial portfolios, which are protected against inflationary losses.

The combination of a smaller GDP and more inequality causes an increase of the proportion of poors; as expected, the "new poors" are essentially wage-earners.[23]

5.2. Demand control

5.2.1. Fiscal policy

The exercices that follow examinate the effect of the various fiscal policy measures on macro aggregates and income distribution. In each case, only one policy variable is changed; all the others remain the same as in the base case.

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[23]Real income of informal workers, as we said above, resist better to increases of inflation.

As any significant measure was implemented to modify government receipts, we limit our analysis to what happened with expenditures. We can see, in table 5, that the only government expenditure that had a "coherent" path during this period is the wage policy: average real wage of civil servants has lowered continuously, despite the increasing participation of skilled workers in total government employment.[24]

a. wage policy

In simulation WGO, we have maintained civil servants real wages fixed. Comparing its results with those of the base run, we can see that this measure had a significant impact in reducing public deficit (and then provoking smaller interest rates and a less important fall in investment) and that it prevented the rate of inflation to increase even more.

Nevertheless, this measure has not been very effective in improving the current account balance. To see it, we have to compare the evolution of this variable in WGO and in the base run during the entire period, because results for 1983 are, of course, influenced by the assumption of flexible real exchange rate. Our estimation is that this reduction of civil servants real wages explains an economy of foreign currency of only 0,37% of the 1980's GDP during the whole 1981-1983 period.

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[24]From 24,43% in 1981 to 25,56% in 1983. For more details, see Urani (1992), chapter 5.

It has provoked, moreover, a very important loss in terms of GDP growth (through consumption) and of social welfare. Civil servants belnging essentially to middle-class, the reduction of their real income implied an increase of inequality. Finally, the combination of more recession and more inequality produced an increase of the proportion of poors.

b. government employment

Table 4 shows that the number of civil servants has increased considerably in 1981 and especially in 1982 (because of the elections) and has lightly decreased in 1983.

In simulation EGO we analyze what could have happend if civil servants employment had been maintained constant for the whole period.

The results exposed in table 5 show that the main impacts of such a measure would be on the level of activity and on social indicators: GDP would be even lower but we would have less inequality and poverty. For what concerns inequality, the effect caused by the diminution of employment would be more than compensated by a smaller transfer to richer socioeconomic groups (the cut down of public deficit would reduce interest rates). The reduction of poverty, despite a deeper recession, would result from the combination of less inequality and a less important increase of the rate of inflation.

c. government consumption

Consumption represents the most important component of public expenditures and the one which has increased the most during this period. We are forced by our analytical framework to assume that its composition has been maintained fixed during the whole period, despite its increase is concentrated in 1982, an electoral year, what could mean that in fact it could have changed significantly.

Results of simulation CGO show that a freezing of government consumption would have produced an even deeper recession, an increase of investment rate (through crowding-in), a smaller rate of inflation and a saving of foreign currency (over the entire period) equivalent to 0,20% of 1980's GDP.

Smaller interest rates would reduce portfolio income of richer households but this would not be enough to diminish inequality because the real income of informal workers would be considerably reduced by the deepening of recession. Finally, with a smaller GDP and a bigger inequality, the proportion of poors would be higher.

d. public investment

Public investment has been the main victim of stabilization policies adopted during this period, despite its increase in 1981.

The results of simulation IGO, nevertheless, suggest that such a relentlessness is hard to justify: this measure had no significant effects on the two main desequilibria that the government wanted to fight: balance of payments deficit and the rate of inflation. Its only important repercussions are on GDP and on the investment rate.

e. overall balance

Despite its many contradictions, we can consider that the fiscal policy has been globally expansionist during this period. In other terms, the increasing of consumption and of employment has prevailed on the diminution of real wages of civil servants and of investment.

Simulation FIS is the combination of the previous four: it indicates what could have happened if public expenditures as a whole had been freezed in real terms during the entire period.

We find that the fiscal policy that was implemented has alleviated recession[25] without having significant impacts on the rate of inflation or on the balance of payments, but also that it has caused a crowding-out over private investment.

This policy had, nevertheless, perverse effects on social indicators. The sharp increase of the real income of informal workers (about 11%) didn't compensate, in terms of total inequality, the diminution of the real wages of civil servants and the effects of the increasing interest rates in the portfolio income of richer households. This explains why the headcount increases even if the estimated GDP is bigger.

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[25]We estimate that the cost - in terms of GDP growth - of maintaining public expenditures freezed during the whole period would reach 7,25% of 1980's GDP.

5.2.2. Monetary policy

Table 4 shows that the real stock of money has been reduced by about one third from 1981 to 1983. Simulation MON shows what could have happened if, *caeteris paribus*, the government had maintained a constant stock of money in real terms.

Our results are rather keynesian (which is not surprising, given our assumptions): monetary policy is powerless against the rate of inflation and the external deficit but has heavy impacts on the quantities and on social indicators.

By the end of 1983, the loss in terms of growth associated to this policy is estimated at 22,89% of 1980's GDP. Its effect on the investment rate (through interest rates) is also considerable. The effects on the balance of payments are more important than those estimated for fiscale policy; however, the saving of foreign currency attributable to this policy (by the mean of the reduction of the demand for imports provoked by recession) is less than 1% of 1980's GDP for the whole period.

The recession caused by the contraction of the real money supply increased significantly the proportion of poors, because it reduced formal employment ans the per capita real income of informal workers (increasing the supply and decreasing the demand of this sector). Inequality grew even more, because the income of the richer households portfolios were increased by higher interest rates.

5.3. Overall balance

Simulation ABS groups together all the demand-managing measures considered above. Results exposed in table 5 show that the expansionist effect of the fiscal policy on GDP is more than compensated by the contractionary impact of the monetary policy.

Investment rate is affected twice: the fiscal policy increases public deficit and then produces an increase of interest rates, which is magnified by the sharp decrease of the liquidity.

Welfare impacts are also very strong: the diminution of global demand induces a sharp decrease of formal employment and consequently of the real income of informal workers, increasing in this way the proportion of poors, at the same time that higher interest rates increase the real income of the richer.

Nevertheless, we don't find any significant repercussion on the rate of inflation or on the balance of payments.

6. Conclusion

The main target of the Brazilian economic policy during the period 1981-1983 was to clear the current account of the balance of payments. We have showed in this paper that a simple devaluation of the real exchange rate would suffish to fulfil this objective. Government's hesitation to devaluate can be explained by its side-effects on the inflation rate,[26] on social indicators and even on GDP growth (we estimate that the devaluation is contractionist in the short-run).

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[26]Even because its first attempt to devaluate, in 1979, has not been succesful.

Nevertheless, devaluation has not been the only instrument used to reduce the excess demand for foreign currency during this period: absortion has decreased considerably, in response to a very restrictive monetary policy and to severe cuts in several government's expenditure components. Our simulations show that these expenditures-reducing policies characterized an overshooting from a balance of payments standpoint, had no significant effect on the rate of inflation and provoked a sharp worsening of the social indicators.

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