SUSTAINABLE AGRICULTURAL DEVELOPMENT: THE ROLE OF INTERNATIONAL COOPERATION

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Inflation and Agriculture:
Ten Years of High Inflation and Government Debt in Brazil

INTRODUCTION: PRICE FLEXIBILITY AND RIGIDITY

The fundamental assumption among structural economists of the early 1980s concerned the existence of a type of market failure. Factor mobility was imperfect when supply was concentrated in a few firms which could sustain a price policy with a fixed mark-up over variable cost, a feature which could arise if the industrial sector enjoyed high levels of protection. Price rigidity would come about in the short run if there was also real wage rigidity, an hypothesis generally accepted when short-run price indexation clauses were widespread in the urban labour market. Adjustments to changes in demand became predominantly changes in the quantity supplied.

In a macro-model formulation the following equations (Ramos, 1986; Olivera, 1967) apply to the rigid price sector of the economy. For urban wage determination:

$$W = f(P_{t-1}) \tag{1}$$

where:

W = nominal wage
$f(\ )\ w$ = rule for indexation
P = general price level

from which we get:

$$dW/W = F(dP/P) \tag{1a}$$

F reflects the capacity of the urban labour sector to keep the real wage constant.

Inflation is a process in which nominal wages temporarily lag behind the desired level, enforcing a solution to the distributive conflict. By the logic of this model, competitive sector prices rise first, followed soon afterwards by wages, with a subsequent adjustment in the 'rigid' price sector. For that

reason the agricultural sector is always pointed to as the original source of inflationary pressure (Ramos, 1986). The mark-up price determination equation becomes:

$$Pr = (1+u) \, W/k \qquad (2)$$

where:

k = labour productivity
u = mark-up percentage
and

$$dPr/Pr = dW/W - dk/k \qquad (3)$$

In the agricultural sector a competitive market prevails with market equilibrium being described as:

$$Q^d c \, (Pc/Pr, y, H) = Q^s c \, (Pc/Pr, Z) \qquad (4)$$

where

Pc/Pr = (#) -relative price
y = real income of the urban sector
H = urban population
Z = autonomous expansion of the competitive sector excess supply (technology and/or agricultural frontier expansion)

Logarithmic derivation then gives:

$$-Ep \, \dot{\#} + Ey \, \dot{y} + \dot{H} = Np \, \dot{\#} + \dot{Z},$$

where
E = demand elasticities
N = supply elasticity
and

$$\dot{\#} = \dot{Pc} - \dot{Pr} = [Ey/(Ep + Np)] \, \dot{y} + [\, \dot{H} - \dot{Z} / (Ep + Np)] \qquad (5)$$

It follows that:

$$\dot{\#} > 0 \text{ for } \dot{y} > [\dot{H} - \dot{Z} / Ey]$$

There is a maximum rate of growth for real income in the urban sector, $\dot{y}*$, compatible with constant relative price:

$$\dot{y}* = \dot{Z} - \dot{H} / Ey \qquad (6)$$

Finally, a proper definition for the relevant price level P in equations (1) and (2) is needed, given by assuming that:

$$Pt = Pc, t^a \, Pr, t^{1-a} \tag{7}$$

where a and $1-a$ are respectively the share of rigid and flexible price sector products in the representative basket of consumption goods.

From (7) dynamics of this inflationary process become:

$$Pt = a \, [(\dot{P}ct - \dot{P}rt] + \dot{P}rt.$$

From (5), (3) and (2):

$$\dot{P}_t = a \, [\, Ey/ \, (Ep + Np) \, (\dot{y}_t - \dot{y}*_t) + (\dot{H} - \dot{Z}) \, / \, (Ep + Np) \,] - \dot{k} + F \, (\dot{P})_{t-1} \tag{8}$$

Equation (8) can be solved as follows:

If $F=0$, $dP/dt=A$,
where $A=a \, [Ey/(Ep + Np) \, (y_t - y*_t) + (H - Z) \, / \, (Ep + Np)] - dk/k$

there will be some inflation because agriculture's relative price will increase if the current rate of growth in real income of the urban sector is greater than the 'warranted' rate of growth – a structural component that reflects the impact of urban population growth and technological rural innovations – as long as these factors are not compensated for by a deflationary effect from urban labour productivity growth. All these factors together can account for a small rate of inflation if there is no indexation (propagation) in the urban wage market.

If $0 < F <1$ $(dP/P)_t = - A/1 - F \, [F]^t + A/1 - F$

the inflation rate will converge.

If $F = 1$ $(dp/p)_t = A_t$

the inflation rate will be growing at a constant rate. If $F > 1$ rate of growth of inflation is positive and there will be an explosive path to hyperinflation. This is an acceptable hypothesis if labour is willing to compensate for the loss in the average real wage which occurred in the previous period.

According to the structural economists' consensus, an anti-inflationary policy must have a radical income policy with price and wage control, aiming not only at the invalidation of all indexation clauses on commercial contracts, but also a different and sustainable pattern of income distribution. Recession brought about through fiscal and monetary policy, acting over $[(dy/y) - (dy/y)*]$, is a very weak element in equation (8). Only if carried on for a long period will it be able to halt an inflationary process of the kind described, and only then at a prohibitive social cost. Political negotiation of such a sensitive income policy is impossible if the unemployment rate is high and long-

lasting. Control over food prices is especially relevant because it would vindicate government intervention in collective wage negotiations. Subsidies on food imports become common, as do interest rate subsidies on rural credit. The government primary deficit increases.

The government budget constraint

It will be appreciated that the monetary dimension of the inflationary process has been placed very much at a secondary level in the system described. The fundamental reason concerns the role of the central government as the main actor in the development process. Government has an active role in the process of resource transfer that goes beyond the ordinary institutional framework of public finance.

Within the structuralist institutional framework, government is directly involved with other groups in the process of transformation of the productive structure of the national economy. The other main factors are foreign capital, a fragile urban bourgeoisie, an entrepreneurial class without leadership, and a disorganized urban labour force. Industrialization is the main target (Hirschman, 1968) and government may become the owner of productive resources, and bureaucracy the leading source of entrepreneurship, in any strategic sector (Evans, 1979). National sovereignty is a strong and pervasive ideal legitimating government power in the appropriation of domestic resources by means other than ordinary collection of taxes. Money seignorage, inflationary taxation, non-price market rationing devices for scarce foreign currency and over-pricing of products and services from government agencies are good examples of these heterodox practices (Mendonca de Barros and Graham, 1978).

If this a satisfactory description of government as an aggregate actor in the structural macro-economic model, the fiscal deficit may be better understood as an endogenous variable. Deficit financing can be sustained for a long time through foreign debt: in the Brazilian case from 1968 to 1983. When the Federal Reserve Bank raised interest rates in 1979, the financial conditions needed to sustain a process of increasing debt began to deteriorate. In 1982, it was brought to a sudden halt by the Mexican default. From that time on, in the absence of a strong fiscal reform, foreign debt service had to be financed through money creation or public domestic debt.

Interest-paying public debt could be kept increasing by a permanent reduction in the maturity of government paper, and by continuous action by the central bank in the open market. Money was becoming gradually passive in the second half of the 1980s (Pastore, 1991). The monetary authorities did not use money supply as a control variable, but the inflation rate itself became the 'variable' to be monitored by macro-economic policy in order to maximize seignorage collection. In this framework the government's first priority relates to full employment.

In order to introduce government into the macro-model, the budget constraint needs to be considered. To do so define:

$$(G - T) + i.B + E.i^*.B^* = dBg + E.dB^* \qquad (9)$$

where

$(G - T)$	=	public expenditures less tax collection
$i.B$	=	nominal interest paid on bonds held by private sector
E	=	exchange rate
$i^*.B^*$	=	nominal interest paid on public foreign debt
dBg	=	net increase in total public debt, including the share held by Central Bank
dB^*	=	net increase in public foreign debt (assuming nothing is private)

together with the following identities:

$dBg = dB + dM - EdR$ Central Bank constraint, where dR is accumulation of foreign reserves

$dR = T^* - i^*.B^* + dB^*$ Enforced convertibility, where T^* is current trade surplus; assuming no explicit policy of reserve accumulation

Through substitutions and assuming that bonds are perfectly indexed to current inflation $(dP/P^* = dP/P)$, we obtain:

$$[(G - T)/P + E/P.T^*] + r.B/P - dP/P.M/P = d (B/P) + d(M/P) \qquad (10)$$

After many more substitutions we arrive at:

$$db/dt = d(B/py)/dt = \{[(G - T)/P + E/P.T^*] - mdM/M\} + (r - dy/y) b_t \quad (11)$$

Equation (11) describes the dynamic behaviour of government interest-paying debt in relation to nominal income. Subjected to an intertemporal budget constraint, meaning that today's debt coefficient must be equal to the present value of future non-financial government budgets coefficients, the solution becomes:

$$b_t - \{m \, dM/M - [(G - T)/P + E/P.T^*]\}/ (r - dy/y) = 0$$

In a steady-state equilibrium, $dM/M = dP/P + dy/y$, and

$$b_t - \{\dot{P} + \dot{y})m - [(G-T)/P + E/P.T^*]\} / (r - \dot{y})=0 \qquad (12)$$

This is an equilibrium condition for b that, when $r>dy/y$, may require an extremely large primary fiscal adjustment. If b is increasing over time, inflation will be expected to increase in order to 'finance' the government deficit. In Figure 1 below there is an upward-sloping curve $(r>dy/y)$ that represents the loci of combinations between dp/p and b under the condition that $d(db/dt) = 0$, with the deficit coefficient constant over time. To the right (left) of this curve, at a given level of inflation, seignorage is insufficient (excessive), meaning that b is increasing (decreasing).

The IMF and World Bank have formed the 'Washington Consensus' concerning policy adjustments for countries facing high foreign debt and inflation. Under this agreement stabilization, structural reforms and growth policies are different at subsequent stages in the adjustment process (Williamson, 1990; Selowsky, 1990; Fanelli, Frenkel and Rozenwurcel, 1990). Stabilization comes first with a set of policy actions aiming at a stable path for *b* without any requirement for an inflationary tax. This usually means an extremely large fiscal surplus in order to service foreign and domestic public debt, together with a strict monetary policy, combining in a set where the interest rate is greater than the real output growth rate for a long period of time.

THE STRUCTURAL MODEL REVISITED:
THE DYNAMICS OF STABILIZATION

In this section the original structural model is modified in order to include government relations with the private sector. In this version (Toledo, 1986) *r* will become endogenously determined and another equilibrium condition between *b* and *dP/P* is required, where a sustainable rate of inflation can be attained. Accordingly the following are used:

(a) wage equation: $W = f_1 (P_{t-1})$.
(b) demand for real cash balances from wage earners only, in order to stress the regressiveness of the inflationary tax:

$$M/P = m(WN/P, dP/P, i) \qquad (2')$$

It then follows that

$$\dot{W} = F_1 (\dot{P})_{t-1} + F_2 (P.\dot{M}/P).$$

(c) for the profit equation:

$$Pr = [1 + u(r)] \, W/k$$
$$dPr/Pr = dW/W - dk/k + u'(r)w$$

Where the mark-up reacts to the real interest paid on government bonds, $u'(r)>0$. Here w = labour share.
(d) the competitive market equilibrium condition is left unchanged.
(e) for the bond market equilibrium

$$r=r(b) \qquad (13)$$

The government increases the interest rate through the open market in order to keep *db* in the private sector's portfolio, $r'(b)>0$. From these assumptions:

$$dPr/Pr = dW/W - dk/k + u'(r) \; r'(b) \; db \; w \qquad (3')$$

With these new equilibrium conditions we can return to equation (8), obtaining:

$$(dP/P)_t = a \ [Ey/(Ep + Np) \ \{(dy/y)t - (dy/y)'t\} + (dH/H - dZ/Z)/(Ep + Np)]$$
$$- dk/k + F_1 \ (dP/P)_{t-1} + F_2 \ (dP/P).M/P) + u'(r) \ r'(b) \ db \ w \qquad (14)$$

It is possible to deduce that this will lead to a downward-sloping locus of combinations of values of b and dP/P in Figure 1, under the condition that $d(dP/P)/dt = 0$. Both partial derivatives of dP/P with respect to b, dp/p are positive, meaning that :

$$d(dp/p)/db<0 \ d(dp/dt) = 0$$

Any combination to the right (left) side of the curve means that the real rate of interest, given a higher (lower) b, is above (below) the required level to warrant the current mark-up. Prices will be increased at a faster (slower) rate in order to increase (decrease) mark-up ; the inflation rate goes up (down). Figure 1 gives an idea of the instability implicit in equations (11) and (14). It is only at a combination like C that we have a path toward stabilization; at any other combination government debt or inflation may follow an explosive path.

A strict monetary policy would mean less seignorage moving the debt equilibrium curve to the left; a higher interest rate would call for an increase in mark-up moving the inflation equilibrium curve to the right, except that it will also reduce the rate of growth, moving it back partially. The final effect will be a reduction in region C which shows good stabilization properties. If government follows a more flexible monetary policy, reducing the interest rate, and keeping growth not much beyond the warranted rate, it will move the
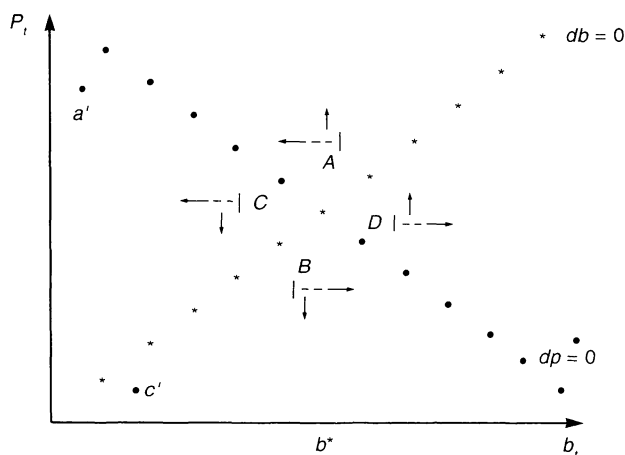

FIGURE 1   *Dynamics of the adjustment process*

debt equilibrium curve to the right without changing the inflation curve significantly. Region *C* will be enlarged.

Higher indirect taxes will shift the debt equilibrium curve to the right (enlarging the *C* region) but the equilibrium relative price of food products may well increase (they are price-inelastic in demand). In this case the inflation required to keep wage demands constant would have to be smaller (less inflation tax) as a compensation ; the inflation curve moves to the left (diminishing the *C* region). Direct taxes or lump sum taxes would be more effective.

Trade liberalization (lower implicit tariffs on agricultural exports and industrial import substitutes, and a higher exchange rate) may increase the trade surplus, worsening the government operational deficit and external debt service position; the debt equilibrium curve shifts to the left (diminishing the *C* region). Food relative prices will increase, shifting the inflation curve to the left also (further diminishing the *C* region). This is an unexpected result because trade liberalization is a strongly recommended policy and is a conditionality for IMF and World Bank structural reform programmes.

A perfectly effective income policy would turn our inflation curve into a vertical line. If b is larger than b^* the interest rate is high enough to decrease the rate of growth of income closer to or below the warranted rate, inflation would be reduced. The result is reversed if b is smaller than b^*. Under such an incomes policy there is no role for social conflict in the inflationary process because any movement of prices will be followed by wages in such a way that there will be no income transference. Both curves would be crossing in a saddle point (Messenberg, 1990).

Freezing prices and wages means an instantaneous shift in any combination of dp/p and b to a lower level of dp/p, of a shift from *C* to c' on Figure 1. Those who were caught below their desired relative price at the moment prices were frozen would be willing, immediately after, to increase prices. Those caught above would try to keep the gains. The inflation equilibrium curve shifts to the left.

Debt repudiation is an instantaneous shift in any combination to a lower level of b, a shift from *A* to a' on Figure 1. Nobody would be willing to hold government bonds at the same interest rate as before; the debt equilibrium curve shifts to the left. There may be a combination of debt repudiation and price and wage freezing which would reduce the *C* quadrant to nothing; any debt is too much debt, any primary deficit is too much to be financed by seignorage.

AGRICULTURE AND STABILIZATION POLICY

From 1980 to 1984, the orthodox approach to stabilization predominated; government sustained a high level of investment, first through borrowing, but after 1983 an expenditure switching policy was able to adjust the balance of trade to the external debt crisis (Tables 1 and 2). Relative prices for agricultural products decreased initially but then increased substantially with devaluation and growth recovery. Inflationary acceleration was contained only in 1982, owing to a combination of currency over-valuation and two good harvests

in 1980 and 1981. Control over the government deficit meant that for agriculture there was credit rationing and fewer subsidies on the interest rate. After two years of supply adjustment (1983–4) the yield increment was more than

TABLE 1   *Macroeconomic instability in the 1980s*

Year	GDP % growth rate	Deflator (%)	Relative price P_a/P_i	Curr. account Surplus	Real Ex-change rate	PSBR %GDP	Cur. Acc. Gov. Sav. %GDP	Invest-ment %GDP
1980	9.2	90	1.00	−1.4	100.0	n.a.	4.0	22.9
1981	−4.4	107	0.98	−0.4	84.2	6.2	4.4	21.0
1982	0.6	105	0.85	−0.7	78.4	7.3	4.2	19.5
1983	−3.4	140	1.16	2.4	104.6	4.2	4.3	16.9
1984	5.3	213	1.28	5.7	105.9	2.5	4.1	16.3
1985	8.0	232	1.33	5.2	108.9	4.4	3.8	16.4
1986	7.5	146	1.65	2.5	110.1	3.6	5.2	18.7
1987	3.6	204	1.43	3.3	103.0	5.7	1.0	17.9
1988	−0.1	648	1.34	5.2	98.9	4.8	0.3	17.0
1989	3.2	1323	1.17	3.2	77.4	6.9	n.a.	16.7
1990	−4.6	2849	1.56	1.6	67.4	−1.2	n.a.	n.a.

Sources: National accounts, FIBGE; wholesale prices, EGV; current account non-factor payments (expressed as % GDP), FIBGE; exchange rate, national deflator–OECD deflator, public sector borrowing requirement (PSBR), Central Bank.

TABLE 2   *Agriculture's adjustment in the 1980s*

Year	Agric. GDP %	Area crop index	Area yield index	NPK cons.	Cred. t-1/ GDPt	Price rec/ paid	Gov. exp. on agric % ag.GDP
1980	9.6	100	100	100	0.58	1.00	0.161
1981	8.2	98	116	102	0.56	1.06	0.110
1982	−0.4	102	108	100	0.60	0.98	0.125
1983	−0.4	90	125	89	0.38	0.98	0.063
1984	3.0	99	123	76	0.25	0.94	0.081
1985	10.1	103	137	89	0.17	1.08	0.158
1986	−7.9	106	117	95	0.21	0.95	0.237
1987	14.0	104	148	116	0.29	0.86	0.339
1988	1.5	109	146	114	0.16	0.84	0.306
1989	2.2	105	158	115	0.18	1.02	0.175
1990	−5.8	97	157	105	0.11	0.98	n.a.

Sources: National accounts, FIBGE; production data, FIBGE; fertilizers, Anda; agricultural credit, Central Bank; prices received/paid, FGV/CFP; government expenditure includes subsidy on credit and on wheat consumption (Villa Verde and Gasques, 1990).

enough to compensate. This provides important evidence concerning the irrelevance of interest rate subsidies as a development policy instrument.

A structural consensus took over in 1985, at first with a more flexible wage policy and a minimum price/subsidy combination for food products. Growth and a high real exchange rate meant a further increase in relative prices. The emphasis of the structural model on relative price shocks meant that food prices had to be controlled. Minimum price support programmes began to look like food subsidy programmes; whenever stocks of basic food items became available they began to be sold in the mid-season at a price below what carrying charges would require. Subsidized interest rates on short-run commercial credit were much in demand by the private sector as an insurance against government sales. Export licensing was required for food and raw materials making up for complex system of implicit taxation of agriculture (Goldin and Rezende, 1990; Brandão and Carvalho, 1989; Dias, 1989; Mauro Lopes, 1986). In the early 1980s, agricultural development policy was concentrated on frontier occupation, though investments in research were kept at a reasonable level (both are important elements making for the autonomous rate of growth in this model). Minimum price determination was common throughout the country, and as a result output from the frontier areas destined for the major consumption centres had to be directly subsidized by government.

The first heterodox anti-inflationary policy, the 'cruzado' plan of 1986, came after a severe drought, which meant relying on a large volume of imported food in order to control prices. A second fundamental element was a price freeze with a legal prohibition on any indexation clause in contracts of less than twelve months' duration. Almost all agricultural transactions lasting less than a year, and even long-term credit contracts, were later exempted from monetary correction, which meant extremely large subsidies. According to the structural consensus a strong emphasis was given to income policies in the urban sector. A 'wage law' was approved by congress, adjusting all wages simultaneously by their average real level in the last six months, and industrial prices were frozen at their level in the last week immediately after the plan was announced.

Public services and government-supplied goods had their prices frozen at a lagged value relative to private sector prices but that was felt to be more than compensated for by increased seignorage and a windfall gain in real tax collection, given that inflation was halted (these were temporary rather than permanent fiscal gains). Government and private sector expenditures increased as a result of the simultaneous monetary correction of all wages, and from saving accounts that were earning an extremely low 'expected' interest rate. Inflationary 'memory' proved to be persistent and the government deficit was another mortal threat to the heterodox anti-inflationary policy.

Failure in the second heterodox trial of 1987 meant a radical shift towards government deficit control. Equation (12) proved itself in the next two years; increasing emphasis on interest-bearing deficit financing in 1988–9 drove the Brazilian economy to hyperinflation because of the explosive behaviour of the financial component of the fiscal deficit. The current strategy is based on partial default in public debt (that is, a lump sum tax on financial assets), the Central Bank does not sustain the short-term liquidity of government debt,

there is a substantial cut in real wages in the public sector and price control is in operation. The improvement in the public borrowing requirement is due mostly to partial default and temporary taxes; if it is not a permanent structural adjustment it may be better interpreted as the situation pictured earlier, where region *C* disappears and debt increases (or debt monetization spreads) together with a mild acceleration of inflation. The agricultural relative price is at a high level again due to high real interest rates and the lower level of government expenditure, adding an important component for the acceleration of inflation.

Too much emphasis on the strategy of 'stabilization first-growth later' is a difficult path when government itself is the dominant foreign debtor. Disrupting the traditional role played by the public sector in Latin American development, without the disruption of the growth process requires the activation of a new strategic role for foreign capital and domestic saving. This is a very sensitive political challenge if government is at the same time required to tax heavily the private sector in order to service foreign debt (Fanelli, Frenkel and Rozenwurcel, 1990).

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DISCUSSION OPENING – RICHARD L.MEYER*

The highly successful Brazilian economic miracle of the 1960s and 1970s ran
into serious trouble in the 1980s. GDP growth rates fluctuated widely between
plus 10 and minus 5 per cent. Annual inflation rates rose from two-digit levels
at the beginning of the decade to four-digit levels at the end. Investment fell
from over 20 per cent of GDP to 16–18 per cent, and the foreign debt grew to
over $100 billion. Shock treatments were applied to stimulate growth and
slow inflation in 1986 and 1987, but their failure led the new Collor de Mello
government to adopt even more stringent policies in 1990. On all three occa-
sions, inflation at first declined but subsequently accelerated. It is obvious
that the structural problems contributing to inflation were not resolved.

Professor Dias has undertaken the tough challenge of trying to explain
government policy and economic performance in the 1980s. Although the
model and supporting arguments are presented in a somewhat frustrating way,
I compliment him for the creativity of his work and his courage in tackling a
tough assignment. His paper provides us with helpful insights into reasons for
the government and the economy behaving as they did, and for growth with
stability being so elusive in Brazil during this decade. It also leads me to
conclude that Brazilian attempts at 'quick fixes' have about run their course
and a fundamental redirection in growth strategy is required.

The author begins his analysis by arguing that Brazilian objectives during
the period were to pursue fairly rapid economic growth rates with high levels
of employment, and without resorting to increased taxes. They key economic
actors are identified as the government, foreigners (or foreign capital), a
fragile urban bourgeoisie, an entrepreneurial class 'without leadership' and a
'disorganized' urban labour force. The Brazilian growth strategy for some
time has placed heavy emphasis on industrialization, with the government as
owner and source of entrepreneurship for strategic economic industries and
sub-sectors (such as steel and petroleum). As a result, in the early 1980s, 60
per cent of gross capital formation was handled through state enterprises and
government banks. The country has long accepted the government's appro-
priation of domestic resources by means other than tax collection.

The macro-economic structural model developed by Professor Dias con-
sists of 14 equations, including:

(1)   three equations representing a rigid price structure for (a) urban wages
       and (b) the mark-up of prices in the non-competitive (non-agricultural)
       sector;

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(2)   one market equilibrium equation for the competitive (agricultural) sector;
(3)   four equations to explain the dynamics of inflation;
(4)   four equations to derive the equilibrium conditions for public sector debt; and
(5)   two equations to derive a sustainable rate of inflation.

Figure 1 in the paper is used to show the dynamics of macro-economic adjustment. The upward-sloping line where $db = 0$ represents equation 12 and connects the combinations of price changes and interest rates for which domestic debt is in equilibrium. Points to the right of the curve represent a situation in which interest rates rise faster than inflation to cover fiscal deficits. The downward-sloping line where $dp = 0$ represents equation 14 and connects the combinations of price changes and interest rates for which inflation is in equilibrium. Points to the right of this line represent a situation in which interest rates are higher than the rate of change in prices, so prices are bid up and inflation increases so that real mark-ups are maintained. A leftward shift of either curve decreases area C in the figure, leading to an explosion of government debt, or inflation, or both. Although not explicitly stated in the paper, these shifts occurred in the 1980s, especially at the end of the decade, thereby contributing to the inflation explosion.

Agriculture plays a crucial role in the model. Any shock (such as crop failure or large exports) throws supply and demand out of equilibrium. The rise in prices in the competitive sector is then followed by a rise in wages and prices in the rigid sector. This fact explains government preoccupation with controlling agricultural prices since, by definition, the rigid sector is able to maintain real wages and mark-ups. Therefore, it does not bear the burden of inflation through changes in its relative income. It is surprising, then, that non-farm entrepreneurs are labelled 'without leadership' and the urban labour force 'disorganized' when they are strong enough to maintain their relative incomes during inflation.

Prior to the 1980s, Brazil was able through external finance to grow rapidly with a large government sector and fiscal deficit. This alternative disappeared, however, as a result of the rise in interest rates beginning in 1979 with the change in Federal Reserve policies and the Mexican default in 1982. Thereafter, maintaining rapid growth in a government-led economy required either increased taxation (the alternative not chosen) or increased internal debt financed through high interest rates.

Professor Dias discusses a number of events which occurred in Brazil which reflect the country's struggle to cope with growth and stability, though he does not explicitly relate them to the model. On the one hand, a series of actions were taken to control inflation by keeping agricultural supplies and demand in balance. Frontier expansion was an important source of growth, but investment in research contributed to some yield improvement. Minimum price supports were also used to encourage production. In years of short supply, exports were limited and food imports and subsidy programmes helped hold down food prices. On the other hand, agricultural credit subsidies were at times eliminated, and at other times reinstated. These subsidies have been

considered important in Brazil to stimulate production, but they became so large in the 1970s that they are accused of contributing to inflation.

In 1986 and 1987, heterodox anti-inflationary shock treatments were introduced to control inflation and stimulate growth. They involved complicated price freezes, and de-indexation of contracts, but they also included wage increases. Inflation slowed for a time, but later accelerated. Faced with four-digit inflation, the new Collor government took even more drastic action in 1990, including the partial default of public debt through the freezing of private bank accounts. The current resurgence of inflation suggests that the country has not yet found a stable means to finance its desired growth.

I hope that Professor Dias will be encouraged to extend this important work, in four ways. First, a clearer exposition of the model would be useful, along with a more explicit discussion relating the events of the 1980s to the model. Second, it would be helpful to incorporate a more complete discussion of the implications derived from the model of following the standard IMF and World Bank structural reform and growth policies, particularly in a country where expanded agricultural growth and higher prices simultaneously contribute to paying the external debt and to inflation. Third, an attempt to test the model empirically would be interesting in order to quantify its explanatory power and determine the significance of individual variables at specific points of time. Finally, some predictions about future growth strategies could be enlightening. It appears that the simultaneous objectives of rapid government-led growth, with high employment, low rates of interest, inflation and taxes, but without internal or external debt default, are impossible to obtain. Simulation studies might help identify a set of attainable objectives and point to changes which Brazil must implement to return to the 1970s levels of growth and inflation.