CHAPTER V Annexes

ANNEX V 1 THE CAPITAL COEFFICIENT

Much use has recently been made of the so-called "capital coefficient," a concept not heretofore given a prominent place in economic analysis. As now understood it may be defined as the quantity of capital needed for the production of a unit of product. Since both elements in this definition may be defined in manifold ways, care must be taken in selecting and adhering to a definition.

As to the concept of "product," a choice can be made between value and volume of production (i.e., between money or physical concepts of "product"), and between gross and net product. Capital may, in addition, also be conceived in a more abstract way, and then often will stand for all assets involved in the process of production, or in a more physical way, in which case money or some physical unit may likewise be the yardstick. If physical objects are selected to represent capital, attention must be paid to the difference between the value of a newly established plant and the value of a plant that has been used for some time already and hence is partly worn out. The true measure of capital involved should be the sum total of market value of the equipment and stocks and the depreciation funds accumulated; a fact sometimes neglected. Corrections may be needed for price changes that have meanwhile taken place. (Cf. Annex Table 2.)

Next must be answered the question whether land and other natural resources are meant to be included. Both inclusion and exclu-

sion are possible, and it depends on the problems in question which is to be preferred.

Finally it should at least be realized that skilled labor in a certain sense also contains an element of "capital," in that education and training have been "invested" in the workers.

The use that may be made of the concept of capital coefficient originates in certain technical or statistical facts referring to it. In many individual production processes there exists a fixed proportion between the physical output of products and the quantity of certain means of production, among which are equipment and stocks. With two cars, twice as much freight can be handled as with one car. That is, on the one hand, almost self-evident, but on the other hand it is true given a number of restrictive conditions, only too well known to engineers and economists, This proportionality applies only if no alternative methods of using the equipment are available, as is the case, e.g., in spinning and weaving, where the ratio of equipment to product can be changed by changing the number of workers. Similarly, it can often be changed by varying working hours or number of shifts. To the extent that the constancy applies it is essentially a constancy in the ratio between the quantity of equipment and the gross physical product obtainable. The word "equipment" is now used to indicate the capacity to produce, e.g., the tonnage of ships available, whether new or old (provided they are of the same type).

This individual-industry capital coefficient, essentially a technical concept, may, for the sake of comparison, also be expressed as a ratio of money amounts, but then it is no longer necessary that it be a constant, even if it would be physically a constant. In addition, it varies widely from one industry to another. It is a well-known fact that there are particularly labor-intensive industries as well as particularly capital-intensive ones. Some figures estimated by Professor Leontief illustrate this (see Table 1, page 72).

Instead of using capital-output ratios, one might also use capital per head figures, i.e., the capital needed per person employed in a

ANNEX V 1 TABLE 1 Capital Coefficients of Some American Industries

House renting	8.2
Communications	4.6
Railroad transportation	3.3
Medical, education and non-profit organizations	2.7
Agriculture and fisheries	2.5
Coal, gas, electric power	2.2
Metal working machinery	1.2
Iron and steel	1.0
Trade	1.0
Personal and repair service	0.7
Textile mill products	0.5
Motors and generators	0.4
Apparel	0.3
Leather and leather products	0.3
Finance and insurance	0.03

certain activity. These figures are perhaps even more appropriate, since it is the relative factor endowment of a country that should be one of the bases for choosing industries, and for such a selection the capital per head figures are more significant than capital coefficients. Stated in other words: for a given country the number of persons to be employed is known, whereas the quanitity of product is not known beforehand but has to be made as high as possible. Some figures of capital per head are to be found in Annex Table 2. It should be stated that these figures are very rough estimates only; for lack of better data census figures have been taken, with a few corrections only.

The remarkable fact should be noted (cf. Annex Table 1) that, as a rule, the products of very capital-intensive as well as only slightly capital-intensive activities are products that do not easily enter into international trade.

Another fact of some importance to development programming is that there may be a marked difference in capital intensity between the activity carried out with a given type of equipment and the ac-

tivity of producing that equipment. To produce electricity, for example, is a very capital-intensive process; to build an electricity plant, however, is not. The decision to create such a plant therefore implies a decision with respect to two very different kinds of activity.

ANNEX V 1 TABLE 2 Capital Per Person Employed (thousands of U.S. dollars, 1950 prices)

Census year	United States 1950	Mexico 1945	India 1950
1. Bread and bakery products	5.0	1.7	3.5
2. Cotton yarn and cloth	8.7	2.1	1.8
3. Flour and grist mill products	39.1	10.4	5.6
4. Iron and steel industries	32.1	10.8	5.7
5. Sugar refining	26.8	8.2	2.6
6. Woodpulp, paper and paper products	10.2	8.9	6.6

Source: Calculations by Netherlands Economic Institute.

Figures are census figures for equipment, machinery, buildings and inventories with three corrections:

(1) figures were derived from equipment value estimates through multiplication by 2 (in order to approach values before depreciation);

(2) they were multiplied by the ratio $\frac{\text{price level of census year}}{\text{price level 10 years earlier}}$ in order to correct for price changes between year of purchase (assumed, on the average to be 10 years earlier) and census year; and

(3) finally, the figures were multiplied by the ratio $\frac{\text{price level 1950}}{\text{price level census year}}$. The first correction was, however, not applied to the U.S. figures, since these are reported to be undepreciated.

Apart from these well-known technical facts on which, nevertheless, much documentation would be very welcome, there is also another statistical fact, only recently discovered. This fact is the relative constancy of the ratio of national capital to net national product. The word "relative" should be kept in mind: the figures so far estimated are subject to wide margins of error and comparison of

any two is possible only within correspondingly still wider margins. The better formulation, therefore, of the results so far found is that the variations of the capital coefficient as here defined between periods as well as between countries is not very systematic. Clearly the figures depend somewhat on the exact definition of capital. Some information will be found in Table 3.

ANNEX V 1 TABLE 3 Capital Coefficients for National Economies

Country	Period	Coefficient	Source
Argentina	1913	5.8	(a)
Australia	1913	5.5	(a)
Italy	1913	4.4	(a)
U.S.A.	1913	4.3	(a)
Japan	1913	3.6	(a)
U.S.A.	1889	3.0	(b)
U.S.A.	1909	3.4	(b)
U.S.A.	1919	3.8	(b)
U.S.A.	1939	3.3	(b)
Average for about 30 countries	Various	4.7 max.[1] 3.0 min.[2]	(c) Derived from regression curve on income per head
Mexico	ca. 1955	1.5	(d)
India	ca. 1955	1.5	(d)

[1] For relatively poor countries.
[2] For wealthiest countries.

Sources: (a) Colin Clark, *Conditions of Economic Progress* (1940), p. 389.
(b) Simon Kuznets, *Income and Wealth of the U.S.* (1952), p. 297.
(c) Colin Clark, *Conditions of Economic Progress* (1951), p. 503.
(d) Recent progress reports on economic conditions in the countries concerned.

The interpretation to be given to these figures clearly is that although technical development has been characterized by an increase in capital per head, and by an increase in product per head, it so

happens that, for an economy like the United States as a whole, the quantity of product obtained is practically proportional to the quantity of capital. The same result has been found in the case of Great Britain. In addition, the ratio between capital and product seems not to depend on the degree of development of a country. Some of the differences observed seem to be explicable in terms of the factor endowment of the country. (Cf. E. E. Hagen, "Social Accounts and the Incremental Capital-Output Ratio in Underdeveloped Countries," presented at Third Conference of International Association for Research in Income and Wealth, Castelgandolfo, September 1953.) This phenomenon applies to national averages only; it can hardly be expected to apply in an exact way, since as we have already seen, figures for individual activities diverge widely.

For the reasons indicated, the use to be made of the capital coefficient can be one of rough estimation only of the capital needed for a country's development: for a given or desired increase in production the necessary investments can be calculated by multiplication with the coefficient. It is to be hoped that further research will narrow down the margins of error of such calculations which, for the time being, are still considerable.

Given the usefulness of the capital coefficient to development programming for underdeveloped countries, a question of some relevance is whether the coefficient will be higher or lower for these countries than for developed countries. Different opinions have been expressed by different authors. On the one hand the necessity of creating some basic facilities of a very capital-intensive character not yet in existence in underdeveloped countries is an argument for expecting a high coefficient. On the other hand the possibility of developing labor-intensive industries and of improving efficiency by better organization are arguments in the opposite direction. Recent statistical investigations have produced a number of instances in which low coefficients only seemed to prevail: the cases of India and Mexico may be quoted where the coefficient has actually been, in the last few years, as low as 1.5. This may partly be due, however, to

particular circumstances. In a recent analysis, one of the reasons for a low coefficient was found to be the introduction of more shifts in heavy industries. Excellent as the measure is, it cannot be repeated once the maximum of shifts has been attained. Good crops may also have played a role. They may be followed by less good crops. The conclusion can only be repeated that further research is of great importance.

ANNEX V 2 FUNDAMENTAL DISEQUILIBRIA IN UNDERDEVELOPED COUNTRIES AND ACCOUNTING PRICES

As was briefly indicated in Section III 6, there is reason to believe that most underdeveloped countries are characterized by some "fundamental disequilibria," the most important being that part of the population cannot be gainfully occupied for lack of complementary means of production: land and capital. In certain cases a further disequilibrium, namely one in the balance of payments may occur. Since some rather far-reaching conclusions are drawn from this diagnosis, it seems appropriate to give a fuller picture of what the author supposes the situation to be. This picture, if it is correct, must be consistent and so must the conclusions to be drawn from it.

The point made was that certain prices in these countries do not correctly reflect the intrinsic value of the goods or factors to which they relate. Probably the proceeds of the country's products to the extent sold in the world market do reflect their intrinsic value more or less: more so for products whose contribution to world supply is small, than for products, such as jute in Pakistan, whose contri-

bution is large. The market wage rate, however, probably is higher and the market interest rate lower than their respective intrinsic values. The intrinsic value of labor is so low that wages in accordance with it often would mean starvation. Also the trade unions are able, in a number of cases, to raise wages above what would be an "equilibrium level." This abnormal situation is largely due, in the author's opinion, to the scarcity of capital, and can be ended only by a better balance between population and capital.

With wage rates probably above their intrinsic value, there remains a margin for entrepreneurs which on the one hand is lower than its intrinsic value, but on the other hand is not necessarily low, since market wages are still very moderate. Moreover, the scarcity of entrepreneurs and of capital is so pronounced that their intrinsic value is often extremely high. Profit rates and, as a consequence, interest rates will thus be lower than their intrinsic values; and this fact is strengthened by the circumstance that the interest rates charged by international institutions are usually moderate. Moreover, there is a tendency for underdeveloped countries to organize cheap credit facilities for certain types of small enterprise. All this makes it probable that interest rates on the whole have a downward bias as compared to "accounting rates."

With wages above, and interest rates below, their intrinsic values, there are some further discrepancies in the pricing system. Commodities with a high labor content will be overvalued; commodities with a high capital content, such as, e.g., transport and power rates will be undervalued.

A better insight into the real consequences for the economy as a whole of certain investments will therefore be gained if, instead of market prices, accounting prices are applied, implying, *inter alia,* that labor costs are assumed to be considerably lower than market wages indicate. This may lead to the execution of projects not attractive to the private investor, but attractive according to accounting prices.

It may seem unnatural to "calculate oneself rich" in this way. If

in reality it is so "advantageous" to employ labor, where do these advantages show up and how, if only as an illustration of our recommendation, can the government realize them? The answer is that in a country with widespread unemployment a worker, when employed in a new investment project, becomes so much better off that he could, in principle, be taxed without a deterioration in his situation. More exactly still, not so much the worker, but his family (in the broader sense) which was feeding him, will experience this improvement. The government, of course, does not tax them since this would mean a discrimination against those previously unemployed as compared with those by coincidence not unemployed before. This in a way is equivalent, from the economic point of view, to a subsidy being paid to the worker; as, in fact, for the reason of the "fundamental disequilibrium," one is being paid by every employer to every worker. It is, therefore, not easy for the government to realize the advantages. Thus our conclusion is twofold. First, one of the beneficiaries is the previously unemployed worker and his family; since development policy is meant to be a contribution to the well-being of this group in particular this is not completely foolish. Secondly, however, the government as a rule foregoes certain theoretical tax receipts which it could otherwise have spent for further development. Put otherwise, the execution of the projects does absorb actual tax revenue. This sets a limit to either development at large or to the execution of "accounting price projects." An attempt to estimate the consequences and to take account of them in the national product test will be found in Annex v 3.

ANNEX V 3 THE NATIONAL PRODUCT (OR CONSUMPTION) TEST

Contents:

1 *Nature of Problem; General Remarks*

The techniques recommended and, to an increasing degree, applied in the appraisal of investment projects are of a fairly complicated nature which justifies their being handled by specialists and their treatment, for the purpose of this report, in a separate annex.

Even then there is a wide range of methods among which to choose, according to the availability of data and experts to handle them, and to the nature of the questions to be answered. It is not the intention of this annex to give anything like a full treatment of all these methods, but rather to stress certain of their aspects that are accessible to still fairly simple calculations. Before trying to give a systematic treatment we want to make it clear that in principle the problem at stake is rather complicated and that therefore for practical purposes also, it "pays" to go into these questions.

We will not go into the preliminary question, already discussed in the main text, whether the contribution to national income or the contribution to some more general concept of welfare should be the ultimate aim of the program. It will be assumed that national income (alternatively, national consumption) is the criterion. It would not be difficult to generalize the method somewhat and to

take account of, e.g., the distribution of income or consumption over regions or over some classes of the population. Such generalization does require agreement, however, as to the quantitative importance of any shifts desired, which is clearly a political choice.

The complexity of the problem arises first of all from the fact that the effects of one project of the program are not independent of those of other projects, and that therefore it is the program rather than the individual project that should be considered. This is perhaps best illustrated by the quantity of scarce factors left for the rest of the economy: this depends on the whole program rather than on one project. Thus the choice is rather between alternative programs than between alternative projects. Often the simplification of considering the projects as mutually independent will be justified. This simplification is justified if each program is small enough not to influence the rest of the economy; but the programs to be considered are not always that small.

A second reason for complexity is found in the length of the period over which the consequences of a project have to be considered. It is hardly realistic to assume that the general economic situation will be constant during that period and it is essential that it should not be. It is again by some further simplification that the additions to national income can be considered to be independent of its size.

Both points so far discussed are illustrative of an important feature of the problem, namely, that it is a combination of the traditional type of appraisal, valid for small programs only, and of development planning. This is why there are as many possible methods of appraisal as there are methods of development planning itself. We shall not go into the more intricate problems of such planning, which are largely of a mathematical nature, and we shall make use of some of the simpler approaches only.

The third reason for the complexity of our problem is to be found in the factors that necessitate the use of accounting prices, mainly the existence of structural unemployment and of balance of payments difficulties. These factors are so real as to justify some extra

trouble and it also seems feasible to apply accounting prices even if only a rough analysis is possible.

We will first try to formulate the problem in its most general way in order to show what the principles of the method should be; after that has been done, a few simplifications will be discussed that may make the method amenable to practical application.

2 *Principles to be Used in the Solution*

As already explained in the main text, the solution of the problem of appraising a project or a program of projects has to take into account first of all an estimation of its *consequences*. Essentially, this requires the comparison of two developments of the economy, development with and without (in the absence of) the program. If an exact model for the development of the economy concerned were available, two successive solutions of the system of equations of such a model should be determined. In the second solution all data referring to the program would be used; if the system of equations is exact, it would automatically yield the complete consequences—direct, indirect and secondary—and there is no reason to make a distinction between these types of consequences.

An exact system of equations does not exist, however; and if it existed it would be very complicated. It would be dynamic and micro-economic. For practical purposes, it will be necessary to simplify without, however, affecting essential features. Two problems then seem outstanding: what degree of *aggregation* can we apply and what simplified picture of *development* can we use? As to aggregation it seems natural to make a distinction at least between the program sectors and the rest of the economy. If the program consists of an electricity plant, the only corresponding sector is the one of building the plant and of producing electricity; if the program consists of a land reclamation project the reclamation process plus the production of wheat on the land may be the sector. Still

another example might be the erection of a certain number of textile plants. There would be n+1 sectors (including the "rest" sector) if the program exists of "n" projects of "n" different types. If, among the "n" projects "m" would belong to the same type of activity, the number of sectors should be n−m+2.

Development in each of the sectors related to the program should be described in some detail by the equations, in fact in as much detail as is thought necessary for a true picture. Development in the "rest" sector may, however, appropriately be described in a simplified way. Here the assumption of a constant capital coefficient of the average size may be appropriate. The development of income in this sector would then be equal to the development of capital, divided by the capital coefficient. The development of capital would be a consequence of the process of saving. Savings might be assumed to be a given percentage of the "rest" sector income plus a varying ratio of income in each of the project sectors, depending on the nature of the projects. A possible influence of taxes on savings could also be easily brought into the picture. In the subsequent sections of this annex an example of the calculations will be given.

One particular consequence of the subdivision chosen is that possible future projects not explicitly specified at the moment of programming may be, in principle, part of the rest sector.

The next step consists of the *appraisal* of the consequences. This means the application to all physical elements of net income (i.e., output of products and input of factors) of accounting prices representing the "true value" of these products and factors. This step, therefore, raises the question of how to calculate accounting prices. In principle this calculation requires a "shadow development program," differing from the "real" program in that equilibria would be obtained by flexible pricing instead of, as may be the case in reality, by quantitative restrictions and rigid pricing. Thus, while in the real program balance of payments equilibrium may have been projected with the aid of quantitative restrictions on imports and without a change in exchange rates, in the shadow program it

will have to be obtained by changes in exchange rates without quantitative restrictions. The same may be true with regard to savings [1] and the interest rates, with regard to scarce labor and the wage rate for such labor, etc. It may happen that for some reason no equilibrium can be obtained by flexible pricing alone (cf. Annex v 2); this may apply to the market for unskilled labor, usually in abundant supply. Capital may not be sufficient to employ all unskilled labor, even at zero price. The accounting price of such markets should be taken as equal to zero or only so much more as to account for the "displacement cost" (including psychological displacement); in all the other markets the flexible equilibrium price is taken to represent the accounting price.

From this definition it will be clear that accounting prices, at least in principle, can be estimated for complete programs only, not for separate projects, as has already been said.

The appraisal of the investment programs will then become possible by a calculation, year by year, of the accounting value of the additions to net income due to each of a set of alternative programs. Finally, the appraisal of the investment program must be summarized in the influence exerted on the *discounted "present" value of all future income* (or, alternatively, consumption). The discount rate to be applied is of considerable influence on the result and presents another example of the importance of the choice of accounting prices. Instead of income, consumption could have been taken. As a rule proportionality of consumption and income will be assumed—if only as an approximation—and then there is no need for this amendment. But the method presented may just as well be applied to consumption as to income.

Among all possible programs the one making the maximum con-

[1] There may be a complication here. There will be a difference between the capital needed on the basis of market prices of factors and products and that needed on the basis of accounting prices. For a calculation of the accounting price of capital, one should use the demand for capital based on the market prices of the other factors and of the products, since this is the demand actually to be exerted.

tribution to national income will finally have to be chosen; or, if consumption rather than income is taken as the criterion, the one with the maximum contribution to present and future consumption. Because of the tremendous work involved in evaluating the consequences of a program, it is of the utmost importance to have some guidance in the selection of programs before the appraisal on the basis of the national income (or consumption) test is undertaken. Such guidance should have the function of selecting projects likely to be optimal. It may refer to the type of product and its quantity as well as to technology to be applied. Some tentative rules were given in the main text (cf. Section IV 2). General programming will be one of the sources, since it may give some clues as to the market development to be expected as well as to the capital available per additional worker to be employed. It should be observed that, especially in this field, scientific development is fast and that new methods are being continually launched. Some of them are of a very complicated mathematical nature and require a large quantity of data; others are less exact and easier to handle. Again, what should be recommended will have to depend on the details of the situation in a given country.

3 *Evaluating the Consequences of a Program*

Having indicated the principles of a solution, we will now describe a simplified procedure that nevertheless seems to yield an essentially sound approximation in a number of cases.

For each project of a program, the succession of inputs and outputs for all future years will be considered given. This by itself, however, requires a program of analysis. It is not sufficient to know the input during the investment period, or the output and input during the operation period of the project proper. Indirect consequences will have to be collected, such as changes in the industries producing the raw materials needed for the project and changes

in the industries using products of the project. Examples are given in the main text (cf. Section IV 3). It does not matter whether these changes are accompanied by flexible or by rigid prices in the markets concerned, but realistic assumptions have to be made. Another indirect consequence may be found in competing industries. All the changes so far considered may be summarized as primary or autonomous changes in the aggregated sector of the project considered. They have to be estimated for each project sector and the additions to national income so found will add up to the autonomous change in national income. The accounting prices to be used will be discussed separately. (Cf. Section 4 of this annex.)

The secondary or induced consequences have now to be evaluated. By this term is meant the consequences in the rest sector. As already observed, this evaluation may be made in a more or in a less sophisticated manner. Only a simple approach will be discussed here. More sophisticated methods require well-defined systems of equations and their solution. If we assume that net income in the rest sector is determined by the nation's capital (except the capital invested in the project sectors), an evaluation of this capital and the resulting income may be made. As already stated, the additions to this capital may be made by all sectors and this is the simplest way of interconnecting the sectors. The savings available in each sector will depend on the income and the type of income to be generated as well as on the capital requirements of the sectors themselves and the foreign assistance receivable. A first refinement may be made by the assumption that export values will depend on the quantities to be supplied and the corresponding price level of exports.

4 *Choice and Use of Accounting Prices*

As already stated (Section 2 of this annex), accounting prices have to be determined, in principle, by a cumbersome process of trial and error including "shadow programming." There seem to

be approximations of a much simpler nature which are still relevant. Some of them will be discussed here. The simplest example is the one of the accounting price of unskilled labor. It will be possible to take this price as equal to zero in a good number of cases. Another not too difficult example is the accounting price for capital. An important indication of the influence of the price of capital may be obtained if an interest rate of some 10% is used alternatively to the rate at which, say, the International Bank for Reconstruction and Development makes loans.

A third example of an accounting price that may sometimes be estimated on *a priori* grounds would seem to be the rate of exchange, if there is a disequilibrium in the balance of payments. Sometimes estimates can be made, on the basis of an over-all model of the economy, not even showing separate sectors for each of the projects, of what exchange rate would seem to be an equilibrium rate.

A fourth example consists of the prices to be applied for individual commodities, if these commodities appear to be protected by import duties or quantitative restrictions. World market prices plus an average import duty for all commodities imported into the country will be a better approximation than the actual national price.

It may be repeated that even if it is not possible to make any sensible estimate of an accounting price, it may be useful to make a set of alternative calculations using plain guesses for the accounting prices. Such a set of calculations may show the influence exerted by changes in prices (cf. main text, Section IV 7).

The application of accounting prices without a complete "shadow program" should, of course, be a careful one and should at least be based on common sense consideration of the markets considered. Prices of scarce factors should not be taken to be equal to zero; sometimes a distinction between types of labor will be useful. Prices of products of which the supply is assumed to increase considerably as a consequence of the program under discussion should not be left

unchanged. Sometimes demand studies may be available, giving some indication of the change in price to be expected from a given increase in supply.

5 *An Illustration of the Estimation of Secondary Effects*

As already observed, the complete calculation of all effects of a program requires the application of methods usually too difficult to be handled by the general economist and only worth while if rather extensive material is available. Often more or less approximate methods will have to be used. One possible method may be illustrated by the following scheme in which a number of elements have been inserted that were discussed in the previous sectors and the main text.

Example of a Scheme for the Estimation of the Effects on Future National Income (and Consumption) Exerted by a Program of Investment Projects

A. Figures at market prices.
B. Figures at accounting prices.
C. Figures at accounting prices, discounted.

Line	Years	1			2			3			4			5			etc.	Total
		A	B		A	B	C	A	B	C	A	B	C	A	B	C		C
	Sector 1, Direct																	
101	Gross product																	
102	Imports																	
103	Depreciation																	
104	Net product (= 101 — 102 — 103)																	
105	Scarce factors used																	
	Indirect																	
106	Gross product																	

Line		Years	1			2			3			4			5			etc.	Total
			A	B		A	B	C	A	B	C	A	B	C	A	B	C		C
107	Imports																		
108	Depreciation																		
109	Net product (= 106 — 107 — 108)																		
110	Scarce factors used																		
111	Primary = dir. + ——— indirect																		
112	Net product (= 104 + 109)																		
113	Low incomes																		
114	High incomes																		
115	Gross savings																		
116	Capital requirements																		
117	Net savings (= 115 — 116)																		
	Sector 2,3 etc.																		
201	etc. (Same subdivision)																		
	Rest of Economy																		
901	Savings previous year																		
902	Influence of subsidies on government investments																		
903	Net savings from other sectors (117 + 217 + ...)																		
904	Total (= 901 — 902 + 903)																		
905	Capital, beginning																		
906	Income (uncorrected)																		
907	Correction for scarce factors (= 105 + 110 + 205 + ...)																		
908	Income rest of economy																		
909	*Income, all sectors* (= 112 + 212 + ... + 908)																		
910	*Consumption, all sectors*																		

The following explanations may be added.

It should be kept in mind that the scheme is one out of a large number of possibilities, none completely satisfactory.

The *number of years* depends on the rate of discount and can be less with higher discount rates than with lower rates. Sometimes the total over all years can be approximated by mathematical formulae, as, e.g., those for geometrical series.

Sectors are supposed to refer to projects.

Direct figures refer to production by project itself (cf. usual distinction in Kahn-Keynesian multiplier terminology).

Gross product (101) will be different for investment period and for operation period. Here it is defined as value added in process taking place each year.

Net product (104) is here defined as customary in national accounting, without deducting value of scarce national factors (skilled labor, technicians). Since these are, however, withdrawn from rest sector, a correction is made in items 105, 110, 205, etc., 908.

Scarce factors (105): see net product.

Indirect figures defined as in main text. Indirect figures may be superfluous if it is attempted to imply indirect consequences in the values given to accounting prices for the products and raw materials of the project.

"High" and "low" incomes (items 113 and 114) are supposed to be a breakdown of primary net product (112); the breakdown may be used to estimate the influence of the nature of the project on the nation's rate of savings.

Gross savings (115) are the savings originating from 114.

Capital requirements are the capital needed in the sector, after correction for possible capital imports.

Net savings (117) are available for the rest of the economy.

Sectors 2,3, etc. represent other projects of the program. If only one project is studied and if it is assumed that accounting prices can be applied independently of other projects, these sectors do not appear in the scheme. The rest of the economy sector should always be included, however, since it is the bearer, in this scheme, of all secondary consequences.

Rest of economy represents a simplified picture of all other sectors, using macro-economic concepts and relations.

Savings previous year are savings in rest sector, to be estimated on the basis of the income to the rest of the economy (908), with the help of a general savings rate (meant to include government savings).

Subsidies, possibly paid by government (cf. main text, Section v 4) to further labor-intensive activities, may reduce government investment itself (by the full amount of subsidies or by part only).

Net savings from other sectors represent the influence exerted by type of project on general savings.

Total savings (previous year) accruing to rest sector (904) is the addition to capital of rest sector at beginning of year of reporting; it is supposed to be the chief determinant of income of the rest sector (in accordance with capital coefficient theory).

Income (uncorrected) (906) to be derived from capital, by division through capital coefficient (cf. Annex v 1).

Correction for scarce factors. The uncorrected income estimate may need correction for the fact that scarce factors will be withdrawn from the rest sector. One way of correcting this may be the deduction of the value of scarce factors from the uncorrected estimate (906). This implies a certain hypothesis as to the nature of the production function, however. Other hypotheses may be better, e.g., the assumption

that scarce factors are a bottleneck and hence also restrict the use that can be made of other factors.

Income, all sectors (909) represents a national income estimate. Its value in column total, C, is the criterion for the appraisal of a project or program according to national income test.

Consumption, all sectors (910) might be taken instead, since it does not imply double counting of investment.

ANNEX V 4 SOME FIGURES ON INVESTMENTS IN TRANSPORTATION AS A PERCENTAGE OF TOTAL INVESTMENTS

I. *Long-term movements in the United States*

Percentage of national wealth invested in railways, shipping and canals:

1880	*1890*	*1900*	*1912*	*1922*	*1939*
28.5	26.6	27.0	25.1	22.2 [1]	22 to 23 [2]

Source: S. Kuznets, *National Product Since 1869* (1880-1922) W. Leontief cf. *Studies in the Structure of the American Economy,* 1953 (1939). With correction for automobiles.

II. *Recent figures for two underdeveloped countries*

India, 1951-56: 20 *Source:* First Five Year Plan, p. 36-39

Mexico, 1939-1950: 27 *Source:* *The Economic Development of Mexico,* Baltimore, 1953, p. 189, 201.

[1] Figure given by Kuznets (*op. cit.*) excludes motor cars, but is supposed to be too high (cf. Leontief, *op. cit.,* p. 218).

[2] Inclusive of the estimated value of motor cars.

III. *Recent figures for some European countries*

Average percentage (for 4 to 5 post-war years) of gross investment devoted to railways (including tramways), shipping, air transportation, motor traffic and communications:

Belgium	24
Norway	30
United Kingdom	17
Netherlands	23
France	19

Source: Economic Survey of Europe Since the War, United Nations, corrected to make strictly comparable.