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— Development Studies —
Project 528-15-999-000

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THE ROLE OF FISCAL FACTORS IN URUGUAY'S INFLATION

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This Memorandum attempts to explore the influence of fiscal policy in Uruguay's inflation. It is divided into three main parts. In the first, the notion of a "fiscal inflation" is described, and examples are given, from the experience of other Latin American countries, of both "fiscal" and "non-fiscal" inflations. Then Uruguay's inflationary history up to 1971 is presented, and a diagnosis of its changing degree of fiscal connection is given.

The second part focuses more explicitly on the Uruguayan case. The historical experience of the country with respect to fiscal deficits is reviewed, and the fiscal-monetary connection is traced for the recent past period (1968-73). Out of this examination there emerges a "characterization" of the Uruguayan economy for this period, which in turn provides the point of departure for the series of simulations that constitute Part III.

These simulations explore the likely effectiveness in producing, or helping to bring about, an economic stabilization. The simulations basically explore i) how strong a stabilizing force would be generated by an additional enforcement effort that raised real tax yields by 2 percent per annum above what they might otherwise have been; ii) how much of a fiscal dividend would be produced if the economy started to grow at 6 percent per annum in real terms, with taxes keeping pace and with

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expenditures being held to a 4 percent per annum real growth; and iii) how much more rapidly economic stabilization would be brought about by the continuation of tax effort and growth-cum-fiscal dividend. The conclusion of this examination is that either one of alternatives (i) and (ii) would by itself essentially eliminate fiscal pressure as a source of inflation within something less than a decade, and the two together would do it in something like three years. Combined with other tools of economic policy, the fiscal moves could be made to contribute even more effectively to a rapid and successful stabilization.

I. Fiscal Inflations in Latin America

A. Characteristics of "Fiscal Inflations"

The notion of a "fiscal inflation" is not a precise technical term. Yet I believe it is the consensus of observers of the Latin American scene that most of that region's serious inflations have been fiscal in origin. This consensus, indeed, was the main result of the confrontation between "structuralists" and "monetarists" at the Conference on Inflation and Growth at Rio de Janeiro in 1963.¹ The general picture of a fiscal inflation is one in which the banking system is "required" to grant substantial increments in credit to the government each year. The impact of these increments on the money supply could be cushioned if the banking system had sufficient assets of foreign exchange to sell (and were willing to sell them), or if it were able (and willing) to go sufficiently into

¹See Werner Baer and Isaak Kerstenesky, Inflation and Growth in Latin America (Homewood: Richard D. Irwin, 1964), especially the summary statement of W. Arthur Lewis.

debt to foreign countries to acquire foreign exchange to sell, or if it were prepared to make drastic cuts in the share of bank credit going to the private sector.

It is within the general notion of a fiscal inflation that some of these cushions might be employed some of the time, but that the degree of fiscal pressure is too strong for the cushions to exert more than a palliative effect on the inflation. Having to finance a significant government deficit, the banking system must expand government credit. Private sector credit then follows, in order to prevent its being eroded away. Characteristically, in a fiscal inflation, the share of private sector credit in total bank credit is allowed to fall to some extent, but after a point, the monetary authorities make serious efforts to prevent its further erosion. Once that point is reached, the relative shares of bank credit going to the public and the private sectors tend to stabilize, fluctuating within a band, but not going outside it.

Another characteristic of fiscal inflations is the absence of large net reserves of foreign exchange in the banking system. Where such reserves are present, they represent a cushion that the authorities tend to draw upon. In this way, any substantial foreign exchange reserves that may appear during a fiscal inflation tend rather rapidly to be eaten away.

B. Some Examples of "Fiscal Inflations"

As was indicated above, the notion of "fiscal inflations" helped resolve the structuralist-monetarist controversy. To the structuralists, the fiscal deficits were a structural failing of the system, and were ultimately responsible for most of the major inflationary pressures

observed in Latin America. To the monetarists, the mechanism by which inflation worked itself out was through increases in the quantity of money. The theoretical structure connecting monetary expansion with rises in the price level remained intact under the fiscal explanation-- which did not deny the monetarist mechanism but only helped to explain why monetary emissions were so large, so persistent, and so resistant to simple "cures." So both sides, each in its own way, could go away from the Rio conference reasonably content with the consensus that was reached.

Since the evidence explored and the judgments reached at the Rio conference were based mainly on the decade of the 1950's, I have attempted to bring later data to bear on the same general question. In examining the history of inflation in Latin America during the 1960's, perhaps the most striking observation is that--in spite of the widespread belief that high inflation is characteristic of most Latin American countries, or at least of most South American countries--only four countries (Argentina, Brazil, Chile, and Uruguay) had inflation rates averaging significantly over 10 percent per annum during the decade. Peru and Colombia averaged right around the 10 percent mark, and all the rest of the countries had average rates significantly less than 10 percent.

Outside of Uruguay, then, the phenomenon of serious inflation was concentrated only in the ABC countries during the 1960's. Their experience is examined in Table I. Most of this experience can be classified under the label of fiscal inflation, of which three rather clear-cut episodes are summarized in Table Ia. In the paragraphs that follow, I shall go through the evidence presented in Table Ia, and try to convey

TABLE Ia
THREE "FISCAL INFLATIONS"

	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
Argentina, 1962-72											
FA/M	-.10	-.01	-.01	.02	.01	.11	.11	.06	.10	.001	.03
GC/DC	.32	.38	.42	.42	.42	.46	.39	.35	.34	.33	.33
GC _t /GC _{t-1}	1.18	1.23	1.40	1.26	1.31	1.40	1.28	1.19	1.18	1.44	1.51
CP	90	110	131	179	229	298	326	351	420	575	955

Cumulative annual rates of change: GC = 30.5; M = 29.5; CP = 26.6

Brazil, 1955-64

	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
FA/M	-.02	.01	.00	-.02	-.01	-.02	-.00	.00	.04	.06
GC/DC	.27	.37	.36	.32	.32	.33	.35	.40	.37	.37
GC _t /GC _{t-1}	1.15	1.43	1.46	1.15	1.28	1.47	1.51	1.83	1.52	1.77
CP	9	11	13	15	20	27	38	58	100	187

Cumulative annual rates of change: GC = 47.6; M = 45.4; CP = 40.1

Chile, 1961-68

	1961	1962	1963	1964	1965	1966	1967	1968
FA/M	-.40	-.38	-.70	-.57	-.34	-.11	-.16	.07
GC/DC	.33	.40	.43	.45	.49	.49	.52	.49
GC _t /GC _{t-1}	1.75	1.77	1.45	1.53	1.55	1.32	1.48	1.17
CP	63	78	113	161	202	243	291	371

Cumulative annual rates of change: GC = 45.7; M = 39.7; CP = 32.1

TABLE Ib
A "NON-FISCAL INFLATION"
Brazil, 1967-72

	1967	1968	1969	1970	1971	1972
FA/M	.07	.04	.10	.13	.17	.32
GC/DC	.30	.26	.21	.20	.13	.05
GC_t/GC_{t-1}	1.58	1.33	1.09	1.22	.95	.52
CP	575	714	880	1048	1269	1515
Cumulative annual rates of change: GC = -2.70; M = +34.9; CP = +21.4.						

TABLE Ic
THE URUGUAYAN CASE, 1957-71

	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
FA/M	.07	.09	.22	.27	.32	-.06	.09	-.16	-.03	-.24	-.28	-.11	-.02	-.12	-.05
GC/DC	.14	.12	.06	.03	.03	.11	.14	.11	.16	.22	.29	.20	.31	.24	.30
GC_t/GC_{t-1}	1.25	1.02	.57	.78	1.11	4.38	1.66	1.20	2.19	1.50	2.39	.97	2.25	1.04	1.99
CP	26	31	44	61	74	82	100	141	221	384	728	1639	1972	2313	2859
Cumulative rates of growth 1957-61: GC = -14.3; M = +31.4; CP = +29.8															
1961-71: GC = -77.6; M = +46.7; CP = +44.1															

FA = Foreign Assets of the Consolidated Banking Systems
M = Money Supply
GC = Credit to the Central Government and Official Agencies by the Consolidated Banking System
DC = Total Domestic Credit Outstanding (Consolidated Banking System)
CP = Consumer Price Level.

Source: International Financial Statistics, Supplement, 1972.

to readers a feeling of what a fiscal inflation "looks like."

The case of Argentina (1962-72) is quite typical. The "range" in which the governments' share of banking-system credit was allowed by the monetary authorities to fluctuate was from 32 to 42 percent (with one exception in 1967). Foreign exchange reserves remained low in relation to the money supply throughout the period, offering no plausible possibility of offsetting the fiscal deficits that regularly emerged. The banking system was called upon to increase its holdings of government obligations every single year, at rates ranging upwards of 18 percent, and averaging over 30 percent per year. With that, the money supply grew at nearly 30 percent, and prices at about 27 percent per annum.

Brazil's fiscal inflation is shown for the years 1955-64. Here, too, foreign assets of the banking system remained negligible throughout the period, and the band in which the ratio of government credit to total credit fluctuated was from 30 to 40 percent, rising into this range from an initial position of 27 percent in 1955. In this period the pressure from increases in government credit was indeed severe--apart from two years (1955 and 1958) in which such credit increased by only 15 percent, and one (1959) in which it grew by 28 percent, the growth of government credit was more than 40 percent every year, and averaged over 47 percent for the entire decade. This pressure, and the inability and/or inadvisability of the banking system's squeezing other assets further in the face of it, led to the money supply's increasing at an average rate of over 45 percent, and to a price inflation averaging over 40 percent during the 10 year span here covered.

In Chile, the foreign asset position of the banking system was

dramatically (almost incredibly) negative for much of the period covered, and attained a positive value only in the final year (as a result of a surge in copper prices). The band of fluctuation for the ratio of government credit to total domestic credit was in this case 40 to 50 percent--a range which was entered from below after the first year of the period, and which was exceeded only once, with 52 percent in 1967. The pressure on the banking system to grant additional credits to the government was continuous and strong, with such credit growing at an average rate of over 45 percent per year over the period, and falling short of that average only in 1966 and 1968. The 45.7 percent rate of expansion in government credit was partly offset, but still the money supply grew at nearly 40 percent, and the average rate of price inflation was 32 percent.

C. A Case of "Non-Fiscal Inflation"

Brazil's experience in the late 1960's and early 1970's is a rare example of "non-fiscal" inflation. Table Ib summarizes this episode. The differences between it and those reflected in Table Ia are striking. The share of government credit in total banking credit fell from 30 percent to 5 percent. In fact, the absolute amount (in nominal cruzeiros) of such credit was lower in 1972 than it was in 1967. Brazil simply did not resort to banking-system financing of government deficits during the period. The money supply grew at nearly 35 percent per annum, but certainly not as a consequence of fiscal pressure. Massive reserve accumulation--the consequence of a phenomenally successful export-promotion policy plus large inflows of foreign capital--together with significant credit expansion to the private sector were the obvious proximate causes of this particular inflationary experience. And it should also be noted that this

period in Brazil was the culmination of a dramatic disinflation from an annual rate that reached around 100 percent in 1963-64 to the steady rate of around 20 percent that characterized the period shown in Table Ib.

D. The Historical Setting of Uruguay's Current Inflation

Against the backdrop of the experiences just reviewed--of "fiscal" and "non-fiscal" inflation in other countries, we now proceed to examine the case of Uruguay in the years including and immediately surrounding the decade of the 1960's. The comparable data (drawn from the same source--International Financial Statistics) are presented in Table Ic. As I read the story from that table, the period can be divided neatly into two quite distinct parts. From 1957 through 1961, Uruguay's inflation seems quite clearly to be "non-fiscal" in origin. As was the case in Brazil from 1967 to 1972, even the nominal amount of banking system credit to the government declined over this period. By its close in 1960 and 1961, government credit amounted to only 3 percent of total domestic credit, and there was no serious pressure on the banking system for adding to its total holdings of government obligations. At the same time the country was undergoing a major accumulation of foreign reserves--which moved from 7 to 32 percent of the money supply during this period--precisely the range over which Brazil's reserves moved between 1967 and 1972. There can be no doubt, then, that foreign exchange accumulation and credit to the private sector were the proximate causes of Uruguay's monetary expansion during 1957-61. And, furthermore, the setting was such that these could not be interpreted as some sort of lagged reaction to a prior episode of fiscal pressure. Fiscal pressure was totally absent during this period,

which makes it another of the rare cases of significant "non-fiscal" inflation in Latin America (prices almost trebled in four years).

The picture changes drastically as one moves past 1961. Starting from its very low base, government credit multiplied by more than four between 1961 and 1962, and increased thereafter at rates which fell below 50 percent only three times in a decade, averaging over 75 percent per annum over the whole period 1961-71. At the same time, the foreign asset portfolio of the banking system turned abruptly negative in 1962, and stayed that way, with but one exception (1963), throughout the decade under review. This period thus seems to have all the earmarks of a fiscal inflation--the only caveat being the very low base from which government credit started. It is only for this reason that, I am reluctant to call this period in Uruguay one of clearcut fiscal inflation, but there is no doubt that all the signs point in that direction. The move of the government credit/total credit ratio from 3 percent in 1961 to 16 percent in 1965 surely was not in itself a powerful inflationary force. It could, had it not continued further, have easily been cushioned by a modest reduction in private-sector credit. But it did continue, and by the end of the period the ratio of government credit to total credit was approaching 30 percent--the lower range of the bands that characterized this ratio for Argentina's and Brazil's "fiscal inflations." By this point in time the label of fiscal inflation seems to apply reasonably well to the Uruguayan case.

II. The Fiscal Setting of Uruguay's Current Inflation

A. The Central Government Budget

It is incredible how stable has been the macroeconomic budget picture in Uruguay over the past decade or so. In spite of almost annual changes in tax legislation, some of them quite dramatic, and in spite of some quite important changes on the expenditure side, the fractions of GDP accounted for by central government receipts and expenditures, respectively, have remained essentially constant. Table II contains the data supporting this assertion. As can be seen there, central government receipts averaged 13.2 percent of GDP during the period 1961-67, and 13.5 percent during the period 1968-73. Similarly, central government expenditures averaged 16.0 percent of GDP during 1961-67 and 15.9 percent during 1968-73. Though there were transitory variations on both the receipts and the expenditure sides, the basic fiscal structure remained essentially unchanged. This fact will be used in developing simulations of Uruguay's fiscal situation subsequently in this paper.

Table III shows the relationship between the figures for fiscal deficits, as shown in the fiscal statistics, and the financing of such deficits by the banking system, which is what is relevant for our analysis of inflation. Line 1 presents the absolute figures on the deficit as drawn from the fiscal accounts of the central government. Line 2 shows what part of the deficit, thus defined, was financed by sale of government obligations to the monetary authority (in this case Central Bank plus Banco de La República). The third line represents obligations by the banking system. It is drawn from the monetary--not the fiscal--accounts but it represents a quite similar concept to that reflected in line 2.

TABLE II
CENTRAL GOVERNMENT BUDGET, 1961-73

	Receipts/GDP	Expenditures/GDP
1961	15.6	16.6
1962	14.4	18.2
1963	14.4	17.3
1964	14.0	16.1
1965	10.6	15.7
1966	12.5	13.8
1967	<u>10.9</u>	<u>14.1</u>
Average 1961-67	<u>13.2</u>	<u>16.0</u>
1968	13.0	13.2
1969	12.2	14.7
1970	13.5	15.3
1971	14.0	18.7
1972	13.6	16.1
1973	<u>14.8</u>	<u>16.3</u>
Average 1968-73	<u>13.5</u>	<u>15.9</u>

Source: Banco Central del Uruguay, Boletín Estadístico Mensual,
No. 13 (Dec. 1973), Table III.1.

TABLE III

COMPARISON OF ALTERNATIVE DEFICIT MEASURES

	1968	1969	1970	1971	1972	1973
1. Central Government Budget Deficit ^a	754	12,690	10,596	41,666	51,899	36,332
2. Central Government Financing with Monetary Authorities ^b	n.a.	6,883	3,233	36,448	24,780	20,858
3. Banking System - net Central Govt. Credit ^c	610	10,260	3,391	26,110	24,332	18,790
4. Banking System - net Total Govt. Credit ^d	-1,172	12,153	2,574	23,778	36,962	25,487

^aSource: Banco Central del Uruguay, Boletín Estadístico Mensual, No. 13 (Dec. 1973), Table III-1.

^bIbid., Table III-2.

^cIbid., Table I-10 (Central Govt. Credit only)

^dIbid., Table I-10 (Credit to Central Govt. plus Rest of Public Sector plus Development Banks).

The financing of the deficit shown in line 2 represents the net sale of obligations by the central government to the monetary authority. Line 3 shows the acquisition of central government obligations by the entire banking system. There are thus two main ways in which a discrepancy between lines 2 and 3 could be generated. On the one hand, the central government might sell some obligations to some banking entity other than the monetary authority, leading to a different figure being reported from the banking system as a whole than that for government sales to the monetary authority. On the other hand, banks could acquire some government obligations that were held by non-bank institutions (or individuals), thus generating a rise in their portfolio unconnected with the financing of the current year's deficit. Given these sources of possible discrepancies, the degree of agreement between lines 2 and 3 seems reasonably close--indeed, cumulatively, from 1969 through 1973 the difference is only in the order of about 10 percent (92 billion [row 2] versus 83 billion pesos [row 3]).

As we move from row 3 to row 4 we are comparing two sets of statistics from the banking system--the first concerning its holdings of central government obligations, the second dealing with its holdings of obligations of all governmental entities. The possibility of discrepancy is obvious in this case, but once again the relationship between the two sets of figures is reasonably close, with the increase in credit to all governments (100 billion pesos) over the full period 1968 through 1973 exceeding the increase to the central government (83 billion pesos) by about 20 percent.

Finally, we come to the comparison between rows 1 and 4. Row 1 gives us the fiscal deficit concept that is most frequently discussed, and that

is most directly under the control of the finance ministry. Row 4 gives us the variable that most directly connects the fiscal with the monetary sector. Here, in addition to the sources of discrepancy already discussed, there is the important one of other sources of financing for the central government deficit. Indeed, the main source of difference between rows 1 and 4 may be said to depend on whether the financing of central government deficits outside the banking system (which appear in row 1 but not row 4) exceeds or falls short of the financing within the banking system of deficits (which appear in row 4 but not row 1) in other agencies of government besides the central government. In this case the latter type of financing appears to fall substantially short of the former, as row 4 averages about 75 percent of row 1. I should emphasize at this point that it is row 4 which is of interest for the analysis of the fiscal-monetary connection, but the data presented in Table III reveal that the deficits measured under other budget concepts were of the same general order of magnitude.

III. Alternative Paths of Disinflation (Simulations)

Tables IV, V, and VI present three alternative scenarios of disinflation in Uruguay. In Table IV it is assumed that the stagnation that has characterized Uruguay's economy for the past two decades will continue. Reliance for combatting inflation is therefore placed on taxes. In the scenario of the table, these are projected to expand at the rate of 2 percent per annum, in real terms. This row 1 of the table shows expenditures constant (in real terms) at 16 percent of GDP (see Table II), while government revenues grow from 13.5 percent of GDP (again see Table II), at the

TABLE IV
 DISINFLATION SCENARIO WITH FISCAL EFFORT (2%) BUT NO GDP GROWTH
 (GDP constant at 1000)

	Year									
	0	1	2	3	4	5	6	7	8	9
1. Government Expenditure	160	160	160	160	160	160	160	160	160	160
2. Government Revenue	135	138	140	143	146	149	152	155	158	161
3. Deficit	25	22	20	17	14	11	8	5	3	-1
4. Rate of Inflation	89%	76%	67%	54%	42%	32%	22%	13%	8%	-

assumed 2 percent per annum rate. As can be seen, it would take until year 9 for revenues to surpass expenditures. However, long before that the inflationary pressures emanating from the fiscal side would have been brought down to a more manageable range. By the fifth year, for example, the deficit would be only around 1 percent of GDP.

In Table V the assumption is made that the Uruguayan economy will break out of its "traditional" stagnation, hopefully as a result of the general liberalization of economic policies that is now under way. Growth is there postulated at 6 percent per annum in real terms. It is assumed that without additional "fiscal effort" tax revenues can grow in proportion to GDP, though it is recognized that some restructuring of particular revenue sources may be required to achieve this result. The "effort" involved in this particular scenario does not concern taxes, however; rather it entails containing the growth of real fiscal expenditures to 4 percent per annum, in the face of a 6 percent rate of growth of real GDP. Row 3 of Table V shows the deficit implied by these assumptions; it reaches zero in the 9th year of the exercise. But once again the bulk of the reduction of inflationary pressure takes place early in the scenario; as shown in row 4 of the table, the deficit is once again reduced to 1 percent of GDP by the fifth year of the exercise.

In Table VI the assumptions underlying the previous two scenarios are combined. Expenditures are there projected to grow by 4 percent per annum as in Table V, but revenues are projected to grow at 8 rather than 6 percent per year, owing to a combination of GDP growth (at 6 percent) with additional fiscal effort causing a further rise of 2 percent per annum in the tax yield out of a given GDP. The rate of reduction in the

TABLE V
 DISINFLATION SCENARIO WITH REAL GDP AND TAXES GROWING AT 6% PER YEAR WHILE REAL
 EXPENDITURES GROW AT 4% PER YEAR

	Year									
	0	1	2	3	4	5	6	7	8	9
1. Real Expenditures (4%)	160	166	173	180	187	195	202	211	219	228
2. Real Taxes (6%)	135	143	152	161	170	181	192	203	215	228
3. Real Deficit	25	23	21	19	17	14	10	8	4	0
4. Deficit/GDP	.025	.022	.019	.016	.013	.010	.007	.005	.003	0
5. Rate of Inflation	79%	61%	49%	39%	31%	22%	12%	7%	0%	-

TABLE VI

DISINFLATION SCENARIO WITH REAL GNP GROWTH AT 6%; TAX GROWTH
(THROUGH FISCAL EFFORT OF 2%) AT 8%; AND EXPENDITURE
GROWTH (THROUGH FISCAL RESTRAINT) AT 4% PER YEAR

	Year					
	0	1	2	3	4	5
1. Real Expenditures (4%)	160	166	173	180	187	195
2. Real Taxes (8%)	135	146	157	170	183	198
3. Real Deficit	25	20	16	10	4	-3
4. Deficit/GDP	.025	.019	.014	.008	.003	-.002
5. Rate of Inflation	79%	50%	34%	16%	2%	-

deficit is consequently faster, with the deficit in absolute terms being eliminated by the fifth year of the scenario, and with the deficit being reduced to below 1 percent of GDP by the third year of the exercise.

Another way of examining the scenarios underlying Tables IV, V, and VI is to inquire how much inflation they imply year by year, or cumulatively. This is difficult to do except on the basis of rigid assumptions. One could always reduce the extent of inflationary impact of a given budgetary situation, for example, by selling gold (something quite feasible in the case of Uruguay), or by borrowing more from abroad (which for Uruguay would probably mean mortgaging a further part of its gold stock). Then, too, there is always the possibility of further squeezing the share of bank credit going to the private sector, though this is hardly a course which responsible monetary authorities would espouse at the present time.

The procedure followed in the tables is a conservative one, which assumes that the total money supply grows in the same proportion as does bank credit to the government. In addition, we assume (again conservatively) that the stock of money will continue to bear the same relationship to nominal income throughout the stabilization process reflected in each of the scenarios. These two assumptions, taken together, mean that nominal bank credit to the government will bear a constant relationship to nominal GDP, and hence that real bank credit to the government will bear a constant relationship to real GDP. Let this relationship be 4 percent--i.e., the level of real bank credit to the government at any point in time is equal to 4 percent of a year's

real GDP, centered around the same point in time. (This ratio approximately characterizes Uruguay's recent history.)

For the exercise of Table IV, where real GDP is constant, this means that real bank credit to the government will be constant at 40. Such credit in nominal terms will have to rise, however, as the inflation proceeds. The increment in nominal credit in year zero is 25, which would carry it from a beginning-of-year position of, say, 28 to an end-of-year position of 53. This in turn would imply a within-the-year inflation of 89 percent ($= 25/28$), and an end-of-year price index of 1.325 ($= 53/40$), taking the average price level of the year as 1.00.

Subsequent movements in the price level are generated by the formula:

$$(1) \quad B_t + d_t [(P_t + P_{t+1})/2] = B_{t+1} = b_{t+1} P_{t+1} .$$

Here B_t refers to the nominal amount of bank credit to the government that is outstanding at the beginning of year t ; d_t is the real deficit financed by the banking system during year t ; $[(P_t + P_{t+1})/2]$ is the average price level during year t ; and b_{t+1} is the real amount of credit to the government that is outstanding at the beginning of year $t+1$. For the exercise of Table IV, $b_t (= b_{t+1})$ is constant at 40, so the price level at the beginning of year 2 can be obtained by solving

$$b_1 p_1 + d_1 [(p_1 + p_2)/2] = b_2 p_2$$

$$40 p_1 + 22 [(p_1 + p_2)/2] = 40 p_2$$

$$51 p_1 = 29 p_2$$

$$\frac{p_2}{p_1} = \frac{51}{29} = 1.76$$

In general, for the case of $b_t = b_{t+1} = 40$, we have

$$(2) \quad (p_{t+1}/p_t) = [40 + (d_t/2)] / [40 - (d_t/2)].$$

This equation was used to generate the rates of inflation shown in row 4 of Table IV.

In the cases of Tables V and VI, the process of generating the implied rate of inflation is similar, except that in these cases the real quantity of money, and hence (under our assumptions) the real amount b_t of banking system credit to the government, grows at the same rate (6 percent per annum) as GDP. In this case the nominal credit of 53 outstanding at the end of period zero corresponds to real credit of 42.4 [= 40(1.06)], so that the price level at the beginning of period 1 is 1.25 (= 53/42.4). Thereafter, successive implied increases in the price level are generated by the formula

$$(3) \quad (p_{t+1}/p_t) = [40(1.06)^t + (d_t/2)] / [40(1.06)^{t+1} - (d_t/2)].$$

As can be seen in the tables, the scenario of Table IV requires nine years to eliminate inflation; that of Table V takes eight years, while under that of Table VI the task is essentially accomplished by the end of year 3. Looked at in another way, and starting the measurement from the average price level of year zero, the overall price level would have risen from 1.00 to 16.74 before the inflation had stopped, under the sequence depicted in Table IV. Under that of Table V the corresponding rise would be from 1.00 to 7.98, while under the scenario of Table VI the rise would only be from 1.00 to 2.97.

These cumulative figures are probably overestimates, as they do not

take into account the substantial reduction in velocity of circulation that is almost certain to occur as the Uruguayan economy disinflates. Nonetheless, even allowing for velocity to be cut by a third or a half (which, if anything, overstates the likely reduction), one must still look forward to a many-fold increase in prices under either of the scenarios depicted in Tables IV and V. Only that of Table VI can be regarded as giving an optimistic picture. Yet it is not an absurdly unfeasible one. What is required for the picture of Table VI to emerge is a confluence of reasonable efforts, crowned with reasonable success, in several directions at once. And if in addition there is a significant reduction in velocity of circulation, it is quite conceivable that the price^{level} might only have to rise by perhaps 100 or 125 percent cumulatively, from the moment of initiation of a major new economic policy thrust, until the inflation is effectively stopped.

But it is important to realize that this very happy and favorable result depends critically on the reactivation of the process of economic growth, as well as on expenditure restraint and additional tax effort. The "miracle" involved would not be without precedent, but it would not be an easy trick by any means. To my mind the key question is whether the liberalization efforts under way in Uruguay will be powerful enough, and whether they will unleash enough pent-up or repressed forces of growth, so that the private economy will be the major engine of economic progress, permitting the government to take a "conservative" fiscal stance (restraining expenditures while pressing forward on the tax front) without impeding the economy's real growth.