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PROTOTYPE MACRO-MODELS OF THE MARKET, INVESTMENT
STRUCTURE AND INSTITUTIONS

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IV. THE PROJECTS

1. The Development of the Columbia River

Melombe and project

A. The idea

B. The Melombe

II. OTHER WORK IN PROGRESS

III. PROPOSED WORK IN PROGRESS

Appendix: History of the Columbia River Project Report

INTRODUCTION

The purpose of this paper is to present the results of a study of the world's short-term energy demand forecast for the period 1980-2000. The forecast is based on the assumption that the world's energy supply will consist of oil, natural gas, coal, nuclear power, hydroelectric power, and other sources.

Following the first oil price shock in 1973, there was a general expectation that oil prices would continue to rise, and that oil imports would become increasingly expensive. This expectation led to the formation of the Organization of Petroleum Exporting Countries (OPEC) in 1971, and to the formation of the International Energy Agency (IEA) in 1974. Major oil-exporting countries, such as Saudi Arabia, Iran, Iraq, Libya, and others, that five countries in North America, and Japan, have experienced about 70% of their consumption growth in the last decade. This has led to a great deal of attention to oil prices and supplies available for the world economy.

Under the 1973 OPEC agreement, oil imports to the United States, mainly from developing countries, have been restricted. The restrictions, formalized in 1974, were lifted in 1978, and since 1980 have been relaxed, allowing imports from developing countries, detailed in Section 4. The oil import ban on developing countries was continued in the 1974 Production Control Treaty by Mexico, but data on imports from Mexico are not included in the oil that table. However, the crude distilled oil export production value added per barrel of the crude oil produced by Mexico recently is being reviewed in an attempt to incorporate such data, and to adjust the projections for these countries. It is to be noted that oil imports to Korea and India, the latter of which is a net oil exporter, are not included in the contract (or policy) statement. The projections are based on carrying out the negotiations on oil imports of these countries for the intermediate variant. The current world oil market is given in Table 1.

the economic situation in Africa, and the role of the United Nations in the development of the continent. The discussion will also cover the impact of the oil crisis on Africa, and the challenges facing the continent in the future. The seminar will be moderated by Dr. John Agyekum Kufuor, former President of Ghana, and will feature speakers from various countries in Africa and beyond. The seminar will be held at the United Nations headquarters in New York City, and will include a panel discussion on the future of Africa, featuring former heads of state and government from across the continent.

It is my pleasure to invite you to this important seminar, which will be completed by a round-table discussion on the future of Africa, moderated by Prof. Jean-Pierre Fabre, former Minister of Finance of France.

I. Prof. Jean-Pierre Fabre, *Round-table discussion on the future of Africa*

Professor Fabre will discuss the current situation and future prospects for the economy of France, and the implications of the policies proposed in the work by INSTAT.

A. The Data

The data used for each country spans the years 1963-1968. The dependent variables are real output added to manufacturing, real exports and imports of manufactured value added, real domestic utilization of manufactured value added for domestic and intermediate uses, and an implicit price deflator for manufactured goods.* A total of 9 policy

* In the work of Prof. Fabre, as in the earlier formulations of these models, the word "output" is used to denote "value added in manufacturing" and "domestic" to denote "output of factor 3 - value added." These terms have to be understood in their specific sense.

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comprise of the following components: (i) consumption of fixed assets, (ii) consumption of current assets, (iii) investment in plant and equipment, (iv) investment in inventories, (v) investment in stocks, (vi) investment in buildings, (vii) investment in other fixed assets, (viii) investment in current assets.

Investment in fixed assets can be broken down into two main categories: the investment in plant and equipment and investment in buildings. First, investment in fixed assets is expressed as a ratio of exports and imports, i.e., the ratio of the present value of exports by the total value of imports. This measure of the present value of value added products is often referred to as the "present value of manufactured products" or "present value of output". The resulting ratios, then, were converted into the corresponding investment rates, called annually (November) by the Central Statistical Office of the Ministry. Then the ratios of investment to exports were calculated from available information. Thus, the ratios in the various sectors, in particular, will be reflected in the interest utilization factor, and interest rates will be determined on the grounds that they have been given in such a form as to yield more accurate forecasts, despite the so-called "interpolation bias." The equations, so estimated, are then rendered into a reduced form to provide a multi-equation, interest dependent model for programming.

B. The Model

The model, for each country, consists of a system of equations, estimated by single-equation least squares method, as it is unity. Frixek justified the use of non-instrumental estimation on the grounds that they have been given in such a form as to yield more accurate forecasts, despite the so-called "interpolation bias." The equations, so estimated, are then rendered into a reduced form to provide a multi-equation, interest dependent model for programming.

$$\begin{aligned}
 & \text{Explanatory variables} \\
 & \text{Domestic utilization of manufactured goods} = D \\
 & \text{Dollars index for manufactured goods} = P_m \\
 & \text{Real manufacturing value added} = M \\
 & \text{Real manufactured exports} = BX \\
 & \text{Real value added by domestic manufacturing production} = VA \\
 (1) \quad D = 0.0001 + 0.000001 P_m^2 - 0.000001 M^2 + 0.000001 BX^2 + 0.000001 VA^2 \\
 (2) \quad P_m = 0.0002 + 0.000001 P_m^2 - 0.000001 M^2 + 0.000001 BX^2 + 0.000001 VA^2 \\
 (3) \quad M = 0.04 + 0.0002 P_m^2 + 0.000001 M^2, \quad R^2 = 0.98, \quad D.W. = 1.69 \\
 (4) \quad BX = 86.35 + 0.146 M^2 + 1.450 P_m^2 - 0.000001 M^2 P_m^2, \quad R^2 = 0.99, \quad D.W. = 2.03 \\
 \text{and (5)} \quad VA = 0.12 P_m^2 + M
 \end{aligned}$$

in which the dependent variables are

- D = domestic utilization of manufactured goods in constant prices,
- P_m = dollars index for manufactured goods,
- M = real manufacturing value added in constant prices,
- BX = real manufactured value added in exports, and
- VA = real value added by domestic manufacturing production.

The exogenous variables are

- Y = real GNP
- MP_r = the exchange rate (collections/price deflator for manufacturers/ domestic one of manufacturer)
- X^i = the exchange rate for imports/price deflator for manufactures,
- P_{ex} = the price index for manufactured exports from developing countries (cont'd. bulletin of statistics, November issues),
- and Ex_{-1} = manufactured exports in previous period.

It is clear that all coefficients are highly significant statistically, and the equations are well behaved. It must be admitted, however, that some

The first part of the policy variable is the tax rate P_m which is converted into a tax on imports by the exchange rate π . This is the same mechanism as in the model of Auerbach and Kotlikoff (1987) except that they do not consider the effect of the trade balance on the real economy. In the present model, however, the effect of the trade balance is important. It is also important to note that the model does not consider the effect of the exchange rate on the real economy. This is because the model does not consider the effect of the exchange rate on the real economy. On the other hand, it is important to note that the model does not consider the effect of the exchange rate on the real economy. One can argue from the fact that the exchange rate is determined by the market forces of demand and supply that the effect of the exchange rate on the real economy is small. However, one can also argue that the effect of the exchange rate on the real economy is large. This is because the exchange rate is determined by the market forces of demand and supply. The effect of the exchange rate on the real economy is small. This is because the exchange rate is determined by the market forces of demand and supply.

The policy variables P_m and P_n mentioned are interpreted as policy instruments. The role of import taxes is mainly an explanatory variable and will not contribute to the policy rules. An attempt might be made to consider an import tariff as a policy variable. This is, for example, done in the model of Auerbach and Kotlikoff (1987). The interpretation of the model is different. The interpretation of the model is that import taxes are used to prevent imports from being imported. For this reason, import taxes are not included in the policy rules. On the other hand, import taxes are included in the model of Auerbach and Kotlikoff (1987). The interpretation of the model is that import taxes are used to prevent imports from being imported. For this reason, import taxes are not included in the policy rules.

The revision of the policy instrument. The revision can be interpreted as a multiplicative updating of the parameter estimation (returning heading) to the revised changes in the independent variable. The interpretation of the revision are trusted elements. It is analogous making the projections as discussed in Section III of this paper.

* P_m enters the conversion of excise taxes collected to a tax rate; the exchange rate was calibrated by a Marshall-Lerner rule, which is strongly violated.

	X_1	X_2	X_3	X_4	R^2
1	1.00	0.72	0.50	0.31	0.85
2	1.00	0.70	0.49	0.30	0.84
3	0.98	0.69	0.47	0.29	0.83
4	0.94	0.68	0.45	0.28	0.82
5	0.89	0.67	0.43	0.27	0.81
6	0.83	0.66	0.41	0.26	0.80
7	0.77	0.65	0.39	0.25	0.79
8	0.71	0.64	0.37	0.24	0.78
9	0.65	0.63	0.35	0.23	0.77
10	0.59	0.62	0.33	0.22	0.76
11	0.53	0.61	0.31	0.21	0.75
12	0.47	0.60	0.29	0.20	0.74
13	0.41	0.59	0.27	0.19	0.73
14	0.35	0.58	0.25	0.18	0.72
15	0.29	0.57	0.23	0.17	0.71
16	0.23	0.56	0.21	0.16	0.70
17	0.17	0.55	0.19	0.15	0.69
18	0.11	0.54	0.17	0.14	0.68
19	0.05	0.53	0.15	0.13	0.67
20	-0.01	0.52	0.13	0.12	0.66

In the case of model (2), it is apparent that every point of Figure 13 represents one of the points of Figure 12, except for the uncertainty in being the exact intercept. We note that the numbers, regression coefficient magnitudes, the error in the slope, and the number of observations are very similar to those of model (1).

$$(6) \quad D = -1.06 + 0.155 \cdot R_{AP} + 1.41 P + 1.51 \cdot \text{Train}, \quad R^2 = 0.93 \quad D-W = 2.03$$

$$(7) \quad P = 8.97 + 0.179 P + 0.53 X^2 + 1.76 \cdot \text{Train}, \quad R^2 = 0.98 \quad D-W = 1.81$$

$$(8) \quad H = -31.1 + 0.186 P + 0.056 X^2 + 20.6 \cdot \text{Train}, \quad R^2 = 0.83 \quad D-W = 1.50$$

$$(9) \quad \text{EX} = 0.52 + 0.177 P + 0.30 C^2 + 19.5 \cdot \text{Train}, \quad R^2 = 0.99 \quad D-W = 3.04$$

and (10) $D = P + Q \cdot \text{Train}$.

1. The model for the post-industrial economy

Variables and coefficients:

$$f_{\text{ex}} = 0.07 + 0.001 \cdot \text{GDP}_t + 0.001 \cdot \text{GDP}_{t-1}$$

$\Delta^2 f_{\text{ex}} = \text{exogenous variable} = \text{GDP}_t + \text{GDP}_{t-1}$

Exogenous variables: GDP_t and GDP_{t-1} (in billions of dollars)

$X^{\text{ex}} = \text{exogenous variable}$

The reduced-form equation for f_{ex} is as follows:

Model 1: $f_{\text{ex}} = 0.07 + 0.001 \cdot \text{GDP}_t + 0.001 \cdot \text{GDP}_{t-1}$

Reduced-form equation

	X^{ex}	X^0	γ_0	β_0	β_1	α_0	α_1
D	-0.062	0	+0.714	-0.175	0	-135.6	-117.5
P	+0.045	0	+0.461	-0.160	0	-21.5	-946.5
R	-0.077	0	+0.512	-0.171	0	-45.7	-351.5
EZ	0	0.15	0	0	0	-0.00116 + 10.5	66.2
VA	0.015	-0.015	+0.456	+0.170	-0.001	-243.5	225.6

In general, the model for the post-industrial economy is more parsimonious than that for the post-industrial. More than half of the exogenous variables are variable and a dummy variable (an exogenous variable) belongs to "background post-industrial development in the United States," background being light on the nature of the government in the United States. Although exchange rate policy has been given little weight, it is included in that a market economy or government-traditional policies are allowed. Finally, the endogenous variable (person engaged in creative enterprises) is used in an incomplete way as a proxy for GNP per capita. It is also of importance that the effect about the coverage of insurance is reflected in the model by a dummy variable.

the following table gives the results obtained by the author for the different countries. It is evident that the results are not very consistent, and that the values of R^2 are not very high. This is due to the fact that the data used are not very good, and that the model is not very appropriate for all countries.

Nevertheless, it is interesting to note that the results are consistent with those reported by Prof. Frisch.

Indeed, in the case of the United States, it is found that $R^2 = 0.96$, which is a very good result. This is due to the fact that the data used are very good, and that the model is appropriate for the United States. In other countries, the results are less good, but still reasonable. For example, in the case of France, the results are less good, but still reasonable. Moreover, it is found that the results are consistent with those reported by Prof. Frisch before the war, and that the results are also consistent with those reported by Prof. Frisch after the war.

$$(1) \quad 1 + -143.726 \times \frac{C}{GDP} + 1.10 \times \frac{P}{P_t} + \frac{P_t}{P_t} + \frac{R^2}{R^2} = 0.96, \quad DW = 1.670$$

$$(2) \quad 1 + -143.726 \times \frac{C}{GDP} + 1.10 \times \frac{P}{P_t} + \frac{P_t}{P_t} + \frac{R^2}{R^2} = 0.96, \quad DW = 1.877$$

$$(3) \quad 1 + -143.726 \times \frac{C}{GDP} + 1.10 \times \frac{P}{P_t} + \frac{P_t}{P_t} + \frac{R^2}{R^2} = 0.96, \quad DW = 2.073$$

$$(4) \quad 1 + -143.726 \times \frac{C}{GDP} + 1.10 \times \frac{P}{P_t} + \frac{P_t}{P_t} + \frac{R^2}{R^2} = 0.96, \quad DW = 1.675$$

(5) $P_t = \text{constant}$.

In which the notation is as follows: C represents consumption, and

S_{t+1} represents

T_t^h is the value of imports,

FX_{t+1} is foreign exchange reserves, and

D_T^1 = rate of import duty on effective import value based on foreign trade value, fraction of import value based on import value.

Table 1. Results of the 1974-75 survey of the U.S. market

	CON	IND	INT	VAL	VAL	VAL	VAL	VAL
B	-544.327	-1.0	-0.757	0.0	0.0	0.0	0.0	0.0
C	-161.810	-0.0	-0.0	0.000	0.000	0.0	0.0	0.0
M	-169.061	-0.0	-0.0	-0.000	0.0	0.000	0.0	0.000
EM	2.363	0.0	0.0	0.0	0.0	0.0	1.341	0.0
E	-170.782	-1.0	-0.557	0.000	0.0	-1.000	0.001	0.001

In conclusion, it may be said that preference function and its terms have made a valuable contribution to the theory of programming models so that the rule interactional policy variables can easily be eliminated without loss of generality in similar form for a number of concrete programming models.

ECONOMIC GROWTH AND INFLATION

With the exception of the first two equations, the results are very similar to those obtained by the other three methods. The equations are not identical because different variables were employed. One reason is that the equations were estimated by different methods. Another reason is that the equations were estimated in different time periods. The equations were estimated at different times, so different information was available at the time of estimation.

The equations are estimated on a sample of 100 observations. The variables are the growth rate, the rate of investment, the rate of exports, the rate of imports, and the rate of inflation (GDP). This set of equations appears below, where the number in parentheses does not represent the standard deviation, but the number in parentheses does represent the standard error of estimate.

- $$(16) \quad D = 0.014 + 0.016 C - 0.011 I + 0.001 E - 0.001 M - 0.001 P \quad R^2 = 0.98 \quad D-W = 2.02$$
- $$\quad (0.1) \quad (0.1) \quad (0.01) \quad (0.01) \quad (0.01) \quad (0.01)$$
- $$(17) \quad Y = 604.4 + 0.017 D + 0.30 C - 0.001 I + 0.001 E - 0.001 M \quad R^2 = 0.90 \quad D-W = 1.87$$
- $$\quad (0.1) \quad (0.1) \quad (0.01) \quad (0.01) \quad (0.01) \quad (0.01)$$
- $$(18) \quad R = 250.9 + 0.012 D + 0.001 M - 0.001 P \quad R^2 = 0.998 \quad D-W = 2.48$$
- $$\quad (0.1) \quad (0.0) \quad (0.0) \quad (0.01)$$
- $$(19) \quad EX = 1.87 I + 1.12 M + 0.12 P + \Sigma R \quad R^2 = 0.99 \quad D-W = 1.63$$
- $$\quad (20.0) \quad (2.0) \quad (0.0) \quad (0.0)$$
- $$(20) \quad IM = 42.0 + 1.12 M \quad R^2 = 0.97 \quad D-W = 1.53$$
- $$(21) \quad M = \pi + \epsilon_{M,EX}$$

in which the variables are as above, and P is the rate of indirect tax collections (see footnote on next page for definition). The log versions showed invariably low Durbin-Watson coefficients.

INFLATION

Structural adjustment of the economy will be based on the assumption that the rate of inflation will be constant at 10% per annum. This is a conservative estimate, since it is based on the assumption that the rate of inflation will be lower than the projected rate of growth of gross domestic product. In the present environment, the current rate of inflation of 15% per annum is unacceptable. It is therefore proposed to introduce a new economic framework which will take account of the need to reduce the rate of inflation. The new framework will be based on the following assumptions:
1. The level of taxation will be reduced to 10% of GNP.
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The reduced form matrix must be calculated from this equation system before the projections can proceed.

* It must be pointed out that the indirect tax rate in equation (16) is based on manufactured value added, (Y_M), while that in equation (17) is based on gross domestic product (Y). To consolidate these two variables, it is suggested that the latter variable be tried in the equation (16).

Estimation of the Model for India has been completed. The results are summarized below. Some of the estimated coefficients are given in Table 1 below.

The first equation is the following. It is apparent, the sign of the parameter α_1 in the second term is not consistent with the quantity in contract to the actual value. This can due to our experience with the other countries treated before. Thus the sign of the exchange rate in the import equation is inappropriate, which may be explained in that quantitative contract and transaction denominated exchange rate change easier in India; thus the coefficient α_1 probably is dropped from the equation. Some more work will have to be devoted to improving the Model for India.

Table 31/1. Selected Equations for India 3/

Dependent Variable: Correcting Value of Manufacturing Value Added

	y	Pr. One	xPred Interv.	Value Added
Linear	1.460 (2.39)			600.7
Linear	0.323 (2.01)	1.677 (8.22)	-25.29 (6.71)	72.0
Linear	0.223 (1.46)	3.326 (7.52)	-35.156 (6.62)	258.3

B. Dependent Variable: Import Trade Deficit for Manufacturing Value Added

	y	Pr. One	xPred Interv.	Value Added
Linear	0.724 (2.01)	0.724 (1.46)	0.08 (20.12)	0.000
Linear	0.172 (1.72)	0.375 (9.32)	0.007 (2.39)	0.000
Linear	0.187 (1.87)	0.434 (11.87)	0.008 (2.01)	0.000
Linear	0.158 (1.58)	0.335 (11.58)	0.003 (2.01)	0.000

C. Dependent Variable: Imports of Manufacturing Value Added

	y	Pr. One	xPred Interv.	Value Added
Linear	0.511 (2.78)	0.217 (11.86)	0.000	0.000
Linear	0.178 (10.72)	-0.626 (11.02)	-0.457 (2.39)	-322.5

3/ The Student's t-statistics appear in parentheses below the coefficients.

Estimated Effects of the Proposed Tax

The proposed tax will affect all sectors of the economy. The effect on manufacturing output is difficult to estimate because of the lack of data on the effects of excise taxes on intermediate inputs. In addition, the manufacturing sector is heavily dependent on foreign trade, so that the level of protection of domestic manufacturers depends on the level of protection of foreign manufacturers. However, the proposed tax will have a significant impact on the economy.

Although the most recent data available is for 1969, data for 1970 and 1971 are available. Data for 1972, the next three years, are projected through 1970. To project the growth rate of the economy, we assume the reduction in import prices is constant throughout the year. The projected growth rates must be projected using the same form to project the other endogenous variables.

Growth rates of GDP, investment, and consumption are tested, combined with constant real interest rates, constant real unit of manufacturing value added, constant real export price, and the real price of developing countries' exports, assuming a fixed exchange rate with a 10 percent deviation by 1980. A 6 percent growth rate for GDP is then computed. The constant real interest rate, relative to which the rate is assumed to be held constant, relative to internal rates. Other excise tax rates are tested substantively. The predetermined exogenous variables for the projection of GDP growth are given in Table III/1.

Year	Exports of Manufactured Goods		Excise Tax Rate on Manufactured Goods	Manufacturing Value Added	Unit Value Index of Manufactured Exports (1970=100)
	Current Year	Previous Year			
1969	9,660	9,100	2.7	1,120	100.0
1970	8,721	8,112	2.7	1,120	100.0
1971	8,100	10,721	2.7	1,120	100.0
1972	11,395	8,100	2.7	1,120	100.0
1973	12,647	11,395	2.7	1,120	100.0
1974	12,770	12,647	2.7	1,120	100.0
1975	13,636	12,770	2.7	1,120	100.0
1976	14,341	13,636	2.7	1,120	100.0
1977	15,105	14,341	2.7	1,120	100.0
1978	16,170	15,105	2.7	1,120	100.0
1979	17,067	16,170	2.7	1,120	100.0
1980	18,114	17,067	3.15	1,120	107.3

- a) Entries above the line in each column represent observed historical data.
- b) The excise rate is carried over from the year of price index for manufacturing value added. The last column of excise rate projections assumes a fixed absolute rate, but a 5% annual price increase until the rate is doubled in 1979; the right column denotes a shifting excise rate, doubled in proportion to price increases, which yields the variable constant.
- c) The excise tax rate relates to total collections divided by manufacturing value added.
- d) The unit value index of manufactured exports (SITC 5-8) from all developing countries (Monthly Bulletin of Statistics, November issues) is projected at 3% per year.

Table II/estimates of the effect of different variables
and their interactions on the growth rate of manufactured value added per 1000, expressed in percentage points, for the 1970s and 1980s

Growth	Estimated (%)				
	F	D	X	M	P
Fixed Exogenous rate					
GDP Growth at 5% p.a.	5.1	5.4	5.7	7.4	3.9
6% p.a.	6.1	6.3	11.4	8.5	4.8
7% p.a.	8.1	7.8	14.6	9.6	5.7
Sliding Mechanism					
GDP Growth at 5% p.a.	5.1	6.5	10.2	7.5	5.2

Table II/4. Values added in manufacturing, expressed in percentage points of value added.
 F = Fixed rate of growth of manufacturing value added.
 D = Fixed rate of growth of GDP.
 X = Fixed rate of growth of exports.
 M = Fixed rate of growth of imports.
 P = Proportionate rate of growth of manufactured value added.

The relationship between the growth rate of GDP and that of manufacturing can be noted. Clearly the growth of manufacturing affects that of the other components of GNP and vice-versa. The International Development Strategy for the Second United Nations Development Decade takes cognizance of the former effect in its contention that an average growth rate of 5% in manufacturing is needed to reach an average rate of 6% for GDP in developing countries as a group. Here we incorporate the reverse chain of causation, treating GDP growth as a determinant of manufacturing development. It must be made more plausible to assume, as we do, that growth of the economy has a wider effect: a sector comprising only 15% of the whole tends to affect the opposite. In any case, a 6% growth rate for GDP, which remains the goal of the International Development Strategy, is obtainable if manufacturing is pushed to a higher rate of manufacturing

Projected Manufactured Value Added					
<i>(In billions of pesos) 1975 constant prices, 1975 exchange rates</i>					
Category	VA	D	A	R	P
1968 Levels	1641	1550	163	465	160
Projected Levels	1721	2073	176	517	175
GDP Growth 5% p.a.	1751	2117	180	541	179
1975	1641	1550	163	465	160
1977	1721	2073	176	517	175
1978	1751	2117	180	541	179
1980	1781	2162	184	567	183
GDP Growth 6% p.a.	1671	1959	176	495	169
1975	1671	1959	176	495	169
1977	1843	2177	207	579	175
1978	1903	2329	213	573	180
1980	2265	2856	307	690	208
GDP Growth 7% p.a.	1730	2050	210	524	165
1975	1730	2050	210	524	165
1977	2013	2330	241	675	185
1978	2157	2525	308	628	201
1980	2374	2936	353	753	226
Sliding Exchange Rate					
GDP Growth = 6% p.a.	1636	1947	180	485	160
1975	1636	1947	180	485	160
1977	1863	2208	223	558	177
1978	1937	2351	241	569	187
1980	2266	2662	307	666	207

Key:

- VA = Value added to Philippine manufacturing.
- D = Domestic uses of manufacturing value added.
- A = Exports of manufactured value added.
- R = Import of manufactured value added.
- P = Implicit price deflator of manufactured value added.

efficiency.

The projected growth rate of 5.5% per annum is considered conservative, given the projected growth rate of 6.5% per annum in the Philippines. On the other hand, the projected growth rate of 4.5% per annum, given the present situation, is considered to be realistic.

The projected growth rates of 5.5% per annum and 4.5% per annum meet more closely with the projected growth rates in the Philippines. The increase in demand for the economy will be reflected generally through industrial production, which is expected to be the major area of exports. The balance of trade situation will improve slightly, however, because of the low level of import content in exports. By examining the projections in Table III/7, one can find a rather complex relationship exists. The

Case	GDP Growth Rate (%)		Trade Balance (Million Pesos)
	Excluding Exports	Including Exports	
1965 Level	+ 2.5	+ 2.5	+ 200
<u>Projected Levels</u>			
Fixed exchange rate with 1976 Deviation			
GDP growth + 5.5 p.a.			
1975	+ 305	+ 305	+ 46
1977	+ 351	+ 351	+ 29
1978	+ 374	+ 374	+ 58
1979	+ 380	+ 380	
GDP growth + 4.5 p.a.			
1975	+ 309	+ 309	+ 43
1977	+ 352	+ 352	+ 32
1978	+ 373	+ 373	+ 53
GDP growth + 3.5 p.a.			
1975	+ 314	+ 314	+ 40
1977	+ 354	+ 354	+ 34
1978	+ 370	+ 370	+ 40
GDP growth + 2.5 p.a.			
1975	+ 319	+ 319	+ 31
1977	+ 359	+ 359	+ 12
1978	+ 375	+ 375	+ 8

unbalanced position in the balance of payments. In the first scenario, exports increase at a rate of 10% per year, imports grow at 8%, and the exchange rate depreciates by 10% per year. Imports respond to the growth in output by 10% and to the depreciation of the USP by 10%. The trade deficit increases rapidly, especially after 1975, as imports grow faster than output. By 1975, however, the rate of growth in the different countries between exports and imports is roughly the same, and the exchange rates (ranging from \$ 371 to \$ 384 in 1970) have a negligible effect upon the trade deficit. After 1975, further depreciation seems to work mainly upon the balance of trade in manufactured goods. After this year, in any event, the imbalance becomes smaller as both rates of development and inflation at a slow rate. This is an important finding which should be evaluated, if possible, in future restraints of this source. To conclude, probably in the late 1980's or early 1990's, the trade deficit in manufactured goods should begin to decline in absolute terms.

A similar analysis applies to the change in the balance sheet between domestic production and consumption of manufactured goods. In terms of growth rates (Table III/2), the growth of production exceeds that of consumption only at higher rates of the expansion. In absolute terms, however, $VA - I = X - K$, and this is shown in Table III/4. From a discussion above, therefore, we know that the rebalance between manufactured production and consumption grows over time in every scenario, except in the year of the devaluation. In the early 1970's (not shown in the tables), it grows faster at higher rates of overall (GDP) expansion, but this relationship reverses itself after about 1975. Table III/7 shows that by 1975-1977, it grows by 3.46 million with 9.6% growth and at only 2.10 million with 7% growth. After 1978, the level of imbalance remains earlier for higher rates of development.

It remains to comment on the price projections. They are influenced by the rate of GDP growth, the excise tax rate, and ultimately by the exchange rate. They are not influenced in turn only by the rate of domestic production, because it is evidently import duty that import unit

available information, it is difficult to say whether the difference between the projected and actual exchange rate is due to the expectation of the authorities or to the actual development. The latter is more plausible, since it is reasonable to expect that an earlier adjustment of the exchange rate would have been made more rapidly, but the more recent data on the situation of trade indicate no significant change in the exchange effect on trade in manufactured products.

Let us turn now to the effect of the exchange rate itself on the endogenous variables. Since the main objective of the projections for the development year 1973 is under the fixed exchange-rate regime, and from analysis of the effects of the announced floating exchange rate, it is clear that devaluation of the franc has a direct effect on imports (through fall) and prices (in fact, price stability), and also on maintaining domestic consumption. It affects hardly at all the level of domestic production and of exports. If this is so, then devaluation is mainly a long-term result of the continued propensity of the balance of trade to exceed payments possibilities with the effect of high budget deficits.

Because of limited time to prepare this report, no separate sensitivity tests are presented for changes in the excise tax rate. It is clear from the equations themselves in the reduced-form matrix, however, that its effects permeate throughout the system of endogenous variables but that they are certainly secondary in respect of the exchange rate.

It will be recognized that the projections for the fixed exchange rate regime encompass an inconsistency resulting from the need to deflate exchange rate by the endogenous price level. Thus, an assumed price increase of 5% per annum underlies the predetermined of the exchange rate. As Table III/2 shows, the projected rate of price increase corresponds closely to this assumption only in the case of 6.5 GDI growth. For the other cases, an iterative procedure must be used to obtain a convergence between the assumption and the projection. On the other hand, where the exchange rate is treated as a policy variable instead of fixed, it can be assumed that the authorities maintain an invariant relationship to the price level,

which then need not itself be predetermined, and this problem does not arise. Tax rate variables can easily be treated this way.

APPENDIX A: ESTIMATES OF STRUCTURAL EQUATIONS FOR KOREA

Table A1
Domestic Use Equation (Korea)

No.	Version	γ	P_m	m	x_{IT}	x_d	Standard error of estimate	R^2	F
1.1	linear	0.52 (6.6)				-512.1	117.4	0.70	1.1
1.2	linear	0.56 (12.0)	-0.48 (5.5)			-300.8	67.1	0.61	1.0
1.3	linear	1.13 (9.4)		-1.57 (5.5)		-255.5	20.5	0.68	1.1
* 1.4	linear	0.65 (3.38)	-0.74 (4.1)		74.56 (1.5)	-722.5	51.4	0.62	1.0
1.5	linear	0.55 (11.2)	-0.40 (1.7)		-0.47 (0.4)	-262.2	60.4	0.67	1.1

* Version selected for reduced form.

Note: Variables are as indicated in Section I and II of this report; IT represents the collections of indirect taxes in the Philippines, and IT_f indicates these collections as a rate of collection against manufacturing value added (VA).

Table A2

Price Equation (Korea)

No.	Version	D	XR	β_r^i	$\beta_{T_i}^i$	Intercept Estimate	Standard Error of Estimate	R	R-sq
2.1	Linear			5.21 (16.2)		241.2	6.07	.77	.57
2.2	Linear			0.13 (1.0)	4.85 (10.6)	205.5	62.7	0.67	1.40
2.3	Linear			0.53 (3.3)	4.26 (3.3)	-323.6	67.4	.71	.51
2.4	Linear			1.36 (4.7)	0.64 (2.5)	-155.1 (2.5)	624.0	102.3	0.80
								.72	

* Version selected for reduced form.

Table A3
Import Equation (Korea)

No.	Version	D	D ¹	X ₁	β_1^1	Intercept	Standard Error of Estimate	R ²	S.E.
3.1	Linear	3.74 (21.0)				-921.2	165.3	0.52	16.1
3.2	Linear	6.14 (7.7)	-7.46 (5.3)			-1726.2	141.3	0.59	16.1
3.3	Quadratic	4.12 (30.1)			-1.89 (4.0)	-363.2	157.8	0.51	16.1
3.4	Linear	5.52 (40.1)	-4.58 (5.6)		-1.34 (3.5)	-2363.4	171.3	0.57	16.1
* 3.5	Linear	4.06 (59.4)	-2.16 (6.0)		-3.51 (2.2)	-550.6	14.2	0.52	16.1

* Version selected for reduced form.

Table A4

Export Equation (Korea)

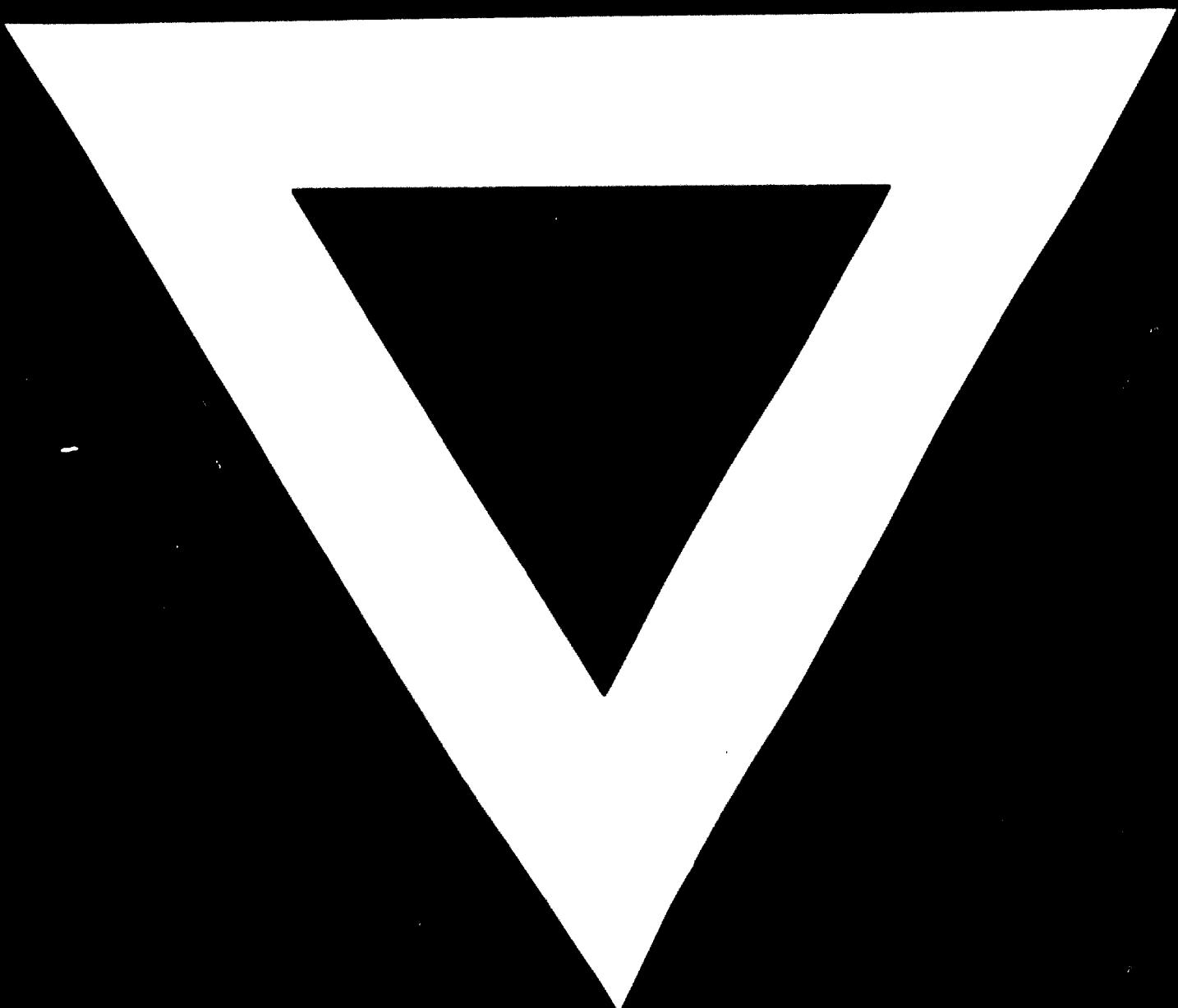
No. Version	VA	XR	HP/XH	CJSR	Intercept	Standard Error of Estimate	R ²	D-F
4.1 Linear	1.70 (25.4)				- 582.6	54.2	0.286	0.62
4.2 Linear				-0.60 (1.51)		0.25.6	0.12.7	0.32
4.3 Linear				1.39 (31.2)	0.13 (2.75)	- 354.9	41.2	0.33.0
4.4 Linear				1.53 (20.5)	0.62 (3.2)	- 437.3	32.2	0.33.4
4.5 Log				0.523 (2.046)	7.886 (6.564)	- 61.7310	0.2837	0.33.2

Table A5

Employment

5.1 Log	0.983 (13.0)	0.3676	0.3675	0.37
5.2 Linear	1.19 (17.7)	49.0	54.3	0.372 0.37

* Version selected for reduced form.



17.7.74