64

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THE MACROECONOMIC EFFECT OF NON-TRADITIONAL EXPORTS IN PERU 1978-1980

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Table of Contents

I

THE SETTING

During the whole decade of the 1970's, Peru was under military rule. This did not mean, however, that either the economic situation or the economic policy was uniform throughout the decade. Rather, three distinct periods can be distinguished: Phase I: the reformist period, Phase II: the return to orthodoxy, and Phase III, the institutionalization of stagflation. While this paper will focus on the macroeconomic impact of non-traditional exports in the last of these periods, when they were truly important, it is useful to provide some background on how Peru came to live under lasting stagflation.1/ It is worth noting, although not part of our story, that the 1980's have been a continuation of Phase III with a vengeance.

The Heyday of Reformism, Phase I (1969-1975):

The military took over at the end of 1968 with a clear purpose; they wished to create a new kind of economy "neither capitalist nor communist", a society more fair and more "independent". Their economic policy consisted of vigorous import substituting industrialization, combined with reform of property rights and large scale government investment in extractive industries. Import substitution was pursued by means of exchange control, import licensing and import prohibition of

anything that could be produced domestically. Property rights were reformed throughout the economy: a substantial part of foreign private investment was nationalized, with varying degrees of compensation; 2/ Agrarian Reform cut up some large estates and converted others into cooperatives; industrial firms were ordered to issue shares to their workers, who were expected to get up to half the voting stock over a period of time; and, new legislation was passed creating the so called Social Property Sector, which was to consist of worker-managed firms. Sate Owned Enterprises took over the nationalized foreign firms and massive investments of long gestation periods where undertaken in mining and agriculture.

The inherent contradictions of import substituting industrialization surfaced very quickly, as was to be expected from such an accelerated industrialization program. Considerable investment in industry occured, and substantial increase in output. However, industrial production was entirely for the domestic market, yet it required imported inputs. The faster it grew, therefore, the more pressure it put on the balance of payments. Rapid growth of output in mining or in agriculture could have provided the foreign exchange needed by industry. However, government investment programs were of far too long gestation periods to provide foreign exchange on a timely basis. Oil finds in the Amazon area briefly provided hope of succour, but then turned out to be only a fraction of the size

expected. For a time, however, the expectation of oil did provide international creditworthiness which Peru exploited to the hilt. It thus supported the industrial growth and government investment while running up by 1975 what was considered a massive long term public foreign debt of $3 billion.[3]

The reforms of property rights reinforced the ISI contradictions. The nationalization of foreign enterprises stopped the outflow of profits. However, the quality of management and particularly the quality of export marketing declined and thus gross foreign exchange revenue suffered. Combined with costly long run investment projects, mining left less foreign exchange available for the rest of the economy than before. Agrarian Reform very effectively disorganized the management structure in the rural sector. Export of agricultural products fell and imports rose. Moreover, the capital stock in the agricultural sector was rapidly run down as the new cooperative owners decided to privatize the wealth in the companies they did not expect to own for very long. The Industrial Community Legislation also did its share. The spectre of eventual loss of property led owners to milk their companies in order to shift assets abroad. In view of the exchange controls, the most feasible way to do this was to invest heavily in new machinery and to purchase as much raw material as possible abroad, over-invoicing the cost of both. Thus, compared to what would otherwise have occurred, the

overall effect of the Property Rights Reform was that foreign exchange earnings fell and the demand for foreign exchange increased.

Balance of Payments Explosion and the Return to Orthodoxy, Phase II (1976-78):

The balance of payments should have exploted in 1973 or 1974. However, terms of trade were favorable to the country and thanks to the oil crisis and the expectation of becoming a major producer, it was able to borrow substantially. By 1975, the terms of trade had turned against Peru, the foreign debt had grown since 1973 by 50%, from $4.1 bn to $6.3 bn, and the great oil finds of the jungle had turned out to be only humdrum (although still interesting at the new high prices). Foreign bankers saw a current account deficit in the BOP of $1.5 billion which was greater than the year's exports of $1.3 billion; they did not want to lend the country more; rather, they wanted repayment.

Peru needed to adjust to a new international reality. The result for internal politics and for economic policy was a progressive abandonment of most of what Phase I had tried to achieve. The reformist-developmentalist view was discredited and conventional orthodoxy took over. Peru retained import licences but it adopted, even if reluctanly, the package consisting of devaluation and fiscal and monetary restraint that

was the hallmark of an IMF-type approach. Over the three years, 1976-78, Peru devaluated by some 330% 4/. Prices rose by 230% and aggregate output fell by 2%: the new policy produced stagflation. The balance of payments was gradually brought into balance by a severe fall in imports, but the fiscal deficit was still 6.1% of GDP in 1978. At the same time, per capita GNP had fallen to the level of 1972 while unemployment and underemployment had risen.

The Raw Materials Boom and Institutionalization of Stagflation, Phase III (1979-80):

In 1979, export at FOB value were 86% higher than in 1978: suddenly foreign exchange was plentiful. Moreover, the export boom continued in 1980, when exports were up by another 6.5% over the preceeding year. Of the almost two billion increase over the two years, about 60% ($1250 m) were due to the price increases of minerals, another 15% ($300 m) originated in the second oil shock, and $500 million came from an increase in non-traditonal exports. The government raked in a very substantial part of the loot and improved the fiscal situation. It imposed a 17% tax on traditional exports and it ordered its mining enterprises to hoard their windfall until proper investment projects were developed. it was also collecting a tax it didn't see and of course did not record in the books: at 65% p.a. inflation in those years it was collecting an inflation

tax of about 4% of GNP. At the same time, per capita GNP was below 1975-76 levels and total value added in manufacturing and construction was well below levels achieved three years before.

Yet the government was convinced it had a demand inflation on its hands, largely because it saw the stock of money rise. Never did it ask who owned the money and what was happening to velocity, nor did it investigate what supply capacity was available in the economy. So it maintained a tight monetary policy, and followed purchasing power parity rules for minidevaluation. But with an important part of the food supply being imported and food being 38% of the cost of living, partially indexed wages and a public quite sensitive to the changes in the exchange rate, the minidevaluation policy was continously pushing the price level. A slowdown in devaluation rates and price controls slowed inflation somewhat in the first half of 1980, then the civilian government took over and initiated a policy of "corrective inflation". For 1980, prices rose 63% on a December to December basis. Moreover, this was only achieved by postponing some price increases to the next year; in January 1981 alone, prices rose by 11.7%.

Excess Capacity and Inflation:

Secular excess capacity has existed in Peru for a long time. Analyses performed by Abusada and Millan 5/ show that for 1971, industrial capacity utilization was quite low: almost no

sector of industry worked more than 300 days a year and half the value added was produced by firms working less than three shifts. However it is well known that the capacity that it is profitable for entrepreneurs to use depends in good part on the incentive structure. High wages, multiple shift premia, discrimination in favor of lending for fixed assets as against working capital, etc., all make multiple shift work and weekend and holiday work unprofitable and thus reduce the effective capacity. In the late 1970's, this type of excess capacity certainly continued to exist in Peru. The only difference between the end of the decade and the beginning was that in the later period many people inside and outside the policy establishment were aware of the waste that such capital idleness in the mist of capital scarcity represented.

Unfortunately, nothing much could be done about secular excess capacity for it had been compounded substantially by the appearance of cyclical excess capacity resulting from the stagflation. Industrial output reached its peak in most sectors in 1976. For 1978, the figures given in the monthly survey of the Ministry of Industry allow the inference that output could have increased by the percentages shown in Table 1, without exceeding the previously observed peak.

The government during that time thought itself to be an expansionary force, and tried very hard to reverse this situation. As a matter of fact, however, the government was a

TABLE 1

POSSIBLE SHORT RUN INCREASES IN OUTPUT, 1978*

(Percent)

Milk products	34	Printing and publishing	210
Marine products	n.a.	Chemicals and fertilizers	21
Fishmeal and fishoil	19	Synthetics	58
Refined sugar	72	Other chemicals	45
Other food indus.	50	Petroleum refining	53
Animal feed	240	Rubber	131
Beverages	7	Plastics	72
Tobacco	70	Cement	54
Textiles	31	Iron and steel	50
Clothing except shoes	167	Non-ferrous metals	61
Leather exc. shoes and clothing	122	Metal products	65
Leather shoes	220	Non-electrical machinery	102
Wood and cork	45	Electrical machinery	81
Non-metalic furniture	382	Transport equipment	n.a.
Paper and paper products	85	Other manuf.	86

Notes: * $\left(\frac{\text{Peak output}}{\text{1978 output}} - 1\right) \times 100$

Source: Indicadores del Sector Manufacturero, 1979, Dirección de Oficina y Registros, Oficina Sectorial de Planificación, Secretaría de Estado de Industria, and Estadística Industrial, 1978.

TABLE 2

Fiscal Deficit and Demand Pull
(Millions of Current Soles)

Year	(1) Central Gov't. Total Deficit		(2) Interest on Foreign Debt		(3) Repayment on Foreign Debt		(4) Import Content Public Investment[a]		(5) =(1)-(2)-(3)-(4) Subtotal[b]		(6) Inflation Tax: Monetary Base x Loss of Purch. Power = Tax				(7) Inflationary(-) or Deflationary(+) Pressure
	Soles	%GNP	Soles	%GNP	Soles	%GNP	Soles	%GNP	Soles	%GNP	Soles	%[c]	Soles	%GNP	%GNP
1975	-43,531	-7.8	4,956	0.9	5,989	1.1	14,000	2.5	-18,586	-3.4	53,122	19.35	10,282	2.1	-1.3
1976	-64,536	-8.4	7,687	1.0	8,289	1.1	18,550	2.4	-30,019	-3.9	78,908	31.03	24,489	3.2	-0.7
1977	-113,041	-10.7	15,620	1.5	23,016	2.2	20,000	1.9	-54,405	-5.2	97,853	24.47	23,946	2.3	-2.9
1978	-156,947	-9.6	36,836	2.2	59,593	3.6	28,900	1.8	-31,618	-1.9	147,784	42.43	62,705	2.4	+0.5
1979	-182,700	-6.0	76,200	2.5	120,200	4.0	64,300	2.1	-73,000	2.6	304,100	40.01	121,670	4.0	+6.6
1980	-417,000	-8.3	127,000	2.5	182,000	3.6	133,000	2.6	-25,000	0.4	535,800	37.81	202,586	4.0	+4.4

Notes:
(a) 50% of Public Investment.
(b) Does not include foreign exchange component of current expenditure or of defense expenditure.
(c) $\dot{P}/(1+\dot{P})$ December-to-December.

Sources:
Banco Central de Reserva del Peru: Boletin Enero 1980 - Cuadros 12-14
Peru Economico, Ene - Feb. 1981, pp. 12-13
Banco Central de Reserva del Peru, Memoria 1976-79
Instituto Nacional de Estadistica, Informe EStadistico, Dic. 1980

deflationary force: it extracted a sizable amount of domestic purchasing power from the economy as it collected taxes in local currency and sterilized the proceeds in the Central Bank through the purchase of foreign exchange to pay its foreign debt. Table 2 shows the record for 1975 to 1980. The figures generally quoted for the government's impact are those of column 1; subtracting foreign exchange expenditure of the government brings us to column 5, which shows a substantially different picture. If we then add in the inflation tax, the government is shown to be generating deflationary pressure of some 5-6% of GNP rather than a inflationary gap of 6-8%.

A government surplus with a Purchasing Power Parity devaluation policy in an economy which is de facto highly indexed to the exchange rate would naturally lead to stagflation. The picture is therefore quite consistent.

The Growth of Non-Traditional Exports:6/

In 1970, non-traditional exports stood at $34.2 million, and 3.3% of total exports. There were two growth spurts during the decade: one tripling from 1971 to 1973 and a multiplication by 2-1/2 from 1976 to 1978. In 1980, non-traditionals reached $832 million and constituted 21.3% of total exports.

The second growth period is particularly notable because it took place in the face of extraordinary skepticism on the part of both the business community and the government. Yet the

combination of substantial export supports (an average of 27% on the f.o.b. value), a real devaluation (28% from 1976 to 1978), and a shrinking domestic market (down 20% or more from 1976 to 1978 as noted above) did the job. In 1979, a new export incentive law for non-traditional products was passed, with the commitment to keep it unchanged for the following ten years. Non-traditional exporting was believed to finally have arrived.7/

It seems appropriate, therefore, to analyse what contribution non-traditonal exports made to the Peruvian macroeconomic situation during the years 1978 to 1980, when their importance was established and recognized. Of interest is their impact on GNP and on the wage and profit bills. Equally important is their net contribution to international reserves, after induced imports are netted out. But most important for the policy debate of the time, is whether non-traditional exports were paying their fiscal way. This last question requires comparing the outflow from the treasury on account of export supports with the new revenue directly and indirectly resulting from the non-traditonal exporting activity.8/

II

THE MODEL: DEMANDS ON SPECIFICATION POSED BY REALITY

The stagflationary situation described in the preceding section corresponds to a Keynesian type of world. There is ample installed capacity and there is insufficient demand to keep the level of production up. The only difference with the standard Keynesian situation on the domestic side is that the price level is moving inexorably upward, driven from below. As a consequence, it is appropriate that the model be demand-driven.

Morever, there is a major non-Keynesian element in the picture, and that arises from the balance of payments. Higher levels of industrial output imply higher levels of imports as well. Raw materials and intermediate goods are demanded directly by industrial users. In addition, higher industrial activity involves higher levels of income, which in turn will lead to higher final demand expenditures, some of which will be for import goods, some of which will be for services and some for domestic agriculture, all of which in turn have import components. Thus for a Keynesian world to be fully present, it is not enough that there be ample domestic supply capacity, it is also necessary that there be plentiful foreign exchange to provide the complementary imports required. In the case of an export analysis, however, it is the exogenous activity itself

which provides the foreign exchange needed to support domestic output. Therefore, the prototype of the model needed is the foreign trade multiplier.

Some exceptions to the ample capacity picture of the Peruvian economy should be noted, however. A major exception is given by the primary sectors. Agriculture and mining typically work at full capacity and were doing so in the period under review. These sectors, at least, must have an income formation mechanism not driven from the demand side, but determined instead by an output ceiling given by capacity. With two different kinds of sectors, then, the model can no longer be an aggregate one but needs to have some of the properties of an input-output framework.

The capacity ceiling so obvious in the primary sectors also applies to manufacturing. For there is no guarantee that the structure of demand resulting from an expansion of non-traditional exports will exactly match the structure of capacity. Therefore, it is quite possible that some sectors will reach full capacity before others, and that the resulting excess demand spills over into imports. A full-fledged multisectoral model incorporating an input-output structure therefore seems necessary. However, as distinct from conventional input-output models which are entirely demand-driven, this must be one which has capacity constraints which differ by sector and which limit the extent to which

domestic output can expand. By the same token, when demand exceeds capacity, competitive imports will be drawn into the economy.

It follows that the model needs to have three different kinds of imports: (i) complementary intermediate goods, dependent on the level of activity in the respective demanding sectors; (ii) competitive imports, appearing whenever there is excess demand for a domestic sector's output; and, (iii) non-competitive final demand imports, which are again for the kind of goods not produced domestically.

Private expenditure would appear to be properly endogenized in the model. The input-output framework can easily be expanded by linking private expenditure to private disposable income. This is standard practice for consumption, however, for the case at issue it is appropriate to take the same approach for investment,replacing the propensity to consume by a propensity to spend. Thus, a composite final demand vector from private disposable income can be generated . A leakage additional to personal income taxation should be introduced, however. This leakage corresponds to the inflation tax and arises from the desire of private household and businesses to maintain a stable level of real balances. With inflation fairly steady during this period at about 65%, maintaining stable real balances translates to an inflation tax of about 4-1/4% on private disposable income.

Taxes and subsidies must naturally appear in the model. Non-traditional exports receive a promotionary tax refund, called the CERTEX. The rates are somewhat differentiated by sector and thus a vector of export promotion refunds needs to be defined. On the other hand, imports pay taxes and domestic sales are subject to the equivalent of a value-added tax. Personal incomes are also subject to taxation and at progressive rates. This is true for social security contributions as well as for wage and profit taxation. Social security taxes are legislated as having uniform rates, but the level of evasion differs considerably by size of firm and level of activity. Thus in practice the rate is progressive. Personal income taxes and corporate income taxes are both progressive in their legal rates as well as in practice as a result of differential enforcement.

A standard input-ouput analysis is not able to handle progressive rates, thus a departure from the standard model must be introduced. This departure is conceptually very similar to the one arising from making competitive imports the result of excess demand. In that case, when aggregate demand exceeds aggregate supply in a sector, imports appear. In essence, a step function is introduced with the step being located at the point of full capacity utilization. In the case of progressive taxation, similar steps need to be specified which correspond to the points at which each tax bracket is "fully utilized". This

means that there are as many domestic steps in the supply function as there are differentiated tax rates, and then there is one final step which corresponds to import supply.

The labor laws in the period under review also exhibited some peculiarities. The Military Government had instituted life-time tenure for industrial workers in the early seventies. Beginning with Phase II, the conviction took hold that such legislation was undesirable and it was progressively limited in its application. However, it was never removed for workers already on the payroll, rather it was weakened for new workers who were to acquire tenure only over much longer periods and with greater difficulty. The effect, in essence, was to make labor a fixed cost on the down-side but a variable cost on the up-side.9/ Given Peru's recession, the down-side was what mattered. Thus, a discontinuity enters the wage bill at the point of full labor utilization. A step function can handle this problem too, thus adding one more possible commutation and permutation to the step functions in the system.

The overall characteristics required of the model are therefore:

(i) mixed output determination, with sectors determined from the demand side or from the supply side, depending on whether or not they are operating below or at capacity;

(ii) mixed determination of demand for imports, being partly complementary and partly competitive, with the latter resulting from an excess demand formulation;

(iii) domestic sectoral supply functions taking the form of step functions, according to the progressivity of the tax system and of the level of utilization of the labor force on the payroll;

(iv) government expenditure divided between an exogenous part and an endogenous part resulting from the export promotion system; and endogenous tax revenue.

III

THE MODEL: SPECIFICATION CHOSEN IN RESPONSE TO REQUIREMENTS OF REALISM

The basic model consists of the well-known input-output balance equation and of a capacity limitation on domestic output. These are shown as equations (1) and (2) below, where

Q^D = domestic supply

Q^M = import supply

A = input-output structure

F = private final demand

G = government demand

Q^* = capacity output, and

X = a vector consisting of installed capacity (Q_{XT}^*) for traditional exports and actual exports (X_{NT}) for non-traditionals

$$Q^D + Q^M = AQ^D + F + G + X \qquad (1)$$

$$Q^D = \min [\, AQ^D + F + G + X,\ Q^* \,] \qquad (2)$$

Final demand is endogenous as given by equation (3):

$$F = fv_D' Q^D + fv_M' Q^M \qquad (3)$$

where

f = structure of private (consumption and investment) expenditure

v_D' = row vector of private disposable income coefficients on domestic activities

v_M' = row vector of private disposable income coefficientes on competitive imports.10/

Imports are of three kinds, complementary intermediate (M_I), complementary final demand (M_F) and competitive (Q^M). These are specified as follows:

$$M_I = NCM' \; Q^D \tag{4}$$

$$M_F = mncf \; (v_D' \; Q^D + v_M' \; Q^M) \tag{5}$$

$$\underset{\not\exists}{Q^M} = pos \; [(A + fv_D')Q^D + fv_M' \; Q^M + G + X - Q^*] \tag{6}$$

where NCM' is a vector of non-competitive import requirements, mncf is the proportion of final demand going on non-competitive imports (a scalar), and $\not\exists$ indicates the equation does not apply to the traditional export sectors. Note that Q^M are defined in domestic market prices, while M_I and M_F can be defined according to convenience in domestic or border prices.

In turn, traditional exports are given by,

$$X_T = neg_T \; [(A + fv_D')Q^D + fv_M \; Q^M + G - Q^*] \tag{7}$$

where the suscript indicates the limited domain of sectors for which the equations applies.

The non-linearity of the tax functions as well as the labor costs require some model modifications. We now need to rewrite domestic supply separately for each step of each of these functions as follows:

$$\sum_i Q_i^D + Q^M = A\sum_i Q_i^D + F + G + X \tag{8}$$

$$F = f(\sum v_{Di}' Q_i^D + v_M Q^M) \tag{9}$$

where the i suscript refers to the step.

The output of each step in the domestic supply function now depends on the range for which a particular tax rate and/or marginal wage bill is applicable, as well as on the ordering of these (here given by the suscripts) which reflects their sequence of applicability. Thus:

$$Q_1^D = \min [A\Sigma Q_i^D + f(\Sigma v_i' Q_i^D + v_M' Q^M) + G + X \ , \ Q_1^*] \tag{10}$$

$$Q_2^D = \min [A\Sigma Q_i^D + f(\Sigma v_i' Q_i^D + v_M' Q^M) + G + X - Q_1 \ , \ Q_2^*] \tag{11}$$

$$Q_t^D = \min [A\Sigma Q_i^D + f(\Sigma v_i' Q_i^D + v_M' Q^M) + G + X - \sum_1^{t-1} Q_t \ , \ Q_t^*] \tag{12}$$

$$Q^M = \text{pos} [A\Sigma Q_i^D + f(\Sigma v_i' Q_i^D + v_M' Q^M) + G + X - \Sigma Q_t] \tag{13}$$

$$X_T = \text{neg}_T [A\Sigma Q_i^D + f(\Sigma v_i' Q_i^D + v_M' Q^M) + G - \Sigma Q_t] \tag{14}$$

Taxes fall into four categories: (i) trade taxation, (ii) domestic indirect taxation, (iii) domestic direct taxation, and, (iv) inflation tax.

Export taxation (ST_X) comprises taxation on traditional exports and the export support on non-traditionals; import taxation (ST_M) falls on non-competitive and competitive imports. These are:

$$ST_X = T_X' \; X_T + CTX' \; X_{NT} \tag{15}$$

$$ST_M = T_M' \; [(\hat{NCM} \; Q^D + mncf \; (\sum \hat{v_{Di}} Q^D + \hat{v_M} \; Q^M) + (I+\hat{T_M})^{-1} \; (I-\hat{v_M}) Q^M] \tag{16}$$

where $\hat{}$ means diagonalization.

Domestic indirect taxation (ST_M) is proportional to domestic output,

$$ST_I = T_I' \sum Q^D \tag{17}$$

Domestic direct taxation is composed of wage taxation and profit taxation, and it differs by step:

$$ST_d = \sum t_{wi} (w_{Di}' \; Q_i^D) + \sum t_{pri} (pr_{Di}' \; Q_i^D) + t_w \; w_m' \; Q^M + t_{pr} \; pr_M' \; Q^M \tag{18}$$

The inflation tax is assumed to be the result of a constant rate of inflation applied to a monetary base which is a constant ratio of private disposable income:

$$ST_{inf} = t_{inf} \left[\sum (w_{Di}' + pr_{Di}' + d_{Di}')\, Q^D \right.$$

$$\left. + (w_M' + pr_M' + d_M')\, Q^M - ST_d \right] \qquad (19)$$

where d is the vector of depreciation allowances.

Notice that the existence of the step functions require a more complicated definition of private disposable income as a base of expenditure:

$$Y_d = \sum (w_{Di}' + pr_{Di}' + d_i')Q_i^D$$

$$+ (w_M' + pr_M' + d_M')Q^M \qquad (20)$$

Equation (20) enters into equations (3) and (5) and their sequels.

Because of the extensive use of step functions no analytical solution to the system of equations is possible. However, it can be quite readily solved by an iterative procedure, which can be shown to converge to a unique solution. For a simplified version of the model, the algorithm operates as follows (where the t suscript refers to steps in the iteration):

$$Q_0^D = G + X \tag{21.1}$$

$$Q_0^M = G + X - Q_0^D = 0 \tag{21.2}$$

$$Q_1^D = \min [(A + fv')Q_0^D + G + X , Q^*] \tag{22.1}$$

$$Q_1^M = (A + fv')Q_0^D + G + X - Q_1^D \tag{22.2}$$

$$Q_2^D = \min [(A + fv')Q_1^D + G + X , Q^*] \tag{23.1}$$

$$Q_2^M = (A + fv')Q_1^D + G + X - Q_2^D \tag{23.2}$$

$$Q_t^D = \min [(A + fv')Q_{t-1}^D + G + X , Q^*] \tag{24.1}$$

$$Q_t^M = (A + fv')Q_{t-1}^D + G + X - Q_t^D \tag{24.2}$$

Notice, finally, that despite its departure in several respects from the simple Keynesian system, the basic macro identities hold. Specifically, the balance of payments deficit or surplus will equal the fiscal deficit or surplus plus the net hoarding of private sector. Since in this model, all private disposable income excepting the inflation tax is spent, one would expect the balance of payments' outcome to be equal to the fiscal outcome, provided the inflation tax is included as government revenue. This result can in fact be easily shown to hold.11/

IV

RESULTS

The model was applied to Peruvian data corresponding to 1978. To this end, the 1973 input-output table was updated by price and the required tax and other parameters were adapted from the national accounts and the tax and wage legislation. The major parameters used, except for the input-output coefficients, are shown in Table 3.

The model was then run with the actual observed values of exports and government expenditure for 1978, to test its calibration. The results are shown in Table 4. The equality of Certex and subsidies are not surprising: these are exogenous inputs into the model. However, the 3.6% difference for GDP is very satisfactory. It is no larger than the difference found in the underlying input-output table and the national accounts for 1973. Likewise, the tax incidence coefficients are remarkably close, and it is only the factoral income distribution which is slightly off, particularly as regards depreciation, which was obviously not captured with enough accuracy.

With the calibration of the model established, it was possible to calculate the macroeconomic effect of non-traditional exports for each of the three years under review. To this end, the values of exports and government expenditure were established in constant 1978 prices for 1978, 1979, 1980,

TABLE 3

Tax Coefficients Used for Simulation

(i) Wage Taxes			
	Step 1	6.75%	
	Step 2	7.5%	
(ii) Employer Contributions Proportional to Wage Bill	Step 1	1.5%	
	Step 2	7.5%	
	Step 3	15.0%	
(iii) Profit Taxes	Step 1	3.0%	
	Step 2	17.5%	
	Step 3	20.0%	
(iv) Import Duties:			
Intermediate Complementary		6.9%	average
Final Demand Complementary		30.0%	"
Competitive		24.5%	"
Overall		15.1%	"
v) Export Tax		17.5%	"
vi) Inflation Tax		4.26%	"

TABLE 4

Calibration of the Model for 1978

(billions of soles)

	National Accounts	Model Prediction	Difference Percent
Gross Domestic Product	1,842.2	1,778.1	3.6
Wages before Taxes	577.5	541.1	6.7
Profits before Taxes	965.4	951.4	1.5
Depreciation	131.1	117.7	11.4
Indirect Taxes	223.5	222.6	0.4
Export Bonus (Certex)	12.7	12.7	s.e.
Various Subsidies	42.7	42.7	s.e.
Exports of Goods and Services	371.1	370.9	0.1
Imports of Goods	263.3	272.8	-3.6
Wage Taxes/Wages	6.75%	6.8%	
Contribution of Employers/Wages	1.96	1.70	
Profit Taxes/Profits	8.34	8.17	
Indirect Taxes/GDP	11.16	12.52	
Import Duties/Imports	12.59	15.07	
Export Taxes/Traditional Exports	17.78	17.50	
Exports Bonus/Non Traditional Exports	21.71	21.71	

s.e. = set at equality

and then the model was run with and without the non-traditional exports and the difference was tabulated. The results are shown in Table 5.

The first column of this table shows the multiplier for a unit of non-traditional exports. It will be noticed that the income multiplier is 1.72, which breaks down into 0.27 of wage multiplier and 1.37 of profit multiplier, with the balance going to depreciation and indirect taxes. The total tax multiplier is 0.42, to which must be added 0.07 of inflation tax, for a total tax take of 0.49 for each unit of non-traditional exports. Since 0.22 is required on average in export support, the net fiscal effect is 0.27 per unit of non-traditional exports. In turn, traditional exports go down by 0.24 as a result of the increase in domestic demand for these goods, which leaves less of an exportable surplus. 0.76 results as an improvement in exports, which are offset by 0.49 of new imports, leaving a net improvement on the trade account of 0.27, which is exactly identical to the improved fiscal account.

The contributions to various categories of national income are shown in the succeeding column of Table 5. Notice that non-traditional exports contributed 6 to 8% of GNP in the years under review. The contribution to the wages was between 3 and 5% while the contribution to the profits is larger, showing up to 12.3% in 1979. The reason for the larger contribution to profits compared to wages lies in the labor legislation. Recall

TABLE 5

MACROECONOMIC EFFECTS OF NON-TRADITIONAL EXPORTS*

	Effect per Unit of NTX	Total Effect and Percentage					
		1978		1979		1980	
		S/.bn	%	S/.bn	%	S/.bn	%
Gross Dom. Product	1.72	100.8	6.0	154.8	8.5	152.2	8.0
Wages	0.27	16.0	3.1	30.7	5.6	31.4	5.2
Profits	1.37	80.0	9.2	116.0	12.3	110.4	11.1
Tax Revenue	0.42	24.3	7.6	41.5	11.8	43.7	12.3
Inflation Tax	0.07	4.0	6.8	6.9	9.8	6.8	9.1
CERTEX (export support)	0.22	12.7	-	22.3	-	22.9	-
Fiscal Balance	0.27	15.6	-	26.1	-	27.6	-
Traditional Exports	-0.24	-14.3	-5.5	-22.5	-7.2	-21.3	-12.0
Non-traditional Exports	1.00	58.5	-	103.8	-	105.7	-
Total Exports	0.76	44.2	13.5	81.3	27.0	83.7	22.9
Imports	0.49	28.6	11.7	55.2	21.1	56.9	19.9
Balance of Trade	0.27	15.6	-	26.1	-	26.8	-

Note: *1978 prices.

Source: Schydlowsky, Hunt, and Mezzera, 1983, table V-3.

that wages are a fixed cost on the down-side and only a variable cost on the up-side when you exceed the number of workers with tenure on the payroll. Given the level of activity of the Peruvian economy, there were a lot of workers already on the payroll to be absorbed, and thus the contribution of non-traditional exports to increasing the wage bill was relatively small.

The level of contribution of non-traditional exports to fiscal revenue is quite substantial, ranging from 7.6% in 1978 to 12.3% in 1980. The contribution to the inflation tax was also substantial, ranging from 7% to 10%. More important, however, the existence of non-traditional exports provided a net income to the Treasury. This means that the tax revenue resulting from the higher level of activity pursuant to the foreign trade multiplier initiated by non-traditional exports was more than the disbursement in export-promotion support provided by the Government.

The self-financing nature of the fiscal export-promotion system is not thoroughly tested by these calculations, however. The reason is that it is to be expected that even in the absence of the fiscal support, some non-traditional exports would have existed. Therefore it is inappropriate to attribute all the revenue generated directly or indirectly by non-traditional exports to the promotion scheme. In order to properly test the fiscal effects of export promotion, it is required to take into

account the elasticity of non-traditional exports supply to export promotion, and only analyze marginal revenue and expenditure.

Elasticities of supply for Peru's non-traditional exports have been extensively explored by Schydlowsky, Hunt and Mezzera, who examined alternative specifications as well as data sets and also confronted the econometric estimates with interview data on entrepreneurial response.12/ Most sectors' supply elasticity was found to lie between 1.0 and 3.0, however, for textiles it could be as high as 5.0, for chemicals as high as 3.7 and for metal working as high as 7.0.

Table 6 shows the macroeconomic effect of export promotion for 1978, 1979 and 1980, on the assumption of "basic estimate" elasticities. These are: 3.0 for textiles, 2.3 for chemicals and 2.0 for all other sectors. It will be noticed that the export promotion system generates significant increases in GNP (3 to 4%) and its components as well as contributing to an improved balance of trade. Moreover, the export promotion system does appear to fund itself even when the inflation tax is not taken into account. With the inflation tax, appreciable surpluses are derived.

Evidently, the results of Table 6 are heavily dependent on the elasticities used. Table 7 shows this sensitivity by tabulating the fiscal results for three additional sets of elasticities: 1.0 for all sectors (1 in the table), 2.0 for all

TABLE 6

MACROECONOMIC EFFECTS OF EXPORT PROMOTION*

	1978	1979	1980
		(Percent)	
Gross Domestic Product	+ 2.8	+ 3.9	+ 3.4
Wages	+ 1.5	+ 3.1	+ 2.7
Profits	+ 4.9	+ 6.4	+ 5.4
Non Traditional Exports	+66.7	+64.8	+65.9
		(Billions of soles)	
Tax Revenue	+13.2	+23.2	+24.4
Inflation Tax	+ 1.9	+ 3.2	+ 2.9
CERTEX	+12.7	+22.3	+22.9
Fiscal Balance	+ 2.4	+ 4.2	4.5
		(Billions of soles)	
Traditional Exports	- 7.0	-10.8	- 8.9
Non-traditional Exports	+23.4	+40.8	+42.0
Imports	+14.0	+25.9	+28.7
Balance of Trade	+ 2.4	+ 4.2	+ 4.5

Note: *in 1978 prices.

Source: Schydlowsky, Hunt and Mezzera, 1983, tables V-4, V-5, and V-6.

TABLE 7

FISCAL EFFECT OF EXPORT PROMOTION

(in billions of soles of 1978)

		Supply Elasticity			
		1	2	"2+"	"3+"
1978	Without Inflation Tax	-3.5	-2.6	0.6	6.6
	With Inflation Tax	-2.3	1.4	2.4	9.4
1979	Without Inflation Tax	-6.2	-0.4	1.0	11.4
	With Inflation Tax	-4.3	2.6	4.2	16.4
1980	Without Inflation Tax	-6.1	-0.03	1.5	11.7
	With Inflation Tax	-4.5	2.6	4.5	16.4

Source: Schydlowsky, D.M., S. Hunt & J. Mezzera, La Promoción de Exportaciones No Tradicionales en el Perú, Table V-7, p. 131.

sectors (2 in the table), and, an alternative labled "3+" which includes an elasticity of 5.0 for textiles, 3.7 for chemicals, 7.0 for metalworking and 3.0 everywhere else. The alternative labled "2+" is the basic case.

It will be noticed that the fiscal effect is negative only when the elasticity is 1.0 everywhere. From 2.0 everywhere on up the result is positive. The tipping point has not been calculated. It is fair to conclude, then, that export promotion did not have an important negative effect on the treasury.

VI

SUMMARY AND CONCLUSIONS

Non-traditional exports occured in Peru in 1978-80 in a period of substantial stagflation. Modelling their macroimpact requires using a non-linear multisectoral model of mixed supply-demand output determination.

Simulations undertaken with such a model indicate a contribution of non-traditional exports to GDP of about 8%, as well as a contribution to the fiscal balance and to the rise in international reserves of the country. Moreover export promotion, accounts for a major part (2/3) but not all non-traditionals. Therefore the contribution of export promotion to GDP is itself quite important, amounting to about 4% of GDP. Improvements in the wage and profit bills are also quite significant, ranging between 3 and 5%.

Most important of all, the growth of NTX obtained required no special continueing finance for except in the most pessimistic elasticity case export promotion more than pays for itself in fiscal resources brought in.

Notes

1. This author's views of the economic history of Peru, 1968-78, can be found in greater detail in Schydlowsky, Daniel M. and Juan J. Wicht, Anatomia de un Fracaso Economico, Lima: Universidad del Pacifico, 1979 (1st. Printing), and Schydlowsky, Daniel M. and Juan J. Wicht, "The Anatomy of an Economic Failure: Peru 1968-1978", Chapter II in The Peruvian Experiment Reconsidered, A. Lowenthal and C. McClintock, eds., New Jersey: Princeton University Press, 1983, pp. 94-143.

2. See Hunt, Shane J., "Direct Foreign Investment in Peru: New Rules for an Old Game" in Abraham F. Lowenthal ed. Chapter in The Peruvian Experiment, Princeton, NJ: Princeton University Press, 1975.

3. To these $3 bn one needs to add private long term debt of $1.3 bn and short term debt of $1.9 bn for a total of $6.3 bn. However, this total was not generally known in 1975.

4. From S/.45= $1 at the end of 1975 to S/.196.68= $1 at the end of 1978. See Banco Central de Reserva del Peru, Boletin, Jan 1980 p. 65.

5. Abusada-Salah, Roberto, "Utilizacion de Capital Instalado en el Sector Industrial Peruano" mimeo, Boston, August 1975; and, Millan Patricio, "The Intensive Use of Capital in Industrial Plants: Multiple Shifts as an Economic Option", Harvard University Ph.D. Dissertation, 1975.

6. For a detailed analysis see Schydlowsky, Daniel M., Shane J. Hunt & Jaime Mezzera, La Promocion de Exportaciones No Tradicionales en el Peru, Ch. II & III, Asociacion de Exportadores del Peru, Lima 1983. All figures given in this section are from this source.

7. Nobody suspected at the time that the new technocratic civilian government taking power in mid-1980 would reverse the policy within six months of taking power. The ten year law stayed unchanged for barely two!

8. For an early and general discussion of this question see Schydlowsky, Daniel M., "Short-Run Employment in Semi-Industrialized Economies" Economic Development and Cultural Change, April 1971.

9. The real wage was not constant during this period, but there is no evidence that it was much affected by fluctuations in aggregate demand; the vagaries of the inflationary spiral and government wage policies seem more obvious determinants.

10. Note that the value added in non-competitive importing is usually reported in the trade activity of the I-O table.

11. See Schydlowsky, Hunt & Mezzera (op cit) p. 146 ff.

12. See Schydlowsky, Hunt & Mezzera (op cit), Chapter III.