AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523

BIBLIOGRAPHIC INPUT SHEET

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Batch 39

1. SUBJECT CLASSIFICATION
A. PRIMARY: TEMPORARY
B. SECONDARY:

2. TITLE AND SUBTITLE
Foreign assistance and economic development

3. AUTHOR(S)
Chenery,H.B.; Strout,A.M.

4. DOCUMENT DATE	5. NUMBER OF PAGES	6. ARC NUMBER
1966	56p.	ARC 338.91.C518

7. REFERENCE ORGANIZATION NAME AND ADDRESS
Harvard

8. SUPPLEMENTARY NOTES (Sponsoring Organization, Publishers, Availability)
(In Am.economic review,v.56,no.4,p679-733)

9. ABSTRACT

(Economics R & D)

10. CONTROL NUMBER	11. PRICE OF DOCUMENT
PN-AAC-446	
12. DESCRIPTORS	13. PROJECT NUMBER
	14. CONTRACT NUMBER: CSD-1543 Res.
	15. TYPE OF DOCUMENT

AID 590-1 (4-74)

A.I.D. Disc. Paper #7

THE AMERICAN ECONOMIC REVIEW

VOLUME LVI SEPTEMBER, 1966 NUMBER 4, PART 1

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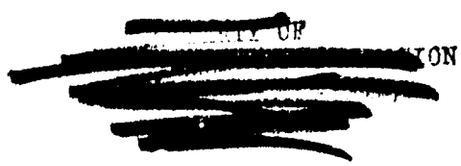
REPRINT

The Journal of
THE AMERICAN ECONOMIC ASSOCIATION



FOREIGN ASSISTANCE AND ECONOMIC DEVELOPMENT

By HOLLIS B. CHENERY AND ALAN M. STROUT*

Most underdeveloped countries depend heavily on external resources to increase their per capita income. A crude measure of this dependence is the net flow of some $9 billion per year from advanced to less developed countries, which is equal to a quarter of their gross investment and nearly a third of their imports.[1] Equally important is the provision of skilled manpower and transfer of technical skills through foreign assistance.

The institutional framework for this resource transfer has changed profoundly over the past ten years. Programs of foreign assistance have replaced colonial relations, and donors and recipients now agree that economic and social development is their primary objective. Private investment, which now comprises only a quarter of the total resource flow, is increasingly screened for its contribution to the recipient country's development. Thus the inflow of external resources—which can loosely be called "foreign assistance"[2]—has become virtually a separate factor of production, whose productivity and allocation provide one of the central problems for a modern theory of development.

The possibilities of securing rapid and sustained development by effective use of foreign assistance have been strikingly demonstrated in the past decade by such countries as Greece, Israel, Taiwan, and the Philippines. In each case, a substantial increase in investment financed

* The research on which this article is based was carried out by the Office of Program Coordination of the U.S. Agency for International Development. The analysis and judgments expressed are the sole responsibility of the authors. The authors are, respectively, professor of economics at Harvard University, and acting chief, Policy Planning Division, AID. They are indebted to Jaroslav Vanek, Joel Bergsman, Lorene Yap, Paula Tosini, and Carmel Ullman of AID in carrying out the analysis, and to Irma Adelman, Samuel Bowles, Francis Bator, David Cole, Robert Dorfman, and Stephen Lewis for helpful comments. An early version of the paper was presented by Chenery to the Boston meeting of the Econometric Society in December 1963. A more complete statistical analysis is given in [8].

[1] The OECD countries' component of this flow in 1963 and 1964 averages $8.3 billion, of which 70 per cent was from public sources [16].

[2] The Development Assistance Committee of the OECD defines "assistance" to include public grants and loans of more than five years' duration; it also uses a broader definition which includes private investment. The latter is more convenient for our purposes, although obviously only part of the total is "assistance" in the sense of an unrequited transfer of resources. The significance of the term as used here is that it represents a governmental decision by lenders and borrowers to secure a given transfer of resources.

largely by foreign loans and grants has led to rapid growth of GNP followed by a steady decline in the dependence on external financing. Not only was growth accelerated by foreign assistance, but the ability of each economy to sustain further development from its own resources was very substantially increased.[3]

The present study first outlines a theoretical framework designed to analyze the process of development with external assistance in quantitative terms. This framework is then used to evaluate the current performance of the developing countries and to assess their future needs for assistance under various assumptions. The evaluation suggests a range of practical possibilities for accelerating growth through external aid as well as some of the conditions which may frustrate this objective. The comparative analysis also suggests some international standards of performance which might facilitate the planning and execution of programs of foreign assistance.

I. *Aid and the Transition to Sustained Growth*

Modern theories of economic development[4] investigate the process by which a poor, stagnant economy can be transformed into one whose normal condition is sustained growth. There is general agreement on the principal changes that characterize this transformation: an increase in human skills, a rise in the level of investment and saving, the adoption of more productive technology, a substantial change in the composition of output and employment, the development of new institutions, etc. There has been relatively little analysis, however, of the possibility of accelerating these changes through the use of significant amounts of external resources over a limited period of time.

A country setting out to transform its economy without external assistance must provide for all of the requirements of accelerated growth from its own resources or from imports paid by exports. Success thus requires a simultaneous increase in skills, domestic saving, and export earnings as well as an allocation of these increased resources in such a way as to satisfy the changing demands resulting from rising levels of income. The attempt to increase output can be frustrated by failure in any one of these attempts, even when the others have been quite successful. When growth is limited in this way by a few bottlenecks, there is likely to be underutilization of other factors such as labor, natural resources, and specific types of productive capacity.

By relieving these constraints, foreign assistance can make possible fuller use of domestic resources and hence accelerate growth. Some of the

[3] This conclusion is documented in more detailed studies of Israel [6], Greece [1], and Taiwan [12].

[4] For example, Lewis [13], Rostow [20], Gerschenkron [10], and Ranis and Fei [17].

potential bottlenecks—of skills, savings, or foreign exchange—can be temporarily relaxed by adding external resources for which current payment is not required. More efficient use can then be made of other resources, so that the growth of total output may be substantially higher than would be permitted by the rate of increase of the most restrictive domestic factor.

While this alternative sequence recognizes the existence of a given set of requisites for continued growth, it makes the timing of their appearance much more flexible. The full set of requirements need only become available from domestic sources as the inflow of foreign resources is reduced. To achieve this result, the additional resources produced through more rapid growth must be used to make good the deficiencies which are temporarily being supplied from outside assistance.[5]

Two basic questions may be raised as to the feasibility of such a sequence. The first is the extent to which foreign resources can actually substitute for missing local factors and permit an increase in total output. The second is whether countries which have achieved some initial success through external assistance will take the further steps needed to reduce their dependence on it in the future. These issues will be discussed in Section II.

A. *External Resources and the Limits to Growth*

The impact of external resources on the growth of an economy can be judged by their contribution to the mobilization and allocation of all productive resources. Three types of resources should be distinguished: (1) the supply of skills and organizational ability; (2) the supply of domestic saving; and (3) the supply of imported commodities and services. At any moment in time these factor supplies represent separate limits to economic growth. While investment can be devoted to increasing the supplies of skills or of imported commodities (through import substitution or raising exports), changes in these factor supplies can only be brought about gradually. They are also substitutes in the production process to only a limited degree in the short run.

Aggregate growth models usually focus on the saving limit, which in a closed economy also sets the investment limit. When external financing is available, however, we need to examine other limits to the ability to increase investment. These may result either from limited supplies of skilled labor, entrepreneurs and other inputs complementary to the investment process or from the limited market expected for the output. The evidence cited below shows that underdeveloped countries have

[5] In criticizing the notion of a fixed set of "prerequisites" to industrialization, Gerschenkron [10] suggests other possibilities of substitution for the missing requirements which stimulate their subsequent development.

demonstrated an ability to raise the level of investment much more rapidly than the level of saving. Sustained rates of increase in investment of 12–15 per cent per year are common, while typical figures for saving growth are 6–8 per cent.[6]

A third factor which may limit the possibilities for accelerated growth is a country's inability to change its productive structure to meet the changing patterns of internal and external demand. Although this problem is not likely to be serious in a slowly developing economy, rapid growth requires a large increase in the supplies of machinery and equipment, raw materials, and other manufactured goods that are typically imported in a poor country. The more rapid the rate of growth, the larger the reallocation of labor and capital away from traditional patterns that will be needed to prevent bottlenecks developing. If this reallocation is not sufficiently rapid, shortages of imported goods will provide a limit to further growth quite apart from the investment limitation. This import limit reflects the inability of the economy to provide the composition of output—from domestic sources plus imports—that is required by its level of income, rate of investment, and pattern of consumer demand. In cases of acute shortages of imported goods, the economy will be unable to transform potential saving into investment because of insufficient supplies of investment goods.

The foregoing description of underdeveloped countries as characterized by persistent resource bottlenecks may be summed up as a hypothesis of limited structural flexibility. In the short run—for periods of five to ten years—we will describe such an economy by a set of linear relationships in the Harrod-Domar tradition which determine the pattern of growth under given assumptions as to government policy. This basic model will be used to evaluate current performance as well as to make 5–10-year projections. For longer periods, we will use a model based on the neoclassical view that domestic resources can be substituted for imports to the extent required by changing demands, although with diminishing productivity. This second model has the effect of reducing the aid requirements for any given pattern of growth. Since most underdeveloped countries fall somewhere between the two extreme cases, the use of both models for projections indicates the probable limits to the range of aid requirements.

1. *The Basic Model.*[7] To simplify our analysis, we shall develop a basic model of the role of aid in the transition in two steps. We consider

[6] These and other characteristics of a sample of 31 underdeveloped countries are summarized in Table 1.

[7] This model is taken from Chenery and Bruno [6], which utilizes a detailed analysis of the economic structure of Israel. The derivation of the three aggregate limits from an interindustry programming model is given there.

first the case in which only the first two resource limits—on skills and saving—are relevant; this situation will be described as *investment limited growth.* It includes the Harrod-Domar model as the limiting case of no external assistance. We then take up the possibilities for achieving self-sustaining growth when the balance of payments limit is effective. This situation will be identified as *trade limited growth.* The complete model includes all three potential limits.

The principal endogenous variables and parameters to be used in the basic model are the following:

Endogenous Variables (subscript indicates year)

V_t Gross National Product
I_t Gross investment
S_t Gross domestic savings
$\overline{S}_t$ Potential gross domestic savings
M_t Imports of goods and services
$\overline{M}_t$ Required imports of goods and services
E_t Exports of goods and services
F_t Net inflow of foreign capital
C_t Consumption

Parameters

$\bar{r}$ Target rate of growth of GNP
r_t Rate of growth of GNP in year t
α' Marginal savings rate $(\Delta\overline{S}/\Delta V)$
α_t Average savings rate in year $t(S_t/V_t)$
β Maximum rate of growth of investment
k Incremental gross capital-output ratio $(I/\Delta V)$
μ' Marginal import rate $(\Delta\overline{M}/\Delta V)$
μ_t Average import rate in year t (M_t/V_t)
Φ_t Ratio of foreign capital inflow to GNP in year t (F_t/V_t)
ϵ Rate of growth of exports

Since the basic model is designed to explain the functions of aid and to evaluate current performance of developing countries, it is useful to have in mind the typical values of the principal parameters. Table 1 gives the upper quartile, median, and lower quartile values of each parameter for a sample of 31 countries during the period 1957–62. The sample covers most of the underdeveloped world, and the median values are quite close to the aggregate U.N. estimates for all underdeveloped countries.[8] The median capital-output ratio (3.5) and saving rate (.12)

[8] The U.N. estimates investment at 16 per cent of GNP in 1960 and a growth of GNP of 4.4 per cent for the previous decade [23, pp. 19, 37].

TABLE 1—DISTRIBUTION OF PARAMETER VALUES, 31-COUNTRY SAMPLE

Parameter	Symbol	Upper Quartile	Median	Lower Quartile
Highest 5 years in recent past				
Compound growth rate of gross investment	β	.19	.14	.10
Relationships during 1957–62				
Compound growth rate of gross investment	i	.12	.07	.01
Incremental capital-output ratio (assuming 1-year lag)	k	2.78	3.52	4.72
Compound growth rate of GNP	r	.062	.046	.034
Ratio of gross investment to GNP in 1962 (after time-trend fitting)	I_0/V_0	.20	.17	.14
Ratio of net foreign capital inflow to GNP in 1962 (after time-trend fitting)	Φ_0	.07	.04	.01
Ratio of gross national saving to GNP in 1962 (after time trend fitting)	σ_0	.16	.12	.09
Marginal national saving ratio (change in saving ÷ change in GNP)	α'	.26	.19	.02
Ratio of gross imports of goods and services to GNP in 1962 (after time-trend fitting)	μ_0	.15	.20	.39
Marginal import ratio (change in gross imports of goods and services ÷ change in GNP)	μ'	.01	.20	.46
Compound growth rate of exports of goods and services	ϵ	.080	.051	.021
Change in gold and convertible foreign currency reserves, December 1956 to December 1962 ÷ change in GNP 1957–62, GNP first converted to 1962 U.S. dollars[a] (after time-trend fitting)	ρ'	.101	−.001	−.065

[a] Excludes Trinidad-Tobago and Mauritius because of lack of data.

Source: Table A-1, Appendix.

suggest that without external assistance the typical growth rate of underdeveloped countries would be about 3.4 per cent or less than 1 per cent per capita.

2. *Investment-Limited Growth.* Our hypothesis of an economy with limited flexibility suggests the use of a programming model[9] in which growth proceeds at the highest rate permitted by the most limiting factor. We assume to start with that the balance of payments does not become the limiting factor. A process by which self-sustaining growth[10] can be attained by using aid to fill the temporary gap between investment ability and saving ability can be derived from the following description of the economic structure:

Definitions:

$$V_t = S_t + C_t, \tag{1}$$

$$S_t = I_t - F_t, \tag{2}$$

Capacity Limit

$$V_t \leq V_0 + \frac{1}{k}\sum_{T=0}^{T=t-1} I_T \quad \text{where} \quad k = \frac{I_{t-1}}{V_t - V_{t-1}}, \tag{3}$$

Ability to Invest

$$I_t \leq (1 + \beta)I_{t-1}, \tag{4}$$

Saving Limit

$$S_t \leq \bar{S} = S_0 + \alpha'(V_t - V_0), \tag{5}$$

Target Growth Rate

$$V_t \leq (1 + \bar{r})V_{t-1}. \tag{6}$$

The *capacity limit* (3) is based on the Harrod-Domar assumption that a specified amount of investment is needed to increase output. The assumption of a linear capital-output function is a matter of convenience. A similar formulation can be derived from more general production functions of the Cobb-Douglas type if there are not significant changes in the relative costs of labor and capital. Since in most cases the period of transition is one in which the total supply of labor is not a significant limitation, it is plausible to approximate the aggregate production function in this way.[11]

[9] A more complete statement of this model in linear programming form, given in Chenery and MacEwan [7], considers the implications of the present analysis for the optimal planning of development.

[10] This concept will be defined as growth at a given rate with capital inflow limited to a specified ratio to GNP which can be sustained without concessional financing.

[11] The introduction of a nonlinear relation between capital and output would not materially affect the conclusions of our analysis. Intercountry regression analyses suggest that there is a

The *limit on the ability to invest* (4) is introduced to reflect the widely held view that absorptive capacity for additional investment in any period is limited by the supply of complementary inputs, which can only be increased as a result of the development process. We refer to the parameter β as the "skill limit," reflecting the skill formation required of managers, skilled labor, and civil servants in order to increase productive investment.[12] The highest observed value for the skill limit over any recent five-year period is about 20 per cent per year, but few countries have sustained a growth of investment of over 10 per cent for as long as ten years.

The *saving limit* (5) is designed to include not only the marginal propensity to save but the government's ability to increase total saving by changes in the tax structure and by other policies. For this reason, we make the saving limit a function of total GNP (and hence of time) rather than of per capita income.[13]

The *target growth rate* (6) reflects the almost universal practice in developing countries of summing up the principal goal of development in a given rate of increase in GNP. In the present context, it also reflects the fact that foreign assistance is limited and is unlikely to be available to finance growth rates much above 6–7 per cent even if they were attainable. Since the average terms on external loans are based largely on the country's future economic prospects, this puts a limit on the total amount which it can afford to borrow. For all these reasons, either a target growth rate or some other reflection of the fact that investment cannot indefinitely exceed saving must be included in the model.[14]

To complete the system, we need some minimal assumptions as to the objectives of the recipient country and the conditions under which aid is provided. We assume that aid is sufficiently limited—or expensive—to make the recipient unwilling or unable to increase aid merely to increase consumption without also securing some rise in GNP. Second, we assume that the country tries to maximize consumption until the target

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reduction in the capital-output ratio at higher growth rates but little relation to per capita income. Efforts to estimate more general production functions from time series in underdeveloped countries have been quite inconclusive because of the limited data available.

[12] In the original model for Israel [6], the skill limit was associated with labor only, but in the more typical underdeveloped country the managerial aspect is at least as important.

[13] Fei and Paauw [9] have recently utilized a similar model to analyze aid requirements for the case in which investment resources provide the limit to growth (our Phase II). They have adapted the Rosenstein-Rodan model [18] by assuming that per capita saving is a constant fraction of the increment in per capita income. There has been no empirical test of the relative merits of this alternative specification of the savings function compared to ours, but they yield similar results when the rates of growth of per capita income and population do not vary greatly.

[14] Alternative formulations are discussed in Section I.C.

growth rate is attained. These assumptions lead to a determinate pattern of growth whose welfare implications will be examined below.

The model of investment-limited growth contains six restrictions and five variables. Under the assumptions made, there is no incentive to build excess capacity or to increase aid by reducing saving. Inequalities (3) and (5) therefore become equalities. The increase in GNP will be limited first by the ability to invest and then by the target growth rate if the investment rate reaches the level ($k\bar{r}$) required to sustain it. We shall denote the first period as Phase I, which is described by equations (1) to (5). In Phase II, inequality (6) becomes effective and replaces inequality (4) as a restriction on the system.[15]

The growth path and aid requirements over time can be described by solving for V_t and F_t in each phase and determining the point at which the economy passes from Phase I to Phase II.

Phase I is characterized by a constant growth in investment at the annual rate of β and by an accelerating growth rate of GNP. From equations (3) and (4) it can be determined that the increment in investment in each period is a constant ratio (βk) to the increment in GNP. Solving the system for the level of capital inflow, gives:

$$F_t = F_0 + (\beta k - \alpha')(V_t - V_0), \tag{7}$$

where $F_0 = I_0 - S_0$. This equation shows that the increment in external capital ($F_t - F_0$) finances the difference between the increment in investment and the increment in saving. Without increased capital inflow, a country having the median values of k and α' (Table 1) would have a growth of investment of about 5 per cent per year. To achieve a growth of investment of 10 per cent would require that nearly half of the increased investment during Phase I be financed by external capital.[16]

This formulation can be interpreted in terms of Harrod's original suggestion of different growth rates corresponding to the growth of the labor force (the "natural" rate) and the potential saving limit (the "warranted" rate). We have replaced the natural rate with a skill-determined rate based on the ability to invest. External assistance fills the gap between investment and saving, permitting the higher rate to be reached.

Phase I ends in year m when investment reaches a level adequate to sustain the target rate of growth:

[15] As shown in [7], this result can be derived in more formal terms by maximizing a welfare function having the characteristics indicated subject to the given restrictions. Each phase is then defined by the restrictions which are binding, which have positive shadow prices. This linear programming formulation is quite useful if we replace the assumption of a target growth rate by a more complicated set of limits, but it is unnecessary with the simplified assumptions made here.

[16] With $k = 3.5$ and $\alpha' = .19$, growth of investment at 10 per cent would require $\Delta I = .35\ \Delta V$ of which $.19\ \Delta V$ (54 per cent) would be financed by increased savings and $.16\ \Delta V$ (46 per cent) by increased capital inflow.

(8) $$I_m = k\bar{r}V_m.$$

Substituting this value for investment in the equations for Phase I gives the value of GNP in the terminal year:

(9) $$V_m = V_0 \frac{(\beta - r_0)}{(\beta - r_m)}.$$

If, for example, investment grows at 10 per cent per year, the hypothetical median country could increase its investment rate from 12 per cent of GNP with no aid to the 21 per cent needed to support a 6 per cent growth target in a period of eleven years.[17]

Phase II in our model corresponds to the process of aid and growth discussed by Rosenstein-Rodan [18] [19]. GNP and investment rise at a constant rate with external assistance determined by the difference between $k\bar{r}$ and α_t. Solving the system for the rate of growth yields a modified form of the Harrod-Domar equation:

(11) $$r_t = \frac{\alpha_t + \phi_t}{k}.$$

where

$$\alpha_t = (\alpha_0 - \alpha') \frac{V_0}{V_t} + \alpha' \quad \text{and} \quad \phi_t = \frac{F_t}{V_t}.$$

In order for the rate of capital inflow to decline, the marginal saving rate α' must exceed the investment rate $k\bar{r}$ required by the growth target. If this condition is satisfied, the system can be solved for the level of GNP in year p when the saving rate has risen sufficiently to eliminate the capital inflow:

(12) $$V_p = \frac{(\alpha' - \alpha_m)}{(\alpha' - k\bar{r})} V_m.$$

Since α' reflects the total effect of government policies on saving, there is no reason to assume that it will remain constant throughout the period of the transition.[18]

3. *Trade Limited Growth.* The process of growth with a varying inflow

[17] The time to complete Phase I can be determined by solving for m in the following equations:

(10) $$\frac{I_m}{I_0} = (1 + \beta)^m = \frac{\bar{r}}{r_0} \frac{(\beta - r_0)}{(\beta - \bar{r})}$$

where $$r_0 = I_0/k V_0 \text{ and } \bar{r} = r_m.$$

[18] The effects on the transition of plausible variations in the saving rate are illustrated by the Pakistan example in the next section.

of capital requires a continual adjustment in imports and exports to make the trade gap equal the desired gap between investment and saving. We have assumed so far that this adjustment process—whether achieved through the market mechanism or through government controls—does not affect the growth path or the aid requirements. For many of the countries in Phase II, however, this assumption may not be valid.

Although in Phase I the rising capital inflow needed reduces the pressure on the balance of payments, the tapering off of the capital inflow in Phase II requires exports to rise more rapidly than imports. The empirical analysis of Section II suggests that many countries have been unable to bring about this required adjustment in their productive structure. While this situation may have been caused by overvalued exchange rates or other inefficient policies, the resulting trade gap is often "structural" in the sense that it can only be reduced over time without reducing the rate of growth by a redirection of investment and other resources.[19]

The trade limit can be incorporated into the preceding analysis in a form quite analogous to the saving-investment limit. We postulate a minimum import level ($\overline{M}_t$) required to sustain a given level of GNP at time t, which is similar to the capacity requirement of equation (3). This import requirement results from the relatively inelastic demand for a large proportion of the manufactured goods currently imported—particularly intermediate goods and investment goods—arising from the lack of domestic supply and their necessity in production. Actual imports may, of course, exceed this minimum. This requirement may be stated as:

$$M_t \geq \overline{M}_t = \overline{M}_0 + \mu'(V_t - V_0) \tag{13}$$

where the minimum marginal import ratio μ' may be derived as the average of the incremental ratios for different components of demand.[20] While the marginal import ratio is probably more subject to policy control than the capital-output or saving ratios, it represents an important structural limitation over planning periods as long as 10–15 years.

The existing economic structure at any moment in time also limits the feasible growth of export earnings. Since export earnings for many primary products are largely determined by demand conditions, a rapid increase in exports typically requires the development of new export products, which is limited by productive capacity as well as organiza-

[19] The nature of the trade limit is discussed further in [5] [6] [15].

[20] These estimates have been made for countries such as Israel, Italy, Pakistan, India, and Argentina by use of input-output models in which import substitution is incorporated on a sector basis. The procedure is described in [5] and [6].

tional and institutional factors. The order of magnitude of this limit is indicated in Table 1 by the recent growth rate of exports, whose median value is 5.1 per cent and upper quartile value is 8.0 per cent. The effects of government policies to increase exports are summarized by the parameter ϵ in the following expression for the export limit:[21]

$$E_t = E_0(1 + \epsilon)^t. \tag{14}$$

The *combined trade limit* is expressed by the requirement that the capital inflow be at least large enough to cover the minimum gap (F_t^m) between import requirements and export earnings:

$$F_t \geq F_t^m = \overline{M}_t - E_t. \tag{15}$$

When the capital inflow determined by the saving-investment gap in equation (2) is greater than the minimum trade gap, the two gaps can be equated by having imports in excess of the specified minimum or exports less than the assumed maximum of equation (14). When the minimum trade gap is the larger, however, it controls the rate of growth of GNP and the inflow of capital. In this case, either saving will fall below the saving potential specified by equation (5) or less productive investment will take place. In either case the saving limit ceases to be binding.

Theoretically the trade limit may replace the saving limit as a determinant of the capital inflow in either Phase I or Phase II. Empirically, this is less likely to happen in Phase I, since the rising capital inflow does not usually require exports to increase as fast as imports.[22] Once a target growth in GNP is attained, however, exports must rise more rapidly than imports if aid is to be reduced. If the trade limit becomes effective at all, it is therefore more likely to be during Phase II. We shall denote the new set of restrictions which would be binding in this event as Phase III.[23]

In *Phase III* inequalities (3), (6), and (15) become equalities, while limits (4) and (5) are redundant. For a given target rate of growth, GNP is determined by equation (6) as in Phase II. The capital inflow is determined by (15) and exceeds that required by the saving gap.[24] In order for

[21] It is probable that ϵ depends on the growth of GNP to some extent, but we have taken account only of the relationship (14) in applying the model.

[22] The relative growth rates required depend on the initial ratio of exports to imports.

[23] The three phases described here can follow each other in any order if we allow the structural parameters to change at random over time. With fixed parameters, the commonest sequence (as shown in Section II) is from Phase I to either Phase II or Phase III. We have not tried to trace such a sequence of phases historically except in the Adelman-Chenery model of Greek development [1] and the Chenery-Bruno analysis of Israel [6].

[24] When the trade gap determines the capital inflow in Phase I, we will denote the corresponding set of restrictions as Phase IB. This combination does not seem to be of great significance empirically. The more common case in which the ability to invest and the saving limit are controlling will be renamed Phase IA.

the capital inflow to be reduced, either export growth must exceed the target rate for GNP or the marginal import ratio must be substantially less than the initial average. From equations (13) and (14) we derive the following condition for the elimination of the trade gap with constant structural parameters within a given period $(q-j)$:

$$\frac{E_j}{M_j}(1+\epsilon)^{q-j} - \frac{\mu'}{\mu_j}(1+\bar{r})^{q-j} \geq \left(1 - \frac{\mu'}{\mu_j}\right). \tag{16}$$

Since the parameters ϵ and μ' are more amenable to policy control in the long run than are k and α', Phase III conditions are less likely to persist throughout the transition than are those of Phase II unless the efforts of the underdeveloped countries to increase their exports are frustrated. For the projections to 1975 that are made in Section II, however, Phase III is of great importance.

4. *Total Requirements for External Capital.* The total capital required under our assumptions to complete the transition to self-sustaining growth can be determined as the sum of the capital requirements for each phase that the economy goes through. In Phases IA and II, external capital is determined by the cumulative difference between investment and savings. In Phases IB[25] and III, it is the cumulative difference between import requirements and exports.

The equations for capital inflow in each phase are given in a symmetrical form in Table 2. All variables are expressed as a ratio to the initial level of GNP (V_0). Summing these equations over time and assuming constant parameter values gives the total capital inflow during any period that the economy remains in that phase. These formulas for cumulative capital inflow are used in subsequent comparisons of growth paths and capital requirements.

B. *The Transition in Pakistan*

We can best illustrate the operation of our basic model by applying it to a specific case. Pakistan will be chosen for this purpose because it has actually started from a very low level of income and accelerated its rate of growth through the use of external resources. Unlike the more advanced countries cited earlier, however, Pakistan has only completed the first decade of a process which may take several decades more. The projections which we will make for Pakistan, therefore, illustrate the procedure to be followed for a large number of countries in Section II in calculating the range of future needs for external capital.

For the past eight to ten years Pakistan has been following the sequence envisioned in our Phase I of a rapid expansion in investment,

[25] See footnote 24.

TABLE 2—SUMMARY OF PHASE FORMULAS FOR FOREIGN CAPITAL INFLOW (F_t) AND CUMULATIVE FOREIGN CAPITAL INFLOW ($\sum F_t$) AS RATIO TO INITIAL GNP (V_0)

Phase	Growth Constraint	Determinant of Foreign Capital	Dependent Variable	Investment or Imports (equals)	Savings or Exports (minus)
IA	Ability to Invest (4)	Investment-Saving	F_t/V_0	$= \frac{I_0}{V_0}(1+\beta)^t$	$-\left\{\alpha_0 + \frac{I_0}{V_0}\frac{\alpha'}{k\beta}[(1+\beta)^t - 1]\right\}$
			$\sum_0^t F_t/V_0$	$= \frac{I_0}{\mu_0}\left[\frac{(1+\beta)^{t+1}-1}{\beta}\right]$	$-\left\{(t+1)\left(\alpha_0 - \frac{I_0}{V_0}\frac{\alpha'}{k\beta}\right) + \frac{I_0\alpha'}{V_0 k i}\left[\frac{(1+\beta)^{t+1}-1}{\beta}\right]\right\}$
			or	$= \frac{I_0}{V_0}\left[\frac{(1+\beta)^{t+1}-1}{\beta}\right]\left(1 - \frac{\alpha'}{k\beta}\right)$	$-(t+1)\left(\alpha_0 - \frac{I_0}{V_0}\frac{\alpha'}{k\beta}\right)$
IB	Ability to Invest (4)	Imports-Exports	F_t/V_0	$= \mu_0 + \frac{\mu'}{k\mu}\cdot\frac{I_0}{V_0}[(1+\beta)^t - 1]$	$-\frac{E_0}{V_0}(1+\epsilon)^t$
			$\sum_0^t F_t/V_0$	$= (t+1)\left(\mu_0 - \frac{\mu'}{k\beta}\frac{I_0}{V_0}\right) + \frac{\mu'}{ki}\frac{I_0}{V_0}\left[\frac{(1+\beta)^{t+1}-1}{\beta}\right]$	$-\frac{E_0}{V_0}\left[\frac{(1+\epsilon)^{t+1}-1}{\epsilon}\right]$
II	Growth Target (6)	Investment-Saving	F_t/V_0	$= k\bar{r}(1+\bar{r})^t$	$-\{\alpha_0 + \alpha'[(1+\bar{r})^t - 1]\}$
			$\sum_0^t F_t/V_0$	$= k[(1+\bar{r})^{t+1} - 1]$	$-\left\{(t+1)(\alpha_0 - \alpha') + \alpha'\left[\frac{(1+\bar{r})^{t+1}-1}{\bar{r}}\right]\right\}$
			or	$= (k - \alpha'/\bar{r})[(1+\bar{r})^{t+1} - 1)]$	$-(t+1)(\alpha_0 - \alpha')$
III	Growth Targets (6)	Imports-Exports	F_t/V_0	$= \mu_0 + \mu'[(1+\bar{r})^t - 1]$	$-\frac{E_0}{V_0}(1+\epsilon)^t$
			$\sum_0^t F_t/V_0$	$= (t+1)\left(\mu_0 - \mu'\right) + \frac{\mu'}{\bar{r}}[(1+\bar{r})^{t+1} - 1]$	$-\frac{E_0}{V_0}\left[\frac{(1+\epsilon)^{t+1}-1}{\epsilon}\right]$

saving and external assistance. In 1956[26] Pakistan was in the lower quartile of countries with respect to its investment, saving, and growth rates. As shown in Table 3, its performance since then has approximated the upper-quartile values for the main performance measures in our model: absorptive capacity, capital-output ratio, marginal saving rate, and export growth. We take 1962 as the base year for these and all subsequent projections. Base-year values for the variables in the model are given in Table 4, expressed as ratios to 1962 GNP.

The growth process from 1962–75 will be determined from the basic model under two sets of assumptions as to the values of the parameters. The more pessimistic (A) assumptions are based on a conservative interpretation and projection of performance in recent years: the corresponding parameter values are labeled "historical performance" in Table 3. The more optimistic (C) assumptions are derived from the Pakistan Perspective Plan for 1965–85; they are labeled "upper limit" perfor-

TABLE 3—STRUCTURAL PARAMETERS FOR PAKISTAN PROJECTIONS

	Growth Target $\bar{r}$	Absorptive Capacity β	Capital-Output Ratio k	Marginal Saving Rate α'	Marginal Import Requirement μ'	Export Growth Rate e
Historical Estimates						
(1957–62)[a]	.041	.15	2.35	.25	.20	.075
(1959–65)[b]	.05	.20	2.8	.22		.070
Projections for 1962–75[c]						
"Historical" Performance (A)	.045	.13	3.0	.16	.10	.049
"Upper Limit" Performance (C)	.060	.13	3.0	.24	.10	.070
Pakistan Perspective Plan[b]	.075	—	2.9	.25	.06	.079
Representative Values[d]						
Median		.14	3.5	.19	.20	.051
Upper Quartile		.19	2.8	.26	.01	.080

[a] *Source:* Table A-1.

[b] *Source:* Pakistan's *Third Five Year Plan*, (1965–70) [10].

[c] General bases for the projections are discussed in the Annex. The parameters are the same as those used for the 50-country projections (Table A-2) except for the export growth rate, which has been revised upward to 7 per cent in the light of recent experience and the revised plan estimate.

[d] From Table 1.

[26] The year 1956 marked the beginning of the first five-year plan, although the plan had little effect on the economy for several years thereafter.

TABLE 4—AN EXAMPLE OF PHASE DEVELOPMENTS FOR PAKISTAN,[a] 1962–75
(All values expressed as ratios to initial GNP)

Year	1956[b]	1962[b]	1963	1964	1965	1966	1967	1968	1970	1975
Historical Performance										
GNP	.838	1.000	1.041	1.087	1.136	1.188	1.241	1.296	1.416	1.764
Investment	.059	.122	.138	.147	.153	.160	.168	.175	.191	.238
Potential saving	.039	.090	.097	.104	.112	.121	.129	.138	.157	.213
I-S gap[c]	.020	.032	.041	.042	.041	.040	.039	.037	.034	.025
Potential imports	.074	.100	.104	.109	.114	.119	.124	.130	.142	.177
Exports	.054	.068	.072	.075	.079	.083	.087	.091	.100	.128
M-E gap[c]	.020	.032	.032	.033	.035	.036	.037	.038	.041	.049
Consumption	.799	.910	.944	.983	1.024	1.067	1.112	1.159	1.266	1.575
Phase	I	I	IA	II	II	II	II	III	III	III
Upper Limit Performance										
GNP	.838	1.000	1.041	1.087	1.139	1.198	1.264	1.339	1.504	2.012
Investment	.059	.122	.138	.156	.176	.199	.225	.241	.272	.364
Potential saving	.039	.090	.100	.111	.124	.138	.154	.172	.212	.334
I-S gap[c]	.020	.032	.038	.045	.052	.061	.071	.069	.059	.029
Potential imports	.074	.100	.104	.109	.115	.120	.126	.134	.151	.201
Exports	.054	.068	.073	.078	.083	.089	.095	.102	.117	.164
M-E gap[c]	.020	.032	.031	.031	.032	.031	.031	.032	.034	.037
Consumption	.799	.910	.941	.976	1.015	1.060	1.110	1.167	1.292	1.687
Phase	I	I	IA	IA	IA	IA	IA	II	II	III
Growth rates:										
GNP	.021	.041	.044	.048	.052	.055	.059	.060	.060	.060
Investment	.130	.130	.130	.130	.130	.130	.130	.071	.060	.060
Consumption	.015	.034	.037	.040	.044	.047	.051	.052	.053	.060

[a] Projections derived from the base-year data for 1962 and parameter values in Table 3.

[b] The 1956 and 1962 figures are trend values for the period 1956–62. The latest revision of the Pakistan national accounts [11] gives a similar investment level but higher initial savings and a negative marginal savings rate for the period 1954–55 to 1959–60.

[c] For 1956 and 1962, potential and actual savings and imports are the same, and the two gaps are identical; from 1963 onward, the larger gap is underlined.

mance.[27] In the case of Pakistan, the upper-limit assumptions are higher than the historical estimate for the growth target, the saving rate, and the growth of exports; the other three parameters already seem optimistic and have been kept unchanged.

Figure 1 and Table 4 show trend values of the variables from 1956 to 1962 and the two sets of projections derived from the model for 1962–75. Although the data before 1960 are not very reliable, it is clear that investment from 1956 to 1964 has grown very rapidly and doubled its share in GNP.[28] The rate of output growth has increased from about 2 per cent prior to 1958 to over 4 per cent since 1960.

The two sets of projections give the following sequence of phases:

	(A) Historical Performance	(C) Upper-Limit Performance
Phase I[29]	1956–63	1956–67
Phase II	1964–67	1968–73
Phase III	1968–	1974–
End of Transition	After 1985	After 1979
Target Growth Rate	4.5 per cent	6.0 per cent

In case C it takes ten years of steadily rising investment from the 7 per cent level of 1956 to reach the rate of 18 per cent of GNP required by a growth rate of 6 per cent. The capital inflow would reach a maximum of 6 per cent of GNP in 1967; throughout Phase I it would finance about 30 per cent of total investment. If the saving-investment limit were the only constraint on the system, the capital inflow could then be reduced to zero by 1980 if the marginal saving rate of .24 were maintained.[30] However, even with the relatively high export projection of 7 per cent per year, the model projects a switch to Phase III in 1974 with a marginal import requirement of .10. There is also a switch to Phase III in case A, even though export growth is assumed higher than the growth of GNP. The same phenomenon occurs in the projections in Table 7 below for the majority of developing countries.

[27] The projections in Section II also contain an intermediate set of estimates and growth targets for each country designated as "realistic plan performance." When the country's own plan seems quite optimistic, as in Pakistan, we have taken it as the basis for the "upper limit" estimates.

[28] The figures in Table 4 are derived from trends fitted to the time series for each variable and differ somewhat from estimates based on the initial and terminal years of each series. A detailed account of the decade 1955–65 is given in the Pakistan Third Five-Year Plan [11]. The general picture that it gives is similar to our upper-limit projections through 1965 except that both investment and foreign capital inflow are higher in the latter year. The statements in the text are consistent with both sets of estimates.

[29] There is considerable evidence that the trade limit was the controlling factor from 1956–59, which would identify this period as Phase IB.

[30] This is approximately the assumption of the revised Pakistan Perspective Plan [11 which aims at a 7 per cent growth rate and a termination of aid by 1985.

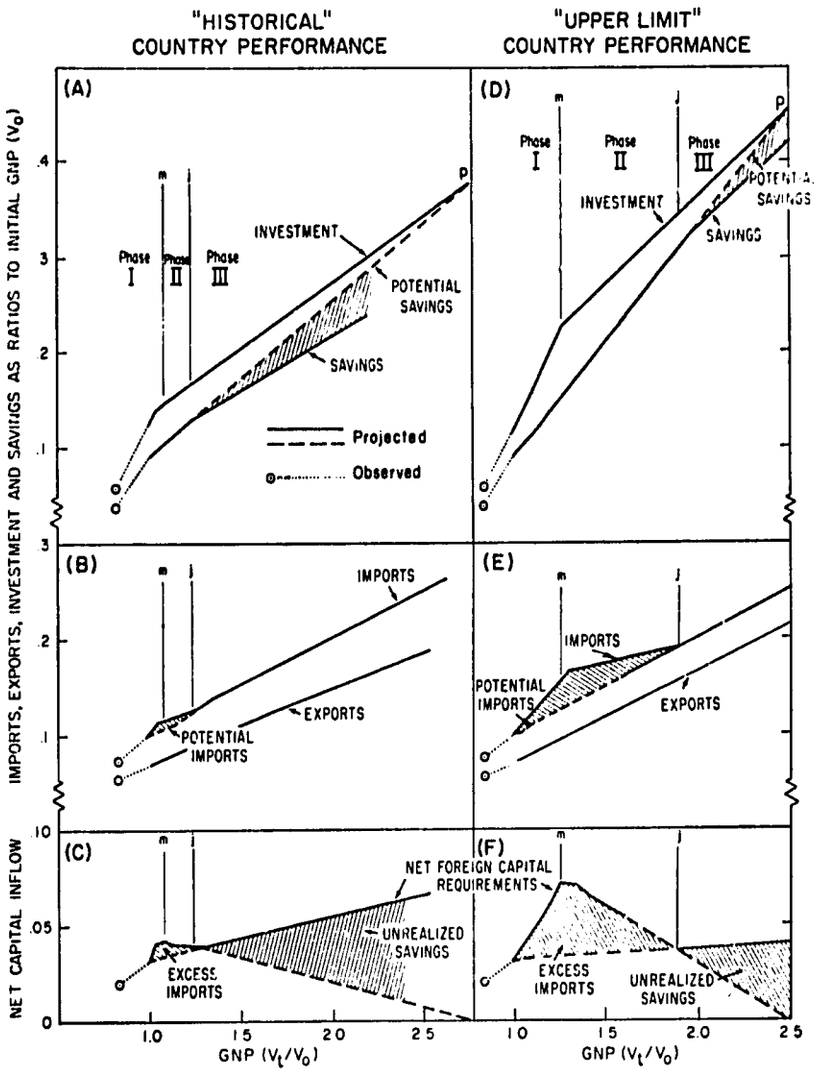

FIGURE 1. ILLUSTRATIVE GROWTH PATHS: PAKISTAN, PAST AND PROJECTED

The importance of the marginal saving rate is demonstrated by a comparison of the two projections. If the balance of payments parameters are subject to sufficient policy control in the longer run (as suggested below), the economy will reach self-sustaining growth at a rate of 4.5 per cent in 1985 under the lower assumption of a 16 per cent marginal saving rate. With a 24 per cent saving rate, a self-sustaining growth

rate of 6 per cent can be attained six years sooner. While more aid is required in the latter case, there is a much larger increment of saving and investment as well.[31]

C. *More Efficient Growth Paths*

The more time that is allowed for an economy to adjust its productive structure to the changing pattern of demand, the less likely it becomes that the rigidities assumed in the basic model will persist. We shall therefore construct a second model which assumes coordinated development policies and a planned adjustment of the trade gap and the saving gap. Actual cases will probably lie somewhere between these extremes.

Under the assumptions of model 1, the amount of external resources needed to fill the larger gap in a given year more than fills the smaller one. As compared to the minimum needs of the economy, there will be a surplus of imports ($M > \overline{M}$) in Phase II or a loss of potential saving, ($S < \overline{S}$) in Phase III. A better coordinated development policy would attempt to reduce the required capital inflow by substituting investment for imports – or vice versa – in order to equate the two gaps *ex ante* over the long run.[32]

If we assume efficient resource allocation, the equilibrium exchange rate—reflecting the opportunity cost of earning or saving foreign exchange at the margin—will be a function of the amount of inflow of external resources, F. Under *ceteris paribus* assumptions, a reduction in F normally implies an increase in the value of foreign exchange as marginal activities of import substitution or additional exports are undertaken. Since capital is the only scarce domestic resource in our model, we assume that a higher capital coefficient is needed to reduce the import requirements of model 1 and conversely that a saving in capital will result when imports increase above the minimum level.[33]

These assumptions form the basis for model 2, in which an import substitution activity is added to model 1.[34] Investment in import substitution I_m requires imported capital goods and a greater amount of capital (bk) per unit of imports replaced by domestic production. The net

[31] A generalization of these relationships is given in Section I.D.

[32] Given the durability of capital, it may not be efficient to equate the two in the short run, especially when there is a significant degree of disequilibrium to start with.

[33] The efficient reallocation of resources to accord with variations in the capital inflow is analyzed in detail in Chenery [5], which provides the basis for the aggregate formulation given here. We have approximated the diminishing marginal productivity in import substitution by a single incremental ratio.

[34] The same argument can be made for export expansion, using the marginal revenue product of additional investment to allow for the inelasticity of export demand. For convenience, we assume only import substitution here.

reduction in import requirements at time t (M_{m_t}) is given by:

$$M_{m_t} = \frac{1}{bk} \sum_{0}^{t-1} I_{m_t} - aI_{m_t}, \tag{17}$$

where a is the import content of I_m above the average for the economy and b is greater than 1.

Equation (13) of the basic model will then be replaced by:

$$M_t \geq \overline{M}_0 + \mu'(V_t - V_0) - M_{m_t}. \tag{13'}$$

The capacity limit, equation (3), must also be modified to allow for the lower productivity of capital in import substitution.

Model 2 will be used to estimate the minimum capital inflow needed to achieve a given level of GNP, first in the Pakistan example and later in comprehensive projections. For this purpose we assume (1) that total import substitution (positive or negative) is sufficient to eliminate the difference between the two structural gaps over the period 1962–75, and (2) that this type of investment increases linearly throughout the period. Solutions calculated for Pakistan for varying growth targets are shown in Table 5.[35] Cumulative values of the two gaps in model 1 and of the single gap in model 2 are plotted in Figure 2.[36]

Figure 2 shows that at a growth rate of GNP of 5.2 per cent, the cumulative values of the two resource gaps in model 1 are the same and equal to the total requirement for foreign capital in model 2. At lower growth rates, the trade gap predominates in model 1 and the difference between the two curves represents an excess of consumption. In model 2, about a third of this excess is utilized to finance the additional investment needed for import substitution; the remaining two-thirds is eliminated by reducing the capital inflow.[37]

At growth rates above 5.2 per cent, Phase II predominates in the basic model and the possibilities of reducing the capital inflow through (negative) import substitution are less. On our assumptions, substituting imports for investment would produce a reduction in the dominant

[35] We have used a value of b of 1.5, which implies that additional import substitutes would become profitable at an average exchange rate 50 per cent higher than the present effective rate. This value was judged to be the upper limit to the cost of import substitution or increased exports in the amounts needed to reconcile the two gaps. A comparable value was found in the investment programming model for Southern Italy [5]. The additional import content of investment (a) is taken as .25, corresponding to a total import content of .35.

[36] For model 1, we have assumed that the total capital inflow would be equal to the larger of the cumulative resource gaps because of the possibilities of adjustment through stock change, variations in imports, building ahead of demand, etc. Taking the larger resource gap on an annual basis would give somewhat higher totals for model 1 in Table 5 and Figure 2.

[37] For example, at a growth rate of 4 per cent excess consumption of .59 in model 1 is converted into increased investment of .19 and reduced imports and capital inflow of .40 in model 2. The same proportions hold at other growth rates below 5.2 per cent.

TABLE 5—EFFECTS OF IMPORT SUBSTITUTION POLICY ON CAPITAL INFLOW PAKISTAN (1962–75)[a]
(All figures expressed as ratios to 1962 GNP)

	ALTERNATIVE GROWTH TARGETS				
1. Target 1975 GNP	1.468	1.665	1.886	2.133	2.410
2. (GNP compound growth rate)	(.03)	(.04)	(.05)	(.06)	(.07)
3. Cumulative Exports (both models)	1.33	1.33	1.33	1.33	1.33
Model 1 (Cumulative Values)					
4. GNP	17.09	18.29	19.60	21.02	22.55
5. Investment	1.54	2.19	2.94	3.78	4.74
6. Savings: (Potential)	(2.00)	(2.29)	(2.60)	(2.94)	(3.31)
7. Savings: Realized	1.16	1.70	2.31	2.94	3.31
8. Imports: (Potential)	(1.71)	(1.83)	(1.96)	(2.10)	(2.26)
9. Imports: Realized	1.71	1.83	1.96	2.17	2.76
10. Excess Consumption	.84	.59	.29	.0	.0
11. Excess Imports	.0	.0	.0	.07	.50
12. Net Capital Inflow	.38	.50	.63	.84	1.42
13. (Dominant Phase)	(III)	(III)	(III)	(II)	(II)
Model 2 (Cumulative Values)[b]					
14. GNP	17.09	18.29	19.60	21.02	22.55
15. Investment	1.81	2.38	3.03	3.76	4.58
16. (Per cent Investment in Import Substitution)	(44%)	(24%)	(9%)	(−2%)	(−10%)
17. Savings	2.00	2.29	2.60	2.94	3.31
18. Imports	1.14	1.43	1.76	2.15	2.60
19. Net Capital Inflows	−.20	.09	.43	.82	1.26
Welfare Effects					
20. Consumption, Model 1	15.93	16.60	17.29	18.07	19.24
21. Consumption, Model 2	15.09	16.00	16.99	18.07	19.24
22. Change in Consumpion (line 21 minus 20)	−.84	−.59	−.29	.0	.0
23. Change in Capital Inflow (line 19 minus 12)	−.57	−.40	−.20	−.02	−.16
24. (Ratio, line 22÷23)	1.47	1.47	1.47	.0	.0

[a] Assumes no constraints on growth of investment or GNP. This means that country could invest sufficient capital in each year to attain the GNP growth rate given in line 2. Actual 1962 investment was sufficient for an initial growth rate of about .04.

[b] The basis for Model 2 is given in the text. The formulas for calculation are detailed in [8, Annex B].

saving gap of about a third of the difference between the two gaps in model 1.

A more efficient method of reducing the cumulative capital inflow in cases where the saving gap exceeds the trade gap is to accelerate the rate of growth at the beginning of the period instead of maintaining a con-

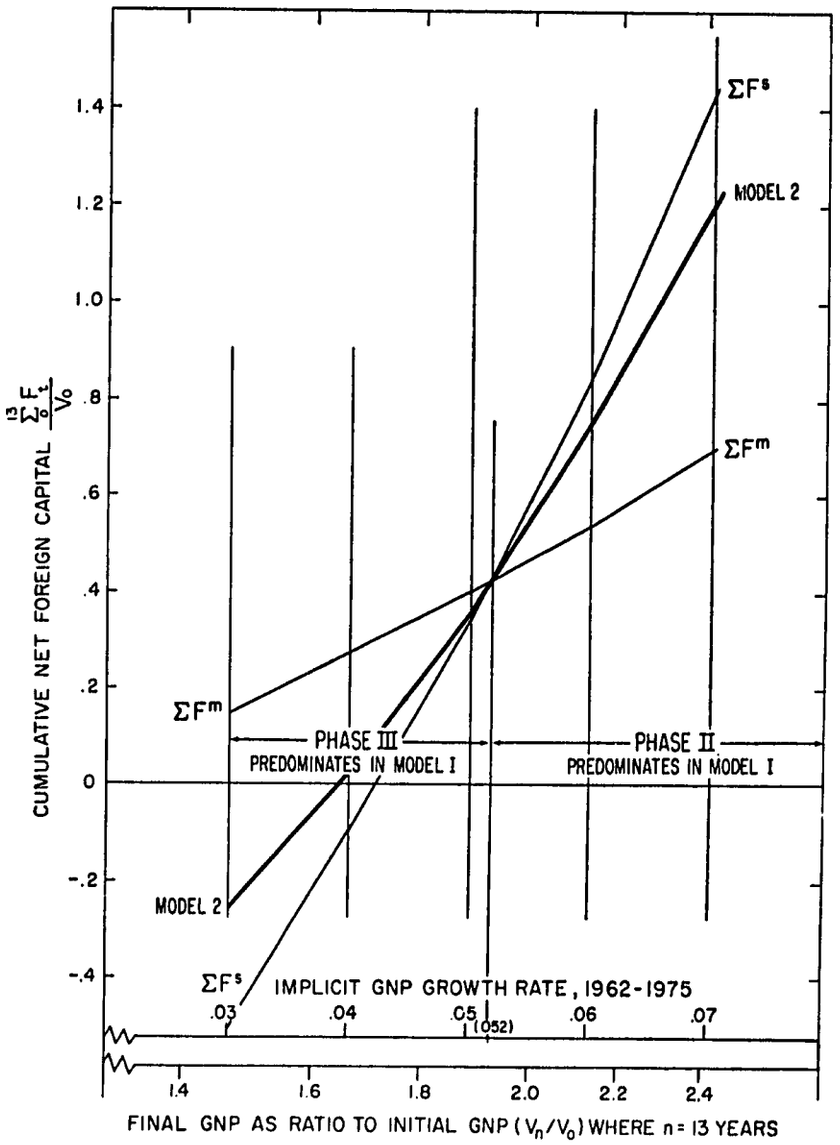

FIGURE 2. GAP EQUALIZATION THROUGH ADDITIONAL IMPORT SUBSTITUTION (MODEL 2), PAKISTAN, 1962–75

stant growth rate. This has the effect of increasing total saving as well as total imports, but the net reduction in the capital inflow is greater than with model 2.[38] The practical scope for raising the growth rate in most countries is limited by absorptive capacity constraints, however.

A more comprehensive analysis of the efficiency of alternative growth patterns would require us to abandon the assumption of a given target growth rate and to determine the growth target and the pattern of capital inflow from the objectives of the economy and the limits to the use of various policy instruments. This has been done in a linear programming analysis of optimal growth patterns in Pakistan [7]. The results confirm our assumption that it is efficient to eliminate the *ex ante* difference between the two resource gaps to the extent feasible. The main features of the growth pattern determined from the basic model also characterize the optimal solutions to the more general planning model.[39]

D. *The Productivity of External Resources*

The productivity of an increment in external resources supplied to a developing country can be measured by the corresponding increase in consumption or total income which it makes possible. The value of external resources depends on the extent to which they facilitate the fuller use of domestic factors. In our models, it is possible to measure the effect of increasing the supplies of investment funds and foreign exchange, but we have no estimate of the possibilities for raising the skill limits to growth.

Figure 2 provides one measure of the marginal productivity of external resources in Pakistan over the range of growth rates indicated.[40] Under the assumptions of model 1, the productivity of aid is much higher in Phase III, when the balance of payments is the factor limiting growth. This result is stated in more general terms in the following formulas for the derivative of the terminal year income with respect to the total capital inflow from the equations in Table 2.

[38] The theoretical aspects of the variable growth mechanism are more fully explored in [8]. There it is shown that slowing down growth to save on external capital in Phase III is a very inefficient alternative to import substitution. In the present example it results in a loss of $1 of consumption per dollar of capital inflow saved.

[39] The principal differences between model 1 and the linear programming solutions are (1) a continuation of Phase I beyond the point at which the target rate is achieved in order to maximize the benefits of accelerated growth; (2) replacement of Phases II and III by a single regime in which the capital inflow is reduced to zero with the two gaps kept equal by import substitution, as in model 2 above.

[40] Since Figure 2 is designed to illustrate the effects of import substitution, we have omitted the complicating element of absorptive capacity, which would raise the total capital inflow required for higher growth rates and put an absolute ceiling on the maximum growth achievable of about 6.3 per cent by 1975 in the Pakistan example. Discounting the total capital inflow at 8 per cent would reduce the total value by 30-40 per cent and raise its marginal productivity.

For Phase II:

$$\frac{d(V_{t+1})}{d(\sum F_t^a)} = \frac{1}{k - \alpha'\gamma}, \tag{18}$$

For Phase III:

$$\frac{d(V_{t+1})}{d(\sum F_t^m)} = \frac{1}{\mu'\gamma}, \tag{19}$$

where

$$\gamma = \left[\frac{t - \dfrac{1 - (1+\bar{r})^{-t}}{\bar{r}}}{\bar{r}(t+1)}\right].$$

Values of γ for relevant time periods and growth rates are:

	Values of γ		
$\bar{r}$	$t=4$	$t=9$	$t=14$
.03	1.8	4.1	5.9
.05	1.8	3.8	5.5
.07	1.7	3.5	4.9
.10	1.7	3.4	4.4

These formulas give the following values for the increase in terminal year income per dollar of increase in cumulative assistance for Pakistan and for the median parameter values of Table 1 (assuming $\bar{r}=.05$ and $t=14$).

	Pakistan	Median Values
Productivity in Phase II	.44	.35
Productivity in Phase III	1.14	.91

For periods under 20 years, there is a pronounced tendency for the two productivity curves to have the relative slopes indicated for Pakistan, with Phase II predominating at high rates of growth.[41] As the length of time increases, the productivity of assistance in Phase II rises because of the additional saving generated, while the producitivity in Phase III falls. Under the more optimal policies assumed in model 2, there is a single productivity curve with a slope closer to that of Phase II in model 1.[42]

For long-term development policy, it is more useful to consider the total assistance required to complete the transition to self-sustaining

[41] This result was also obtained by Chenery and Bruno [3] for Israel and by McKinnon [15] for more specialized assumptions. An estimate of the productivity of aid to Greece is given in [1].

[42] The marginal productivity curve derived from the linear programming model of [7] is similar to that for model 2.

growth in relation to the country's performance. This can be done by varying the parameters for Phase II of model 1 over the range of values observed in Table 1. The results are given graphically in Figure 3, which shows the total undiscounted capital inflow required to produce a self-sustaining growth rate of 5 per cent from the low initial saving rate of 8 per cent of GNP.[43]

To show the effect on aid requirements of a change from average performance to "good" performance, we have plotted points corresponding to median values of k and α' (point H) and also upper quartile values (point U). Median performance requires a total capital inflow of more than $2\frac{1}{2}$ times the initial GNP and a period of 43 years to complete the transition to self-sustaining growth. Upper-quartile performance requires a capital inflow equal to only a quarter of the initial GNP and a period of eight years to reach self-sustaining growth (if we ignore the absorptive capacity limitation). Between these extremes, we might distinguish as "good performance" combinations of k and α' which accomplish the transition with a total capital inflow of not more than the initial GNP, such as $k = 3.2$ and $\alpha' = .20$. These results will be utilized in the discussion of assistance policy in Section III.

II. *Prospects for the Transition*

The preceding analysis provides a way of thinking about external resources as an element in the development process. Their contribution to growth may be large or small depending on the response of the recipient country. We shall now try to evaluate the recent performance of the less developed countries and assess their possibilities for further growth and their needs for external resources.

Since efforts to accelerate growth through foreign assistance have been concentrated in recent years, our statistical analysis is based on the period 1957–62. Rough estimates of the basic relations in model 1 have been made for 50 countries which account for 90 per cent of the GNP of the underdeveloped world.[44] Principal attention will be given to 31 of these countries for which the data are judged to be more reliable.[45] Our interpretation of the results will also utilize more detailed analyses of a dozen of the most important recipients of U. S. assistance.[46]

[43] Model 2 can be approximated by Phase II of model 1 by taking a weighted average of the two incremental capital output ratios in model 2. Figure 3 ignores the absorptive capacity limitations, which would tend to raise the time required for the transition.

[44] Omitting Communist China, Cuba, and N. Korea.

[45] The only large countries omitted from the 31-country sample are: Ceylon, Ethiopia, Indonesia, South Vietnam, the Sudan, and the United Arab Republic.

[46] Preliminary results of the more detailed studies are available for Greece [1], Turkey [25], Colombia [24], and Taiwan [12]. Other countries for which more detailed models have been constructed by AID in order to test the "two gap" analysis of aid requirements and performance include India, Pakistan, Argentina, Brazil, Korea, Jordan, Nigeria, and Chile.

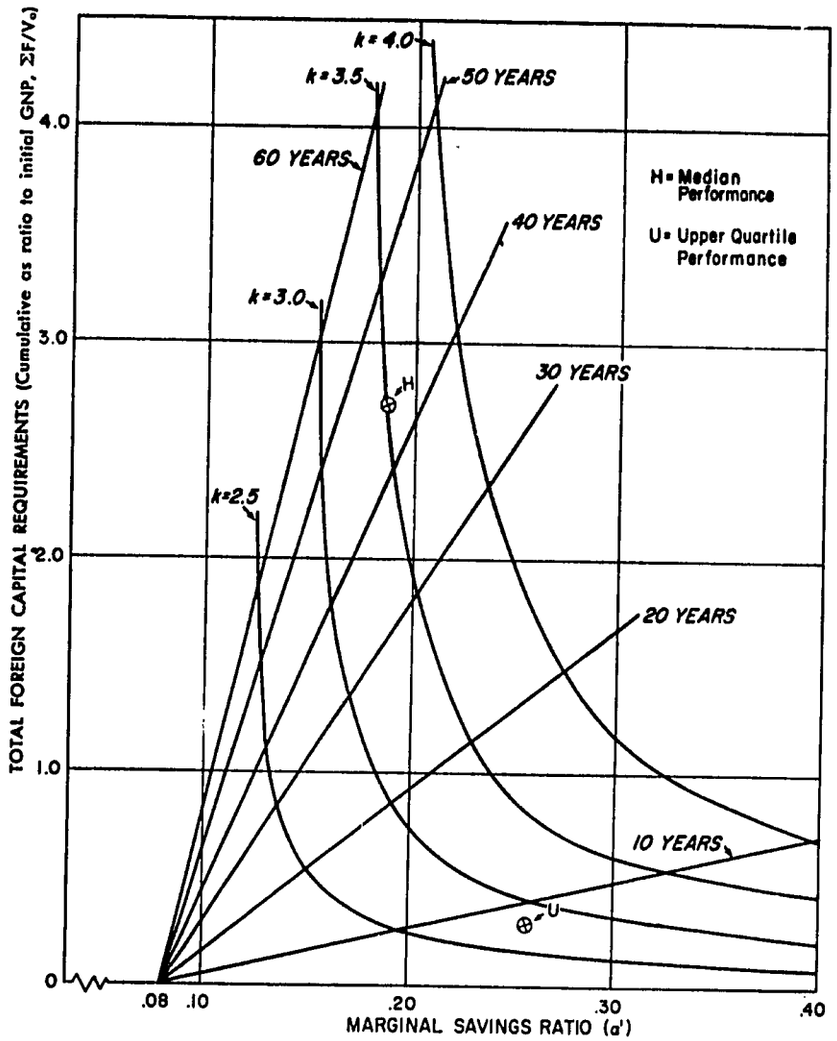

FIGURE 3. TOTAL CAPITAL INFLOW REQUIRED TO REACH SELF-SUSTAINING GROWTH
(Assumes 5 per cent GNP growth rate, initial saving/GNP ratio of .08 and Phase II throughout)

A. *Evaluation of Current Performance.*

The statistical evaluation of current performance is designed to show the extent to which underdeveloped countries have established the structural conditions required to utilize aid effectively in carrying out a transition to self-sustaining growth. It also sheds some light on the validity of our simplified model and provides a basis for subsequent projections of future growth.

For this survey we have adopted a uniform statistical procedure that is applied to all 31 countries. Estimates of the parameters in the basic model are given in Table A-1 below. The main features of the statistical procedure are as follows:

1. All estimates were made from linear trends fitted to time series for the period 1957–62. Marginal saving rates (α'), marginal import rates (μ'), and marginal capital-output ratios (k) were computed directly from these trends.

2. The magnitude of the absorptive capacity parameter (β) is indicated by the highest compound growth of investment for any five-year period in the past decade. The growth of investment (i) observed for 1957–62 is often well below this limit because development has been constrained by other factors.

3. Trend values for 1962 of the investment, saving, and import ratios to GNP are computed as a basis for future projections.

The estimates in Table A-1 will first be used to determine the extent to which recent performance satisfies the criteria for a successful transition to self-sustaining growth. While six years is too short a period to establish reliable estimates for any single country, a comparative assessment for the whole group of countries is quite suggestive.

We have proposed three sets of criteria in Section I to measure progress toward a given rate of self-sustaining growth;

(1) *Investment criteria.* In Phase I, the rate of growth of investment must be greater than the target growth rate ($i > \bar{r}$). Thereafter, the investment rate must be adequate to sustain the target GNP growth rate ($I/V \geq k\bar{r}$).

(2) *Saving criteria.* The marginal savings rate must be greater than the target investment rate ($\alpha' > k\bar{r}$) unless the average rate of saving is already above this level.

(3) *Trade criteria.* Either export growth must exceed the growth target for GNP or the marginal import ratio (μ') must be substantially less than the initial average ratio. The complete statement of the trade criterion is given by equation (16).

These criteria have been used to classify the 31 countries into the four main groups shown in Table 6. The classification is based on the saving and trade performance needed to achieve a self-sustaining growth rate of 5 per cent.[47] As to the investment criteria, all countries except Burma have shown an absorptive capacity for investment of greater than 5 per cent in the recent past, but the five countries indicated by an asterisk do

[47] The parameters should reflect underlying structural characteristics rather than "realized" values in this historical period. The high marginal import ratios for Chile, Nigeria, and Turkey, for example, may reflect Phase II slackness in the foreign trade constraint. The true structural import ratios may be enough lower to move Chile from Group D to C and Nigeria from B to A. Use of parameters for the period 1953–63 would move Mexico from Group C to A.

TABLE A-1—SUMMARY OF PAST STRUCTURAL RELATIONSHIPS FOR LESS DEVELOPED COUNTRIES[a]

No.[a]	Country	Highest 5 Years in Recent Past[b]		Relationships during 1957–62[b]										
		β	Period	i	k	r	I_0	Ψ_0	α_0	α'	μ_0	μ'	e	ρ'
3	Greece	.210	1954–58	.12	3.02	.060	.21	−.06	.15	.26	.18	.19	.051	.097
4	India	.154	1953–57	.07	2.89	.048	.14	.02	.12	.20	.07	.00	.014	−.165
5	Iran	.103	1957–61	.01	3.54	.049	.15	.01	.14	.11	.23	.24	.080	−.044
6	Israel	.129	1953–57	.10	3.07	.103	.31	−.20	.11	.15	.41	.48	.194	.541
7	Jordan	.215	1958–62	.19	1.36	.111	.17	−.24	−.07	.09	.41	.29	.080	.288
8	Pakistan	.198	1960–64	.15	2.35	.041	.12	−.04	.09	.25	.10	.20	.075	−.007
9	Turkey	.102	1959–63	.04	4.79	.030	.15	.03	.12	−.02	.11	.33	.050	.049
11	Argentina	.113	1956–60	.09	10.67	.019	.24	.03	.21	.83	.15	.41	.043	.072
12	Bolivia	.084	1960–64	−.02	4.32	.029	.11	−.07	.04	−.16	.17	.06	−.005	−.029
13	Brazil	.154	1956–60	.09	2.64	.067	.19	.03	.15	.19	.13	.00	−.023	−.001
15	Chile	.169	1958–62	.12	2.77	.058	.13	−.06	.07	.10	.22	.36	.061	−.057
16	Colombia	.078	1958–62	.04	4.15	.050	.20	−.04	.16	−.12	.16	.20	−.031	−.053
17	Costa Rica	.108	1950–54	−.01	4.72	.039	.16	−.05	.11	−.10	.28	.17	.016	−.033
20	Guatemala	.208	1953–57	−.05	3.52	.056	.10	.02	.08	−.03	.14	−.09	.014	−.148
21	Honduras	.155	1960–64	.01	4.05	.033	.13	−.01	.13	.25	.19	−.03	.028	−.074
23	Mexico	.144	1953–57	.02	3.96	.050	14	.01	.13	.11	.12	.06	.051	−.032
25	Panama	.144	1958–62	.10	3.12	.051	.18	−.06	.12	.37	.39	.51	.100	−.114
26	Paraguay	.100	1951–55	.01	6.37	.026	.16	.03	.13	.08	.17	.1	.025	.001
27	Peru	.155	1959–63	.03	3.10	.073	.20	−.01	.21	.31	.24	.21	.143	.105
28	Trinidad-Tobago	.192	1955–59	.05	4.33	.078	.31	.10	.22	.11	.83	1.04	.107	(n.a.)

29	Venezuela	.056	1955–59	−.08	6.53	.043	.19	−.08	.27	−.26	.33	−1.13	−.065	−.691
34	Liberia	.446	1958–62	.57	7.81	.046	.67	−.56	.11	.21	1.13	3.23	.033	.067
36	Nigeria	.051	1956–60	.09	3.71	.033	.14	−.05	.09	.19	.20	.39	.059	−.594
40	Tunisia	.275	1958–62	.27	4.91	.034	.26	−.18	.08	−.84	.42	1.10	−.086	.350
42	Burma	0	1957–61	−.00	4.10	.046	.16	−.00	.17	.21	.16	− .15	.021	.095
43	Taiwan	.164	1956–60	.13	2.68	.074	.22	−.07	.15	.29	.21	.19	.083	.078
45	Korea	.187	1960–64	.00	3.44	.040	.12	−.10	.03	.27	.16	−.06	.165	.216
46	Philippines	.078	1958–62	.05	2.78	.050	.14	.02	.12	.30	.20	.01	.046	−.093
47	Thailand	.126	1958–62	.10	2.11	.080	.17	.01	.16	.22	.19	.15	.077	.226
49	Malaya	.157	1957–61	.18	2.33	.062	.18	−.04	.22	.26	.47	.62	.059	.926
50	Mauritius	.143	1956–60	.08	4.97	.034	.19	−.09	.10	−.39	.49	.67	−.010	(n.a.)

[a] All data derived by fitting time trends to actual points (as estimated in early 1965) for period covered. All data except imports, exports, and reserves expressed in 1962 prices. Imports, exports and reserves expressed in current U. S. dollars.

[b] Symbols for column headings are:

βi = compound growth rate of gross investment.

k = incremental capital-output ratio (assuming 1-year lag).

r = compound growth rate of GNP.

I_0 = ratio of gross investment to GNP in 1962 (after time-trend fitting).

Φ_0 = ratio of net foreign capital inflow to GNP in 1962 (after time-trend fitting).

α_0 = ratio of national gross savings to GNP in 1962 (after time-trend fitting).

α' = marginal national savings ratio (change in savings ÷ change in GNP)

μ_0 = ratio of gross imports of goods and services to GNP in 1962 (after time-trend fitting).

μ' = marginal import ratio (change in gross imports of goods and services ÷ change in GNP).

ϵ = compound growth rate of exports of goods and services.

ρ' = change in gold and convertible foreign currency reserves, December 1956 to December 1962 ÷ change in GNP, 1957–62. GNP first converted to 1962 U. S. dollars (after time-trend fitting).

[c] Country numbers correspond to those in Tables A-2 and A-3.

Source: Imports, exports and reserves largely from IMF, *Balance of Payments Yearbook*. Other data from U. N. *Yearbook of National Accounts* and from AID, Statistics and Reports Division.

TABLE 6—INDICATORS OF PROGRESS IN ATTAINING SELF-SUSTAINING GROWTH, 1957–62

No.	Country	Capital Inflow	Investment Performance			Saving Performance		Trade Performance			Growth in GNP
		F_0/V_0	$k\bar{r}$	I_0/V_0	i	α_c	α'	E_0/M_0	ϵ	μ'/μ_0	r
	A. Countries meeting both saving and trade criteria[a]										
42	Burma*	.00	.205	.16	−.003	.17	.21	1.01	.021	−.91	.046
6	Israel	.20	.154	.31	.10	.11	.15	.51	.194	1.16	.103
7	Jordan	.24	.068	.17	.19	−.07	.09	.43	.080	.70	.111
45	Korea*	.10	.172	.12	.001	.03	.27	.42	.165	.39	.040
49	Malaya	−.04	.116	.18	.18	.22	.26	1.08	.059	1.31	.062
8	Pakistan	.04	.117	.12	.15	.09	.25	.64	.075	1.97	.041
25	Panama	.06	.156	.18	.10	.12	.37	.85	.100	1.31	.051
27	Peru	−.01	.155	.20	.03	.21	.31	1.04	.143	.86	.073
46	Philippines	.02	.139	.14	.05	.12	.30	.90	.046	.06	.050
43	Taiwan	.07	.134	.22	.13	.15	.29	.65	.083	.90	.074
47	Thailand	.01	.106	.17	.10	.16	.22	.93	.077	.82	.080
28	Trinidad-Tobago	.10	.217	.31	.05	.22	.11	.88	.107	1.25	.078
	B. Countries meeting saving criterion only[a]										
11	Argentina	.03	.533	.24	.09	.21	.83	.80	.043	2.66	.019
13	Brazil	.03	.132	.19	.09	.15	.19	.74	−.023	.03	.067
3	Greece	.06	.151	.21	.12	.15	.26	.67	.051	1.05	.060
21	Honduras*	−.01	.203	.13	.01	.13	.25	1.03	.028	−.18	.033
4	India	.02	.145	.14	.07	.12	.20	.68	.014	.07	.048
36	Nigeria	.05	.185	.14	.09	.09	.19	.76	.059	1.98	.033
	C. Countries meeting trade criterion only[a]										
5	Iran	.01	.177	.15	.01	.14	.11	.95	.080	1.04	.049
23	Mexico	.01	.153	.14	.02	.13	.11	.91	.051	.54	.050
29	Venezuela	−.03	.326	.19	−.08	.27	−.26	1.25	−.065	−3.41	.043

D. Countries meeting neither trade nor saving criterion

12	Bolivia*	.07	.216	.11	−.02	.04	−.16	.62	−.005	.34	.029
15	Chile	.06	.138	.13	.12	.07	.10	.73	.061	2.12	.038
16	Colombia	.04	.208	.20	.04	.16	−.12	.76	−.031	1.21	.050
17	Costa Rica	.05	.236	.16	−.01	.11	−.10	.83	.016	.60	.039
20	Guatemala*	.02	.176	.10	−.05	.08	−.03	.86	.014	−.64	.036
34	Liberia	.56	.390	.67	.57	.11	.21	.50	.033	2.85	.046
50	Mauritius	.09	.249	.19	.08	.10	−.39	.81	−.010	1.37	.034
26	Paraguay	.03	.318	.16	.01	.13	.08	.81	.025	.69	.026
40	Tunisia	.18	.245	.26	.27	.08	−.84	.59	−.086	2.59	.034
9	Turkey	.03	.240	.15	.04	.12	−.02	.72	.050	2.95	.030

Source: Table A-1.

Symbols: r = GNP growth rate
$k\bar{r}$ = ratio of investment to GNP needed for 5 per cent GNP growth rate
I_0/V_0 = investment/GNP ratio in 1962
i = annual growth rate of investment
α_0 = 1962 ratio of saving to GNP
α' = marginal saving/GNP ratio
E_0/M_0 = 1962 ratio of exports to imports
ϵ = export growth rate
μ'/μ_0 = ratio of marginal to average import/GNP coefficients
F_0/V_0 = ratio of capital inflow to GNP in 1962 $(I_0/V_0 - \alpha_0)$,

* *Criteria:*

(a) Saving criteria: $\alpha' \geq k\bar{r}$, or $\alpha_0 \geq k\bar{r}$, where $\bar{r} = .05$

(b) Trade criteria:

$$\frac{\mu'}{\mu_0} \leq \frac{(E_0/M_0)(1+\epsilon)^p - 1}{(1+\bar{r})^p - 1}, \text{ for some } p \leq 50 \text{ years where } \bar{r} = .05$$

(c) Minimum investment criteria: The initial investment rate of the countries marked by an asterisk is insufficient to maintain a 5 per cent GNP growth rate, even if the capital-output ratio were to fall to 3.0 (i.e. $I_0/V_0 < .15$), *and* the rate of increase in investment is insufficient to ever achieve a 5 per cent GNP growth rate (i.e., $i < .05$).

* Do not meet either set of investment criteria.

not meet either investment criterion for the period 1957–62.

The 12 countries in group A satisfy the criteria for approaching or maintaining self-sufficiency and nine of them have already achieved growth rates of 5 per cent or more. Half of this group is heavily dependent on external capital for its continued growth, while most of the others have favorable exports and little or no net capital inflow.

Of the 19 countries that fail to satisfy one or both criteria for approaching self-sustaining growth, failure on the trade side seems to be at least as important as deficiencies in saving and investment. More detailed studies suggest that a number of these countries—India, Greece, Turkey, Chile, Colombia, Costa Rica, Bolivia, Guatemala, and Honduras—have recently shown symptoms associated with Phase III in our model: import shortages, substantial excess capacity, and in some cases falling saving rates.[48]

One of the most suggestive features of this grouping of countries is the predominant role played by exports. Ten of the 12 countries in group A have export growth rates of 6 per cent or more and hence could eventually reach self-sustaining growth of 5 per cent even if the ratio of imports to GNP remained constant. Conversely, one of the most significant aspects of the unsatisfactory performance of countries in Group D is the stagnation of their exports, which has typically led to increased requirements for external capital and falling saving rates. There is almost no example of a country which has for a long period sustained a growth rate substantially higher than its growth of exports through continuing import substitution. In the past Brazil, Colombia, Turkey, and India have done so for considerable periods, but each has run into severe balance-of-payments difficulties in recent years.

This comparative assessment also tends to dispel the notion that performance as measured here is necessarily associated with the initial income level. In this period, at least, there is little correlation between initial income levels and either marginal saving rates or balance-of-payments performance.

B. *Projections of Future Growth*

Since less developed countries vary widely in their ability to mobilize their own resources and to utilize external resources, estimates of future assistance requirements based on aggregate models are not very useful. We have therefore made a series of projections for each of 50 countries in order to explore the range of future growth possibilities and corresponding assistance requirements. While the projection for any single country is fairly crude, this approach has the great advantage of taking into

[48] Aggregate evidence is given in [8]; examples of more detailed analyses of the trade gap are found in [1] [14] [24] [25].

account absorptive capacity, import requirements, and other limitations which can only be judged on a country basis.

Our analysis is designed to explore the possibilities for accelerating growth through a combination of improved country performance and additional external resources. We therefore specify a considerable range of performance possibilities, based on the preceding survey of current performance. The range of values chosen for each parameter is designed to show the extent to which the performance variables affect the country's growth and its aid requirements.

1. *Methodology.* The methodology to be used follows closely that used for Pakistan in Section I. A similar range of variation in performance has been specified for each of the 50 countries in the sample. Principal attention has been given to the 25 countries having the largest effect on assistance requirements.

As a starting point we estimated the six parameters in model 1 from the historical performance in each country, modified in some cases by the experience of similar countries. The average of the resulting target growth rates for all countries (projected to 1975) is 4.4 per cent, approximately the same as the recent past.[49]

To evaluate the possibilities for accelerated growth, we divided the six policy parameters into three groups: the growth limits for investment and GNP (β and $\bar{r}$); internal performance factors (k, α', and μ'); and export growth (ϵ). Starting from the historical estimates, we specified two sets of more optimistic assumptions for growth limits and internal performance factors and one alternative set of export projections.[50] These alternative sets of parameters values are shown in Table A-2. The possible combinations of the sets of values for the parameters provide a basis for 18 projections for each of the 50 countries.

In judging the range of possible performance for each country, we took into account its historical performance, its development plan, the observed performance of other countries and some aspects of political performance. We relied heavily on the development programs of the major countries in making the intermediate or "plan" estimates of both growth targets and internal performance. "Plan" targets and performance are defined here as those achievable with moderate improvements in development policies in relation to past experience. The most optimistic (upper-limit) estimates assumed that almost all countries could attain the median observed value of the marginal saving rate (.20) and

[49] These historically based estimates are shown in Table A-2 of the Annex. They differ from the estimates in Table A-1 for 1957-62 primarily in the elimination of abnormal or biased values that need not persist with reasonable policies—e.g., falling export and saving rates, abnormally high capital coefficients, etc. In large part, these abnormal values represent the effects of disequilibrium conditions on our estimates. The revisions reduce the estimates of aid requirements.

[50] Details are given in [8'].

TABLE A-2—VALUE OF PARAMETERS USED IN PROJECTIONS

No.	Country	Target Growth Rate of GNP ($\bar{r}$)			Maximum Rate of Growth of Investment			Incremental Aggregate Capital-Output Ratio			Marginal Gross Savings Ratio			Marginal Import Ratio			Annual Growth Rates		
																	Exports		Population
		(H)istorical	(P)lan	(U)pper Limit	H	P	U	A	B	C	A	B	C	(a)	(b)	(c)	1	2	(1963)
	Near East																		
2	Cyprus	.009	.030	.050	.060	.060	.070	5.00	4.00	3.50	.140	.190	.230	.470	.470	.410	.0088	.0116	.017
3	Greece	.060	.065	.070	.100	.100	.100	3.10	3.10	3.10	.230	.230	.250	.190	.190	.180	.0544	.0712	.009
5	Iran	.044	.055	.065	.060	.070	.090	3.70	3.70	3.50	.140	.150	.250	.232	.232	.180	.0544	.0712	.025
6	Israel	.090	.090	.100	.120	.120	.150	3.19	3.00	3.00	.220	.300	.300	.400	.400	.300	.1122	.1468	.035
7	Jordan	.056	.056	.080	.160	.160	.160	3.37	3.37	3.37	.200	.200	.250	.370	.370	.330	.0571	.0748	.027
9	Turkey	.053	.060	.070	.080	.080	.090	2.91	2.91	2.91	.200	.256	.256	.110	.170	.110	.0306	.0400	.029
10	U.A.R.	.045	.055	.060	.050	.070	.080	2.68	2.68	2.68	.150	.170	.200	.200	.200	.150	.0136	.0178	.025
	South Asia																		
1	Ceylon	.042	.050	.060	.095	.100	.100	3.24	3.24	3.24	.110	.150	.200	.220	.220	.190	.0177	.0231	.028
4	India	.043	.053	.065	.100	.100	.100	3.20	3.20	3.20	.180	.210	.250	.070	.070	.050	.0204	.0267	.024
8	Pakistan	.045	.053	.060	.130	.130	.130	3.00	3.00	3.00	.160	.240	.240	.100	.150	.100	.0374	.0489	.026
	Latin America																		
11	Argentina	.031	.043	.055	.150	.150	.150	7.21	5.30	4.30	.220	.220	.250	.070	.170	.020	.0286	.0374	.017
12	Bolivia	.033	.045	.056	.060	.080	.080	4.00	4.00	4.00	.100	.150	.200	.220	.220	.220	.0068	.0089	.023
13	Brazil	.055	.055	.070	.080	.080	.080	2.90	2.90	2.50	.270	.270	.280	.090	.090	.070	.0286	.0374	.031
14	British Guiana	.029	.040	.050	.100	.100	.100	5.00	5.00	5.00	.200	.250	.330	.470	.470	.470	.0544	.0712	.030
15	Chile	.035	.050	.055	.060	.080	.100	3.40	3.40	3.00	.120	.160	.200	.120	.190	.120	.0190	.0249	.023
16	Colombia	.050	.061	.070	.060	.080	.100	4.80	4.80	4.80	.200	.260	.300	.200	.230	.170	.0272	.0356	.029
17	Costa Rica	.055	.060	.069	.060	.080	.100	3.27	3.27	3.27	.130	.200	.250	.280	.280	.280	.0354	.0463	.039
18	Ecuador	.042	.050	.055	.060	.080	.080	3.74	3.74	3.74	.140	.200	.240	.206	.206	.206	.0340	.0445	.030
19	El Salvador	.050	.060	.065	.060	.100	.100	2.50	2.50	2.50	.110	.180	.210	.268	.268	.210	.0374	.0489	.027
20	Guatemala	.040	.050	.055	.060	.080	.080	4.67	3.50	3.50	.150	.200	.250	.149	.149	.149	.0340	.0445	.030
21	Honduras	.037	.045	.050	.064	.070	.080	3.90	3.50	3.50	.120	.150	.200	.195	.195	.195	.0190	.0249	.030
22	Jamaica	.040	.045	.055	.060	.080	.100	4.00	3.50	3.50	.160	.180	.200	.206	.206	.206	.0340	.0445	.013

23	Mexico	.050	.060	.070	.067	.080	.100	2.52	2.52	2.52	.170	.170	.220	.110	.110	.100	.0537	.0703	.031
24	Nicaragua	.042	.050	.055	.063	.080	.080	3.72	3.72	3.72	.150	.200	.220	.281	.281	.281	.0340	.0445	.034
25	Panama	.050	.050	.060	.144	.140	.140	2.50	2.50	2.50	.120	.200	.200	.385	.385	.350	.0143	.0187	.030
26	Paraguay	.020	.030	.040	.060	.140	.140	5.00	4.00	4.00	.130	130	.150	.249	.249	.249	.0054	.0071	.022
27	Peru	.055	.055	.070	.100	.100	.100	4.94	4.94	4.77	.285	.285	.285	.240	.240	.200	.0524	.0685	.023
28	Trinidad-Tobago	.050	.060	.088	.090	.100	.100	3.65	3.65	3.65	.200	.250	.250	.700	.500	.300	.0952	.1246	.030
29	Venezuela	.045	.060	.070	.080	.080	.100	3.64	3.64	3.64	.290	.290	.290	.314	.180	.160	.0211	.0276	.034
	Africa																		
30	Algeria	.020	.035	.050	.060	.060	.060	3.30	3.30	3.30	.060	.100	.200	.200	.200	.090	.0272	.0356	.025
31	Ethiopia	.045	.045	.050	.150	.150	.150	2.50	2.50	2.50	.140	.170	.200	.116	.116	.116	.0544	.0712	.014
32	Ghana	.045	.055	.060	.098	.098	.098	3.70	3.50	3.20	.130	.150	.200	.220	.220	.220	.0156	.0205	.025
33	Kenya	.017	.035	.050	.060	.060	.060	5.00	4.00	4.00	.120	.150	.200	.266	.266	.040	.0340	.0445	.030
34	Liberia	.057	.060	.060	.150	.150	.150	5.00	5.00	5.00	.110	.150	.200	.573	.573	.573	.0422	.9552	.015
50	Mauritius	.034	.034	.034	.083	.080	.080	4.97	4.97	4.97	.080	.080	.080	.456	.456	.456	.0000	.0000	.032
35	Morocco	.028	.040	.060	.050	.060	.070	5.00	4.00	3.50	.130	150	.200	.150	150	.150	.0204	.0267	.027
36	Nigeria	.040	.045	.050	.082	.082	.082	3.80	3.80	3.80	.090	.110	.200	.250	.280	.280	.0544	.0712	.020
37	Rhodesia-Nyasaland	.043	.040	.045	.060	.060	.060	5.00	5.00	5.00	.160	.180	200	.513	.513	.220	.0755	.0988	.028
38	Sudan	.051	.055	.055	140	.140	.140	2.50	2.50	2.50	.120	.150	200	.220	.220	.190	.0612	.0801	.028
39	Tanganyika	.042	.050	.050	.060	.060	.080	2.93	2.93	2.93	.110	.150	200	.188	.188	.100	.0333	.0436	.020
40	Tunisia	.041	.030	.060	.150	.150	.150	4.62	4.00	4.00	.150	.200	.250	.260	.190	.190	.0340	.0445	.021
41	Uganda	.017	.040	.050	.060	.060	.080	5.00	4.00	4.00	110	.150	.200	.168	.168	.090	.0272	.0356	.025
	Far East																		
42	Burma	.032	.040	.050	.060	.060	.060	5.00	4.00	4.00	.160	.180	.200	.177	.177	.177	.0782	.1023	.022
44	Indonesia	.010	.030	.040	.010	.035	.050	2.75	2.75	2.75	.050	.100	.150	.070	.070	.070	.0109	.0142	.023
45	Korea, South	.043	.050	.060	.050	.060	.080	3.27	3.27	3.27	.100	.150	.200	.240	.260	.180	.0578	.0756	.029
49	Malaya	.040	.050	.060	.119	.120	.120	2.52	2.50	2.50	.190	2.00	.200	.419	.419	.419	.0211	.0276	.032
46	Philippines	.050	.055	.060	.051	.060	.070	2.58	2.58	2.58	.260	.260	.260	.170	.170	.170	.0313	.0409	.032
43	Taiwan	.060	.070	.080	.133	.133	.133	2.62	2.62	2.62	.210	.210	.250	.205	.190	.190	.0544	.0712	.029
47	Thailand	.050	.060	.065	.091	.091	.091	2.50	2.50	2.50	.250	.250	.250	.160	.160	.150	.0462	.0605	.031
48	South Vietnam	.029	.035	.040	.060	.050	.050	3.69	3.70	3.70	.060	.100	.150	.217	.217	.217	.0252	.0329	.028

TABLE 7—PROPORTION OF COUNTRIES WITH FOREIGN CAPITAL REQUIREMENTS DETERMINED BY INVESTMENT-SAVING GAPS

GNP Growth Targets	Internal Performance Characteristics					
	Historical		Plan		Upper Limit	
	Low Exports	High Exports	Low Exports	High Exports	Low Exports	High Exports
1965						
Historical	28%	40%	22%	24%	18%	24%
Plan	52	62	32	46	34	44
Upper Limit	72	80	54	70	48	58
1975						
Historical	32	40	20	34	18	24
Plan	38	58	24	36	18	30
Upper Limit	50	68	30	48	22	40

Source: AID, Office of Program Coordination, "23 Year Projections" of September 16, 1964, for model 1, 50-country sample.

could limit the marginal import coefficient to the normal value derived from intercountry comparisons.

Our notion of the upper limit implies a probability of perhaps one in four that the given target growth and performance could be attained. For all countries, the average of the plan growth targets through 1975 turns out to be 5.2 per cent and the average of the upper-limit targets is about 6 per cent. The "plan" estimates range from 3-9 per cent with a heavy concentration between 5 per cent and 7 per cent.[51]

In order to explore the range of growth possibilities systematically, we have adopted the same degree of optimism for all countries in each trial calculation. Projections on this basis are designed to reveal the range of possibilities that is interesting for policy purposes rather than to forecast the most probable course of development in each country. The projections were made from year to year according to the formulas of the appropriate phase in model 1.[52] Cumulative results for the 18 combinations of growth targets, country performance, and exports are given in Table 8 and regional projections for 1970 and 1975 in Table 9.

The projections based on model 1 include measures of excess consumption and excess imports, which show the extent to which aid requirements could be reduced through policies designed to equalize the

[51] Whatever the validity of our subjective judgments as to the possibility of improved performance, this procedure has seemed preferable to a more mechanical approach to testing the sensitivity of the results to various types of change. Our principal conclusions are not greatly affected by differences in judgment as to the possibilities for individual countries.

[52] Machine computations involve a test in each year to determine the appropriate growth phase and set of equations to apply for the next year.

TABLE 8—AGGREGATE PROJECTIONS FOR 1962–75
(All figures in billions of 1962 U. S. dollars; cumulative values include the years 1962 through 1975[a])

Line No.		Historical Country Performance			Plan Country Performance			Upper Limit Country Performance		
		Historical Growth Targets	Plan Growth Targets	Upper Limit Growth Targets	Historical Growth Targets	Plan Growth Targets	Upper Limit Growth Targets	Historical Growth Targets	Plan Growth Targets	Upper Limit Growth Targets
1	1975 Gross National Product	297	327	354	297	328	356	298	329	360
2	(Implicit GNP growth rate)	(.044)	(.051)	(.058)	(.044)	(.052)	(.058)	(.044)	(.052)	(.059)
	Cumulative values of variables									
3	Exports: Low growth (3.8% per year)	441	441	441	441	441	441	441	441	441
4	Exports: High growth (5.2% per year)	480	480	480	480	480	480	480	480	480
5	Gross National Product	3,186	3,356	3,485	3,188	3,363	3,502	3,195	3,373	3,522
6	Gross Investment	476	591	703	461	572	684	448	557	670
7	National Savings (potential)	(475)	(502)	(526)	(495)	(528)	(558)	(521)	(562)	(598)
8	National Savings, realized	365	435	491	353	430	505	364	451	538
9	Imports (potential)	(533)	(561)	(581)	(533)	(562)	(583)	(509)	(541)	(560)
10	Imports, realized	552	596	652	548	582	620	525	547	573

For footnotes see end of table.

TABLE 8—(*Continued*)

Line No.		Historical Country Performance			Plan Country Performance			Upper Limit Country Performance		
		Historical Growth Targets	Plan Growth Targets	Upper Limit Growth Targets	Historical Growth Targets	Plan Growth Targets	Upper Limit Growth Targets	Historical Growth Targets	Plan Growth Targets	Upper Limit Growth Targets
11	Unrealized Savings (line 7–8)	110	67	35	142	98	53	157	111	60
12	Excess Imports (line 10–9)	19	35	71	15	20	36	16	6	23
13	Total Unrealized Savings and Excess Imports (line 11+12)	129	101	106	157	118	89	173	117	82
14	Net Capital Inflow: Low exports	111	156	212	108	142	179	84	106	133
15	Net Capital Inflow: High exports	90	138	201	83	119	164	60	84	116
	Capital Inflow, excluding countries with net capital outflow:[b]									
16	Low exports	120	165	220	106	152	187	94	117	141
17	High exports	105	150	211	100	131	173	85	99	125
18	Consumption: Low exports	2,821	2,920	2,995	2,835	2,933	2,997	2,831	2,922	2,984
19	Consumption: High exports	2,800	2,903	2,984	2,811	2,909	2,981	2,807	2,899	2,967

Source: Agency for International Development, Office of Program Coordination, machine listings of September 16, 1964.

[a] See Table A-2 for values of parameters used and Table A-3 for initial values of variables used.

[b] Foreign resource flows are measured on a net basis. In any particular year most net flows are capital inflows, but some countries (e.g., Venezuela, Malaya, Burma) may have estimated potential capital outflows under the assumptions made. This alternative net capital estimate shown here excludes these potential capital outflows.

TABLE 9—REGIONAL PROJECTIONS, 1970 AND 1975
(All values in billions of 1962 U. S. dollars)

Targets and Performance	1962	1970[a]				1975[a]				Per cent of Annual Growth, 1962–1975[a]				
		Historical	Plan		Upper Limit	Historical	Plan		Upper Limit	Historical	Plan			Upper Limit
Exports		Low	Low	High	High	Low	Low	High	High	Low	Low	Low	High	High
Near East (7 countries)[b]														
GNP	20.94	32.05	33.22	33.22	31.48	42.12	44.92	44.92	48.55	5.5%		6.0%		6.7%
(% of GNP Total)	(78%)													
Investment	3.76	5.56	6.27	6.27	7.27	7.46	8.70	8.70	10.63	5.4%		6.7%		8.3%
Savings	2.51	3.26	3.45	3.92	5.18	4.35	4.48	5.49	7.73					
Imports	4.61	7.28	7.80	8.02	7.76	9.71	10.82	11.53	11.23					
Exports	3.34	4.98	4.98	5.67	5.67	6.60	6.79	8.32	8.32	5.4%	5.4%		7.3%	7.3%
Foreign Resources[c]	1.26	2.30	2.82	2.35	2.09	3.11	4.22	3.21	2.90	7.2%	9.7%		7.5%	6.6%
South Asia (3 countries)														
GNP	46.22	64.83	69.52	69.52	73.45	80.13	89.96	89.96	100.20	4.3%		5.3%		6.1%
(% of GNP Total)	(97%)													
Investment	7.57	8.89	11.66	11.66	14.93	10.99	15.08	15.08	20.37	2.9%		5.4%		7.9%
Savings	6.46	6.85	9.08	9.26	12.83	8.12	11.12	11.47	17.27					
Imports	3.73	5.20	5.74	5.74	5.45	6.42	7.52	7.52	7.02					
Exports	2.63	3.16	3.16	3.35	3.35	3.56	3.56	3.91	3.91	1.0%	1.0%		3.1%	3.1%
Foreign Resources[c]	1.10	2.04	2.58	2.39	2.10	2.86	3.96	3.61	3.11	7.6%	10.4%		9.0%	8.3%
Latin America (19 countries)														
GNP	62.64	88.60	93.44	93.44	98.56	111.01	121.56	121.56	134.42	4.5%		5.2%		6.1%
(% of GNP Total)	(95%)													
Investment	11.05	15.04	17.61	17.61	20.19	18.85	23.13	23.13	28.49	4.2%		5.8%		7.5%
Savings	10.26	13.28	14.95	15.82	18.39	16.13	18.55	20.24	25.92					
Imports	11.00	15.23	16.12	16.48	16.50	18.92	20.79	21.74	21.40					
Exports	10.20	13.46	13.46	14.69	14.69	16.19	16.19	18.83	18.83	3.6%	3.6%		4.8%	4.8%
Foreign Resources[c]	1.55[e]	2.21[e]	3.27[e]	2.58[e]	2.27[e]	2.87[e]	5.00[e]	3.80[e]	3.23[e]	4.9%	9.4%		7.1%	5.6%

For footnotes see end of table.

TABLE 9—(*Continued*)

Targets and Performance	1962	1970[a]				1975[a]				Per cent of Annual Growth, 1962–1975[b]				
		Historical	Plan		Upper Limit	Historical	Plan		Upper Limit	Historical	Plan			Upper Limit
Exports		Low	Low	High	High	Low	Low	High	High	Low	Low	Low	High	High
Africa (13 countries)														
GNP	17.04	22.28	23.58	23.58	24.56	26.56	29.11	29.11	31.36	3.5%		4.2%		4.8%
(% of Total GNP)	(73%)													
Investment	2.69	2.97	3.61	3.61	4.25	3.63	4.55	4.55	5.59	2.3%		4.1%		5.8%
Savings	1.58	1.65	2.07	2.20	2.85	2.13	2.68	2.94	4.07					
Imports	5.49	7.42	7.63	8.16	8.12	9.09	9.45	10.68	10.59					
Exports	4.38	6.08	6.08	6.75	6.75	7.59	7.59	9.07	9.07	4.3%	4.3%		5.8%	5.8%
Foreign Resources[c]	1.11	1.36*	1.53	1.40	1.40*	1.53*	1.86*	1.61*	1.58*	2.5%	4.0%		2.9%	2.8%
Far East (8 countries)														
GNP	23.68	30.92	33.53	33.53	34.68	36.91	42.07	42.07	44.97	3.5%		4.5%		5.1%
(% of Total GNP)	(86%)													
Investment	3.11	3.11	4.28	4.28	5.01	3.86	5.50	5.50	6.85	1.7%		4.5%		6.3%
Savings	2.26	1.80	2.65	3.00	3.57	2.14	3.10	3.79	4.76					
Imports	4.80	6.41	6.73	6.82	6.98	7.78	8.46	8.70	9.08					
Exports	3.95	5.10	5.10	5.54	5.54	6.06	6.06	6.99	6.99	3.3%	3.3%		4.5%	4.5%
Foreign Resources[c]	.95*	1.31	1.64*	1.31*	1.45*	1.71*	2.41*	1.78*	2.11*	4.6%	7.4%		4.9%	6.3%
50-Country Total														
GNP	170.52	238.68	253.31	253.31	262.72	296.73	327.62	327.62	359.50	4.4%		5.2%		5.9%
(% of All LDC's GNP)[d]	(89%)													
Investment	28.18	35.59	43.45	43.45	51.65	44.79	56.96	56.96	71.93	3.6%		5.6%		7.5%
Savings	23.07	26.84	32.20	34.20	42.82	32.87	39.93	49.93	59.75	2.8%	4.3%		5.1%	7.6%
Imports	29.63	41.54	44.02	45.22	44.81	51.92	57.04	60.17	59.32	4.4%	5.2%		5.6%	5.5%
Exports	24.50	32.81	32.81	36.00	36.00	40.00	40.00	47.12	47.12	3.8%	3.8%		5.2%	5.2%
Foreign Resources[c]	5.97*	9.22*	11.84*	10.03*	9.31*	12.08*	17.45*	14.01*	12.93*	5.6%	7.8%		6.6%	5.9%

[a] See Table 8 for sources and concepts. Column headings identify both targets and performance standards.
[b] Excludes the oil-producing countries except for Iran. Includes Greece, Turkey, and the UAR.
[c] The figures shown here exclude potential capital outflows (see Table 8, note b); regional totals are denoted by an asterisk (*) if they include such a case.
[d] Excludes Cuba, China, North Korea.

two resource gaps. Since the empirical possibilities for such policies cannot be ascertained without detailed studies of each country, we will apply the over-all factors derived in Section I to estimate the reduction in capital inflow that might be achieved in this way.

2. *The Phases of Growth.* The projection of growth paths under alternative assumptions provides a more general evaluation of the relative importance of the two resource limitations than does our attempted identification of these limits in current situations. Table 7 shows the proportion of the 50 countries in which the saving-investment gap was the limiting factor—and hence the determinant of capital inflow—in each of the 18 trial projections. The most striking result of this tabulation is the predominance of the trade limit; it is more important than the saving limit in 1975 in 15 of the 18 sets of alternatives.

This breakdown shows the quantitative significance of three factors that have been discussed previously in general terms.

(1) At higher growth rates the saving limit tends to become more important, for reasons analyzed in Section I. Under most assumptions as to the other parameters, a rise in the growth rate from the historical average of 4.4 per cent to the upper-limit average of about 6 per cent increases the number of countries in which the saving limit is controlling by 50 per cent or more.

(2) The saving limit is increasingly dominated over time by the trade limit under historical conditions of internal performance. This result points to the need for more import substitution unless export prospects can be drastically improved.

(3) A 40 per cent increase in the assumed rates of growth of exports (from the low to the high assumptions) removes the trade limit in only four to six of the 50 countries under most assumptions. Unrealistically large increases in exports would be required to reduce greatly the importance of the balance of payments limitation by 1975.

C. *Development Performance and Assistance Needs*

The projections in Table 8 are designed to show the way in which assistance need vary with the export possibilities and internal performance of the developing countries. For this purpose the 900 separate country projections have been aggregated using the same degree of optimism as to exports and internal performance for each country. To summarize the results graphically, the 18 aggregate solutions of Table 8 are plotted in Figure 4, giving three points on each of the six curves. Curve *P2*, for example, shows the increase in cumulative capital inflow from $100 billion ($7.7 billion per year) needed to sustain an average growth rate of 4.4 per cent to $173 billion ($13 billion per year) to sustain a growth rate of 5.8 per cent, assuming plan performance and high exports.

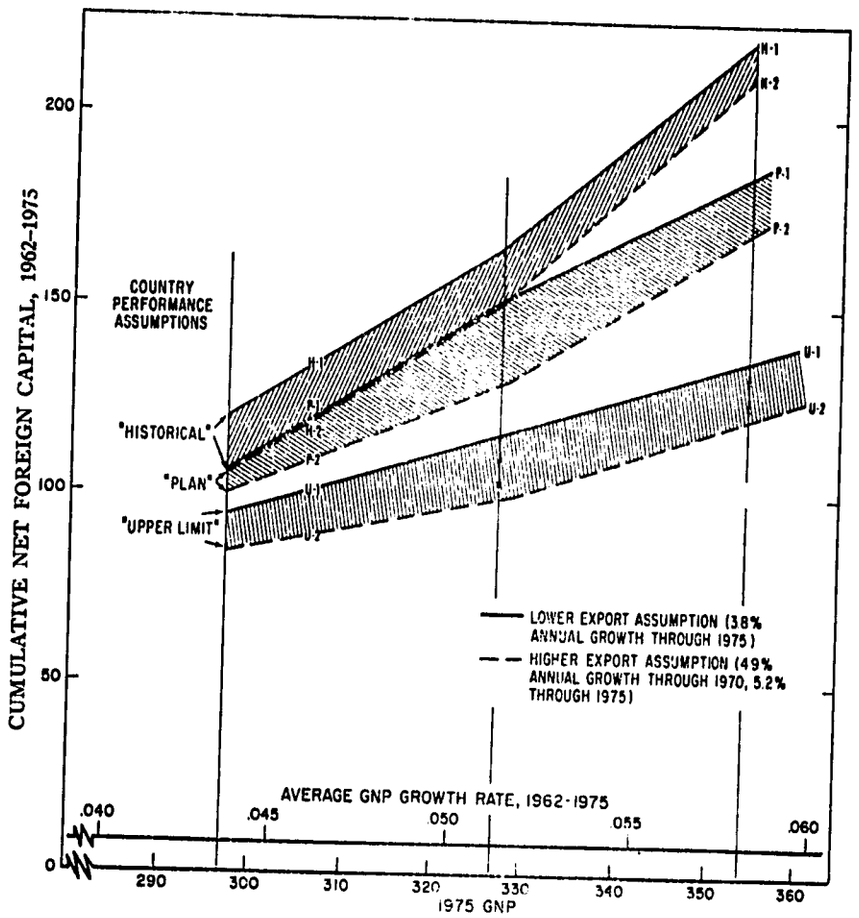

FIGURE 4. FOREIGN CAPITAL REQUIREMENTS OF 50 DEVELOPING COUNTRIES, ALTERNATIVE DEVELOPMENT PATTERNS, 1962–75
(All values in billions of 1962 U.S. dollars)

Source: Table 8.

The graphical presentation facilitates analysis of the productivity of external assistance under alternative assumptions. Along curve *P*2 an increase of a billion dollars of GNP in 1975 can be secured for a cumulative aid input of $1.2–$1.3 billion between 1962 and 1975.[53] The productivity of aid is significantly lower with historical performance and significantly higher with upper-limit performance, as shown by the relative

[53] An alternative calculation would show a cumulative addition to GNP over the period of nearly five dollars per dollar of capital inflow. There is some decline in aid productivity at higher growth rates due to the shifting of countries from Phase III to Phase II.

slopes of the curves.[54] Variation in export optimism affects the level of total aid but not its marginal productivity.

The effects of individual elements can be isolated in Table 8. Starting from the central estimate of $131 billion in capital imports for plan growth, high exports, and plan performance, we can identify the following effects of changes in different sets of policy variables:

(1) *A decrease in export growth from 5.2 per cent to 3.8 per cent* causes a reduction of exports of $39 billion and an increase of total capital inflow of $21 billion.

(2) *An increase in internal performance to the upper limit* (with a constant growth rate) causes a reduction of capital inflow by $32 billion.

(3) *A fall in the growth rate to 4.4 per cent* (with no change in internal performance) causes a reduction in external capital requirements of $31 billion and of consumption by $98 billion.

The relative importance of these changes varies with the starting point and depends largely on which of the growth limits predominates. At the upper limit growth rates, where the saving constraint is more important, the effect of increasing exports on aid requirements is less.[55] At plan growth rates, about half of any increase in exports is reflected in a reduced need for external resources in the model 1 solutions, since the external requirements of countries in Phase II are not affected.

Perhaps the most notable feature of this analysis is the sensitivity of aid requirements to variations in internal performance. At historical growth rates, the maximum reduction due to improved performance is about 20 per cent, but at the 6 per cent growth rate, upper-limit performance would reduce external capital needs by 40 per cent. Put in other terms, the capital inflow required to sustain 4.4 per cent growth with historical performance would sustain 5.4 per cent growth if all countries could achieve the upper-limit standards. The main cause of the greater sensitivity at higher growth rates is the greater importance of saving out of increased income as GNP grows. This sensitivity would be even more pronounced if we assumed that saving depends on per capita rather than total income levels.

To compare our results to other estimates, we can state them in terms of the net capital inflow in 1970 and the implied increase in external assistance between 1962 and 1970. Omitting the less likely combinations of assumptions, the indicated range of capital requirements in 1970 is

[54] The marginal productivity of aid in the three high export cases is .54 for historical performance, .81 for plan performance, and 1.54 for upper-limit performance. Corresponding values derived above from equations (18) and (19) using median observed values of the parameters were .35 for Phase II and .91 for Phase III.

[55] This effect is more pronounced at low growth rates if we do not exclude countries having capital exports.

from $10–$17 billion,[56] corresponding to the rate of growth of external capital of 3 per cent to 10 per cent from its $7.4 billion value in 1962.[57] This range compares to the U.N. estimate for 1970 of $20 billion and to Balassa's range of $9–$12 billion [4]. Our estimates have the advantage of making explicit assumptions as to country performance and of showing how the total depends on them.

The possibility of further reduction in assistance needs through better development policies is indicated in Table 8 by the magnitude of the excess imports for countries in Phase II and unrealized saving for countries in Phase III. With the moderate improvement of performance that is represented by the plan growth targets and plan performance, there would be $98 billion of unrealized saving and $20 billion of excess imports. The predominant need is to convert the unrealized saving into additional investment which will substitute for imports or increase exports.

The theoretical limits to the possibilities for reducing aid requirements in this way are shown in Table 9. As explained in Section I.D, the efficiency of the import substitution mechanism in converting surplus saving into a reduction in capital requirements may be on the order of 50–65 per cent under plausible assumptions. More massive import substitution would raise the marginal capital coefficient for the additional production and thus lower the possibilities for efficient reductions in external capital.

To illustrate the extent to which further import substitution or additional exports might reduce assistance requirements by 1975, we have made a set of projections with model 2 on the assumption that not more than 10 per cent of total investment in each country could be devoted to this purpose. The results are shown in Table 10. They suggest that optimum planning for structural change might reduce requirements for external capital in 1975 by a third or more at plan growth rates compared to the more rigid trade assumptions of model 1.

Some of the regional implications of the projections are brought out in Table 9. The regional growth rates corresponding to the average plan target of 5.2 per cent vary from 4.2 per cent for the sample of African countries to 6.0 per cent in the Near East. South Asia shows the most rapid increase in capital inflow relative to its growth in GNP, reflecting its relatively high absorptive capacity and relatively low initial savings

[56] The principal combinations for 1970 are given in Table 9 and the full range for 1975 in Table 10.

[57] We have used a factor of 1.25 to convert our sample results to the requirements of all less developed countries. The 1962 figure of $7.4 billion is based on balance of payments figures in [21], Tables 1 and 11, and is lower than the OECD estimate of $8.5 billion of capital inflow in the same year. It includes capital flows to Turkey and Greece, and excludes Puerto Rico and $0.7 billion of capital outflows from major oil exporters. The discrepancies between the U.N. and OECD estimates are discussed in [22, Annex, pp. 6–8].

TABLE 10—COMPARISON OF MODEL 1 AND MODEL 2 PROJECTIONS OF 1975 CAPITAL INFLOW[a]
(Billions of 1962 dollars)

GNP Growth Targets	Internal Performance Characteristics					
	Historical		Plan		Upper Limit	
	Low Exports	High Exports	Low Exports	High Exports	Low Exports	High Exports
	Model 1—Projections					
Historical	12.1	10.0	11.8	9.0	9.4	7.1
Plan	18.7	16.2	17.4	14.0	12.0	9.2
Upper Limit	26.1	24.2	22.5	19.6	15.9	12.9
	Model 2—Optimal Adjustment[b]					
Historical	7.9	6.1	7.7	5.4	5.5	3.5
Plan	11.1	10.3	0.3	6.9	5.5	2.9
Upper Limit	20.8	20.8	14.1	13.7	7.6	6.0

Source: MD, Office of Program Coordination, "23-year Projections," machine listings of September 16, 1964.

[a] External capital requirements exclude negative flows (capital outflows) from countries estimated to be net potential capital exporters by 1975.

[b] Estimated by assuming conversion of "excess imports" (Table 8) to additional import substituting investment in amounts not exceeding 10 per cent of total investment estimated for equivalent model 1 development alternative. The 1975 external capital "saving" under this assumption range from $3.4 to $9.5 billions.

rates. Perhaps more significant than the actual estimates is the demonstration that the allocation of external assistance in accordance with comparable standards of performance would be likely to result in substantial shifts in the regional distribution of foreign assistance.

III. *International Assistance Policies*

Our analysis has shown the conditions under which external assistance may make possible a substantial acceleration in the process of economic development. It has focused on the interrelations among external resource requirements and the development policies of recipient countries. Analysis of these interrelations leads to several principles of general applicability to international assistance policy.

The central questions for assistance policy are the measurement of the effectiveness of external assistance, the policies which recipient countries should follow to make best use of external resources, and the basis for allocating assistance among countries. This concluding section summarizes the main implications of our analysis for each of these questions and adds some qualitative elements which have been omitted from the formal analysis.

V. *The Effectiveness of Assistance*

In the short run the effectiveness of external resources depends on their use to relieve shortages of skills, saving, and imported commodities. The productivity of additional amounts of assistance over short periods can be measured by the increase in output [illegible] the fuller use of domestic resources which they make possible.

Over longer periods, the use that is made of the additional increase in output becomes more important. Even if the short-run productivity of aid is high, the economy may continue to be dependent on external assistance indefinitely unless the additional output is [illegible] to increase saving and reduce the trade gap. Over the whole period of the transition to self-sustaining growth, the use that is made of the increases in GNP is likely to be more important [illegible] with which external assistance was utilized in the first year. [illegible] was demonstrated in the discussions of [illegible] in Section I, [illegible] dependence of total aid requirements on [illegible] rate. To emphasize this point, let us assume that [illegible] investment in the first five years of the upper limit [illegible] sequence outlined above for Pakistan had been one-third lower, [illegible] a correspondingly larger amount of investment and [illegible] to achieve the same increase in GNP. The effect would be to increase the total aid required over the 17-year period to achieve self-sufficiency by some 45 per cent. This, however, is less than the effect on aid requirements of a reduction in the marginal saving rate from .24 to .22. The critical elements in the development sequence are getting the initial increase in the rate of growth, channeling the increments in income into increased saving, and allocating investment so as to avoid balance of payments bottlenecks. These long-run aspects are likely to be considerably more important than the efficiency with which external capital is used in the short run.[58]

The long-run effectiveness of assistance is also likely to be increased by supporting as high a growth rate as the economy can achieve without a substantial deterioration in the efficiency of use of capital. This conclusion was derived in [8] and is elaborated in [7]. There are also several factors omitted from the formal models that argue for more rapid growth:

(1) The fact that a smaller portion of the increase in GNP is offset by population growth;

(2) The gain in political stability and governmental effectiveness that is likely to result;

[58] This conclusion is demonstrated in the evaluation of the effectiveness of aid to Greece in [1].

(3) The greater likelihood of being able to raise marginal saving rates and export growth when GNP is growing more rapidly;[59]

(4) The greater likelihood of attracting foreign private investment to finance the needs for external capital.

While the last three factors cannot be measured with any accuracy, they appear to have been important in most countries that are successfully completing the transition, such as Israel, Greece, Taiwan, Mexico, Peru, and the Philippines. These examples support the theoretical conclusion that the achievement of a high rate of growth, even if it has to be initially supported by large amounts of external capital, is likely to be the most important element in the long-term effectiveness of assistance. The substantial increases in internal saving ratios that have been achieved in a decade of strong growth—from 7 per cent to 12 per cent in the Philippines, 11 per cent to 16 per cent in Taiwan, 6 per cent to 14 per cent in Greece, and −9 per cent to 12 per cent in Israel—demonstrate the speed with which aid-sustained growth can be transformed into self-sustained growth once rapid development has taken hold.

B. *Policies for Recipient Countries*

While the receipt of external assistance may greatly reduce the time required for a country to achieve a satisfactory rate of growth, dependence on substantial amounts of external resources creates some special policy problems. One lesson from the preceding analysis is that the focus of policy should vary according to the principal limitations to growth. Just as optimal countercyclical policy implies different responses in different phases of the business cycle, optimal growth policy requires different "self-help" measures in different phases of the transition.

In Phase I, where the growth rate is below a reasonable target rate, the focus of policy should be on increasing output, implying an increase in the quality and quantity of both physical capital and human resource inputs. Our statistical comparisons suggest that a rate of growth of investment of 10–12 per cent is a reasonable target for countries whose initial investment level is substantially below the required level. Phase I can be completed by most countries in a decade if this increase in investment is accompanied by sufficient improvement in skills and organization to make effective use of the additional capital that becomes available. Although it is probably more important in this phase to focus on securing increases in production and income, a start must also be made on raising taxes and saving if international financing is to be justified by performance.

As Phase I is completed, the rate of increase in investment can be

[59] The advantages of more rapid growth with constant per capita marginal saving rates are demonstrated by Fei and Paauw [9].

allowed to fall toward a feasible target rate of GNP growth, which is unlikely to be more than 6–7 per cent. The focus of development policy should then be increasingly on (a) bringing about the changes in the productive structure needed to prevent further increases in the balance of payments deficit, and (b) channeling an adequate fraction of increased income into saving. Although theoretical discussion has tended to stress the second requirement, the first appears to have been more difficult in practice for many countries. Since substantial import substitution is required just to prevent the ratio of imports to GNP from rising, export growth at least equal to the target growth of GNP is likely to be necessary in order to reduce external aid.

As the focus of development policy changes, the instruments of policy must change accordingly. Somewhat paradoxically, successful performance in Phase I, which would justify a substantial and rising flow of foreign assistance, may make success in Phase III more difficult. If investment and other allocation decisions are based on the exchange rate that is appropriate for a substantial flow of aid, they are not likely to induce sufficient import substitution or increased exports to make possible a future reduction in the capital inflow. Planning should be based on the higher equilibrium exchange rate that would be appropriate to a declining flow of aid in order for the necessary changes in the productive structure to be brought about in time.

It is the need for rapid structural change which sets the lower limit to the time required to complete the transition to self-sustaining growth. Even though the simplified model underlying Figure 3 suggests the possibility of completing this transition in less than 20 years starting from typical Asian or African conditions, it is very unlikely that any such country can meet all the requirements of skill formation, institution building, investment allocation, etc. in less than one generation.

C. *Policies for Donor Countries*

Donors are concerned with criteria for the allocation of aid among recipients, and the means for controlling its use. Allocation and control policies are complicated by the mixture of objectives that motivate international assistance, the most important of which are (i) the economic and social development of the recipient, (ii) the maintenance of political stability in countries having special ties to the donor, and (iii) export promotion. This mixture of motives has led to a complex system of aid administration in all countries.

The predominant basis for development loans is the individual investment project, for which external financing is provided to procure capital goods from the donor country. Loans not limited to equipment for specific projects are provided to a few selected countries against the

balance of payments needs of development programs.[6] Substantial but declining amounts of grants are also furnished for budgetary support of ex-colonies and other dependent areas.

Our analysis suggests some directions in which improvements can be sought in the present methods of supporting economic development, which is the objective on which all parties agree. We consider first methods of transferring resources to individual countries and then allocation of assistance among countries.

1. *The Transfer of Assistance.* Any system for transferring resources must include (i) a basis for determining the amount of the transfer, (ii) specification of the form of resources to be furnished, and (iii) a basis for controlling their use. On all these counts the project system has the virtue of simplicity. It also provides for detailed evaluation of the investments that are directly financed from external aid—which may be 10 per cent or so of total investment—and for increasing their productivity through technical review.

While the project system has much to commend it when the main focus is on increasing the country's ability to invest, it becomes increasingly inappropriate as the development process gets under way. As the rate of growth increases, we have shown that the effectiveness of aid depends more on the use that is made of the additional output than on the efficiency with which a limited fraction of investment is carried out. Furthermore, an attempt to finance the amount of external resources needed during the peak period of an optimal growth path—which may imply aid rates of 30–40 per cent of total investment—by the project mechanism does not greatly lower the efficiency of use of total resources. Limiting the form of assistance to the machinery and equipment needed by substantial investment projects is likely either to lower the rate of growth or to distort the pattern of investment.

Foreign exchange assistance would be more effective if the range of commodities [illegible] could be broadened to permit the recipient's pattern of investment and production to evolve in accordance with the principle of comparative advantage.[7] While domestic supply can and indeed must lag behind demand in some sectors to accommodate the needed resource transfer, the country should also be preparing to balance its future external accounts by the end of a specified transitional period.

Since donors fear that uncontrolled imports may be wasted in increased consumption without the restraints imposed by the project

[6] In terminology of AID [2], the latter are called program loans. About half of U.S. loans [illegible] on a program basis in contrast to a much smaller proportion for other DAC countries. Many Committee members or the World Bank

[7] [illegible] to aid in the form of agricultural commodities as well as in the form of machinery or any other specified goods.

mechanism, an alternative means of control is needed. Part of the solution lies in relating the amount of aid supplied to the recipient's effectiveness in increasing the rate of domestic saving, so that the added aid will necessarily increase saving and investment as income grows. As development planning and statistics on over-all performance improve, this type of "program approach" is becoming increasingly feasible, both from the point of view of determining the amounts of assistance needed and of assessing the results.[62]

The strongest argument for the program approach arises for countries in Phase III, where the balance of payments is the main factor limiting growth and there is typically excess capacity in a number of productive sectors. In this situation, the highest priority use of imports is for raw materials and spare parts to make more effective use of existing capacity; project priorities should give primary weight to import substitution and increased exports. In this situation donor controls should be primarily concerned with the efficient use of total foreign exchange resources, which can only be assessed adequately in the framework of a development program.

2. *Allocation of Assistance.* If the objectives of the donor countries could be expressed as some function of the growth of each recipient, it would be possible to allocate aid primarily on the basis of expected development performance. The varying political objectives of the donors complicate the problem because each would give somewhat different weights to a unit of increase in income as among recipients. Even with this limitation, however, there may be considerable scope for reallocating a given amount of aid or for selective increases in individual country totals in accordance with criteria of self-help.

The predominant project approach now in use favors countries whose project preparation is relatively efficient. Other qualities that are equally important to successful development—tax collection, private thriftiness, small-scale investment activity, export promotion—are ignored in focusing on this one among many aspects of better resource use.[63]

Where fairly reliable statistics are available, an alternative procedure would be to establish minimum over-all performance standards for each country and to share the aid burden among interested donors through a consortium or other coordinating mechanism. For example, a country starting in Phase I might have as its principal performance criteria: (i) growth of investment at 10 per cent per year at a minimum standard

[62] The U.S. government has been using the program approach in India, Pakistan, Turkey, Tunisia, Chile, Colombia, and Brazil. See AID [2] and [3].

[63] It is perhaps more than coincidence that most of the striking successes in development through aid—Greece, Israel, Taiwan, etc.—were financed largely on a nonproject basis.

of productivity, and (ii) the maintenance of a marginal saving rate of .20 (or alternatively a specified marginal tax rate). There would be little possibility to waste aid on these terms, since the required increase in savings would finance a large proportion of total investment. Appropriate over-all standards for saving rates and balance-of-payments policies for countries in Phase II and Phase III could also be established without great difficulty. A country maintaining high standards—say a marginal savings rate of .25 and a marginal capital-output ratio of less than 3.3—could safely be allotted whatever amount of aid it requested in the knowledge that the larger the amount of aid utilized, the higher would be its growth rate, and the more rapid its approach to self-sufficiency.

Statistical Annex

The three tables in this annex contain the values of the structural parameters, both observed (Table A-1) and projected (Table A-2), as well as base-year (1962) values of the six variables (Table A-3), on which the 50-country projections of model 1 were based. Data sources were the U.N. *National Accounts Yearbooks*, Statistics and Reports Division of the Agency for International Development, and the *Balance of Payments Yearbook* of the IMF. Projections of the structural parameters were based on individual country studies or, where these were not available, informed judgments of country experts. These projections were made in the autumn of 1964 and reflect the best estimates available in the spring and summer of that year.

Revisions of both the historical data and the projections of structural parameters were made a year later, in the autumn of 1965, as a part of AID's continuing study of prospective worldwide foreign capital requirements. Only Table A-1, showing the structural relationships observed over the period 1957–62, has been revised here, however.

Important changes in the base-year data include downward revisions in both investment and savings for India and Argentina, smaller capital inflows for Argentina and Brazil, and a higher investment figure for Brazil. These changes would not, however, greatly influence the projected foreign resource requirements for the fifty-country aggregate. On the other hand, the 1965 projections gave substantially different results in some cases than the earlier ones had because of changes in the projected structural parameters. Most important of these were increased export growth rates[64], higher upper-limit target growth rates for GNP, and lower upper-limit capital-output ratios for India and Pakistan. The net effect of all changes was to

[64] Projections based upon the export parameters initially obtained for this sample gave 50-country export growth rates ranging from 5.5 to 6.5 per cent. Since these potential increases were considerably higher than most forecasters believe possible for the less developed world, each country's rate was proportionately reduced so as to give a 1962–70 combined export growth rate of 3.7 per cent as one alternative and a rate of 4.9 per cent as a second alternative. These scaled down parameters are shown in Table A-2. The same optimistic attitude toward export potential produced a subsequently revised set of export parameters, used for the 1965 AID projections, implying a combined 1963–70 export growth of 4.6 per cent under the low alternative and a rate of 6.9 per cent under the high option.

TABLE A-3—BASE-YEAR DATA[a]

(Millions of 1962 U. S. dollars)

No.	Country	(1) Gross National Product	(2) Gross Investment	(3) Gross National Savings	(4) Net Foreign Capital Inflow	(5) Trade in Goods and Services	(6)
						Imports	Exports
	Near East						
2	Cyprus	250	52	35	17	132	115
3	Greece	3,861	777	547	231	704	474
5	Iran	4,610	705	654	50	1,070	1,020
6	Israel	2,107	635	229	405	854	448
7	Jordan	339	52	−45	97	141	43
9	Turkey	6,082	968	770	198	699	501
10	U.A.R.	3,692	575	312	263	1,002	739
	South Asia						
1	Ceylon	1,454	223	196	27	447	420
4	India	37,211	6,423	5,584	839	2,529	1,690
8	Pakistan	7,551	922	683	239	756	517
	Latin America						
11	Argentina	12,166	2,956	2,625	331	1,656	1,326
12	Bolivia	470	61	20	41	104	62
13	Brazil	14,053	1,912	1,494	418	1,792	1,374
14	British Guiana	149	50	26	23	100	77
15	Chile	3,458	468	271	197	765	568
16	Colombia	4,259	909	759	150	722	572
17	Costa Rica	467	74	52	22	130	108
18	Ecuador	857	138	112	26	180	154
19	El Salvador	527	64	56	8	144	136
20	Guatemala	1,077	112	81	31	161	130
21	Honduras	418	60	63	−3	81	83
22	Jamaica	737	137	98	39	296	257
23	Mexico	14,175	2,180	2,039	141	1,639	1,498
24	Nicaragua	369	60	51	9	103	94
25	Panama	478	90	57	34	186	153
26	Paraguay	233	18	6	12	59	47
27	Peru	2,444	500	525	−24	595	620
28	Trinidad-Tobago	558	177	117	60	479	419
29	Venezuela	5,741	1,085	1,812	−726	1,801	2,527

[a] Data shown pertain to the year 1962; they are averages derived from 1957-62 time trends.

TABLE A-3—(*Continued*)

No.	Country	(1) Gross National Product	(2) Gross Investment	(3) Gross National Savings	(4) Net Foreign Capital Inflow	(5) Trade in Goods and Services	(6)
						Imports	Exports
	Africa						
30	Algeria	3,680	560[b]	156	404	1,207[b]	804
31	Ethiopia	881	91	64	28	133	105
32	Ghana	1,513	298	195	103	577	474
33	Kenya	718	99	87	12	297	285
34	Liberia	139	93	13	80	159	79
50	Mauritius	167	32	13	18	86	67
35	Morocco	1,977	209	150	60	515	455
36	Nigeria	3,434	564	381	183	738	555
37	Rhodesia-Nyasaland	1,505	268	245	23	795	773
38	Sudan	1,237	177	139	38	283	245
39	Tanganyika	597	67	40	27	223	196
40	Tunisia	739	185	64	121	296	175
41	Uganda	454	44	30	14	182	167
	Far East						
42	Burma	1,405	209	231	−22	248	270
44	Indonesia	8,348	745	486	259	1,206	947
45	Korea, South	2,178	315	82	233	393	159
49	Malaya, Fed. of	1,896	347	419	−72	941	1,013
46	Philippines	3,789	479	404	75	762	687
43	China (Taiwan)	1,805	401	273	128	371	243
47	Thailand	2,879	455	414	41	572	530
48	South Vietnam	1,381	157	−50	207	305	98

[b] Reflects largely arbitrary downward adjustment of 1957–62 averages to reflect post civil-war conditions.

Source: AID, Statistics and Reports Division and Office of Program Coordination, data as of September, 1964.

narrow the range of foreign resource requirements found for the various parameter combinations. The 50-country totals for 1975, shown as $12.1–$17.4 billion in Table 9, dropped to $10.9–$12.7 billion in the 1965 projections. The difference is very largely due to the greater export optimism.

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