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APPROACHES TO DEVELOPMENT PLANNING

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A development program serves a variety of purposes. It is at once a political symbol of a government's commitment to economic and social progress, a general strategy for remodeling the economy and its institutions, a basis for decisions on individual investment projects and a standard against which to measure results.

As planning has proceeded in a number of underdeveloped countries, it has become clear that some form of "planning in stages" is better suited to these various needs than is a single comprehensive analysis. The basic political decisions require a general strategy or perspective while individual allocation decisions require a much more detailed and compartmentalized analysis. It has been found that both analysis and decision making can proceed better in a series of steps than by attempting a simultaneous optimizing procedure. The danger in the step-wise approach is that some decisions will become frozen at an early stage and will not be revised when a more complete analysis is available.

The present paper is concerned primarily with ways of approaching the first stage of the analysis that will reduce this danger by forcing consideration of the main alternatives. Since the theoretical relations involved are well known, I shall focus on an empirical comparison of fourteen development programs and try to show the extent to which the strategic elements vary in practice. I shall also consider briefly the relationship between the general strategy adopted and the subsequent stages of sector planning and project evaluation.

I. FORMULATION OF A DEVELOPMENT STRATEGY

The term "development strategy" has been borrowed from war and competitive games, but no precise definition of it is available. The concept implies a separation of more general or basic decisions from those which require only the application of agreed principles. Elements of a development strategy that are often cited are measures to mobilize savings, the extent of international trade or autarchy, the balance among major sectors of production, and the nature of government interference with consumer choice.

These and other "strategic" choices have two features in common: (a) the decision is rarely based entirely on economic factors, and (b) the outcome affects a substantial portion of the economy. In bureaucratic terms, these are the decisions that cut across departmental lines and have to be taken at cabinet level.

A more technical definition of a strategy is obtained by considering possible solutions to a detailed model of development. Although such a model might have several hundred variables, including production, exports, imports and prices for a number of commodities, each solution could probably be adequately characterized for purposes of general policy guidance by the values of five or ten variables. A strategy can be thought of as a set of values for these variables. The selection of the strategic variables is largely a matter of convenience, since a property of the system can be described in different ways.

This meaning of a development strategy may be illustrated by a specific model, which will be given in a highly simplified form to facilitate the subsequent comparison of development programs. A model which traces the connections between the instruments of policy and the objectives which the

government is trying to achieve may be called a "policy model". To analyze alternative development policies, the model structure must include the most significant limitations on economic growth. Many of these limits can be expressed by equations specifying the balance of supply and demand for scarce factors: capital, foreign exchange, skilled labor, or particular commodities. Other limits are of a political or psychological nature, such as the extent to which the government can increase tax collections or induce private investment by given measures. These limits are matters of judgment and cannot be incorporated in a mechanical way.

Following Tinbergen,[1/] it is useful to distinguish between the variables that are of concern for development policy -- social objectives and economic instruments -- and the remaining ("irrelevant") variables, which are needed to describe the structure of the economy but do not directly affect the social welfare.[2/] The interrelations among the policy variables are revealed most clearly in the "reduced form" of the model, in which the irrelevant variables are eliminated.

I have elsewhere [3/] suggested a procedure for using a policy model to determine alternative development strategies which allows for judgment on the more qualitative limits to development. In applying this analysis to Israel,

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1/ J. Tinbergen, Economic Policy: Principles and Design, Amsterdam, 1956

2/ This distinction will vary among societies; one country may be indifferent to whether steel is supplied from local production or imports, while another may consider it important for military purposes to produce its own supply.

3/ H.B. Chenery and M. Bruno, "Development Alternatives in an Open Economy: The Case of Israel", Economic Journal, March 1962, pp79-103.

attention was focused on six policy variables, the first two representing the social objectives and the last four aspects of the economy subject to the government's influence or control:

(1) Gross national product, Y

(2) The rate of unemployment, u

(3) The marginal savings rate, s

(4) The level of foreign capital inflow, F

(5) The level of exports, E

(6) The growth of labor productivity, λ

In its reduced form, the twelve equations of the model are reduced to three, which correspond to three basic limitations to growth: 1/

(a) The capital limit

$$(1) \quad Y_1 = \frac{Y_0 (1 + \beta f)}{1 - \beta s}$$

where β is the average productivity of investment and $f = \frac{F}{Y_1}$

This gives:

$$(1a) \quad \frac{\Delta Y}{Y} = \beta (s + f)$$

(b) The labor limit

$$(2) \quad Y_1 = \frac{N_0 (1 + \gamma)(1 - u)}{\lambda_0 (1 - \ell)}$$

where N_0 is the initial labor force, γ is its rate of increase, and λ_0 is the initial labor-output ratio.

(c) The balance of payments limit

$$(3) \quad Y_1 = \frac{(1 - \mu)}{\mu}(E_1 + F_1)$$

where μ is the ratio of imports to GNP.

1/ As presented here, the model is simplified by taking a one-year time period and eliminating the breakdown of GNP into its components, which affects both capital requirements and import demand.

The following comparison of two out of a number of solutions for the Israel economy shows the contrast between a "low savings-high foreign aid" policy and a "maximum savings-low aid" policy. 1/ The two objectives -- growth rate and unemployment -- and the increase in labor productivity are held constant.

	Low Savings Policy	High Savings Policy
1) GNP growth	7.7%	7.7%
2) Unemployment rate	5%	5%
3) Marginal savings rate	.16	.30
4) Foreign capital inflow (as ratio to GNP)	.08	.04
5) Export growth rate	13%	20%
6) Annual increase in labor productivity	4%	4%

The result suggests that it is the required growth of exports, as much as the high savings level, that is likely to limit the possibility of carrying out the second strategy.

A final choice cannot be made among development strategies until some of their sectoral implications have been considered, since some of the structural parameters in the aggregate model will have to be modified. Some of the sectoral elements also affect the political judgment of the value of the plan. I shall therefore defer the problem of choice among strategies to the final section.

1/ From Chenery and Bruno, op.cit., Table II, solutions 1 and 4.

II. A COMPARISON OF DEVELOPMENT STRATEGIES

To compare the strategies actually adopted in development plans, I have selected fourteen countries having relatively comprehensive planning and published plans. The countries are shown in table 1; they include two in Latin America, two in South-East Europe, three in the Near East, two in Africa, two in South Asia, and three in the Far East.

Although all planning organizations experiment in a more or less formal way with alternative development strategies, the published plans usually describe only the strategy that has been selected and provide little information on the discarded alternatives. My discussion will therefore be limited to an inter-country analysis of (a) individual policy variables and parameters that can be calculated from the published results and (b) the general nature of the strategies chosen.

A. Variation in Policy Variables

Comparable data are available for the variables in the capital requirements and the balance of payments equations but not for the employment equation. The values of these variables in the base year of the plans, their average value over the plan period and other aspects of the plans are shown in table 1.

For this sample of countries recent growth rates are highly correlated with present income level, to such an extent that the seven countries in the upper half all have higher growth rates for the previous four or five years than any of the countries in the lower income group, all of which grew at less than 4% a year. Table 1 is therefore divided into two parts, with separate medians for each group of seven countries given for each variable.

Table 1-A

Plan Data: High Income Countries

	Israel	Chile	Japan	Greece	Columbia	Yugoslavia	Turkey	Range	Median
Base Year Data									
1. Population in 1960 (Millions)	2	8	94	8	15	19	28	2-94	19
2. Population growth rate	4.4	2.6	1.0	0.9	2.8	1.2	2.9	.9-4.4	2.6
3. GNP per capita	700	585	400	384	261	200	195	195-700	384
4. Productivity of Investment β_o	.364	.397	.27	.358	.187	.230	NA	.187-.397	(.32)
5. Foreign Investment Ratio (to GNP) f_o	.143	.018	-.002	.055	.004	.058	.039	-.002-.143	.039
6. Savings Ratio (to GNP) α_o	.110	.118	.302	.148	.198	.313	.124	.11[illegible]-.313	.148
7. Investment Ratio (to GNP) I/Y	.253	.136	.300	.203	.202	.370	.163	.136-.370	.203
8. Previous Growth in GNP g_o	10.6	3.95	9.9	5.9	4.0	8.4	NA	3.95-10.6	5.9
9. Export growth relative to GNP growth	1.75	1.131	1.131	2.9	-1.33	.60	NA		1.13
10. Import Ratio (to GNP) μ_o	.30	.128	.094	.186	.144	.180	.102	.094-.30	.144
11. Share of Foreign Invest. ϕ_o	.57	.09	0	.27	.02	.16	.24	0-.57	.16
Plan Data									
12. Productivity of Invest. β	.39	.348	.24	.268	.250	.287	.39	.24-.39	.287
13. Marginal Propensity to Save S	.29	.325	.328	.246	.358	.350	.28	.246-.350	.325
14. Average Foreign Investment Ratio f	.094	-.002	0	.068	.034	.037	.031	-.002-.094	.034
15. Average Savings Ratio $\bar{\alpha}$	.151	.156	.31	.166	.200	.354	.147	.147-.354	[illegible]
16. Average Investment Ratio I/Y	.245	.354	.31	.227	.234	.392	.181	.154-.392	.234
17. Plan Growth in GNP g	9.5	5.4	7.8	6.0	5.7	11.3	7.0	5.4-11.3	7.0
18. Relative Export Growth	2.00	1.78	1.00	1.46	.75	NA	.63	.63-2.00	(.123)
19. Change in Import Ratio $\frac{\mu}{\mu_o}$	.97	39	1.19	1.14	1.04	NA	.79	.79-1.19	(.95)
20. Average Share of Foreign Investment $\bar{\phi}$	.39	0	0	.298	.15	.095	.178	0-.39	.15
Plan Period	62-66	62-67	58-70	62-66	60-64	62-65	62-67		

Table 1-B

Plan Data: Low Income Countries

	Tunisia	UAR (Egypt)	Philippines	Nigeria	India	Korea	Pakistan	Range	Median
Base Year Data									
1. Population in 1960 (Millions)	4.2	26.1	28	35	430	24	93	2.4-430	28
2. Population, growth rate	2.2	2.5	3.2	1.9	2.3	2.2	2.2	1.9-3.2	2.2
3. GNP per capita	155	141	140	88	81	62	68	62-155	88
4. Productivity of Investment β_0	(Neg.)	.129	.412	.266	.248	.242	.107	0-.412	.242
Foreign Investment Ratio (to GNP) f_0	.146	.071	.010	.058	.025	.164	.061	.010-164	.061
6. Savings Ratio (to GNP)	.044	.104	.130	.099	.143	.037	.067	.037-.143	.099
7. Investment Ratio (to GNP) I/Y	.190	.175	.140	.157	.168	.201	.128	.128-.201	.168
8. Previous Growth in GNP g_0	-2.2	3.4	3.5	3.1	3.0	3.2	1.2	-2.2-3.5	3.1
9. Export growth relative to GNP growth	2.6	2.82	.37	2.25	.33	3.16	-1.8	-1.8-3.16	2.25
10. Import Ratio (to GNP) u_0	.351	.202	.111	.18	.064	.243	.127	.064-.351	.18
11. Shares of Foreign Investment ϕ_0	.77	.29	.07	.37	.15	.82	.48	.07-.82	.37
Plan Data									
12. Productivity of Investment β	.200	.302	.418	.261	.320	.330	.270	.200-.418	.302
13. Marginal Propensity to Save s	.475	.224	.266	.176	.325	.40	.065	.065-.475	.266
14. Average Foreign Investment Ratio $\bar{f}$	.114	.026	.015	.045	.05	.17	.090	.015-.17	.05
15. Average Saving Ratio $\bar{s}$	.190	.193	.147	.108	.161	.095	.067	.067-.193	.147
16. Average Investment Ratio	.304	.219	.161	.153	.207	.227	.162	.153-.304	.207
17. Plan Growth in GNP g	6.0	6.8	6.5	4.1	6.3	7.5	4.1	4.1-7.5	6.3
18. Relative Export Growth	NA	.76	.40	NA	.48	2.68	.58	.40-2.68	.58
19. Change in Import Ratio u_1/u_0	NA	.71	.95	NA	1.48	.82	1.40	.71-1.48	.88
20. Average Share of Foreign Investment $\bar{\phi}$	.376	.124	.14	.30	.22	.59	.56	.124-.59	.30
Plan Period	62-8	61-5	63-7	61/62-67/68	61/62 65/66	62-6	60/61 64/65		

Table 2

Medians of Variables in the Capital Limit Equation *

Group	Marginal Savings Rate s	Average Savings Rate $\bar{s}$	Capital Output Ratio f	Investment Ratio I/Y	Investment Productivity β	Growth of GNP g	$\beta(\bar{s}/f)$
			Base Year Data				
High Income	----	.148	.039	.203	.32	5.9	6.5
Low Income	----	.099	.061	.168	.242	3.1	4.0
All Countries	----	.127	.056	.195	.248	3.7	4.7
			Plan Data				
High Income	.325	.166	.034	.234	.287	7.0	6.7
Low Income	.266	.147	.050	.207	.302	6.3	6.3
All Countries	.30	.158	.045	.22	.29	6.4	6.4

* Source: Table 1

The Capital Limit

The medians of variables in the capital-limit equation are shown in table 2. The higher past growth rates of the high-income (H) group are due in part to higher savings rates (.15 against .10), which are only partly compensated by a greater flow of foreign capital to the L group (.06 against .04). In large part, the lower growth rates of the countries in the L group reflect the lower efficiency with which they have utilized new investment, their median investment productivity is only .24 against .31 for the H group.

In the plans for the two groups these differences are greatly reduced. While on the average no increase is projected in the productivity of investment in the H group, practically every country in the L group plans a large increase, with the average reaching that of the H group.

Since it starts from a poorer past performance, the L group of countries has adopted more ambitious targets than the H group. The L group typically plans to double its growth rate (from 3.1 to 6.3%), while the plan median of the H group increases from 5.9 % to 7.0%. Much of the contrast between the planned performance of the two groups is in the expected rise in the efficiency of investment of the L group, which in large part reflects the inefficiency of their present economic organization. In the other main element, the savings rate, both groups are projecting significant increases but the gap between the groups will remain about the same. However, the median marginal savings rate of the L group (.27) approaches that of the H group (.325), and represents a larger increase over the past.

The most important difference among the strategies being followed in respect to capital formation is in the proportion that is expected to be

financed from external sources. For all fourteen countries, this ratio falls from a present value of .26 to a planned value of .20, due to a rise in domestic savings rather than to a fall in the amount of external financing. The countries' reliance on external financing varies widely, and is not significantly correlated with growth rates or present income levels. Some of the determinants of this choice of strategy are discussed below.

The Balance of Payments Limit

As shown in equation (3), increases in import requirements can be met either by substituting domestic products for imports (reducing u), by increasing exports, or by increasing the inflow of foreign capital. Both in the present sample and among all countries, the import ratio shows no relation to the level of income although it varies inversely with the population of the country.[1] Among the fourteen countries, as many plans call for an increase in the import ratio as for a decrease.

The export prospects of a country are a significant determinant of its development strategy. A prospective growth of exports that is less rapid than the desired growth of GNP requires either an exceptional effort at import substitution or an increase in the amount of capital inflow. Of the six countries projecting a lower growth in exports than in GNP, India, Pakistan, Colombia and the Philippines plan to increase foreign assistance in relation to GNP while Turkey and the United Arab Republic plan substantial

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1. See H. Chenery, "Patterns of Industrial Growth", A.E.R., Sept. 1960, p. 634, which gives the following regression equation for the import ratio: $\mu = .204\ Y^{-.01}\ N^{-.26}$, where Y is per capita GNP (in hundreds of dollars) and N is population (in tens of millions).

reductions in their import ratios and a reduction in f. The country's estimate of probable sources of foreign assistance and the initial level of capital inflow are among the factors which determine this choice.

The Employment Limit

In most of the L countries and some of the H countries (e.g. Turkey, Chile) the economy has not been growing rapidly enough to absorb the labor supply, which is not likely to limit growth in the near future. Rather, it becomes an objective of planning to hold the level of unemployment to certain limits, as in the example cited for Israel. However, a more detailed analysis of categories of labor would probably show certain skills to be potential limiting factors in all cases.

B. Types of Development Strategy

In addition to the six variables already considered, another five or six should probably be added to any list of strategic variables. My suggestions for such a list would be:

Objectives

(1) Growth in GNP: g
(2) Unemployment level: u

Policy Instruments

(3) Marginal savings rate: s
(4) Foreign capital inflow: f
(5) Investment productivity: β
(6) Effective exchange rate: r
(7) Population growth: p
(8) Labor productivity increase: l

Summary of results:

(9) Manufacturing output: Xm
(10) Agricultural output: Xa
(11) Exports: E
(12) Imports: M

Although the last four variables are the results of the aggregate analysis rather than policy instruments, they form a useful link to the more detailed sectoral analysis and also include other influences (natural resources, international trading possibilities) that are not adequately reflected in an aggregate model.

Any classification of development strategies must be based largely on empirical observation rather than on theory. Of the main policy variables (nos. 1-8), there are only limited possibilities for affecting population growth and labor productivity directly in most countries (although population is an important variable in growth strategy in a few countries like Israel). As noted above, there is significant but limited variation in the productivity of investment. The range of unemployment targets among countries is also limited, since all aim at fairly full employment. We are left, then, with four variables which do vary widely among country plans and which together characterize their development strategies to a large extent. These are the growth rate (g), the average savings rage (α), the foreign capital inflow (f), and the effective exchange rate (r).

The exchange rate has not been discussed up to now, since it is not directly measurable. The effective exchange rate (or rate used for allocation purposes) serves to adjust imports and exports to whatever value is necessary to bring the balance of payments into balance, given the rate of growth and the level of foreign capital inflow. An alternative procedure is to control imports and exports without regard for short-run comparative advantage considerations. In this case, E and M should be substituted for r as strategic variables.

The differences in development strategies stemming from the first three variables are shown graphically in figure 1. This chart plots the two sources of investment financing--savings and foreign capital--against each other. The parallel lines represent constant values of the investment ratio, which is the total of domestic savings plus foreign capital inflow. Constant ratios of foreign capital to total investment are shown by lines radiating out from the origin, of which those for $\phi = .15$ and $\phi = .35$ are drawn to indicate the normal range of foreign capital inflow.

The arrows on the chart indicate the position of each country at the beginning of the plan period, and the intended change in total investment and in the source of investment financing during the plan period. An increase in the investment ratio is shown by a movement outward from the origin. Arrows pointing upward or to the left indicate a low-and, high savings strategy, which is favored in over half of the cases. In the opposite cases of Pakistan, India, and Colombia, the increase in investment is financed primarily from increased foreign assistance.

If investment had the same productivity in all countries, the constant investment lines would coincide with constant growth lines (e.g., a 20% investment ratio normally yields a 6% growth rate). The actual growth rates in the plans are shown in parentheses. Investment productivity appears to be uncorrelated with any of the other variables and should be taken as a separate strategy variable.

Figure 1

INVESTMENT LEVELS AND SOURCES OF FINANCING

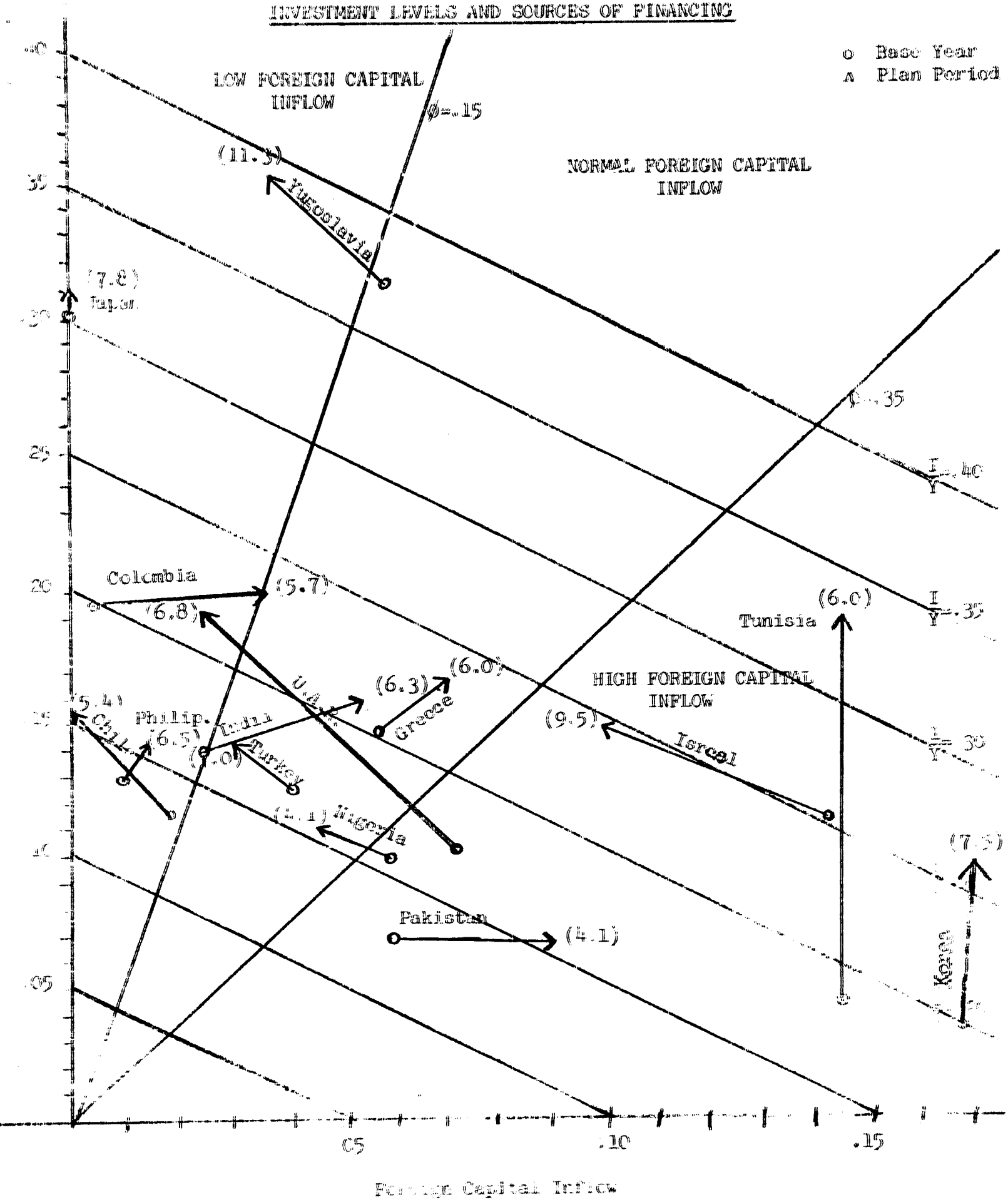

Figure 1 suggests a wide range of possible development strategies. The combination chosen over time will have wide ramifications on the sector allocation of resources, the future structure of the economy, and possibilities for further growth. Some of the elements affecting the choice of strategy are discussed in the concluding section.

III. FROM GENERAL STRATEGY TO SPECIFIC ALLOCATION

The logic of proceeding from an aggregate analysis of development possibilities to sector planning and project evaluation has been stated by several authors.[1/]

Here I wish to stress two points: (1) the need to take account of all of the strategic variables in making the more detailed analysis, and (2) the need to analyse alternative strategies in sufficient detail to make the best choice among them.

Most practical work on development programming stresses quantitative balances and tends to ignore alternative sources of supply and other substitution possibilities. In its most extreme form, this approach makes sector decisions depend only on the target for national income growth, assuming fixed demand elasticities, input-output coefficients, capital-output ratios, exports and import proportions.[2/] When it is followed rigidly, this procedure determines the

1/ See for example ECAFE, Reports of the First and Second Groups of Experts on Programming Techniques, 1960 and 1961; Tinbergen and Bos, Mathematical Models of Economic Growth, 1962; H. Chenery, "Development Policies and Programmes", ECLA Bulletin, 1958.

2/ The programming technique given in U.N., E.C.L.A. Analysis and Projections of Economic Development, I: An Introduction to the Technique of Programming, 1955, tends in this direction, as to Soviet planning techniques.

amount of external capital as the amount needed to offset the deficit in either the savings-investment balance or the balance of payments.

The approach to sector planning from considerations of general strategy is much more flexible than the procedure just outlined. Since most underdeveloped countries have a considerable range of choice as to what proportion of investment is to be satisfied from foreign sources, and hence what proportion of demand is to be met from imports, this choice should also be reflected in the sector analysis. A higher value of capital inflow implies a lower effective exchange rate and higher imports. Consistency between the general strategy and the sector plan can be ensured by estimating an exchange rate from the aggregate analysis and using it to determine the volume of exports and the choice between imports and production in each sector.

An increase in external capital will also increase the overall ratio of capital to labor in the economy. This should be taken into account in the initial choice of techniques in each sector. Instead of using only income projections as a basis for sector analysis, therefore, initial estimates of the exchange rate, capital-labor ratios, and the balance of payments deficit should be included.

The sector analysis also serves to refine the aggregate model and the overall strategy. The productivity of investment, imports and exports for a given exchange rate, and other aggregate magnitudes are determined more accurately from a trial sector plan than from the existing structure of the economy.[1/]

1/ An iterative procedure for revising aggregate and sector models and relating project analysis to them is outlined in the ECAFE reports cited.

IV. CHOICE AMONG DEVELOPMENT STRATEGIES

Since societies have several goals and multiple limits to their achievement, it is not desirable to choose with any finality among alternative strategies until their implications have been explored in considerable detail. It should be feasible to select six or eight combinations of the strategic variables as encompassing the most probable range for the final program[1/] and to develop the implications of each combination in sufficient sector detail to permit a judgment to be made on some of their secondary welfare effects.

A complete statement of a development strategy would require a tracing of the strategic variables over a considerable period of time. A longer perspective is needed to determine the desirable capital inflow in a given period, for example, since there is a limit to the amount of debt that it is advantageous for a country to undertake. The addition of the total foreign debt and the terms on which foreign assistance is supplied would help to clarify the differences in strategies shown in figure 1.

The definition of several alternative programs and the extension of each strategy over time helps to take account of some of the uncertainties of economic prediction. Since it is necessary to revise development programs periodically to correct for the difference between plan and performance, it is useful to have explored a range of feasible policies and not just a single combination.

1/ This procedure is followed in Chenery and Bruno, op. cit.

The choice among development strategies is in the final analysis a political question. The necessity to make political judgments also argues for presenting the responsible authorities with a range of possibilities, each showing costs as well as gains, rather than with a single plan.