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QUANTITATIVE ASPECTS OF THE ECONOMIC GROWTH OF NATIONS:

V. CAPITAL FORMATION PROPORTIONS: INTERNATIONAL COMPARISONS FOR RECENT YEARS*

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I. Introduction

In this paper, the fifth in the series,[1] we assemble comparative data on capital formation and its components, in relation to national product. A brief discussion of definitions and their limitations is followed by international comparisons for the recent post-World War II years. Because of the quantity of data to be covered and the length of the present paper, the long-term records, available for a much smaller number of countries, will be analyzed in the next paper in the series.

Reproducible capital of a country, as commonly measured, includes: (i) all construction and improvement attached to land (buildings, residential and non-residential, dams, roads, land improvement, inputs into exploration and improvement of natural resources, etc. --excluding military installations, at least in the United Nations accounts); (ii) machinery and equipment within the country in the hands of producers, private and government (but neither the durable goods in the hands of households nor, in prevalent practice, war equipment); (iii) inventories within the country in the hands of business enterprises and governments (the latter also usually excluding war materiel); (iv) net balance of claims against foreign countries--the only non-tangible capital good. The sum of (i) and (ii) is domestic fixed capital; the sum of (i), (ii), and (iii) is total domestic capital; the sum of (i), (ii), (iii), and (iv) is total national capital.

* This paper draws heavily upon work in the field initiated under the auspices of the Committee on Economic Growth of the Social Science Research Council. As with the other papers in the series, Miss Lillian Epstein provided indispensable assistance in preparing the tables and editing the text.

1. The others, under the general title, Quantitative Aspects of the Economic Growth of Nations, are: "I. Levels and Variability of Rates of Growth," Economic Development and Cultural Change, Vol. V, No. 1, October 1956; "II. Industrial Distribution of National Product and Labor Force," ibid., Supplement to Vol. V, No. 4, July 1957; "III. Industrial Distribution of Income and Labor Force by States, United States, 1919-21 to 1955," ibid., Vol. VI, No. 4, Part II, July 1958; "IV. Distribution of National Income by Factor Shares," ibid., Vol. VII, No. 3, Part II, April 1959.

Capital formation designates additions to the stock of capital as defined (material and reproducible)--gross if current consumption of fixed capital is not deducted, net if it is. Additions to inventories and to claims against foreign countries are always net. We can thus have gross or net domestic fixed capital formation--a sum of gross or net additions to (i) and (ii); gross or net domestic capital formation--a sum of gross or net additions to (i) and (ii) and net additions to (iii); and gross or net national capital formation, a sum of gross or net additions to (i) and (ii) and net additions to (iii) and (iv).

Capital formation is measured by the flow of resources into it. Gross and net domestic capital formation (fixed or total) are properly parts of gross and net domestic product--which differ from national product by the flow of factor payments across the nation's boundaries. Gross and net capital formation (national) are components of gross and net national product; and on a countrywide scale equal national savings, the part of national product retained for use in further production. The remaining components of national product are flow of goods to ultimate consumers (individuals, households, and private non-profit institutions) and, in the most generally used definition, consumption by government (i. e., purchases by the latter of commodities and services); and their total forms the part of current product that is consumed. It is clearly of interest to consider capital formation in relation to national product rather than as absolute amounts.

The capital formation proportion (the term here refers to the ratio of capital formation to the appropriate national product total) has two analytical aspects. The first stems from the role of capital as a productive factor. Since capital is a tool for further production, the larger the capital formation proportion, other conditions being equal, the higher the rate of growth of national product that can be generated. The second aspect stems from the fact that the national capital formation proportion represents the fraction of national product that is saved; and differences and variations in that fraction may shed light on the relation between income, its level, or its rate of growth, and the savings proportion. The capital formation proportion is thus a means for studying not only the production but also the use of income.

It must be admitted from the outset that for either purpose the capital formation proportion is far from adequate. Capital--particularly in the concept used here, which is limited to material and reproducible goods--is not the only productive factor. It excludes the capital investment in training the labor force, as well as irreproducible natural resources. Different endowments of natural resources, in combination with different supplies of labor of different skill and training, may--even if we disregard major changes in production technology and over-all social structure--mean different rates of growth of national product, despite the same capital formation proportion. A thorough analysis of the production of income should include these other factors of production; and if available data and the promise of the analytical yield justify the effort, this more inclusive analysis should be attempted. Unfortunately, it is impracticable to extend the view here beyond the capital formation proportion proper.

Nor does the capital formation proportion give us much insight into the factors and mechanisms that determine the connection between levels and rates of growth of income and the savings fraction. While the tables below do provide some indication of the shares of the major groups of savers (households,

business enterprises, governments) in total national savings, a full analysis of the savings-income relations would require a review not only of the other major uses of income (flow of goods to households and non-profit institutions, and government consumption), but also of budget cross-section data.

We therefore begin the study of the data in the present paper, fully aware that they are only a part of the complete story. The justification for doing so is that the volume of data on this one part is fairly large, and the attempt to organize it in some orderly fashion seems worthwhile. It may permit us to observe systematic patterns in the relation between the capital formation proportion and growth of income or between it and levels of income. Such findings of reasonably orderly patterns in this one segment would then permit us to formulate some ad hoc hypotheses which would, on the one hand, associate these findings with other available information in the corpus of economic knowledge; and on the other, provide us with guides in the broader studies of the factors of production that determine the product, and of income and other factors that determine the savings fraction.

II. The Over-All Capital Formation Proportions

Table 1 summarizes the evidence on the proportions of gross fixed domestic, total domestic, and total national capital formation, to the relevant national product totals. For each country, the proportions were based on the cumulated totals, usually for the seven most recently reported years (1951-57), although for some countries fewer years had to be used. The cumulated totals of capital formation were divided by the cumulated totals of the appropriate countrywide product--gross domestic product for domestic capital formation and gross national product for gross national capital formation. In one or two countries gross national product had to be substituted for gross domestic product, but the error involved is slight since the two differ by only a minor fraction. All underlying figures were in current prices. We then calculated unweighted arithmetic means of the capital formation proportions derived for each country, for the groups distinguished in Table 1. The countries are grouped by their per capita incomes in recent years (1952-54) along the lines followed in Papers II and IV of this series. [2]

Table 1 excludes all Communist countries, and countries with population of less than a million--which reduces variability in the capital formation proportions. Nevertheless, and despite the length of the period, these proportions are quite diverse and the dispersion within each group is marked. The full detail on the spread appears in Appendix Table 1, which gives the ratios for each of the fifty odd countries covered in the text table. That table reveals that some politically dependent territories, e. g., the Belgian Congo and the Federation of Rhodesia and Nyasaland, are characterized by high capital formation proportions--although their per capita incomes are quite low. Also, in several politically independent countries, financing by foreign funds is a large

2. The Roman numeral groups range from I for the highest per capita income to VII for the lowest, the spread being approximately from 17 to 1. For more details concerning this grouping see Paper II, p. 7.

Table 1.
Proportions of Gross Capital Formation to Gross Domestic or National Product, Countries Grouped by Per Capita Product, Post-World War II Years (Based on current price totals)

Proportions	Groups of Countries by Per Capita Product							Wider Groups			
	I	II	III	IV	V	VI	VII	I	II & III	IV & V	VI & VII
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
A. All Countries											
Gross Fixed Capital Formation to Gross Domestic Product											
1. Number of countries	7	7	6	11	4	8	5	7	13	15	13
2. Proportion (%)	19.6	22.1	17.9	15.0	16.5	12.8	16.3	19.6	20.2	15.4	14.2
Increase in Stocks to Gross Domestic Product											
3. Number of countries	7	6	6	10	4	8	5	7	12	14	13
4. Proportion (%)	1.5	1.4	0.4	1.4	2.6	1.7	1.3	1.5	0.9	1.8	1.6
Gross Domestic Capital Formation to Gross Domestic Product											
5. Number of countries	8	7	6	11	6	10	8	8	13	17	18
6. Proportion (%)	21.4	23.4	18.5	16.3	17.6	16.7	14.0	21.4	21.1	16.8	15.5
Change in Foreign Claims to Gross Domestic Capital Formation											
7. Number of countries	8	7	6	11	6	10	8	8	13	17	18
8. Proportion (%)	-0.5	+0.3	-40.5	-7.9	-10.0	-12.0	-26.5	-0.5	-18.5	-8.7	-18.4
Gross Capital Formation to Gross National Product											
9. Number of countries	8	7	6	11	6	10	8	8	13	17	18
10. Proportion (%)	21.0	23.8	10.3	14.5	16.6	14.5	11.4	21.0	17.6	15.2	13.1

	B. Politically Dependent Territories											
11.	Number of territories	0	0	1	1	1	2	3				
12.	Proportion, gross domestic capital formation to gross domestic product (%)	-	-	19.8	8.2	16.8	23.8	19.4				
13.	Proportion, change in foreign claims to gross domestic capital formation (%)	-	-	-88.3	81.0	-48.5	-5.4	-10.9				
14.	Proportion, gross capital formation to gross national product (%)	-	-	2.2	15.9	8.7	20.6	17.6				
	C. Financially Dependent Countries											
15.	Number of countries	0	0	2	2	0	1	2				
16.	Proportion, gross domestic capital formation to gross domestic product (%)	-	-	19.8	15.1	-	17.1	7.9				
17.	Proportion, change in foreign claims to gross domestic capital formation (%)	-	-	-63.0	-40.0	-	-34.5	-84.2				
18.	Proportion, gross capital formation to gross national product (%)	-	-	6.0	8.7	-	11.2	0.3				
	D. All Other Countries											
19.	Number of countries	8	7	3	8	5	7	3	8	10	13	10
20.	Proportion, gross domestic capital formation to gross domestic product (%)	21.4	23.4	17.2	17.6	17.8	14.6	12.7	21.4	21.5	17.6	14.0

(Continued on next page)

Table 1 (Cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
D. All Other Countries (Cont.)											
21. Proportion, change in foreign claims to gross domestic capital formation (%)	-0.5	+0.3	-9.5	-11.0	-2.3	-10.6	-3.6	-0.5	-2.6	-7.7	-8.5
22. Proportion, gross capital formation to gross national product (%)	21.0	23.8	15.8	15.7	18.2	13.2	12.7	21.0	21.4	16.7	13.0

Proportions are unweighted arithmetic means of percentages for individual countries given in Appendix Table 1.

Panel B covers areas that were, during all or most of the period, political dependencies or parts of larger political units: Puerto Rico in Group III, Malaya in Group IV, Jamaica in Group V, Ghana and the Federation of Rhodesia and Nyasaland in Group VI, Belgian Congo, Morocco, and Nigeria in Group VII.

Panel C covers politically independent countries that were, during the period, heavily dependent upon financing from abroad, as indicated by a ratio of net capital imports to gross domestic capital formation exceeding a third: Ireland and Israel in Group III, Greece and Panama in Group IV, Taiwan in Group VI, Indonesia and South Korea in Group VII.

fraction of domestic capital formation--a condition of financial dependence, constituting an exceptional situation that could scarcely be called long-term. It, therefore, seemed desirable to segregate the politically and financially dependent areas in Panels B and C, and to provide a set of averages in Panel D for a smaller but perhaps more representative sample of non-Communist countries.

The findings, which are based on Table 1 but also refer to some of the detail in Appendix Table 1, may now be stated.

(a) The proportion of gross domestic capital formation to gross domestic product, as shown by the group averages, varies from 14 to 23-1/2 percent (line 6). Furthermore, it is, in general, positively associated with per capita income, being higher in the high income countries than in the low. But the association is not too close, and we shall have occasion to discuss the possible reasons for the rather limited range in the capital formation proportion in association with the wide range in per capita income.

(b) The dominant component of gross domestic capital formation is fixed capital formation: net additions to inventories account on the average for only 1 to 3 percent of gross national product (lines 2 and 4). But whereas the relative weight of fixed capital formation in national product declines as we move from the high to the low income countries, than of inventory accumulation does not; and, in consequence, its share in gross domestic (or national) capital formation is appreciably greater in the low income than in the high income countries. We shall consider this finding more closely when we deal with the composition of capital formation.

(c) Changes in foreign claims are a minor fraction of gross capital formation in the high income, industrialized countries--at least as far as the group averages show. (The latter may conceal a combination of large positive and negative fractions for individual countries.) However, they are a sizeable negative fraction of gross domestic capital formation for countries in Groups III-VII--meaning that in these countries a significant share of domestic capital is financed through foreign funds (line 8). But when the few countries in which foreign financing is extensive are excluded, the average shares of foreign financing in gross domestic capital formation are much smaller (line 21).

(d) The range in the gross national capital formation proportion among groups of countries classified by per capita income is wider than that in the gross domestic capital formation proportion. In Panel A, the range for the wider groups is from 15-1/2 to 21-1/2 percent for the domestic capital formation proportion, from 13 to 21 percent for the national capital formation proportion (lines 6 and 10). For the wider groups in the more representative sample in Panel D, the range is from 14 to 21-1/2 percent for the domestic capital formation proportion and from 13 to 21-1/2 percent for the national capital formation proportion, the latter again exceeding the former (lines 20 and 22).

The wide dispersion of gross capital formation proportions within groups of countries classified by per capita income and the relatively narrow range of the averages for the groups raise the question whether per capita income is the variable with which capital formation proportions should be associated. It may well be that another index of the economic growth of countries would yield a

closer association with capital formation proportions and a wider range in the latter among groups of countries classified by that index. One such alternative measure of economic growth that is easily available is the share of national product accounted for by an extended M sector--the total for mining, manufacturing, and construction plus transportation and communication (designated M+). It may be argued that if the share of the M+ sector is large, other conditions being equal, capital formation proportions would be large because the industries in this sector produce fixed capital goods; and their great weight within a country's economy would mean a high ratio of at least fixed gross capital formation to gross product. Second, the capital needed for this sector, relative to its output, may be larger than for such sectors as agriculture and services (i. e., the sectoral capital-output ratio may be higher); and this greater relative need for capital would also make for high capital formation proportions in those countries in which the share of the M+ sector in national product is high. High domestic capital formation proportions would probably mean high national capital formation proportions--although differences in the relative importance of foreign financing might qualify the association.

For Table 2 we, therefore, arrayed countries by the share of the M+ sector in national product, utilizing for this purpose, whenever possible, the data for the post-World War II years covered in Table 1; and divided them into seven capital letter groups by descending shares of the M+ sector. First, all countries were used, regardless of political and financial dependence; and the averages in columns 2-4 are, as usual, unweighted arithmetic means (lines 1-11). For column 5 we averaged the Roman numeral ranks of the countries included in the capital letter groups--e. g., an equal number of I's and II's would yield a mean of I. 5. Then the calculations were repeated for countries excluding politically and financially dependent units (lines 12-22).

For all countries, the average share of the M+ sector drops from 57 percent in Group A to 17 percent in Group G; or using wider groups, from 57 percent in Group A to 20 percent in Groups F and G (column 2). Because of the marked association between industrial structure and per capita income, the average rank by per capita income also declines significantly as we move down the array by the share of the M+ sector in domestic product (column 5). But the decline in the Roman numeral rank of per capita income is from I. 7 in line 1 to VI. 0 in line 7--not from I to VII, as in Table 1. The domestic capital formation proportion also drops significantly and consistently, except for the slight rise from Group A to Group B (column 3). Most interesting is the fact that the range in the gross domestic capital formation proportion in Table 2, lines 1-7--from 13 to 24 percent--is wider than that in the seven groups in Table 1, line 6--from 14 to 23-1/2 percent; and if we disregard the change from Group A to Group B (which is similar to that from Group I to Group II in Table 1), in the one case of a rise in the rank of per capita income in column 5 (from Group C to Group D), there is a decline in the domestic capital formation proportion associated with a decline in the share of the M+ sector. Even for the wider groups in lines 8-11, the range in the domestic capital formation proportion--from 13 to 23 percent--is wider than that in the wider groups of countries by per capita income in Table 1, line 6--from 15-1/2 to 21-1/2 percent. Thus, for the domestic capital formation proportion the share of the M+ sector is as important a variable as income per capita.

Table 2.
Proportions of Gross Capital Formation to Gross Domestic or National Product, Countries Grouped by the Share of the M+ Sector in Gross Domestic Product, Post-World War II Years (Based on current price totals)

Groups of Countries by Share of M+ Sector in Gross Domestic Product	No. of Countries	Share of M+ Sector in Gross Domestic Product (%)	Proportion, Gross Domestic Capital Formation to Gross Domestic Product (%)	Proportion, Gross Capital Formation to Gross National Product (%)	Relative Position in Grouping by Per Capita Product
A. All Countries	(1)	(2)	(3)	(4)	(5)
1. A	6	57.4	21.4	21.8	I. 7
2. B	6	48.8	23.9	23.4	II. 8
3. C	7	44.6	22.5	19.7	IV. 3
4. D	7	35.4	19.9	12.1	III. 9
5. E	7	29.9	15.9	13.1	IV. 4
6. F	7	23.2	13.5	12.1	V. 1
7. G	7	16.8	13.0	9.3	VI. 0
Wider Groups					
8. A	6	57.4	21.4	21.8	I. 7
9. B & C	13	46.5	23.1	21.4	III. 6
10. D & E	14	32.6	17.9	12.6	IV. 1
11. F & G	14	20.0	13.3	10.7	V. 6
B. Countries Excluding Politically and Financially Dependent Units					
12. A	5	57.9	21.4	21.8	I. 8
13. B	5	50.5	23.5	23.1	II. 0
14. C	5	46.5	18.9	17.9	III. 0
15. D	4	39.9	19.9	18.1	IV. 0
16. E	5	31.4	17.8	16.3	IV. 0
17. F	5	24.4	13.2	12.5	V. 2
18. G	5	19.3	15.6	14.7	V. 6
Wider Groups					
19. A	5	57.9	21.4	21.8	I. 8
20. B & C	10	48.5	21.2	20.5	II. 5
21. D & E	9	35.2	18.7	17.1	IV. 0
22. F & G	10	21.8	14.4	13.6	V. 4

Entries in columns 2-4 are unweighted arithmetic means of percentage for individual countries given in Appendix Table 1. The derivation of column 5 is described in the text.

For countries excluded from Panel B see notes to Table 1.

To a somewhat lesser extent the same can be said of the association between the share of the M+ sector and the gross national capital formation proportion--for all countries. The range in Table 2, column 4, from 23-1/2 to 9 percent is somewhat wider than that in Table 1, line 10--from 24 to 10 percent; in the wider groups the ranges are from 11 to 22 and from 13 to 21 percent, respectively.

The picture changes when we exclude the countries that, by the criteria used throughout this paper, were either politically or financially dependent (lines 12-22). The downward movement of both domestic and national capital formation proportions is less consistent with the large decline in the share of the M+ sector. The range among the seven groups in the gross domestic capital formation proportion--from more than 13 to 23-1/2 percent--is somewhat narrower than the range in Table 1, line 20--from less than 13 to 23-1/2 percent; and the same is true of the wider groups, for which the range in Table 2 is from more than 14 to 21-1/2 percent, in Table 1 from 14 to 21-1/2 percent. For the gross national capital formation proportion, the range in the seven groups of Table 2 is from 12-1/2 to 23 percent, that in Table 1, from 13 to 24 percent; for the wider groups the ranges are from 14 to 22 percent and from 13 to 21-1/2 percent, respectively. Clearly, it is particularly in the politically and financially dependent countries that the capital formation proportion is more closely associated with the share of the M+ sector than with the level of per capita income; although even for the smaller sample of countries, excluding those politically and financially dependent, the share of the M+ sector is an important variable affecting capital formation proportions, particularly domestic.

Some further light is shed on this association when we combine, in rather rough fashion, the grouping of countries by per capita income, with that by the share of the M+ sector (Table 3). Within each Roman numeral group we distinguish two subgroups--the a subgroup with the higher shares of the M+ sector, the b subgroup with the lower shares; and then average for each subgroup the share of the M+ sector, the gross domestic capital formation proportion, and the gross national capital formation proportion (columns 2-4). These averages for subgroups permit us to study the effect of the differences in the share of the M+ sector in domestic product on domestic and national capital formation proportions at a given range of income. As a check upon the association we calculated the per capita income within each Roman numeral group and subgroup (column 5, unweighted means of per capita income, in U. S. dollars, except for Group VII for which the estimates are too unreliable).

In dealing with all countries (lines 1-14) we find that, except for Group I, a decline in the share of the M+ sector from subgroup a to subgroup b is accompanied by a drop in the gross domestic capital formation proportion. Moreover, this decline is observed regardless of the direction of movement in per capita income between the two subgroups. (Because of the wide margin of error in the per capita income estimates, differences among them of less than ten to fifteen percent cannot be ascribed much significance.) Within Group II, the domestic capital formation proportion declines from subgroup a to subgroup b, despite the appreciable rise in per capita income; and in the lower income groups the proportion always declines from subgroup a to subgroup b, even when the per capita income differentials between the two subgroups are not significant. The findings for the sample of countries excluding the politically

Table 3.
Proportions of Gross Capital Formation to Gross Domestic or National Product, Countries Grouped by Per Capita Product and Share of M+ Sector in Gross Domestic Product, Post-World War II Years (Based on current price totals)

	Groups of Countries	No. of Countries	Share of M+ Sector in Gross Domestic Product (%)	Proportion, Gross Domestic Capital Formation to Gross Domestic Product (%)	Proportion, Gross Capital Formation to Gross National Product (%)	Per Capita Product (1952-54 U.S. dollars)
	A. All Countries	(1)	(2)	(3)	(4)	(5)
1.	I(6) High M+ shares	3	57.0	17.7	18.5	840
2.	Low M+ shares	3	45.7	22.2	21.0	1,390
3.	II(6) High M+ shares	3	55.2	25.7	26.6	580
4.	Low M+ shares	3	47.4	20.9	20.9	720
5.	III(6) High M+ shares	3	43.2	22.3	8.8	420
6.	Low M+ shares	3	28.7	14.7	11.7	410
7.	IV(9) High M+ shares	5	37.3	19.2	16.5	260
8.	Low M+ shares	5	23.5	15.2	12.7	230
9.	V(5) High M+ shares	3	39.9	18.8	17.0	180
10.	Low M+ shares	3	30.2	15.3	12.7	170
11.	VI(9) High M+ shares	5	36.3	21.6	17.3	120
12.	Low M+ shares	5	22.0	12.3	11.3	130
13.	VII(6) High M+ shares	3	31.5	22.5	21.7	
14.	Low M+ shares	3	14.6	8.5	3.0	
	B. Countries Excluding Politically and Financially Dependent Units (Groups I and II as in lines 1-4)					
15.	III(3) High M+ shares	2	45.9	15.8	14.6	365
16.	Low M+ shares	2	30.7	14.7	13.3	410
17.	IV(7) High M+ shares	4	38.8	19.9	18.3	265
18.	Low M+ shares	4	24.9	15.6	13.9	225
19.	V(4) High M+ shares	2	42.0	22.5	20.4	195
20.	Low M+ shares	2	28.1	14.6	14.7	160
21.	VI(7) High M+ shares	4	32.3	16.6	15.4	125
22.	Low M+ shares	4	20.8	11.8	10.8	130

Entries in columns 2-4 are unweighted arithmetic means of percentages for individual countries given in Appendix Table 1.

Entries in column 5 are unweighted arithmetic means of per capita incomes, given in United Nations, Per Capita National Product of Fifty-five Countries, 1952-1954, Statistical Papers, Series E, No. 4, with the following additions: for Costa Rica the per capita income of Mexico was assumed; for Bolivia that of Peru. Taiwan is omitted from Group VI.

The numbers in parentheses in the stubs indicate the total number of countries included (except for Group VI, column 5 from which Taiwan was excluded). When the number of countries is odd, the middle item is included in both subgroups.

For countries excluded from Panel B see notes to Table 1.

and financially dependent units are similar although not quite so marked (lines 1-4, and 15-22, columns 2, 3, and 5).

The association between the share of the M+ sector and the gross national capital formation proportion is not as close. In addition to the exception within Group I, there is another within Group III, for all countries (lines 5 and 6); although it is eliminated in the smaller and more representative sample of countries (lines 15 and 16). Thus we find that the share of the M+ sector is a significant variable, affecting also the gross national capital formation proportion.[3]

We can go no farther here in the analysis of the association between the share of the M+ sector in domestic product and the gross capital formation proportions. That the former has significant effects, particularly on the domestic capital formation proportion; and that these effects are particularly marked in the low income countries is clearly suggested by Tables 2 and 3. These effects are to be expected if we assume that a sizeable M+ sector facilitates both production and absorption of a larger domestic capital formation proportion (and hence indirectly also of national); and may provide the base for a larger demand for capital investment. Despite the association found, we did not, in the analysis below, use the grouping of countries by the share of the M+ sector or by the combination of it with per capita income--for two reasons. First, while the share of the M+ sector may affect capital formation proportions as much as per capita income, it cannot be assumed to have as wide an effect on various other aspects of economic structure. If then we need a single criterion of classification for all aspects of economic structure and growth, it must still be per capita income. Second, any combination of criteria of classification would be effective only with an adequately large number of final groupings--attained in Table 3 by doubling the number of classes distinguished. But with a limited sample of countries the averages based on inadequately few units in many of the cells would be erratic. We are, therefore, retaining the grouping of countries by per capita income in the tables that follow.

Before considering the general questions suggested by the findings in Table 1, and amplified somewhat in Tables 2 and 3, we review the data on net capital formation proportions, again for the non-Communist countries (Table 4). The entries in Panel A relate to the same years and have been derived by the procedures described in connection with Table 1, but the necessary data are available for fewer countries.

Capital depreciation, or to use the terminology of the United Nations accounts, provision for the consumption of fixed capital is assumed to cover "the current value of wear and tear and foreseen obsolescence of all fixed capital as

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3. The crude attempt in Table 3 to distinguish the effects of the share of the M+ sector from those of per capita income differentials could perhaps have been handled with more apparent neatness through multiple correlation. But the margins of error in per capita incomes are wide, particularly in the low income, less developed countries; the regressions are clearly non-linear; and there is no reason to assume that the variances will stem from normal distributions of deviations. It seemed better to employ the cruder methods, and not to move too far from the identity of the countries.

Table 4.
Proportions of Net Capital Formation to Net Domestic or National Product, Countries Grouped by Per Capita Product, Post-World War II Years (Based on current price totals)

Ratios or Proportions	Groups of Countries by Per Capita Product							Wider Groups			
	I (1)	II (2)	III (3)	IV (4)	V (5)	VI (6)	VII (7)	I (8)	II & III (9)	IV & V (10)	VI & VII (11)
A. All Countries: Calculation A											
Capital Consumption to Gross Fixed Capital Formation											
1. Number of countries	7	7	4	9	4	6	4	7	11	13	10
2. Ratio (%)	43.9	38.7	35.3	36.7	33.9	47.7	30.7	43.9	37.5	35.9	40.9
Capital Consumption to Gross Domestic Capital Formation											
3. Number of countries	7	6	6	8	5	8	4	7	12	13	12
4. Ratio (%)	41.2	39.4	41.9	35.0	30.3	42.3	28.3	41.2	40.7	33.2	37.6
Net Domestic Capital Formation to Net Domestic Product											
5. Number of countries	7	7	6	9	5	8	5	7	13	14	13
6. Proportion (%)	14.2	16.4	12.3	12.1	13.1	11.2	12.9	14.2	14.5	12.5	11.8
Net Capital Formation to Net National Product											
7. Number of countries	7	7	6	9	5	8	5	7	13	14	13
8. Proportion (%)	13.8	16.7	3.5	9.1	11.4	7.9	12.0	13.8	10.6	9.9	9.5

(Continued on next page)

Table 4 (Cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
B. All Countries: Calculation B											
9. Number of countries in line 10	8	7	6	11	6	10	8	8	13	17	18
10. Proportion, gross domestic capital formation to gross domestic product (%)	21.4	23.4	18.5	16.3	17.6	16.7	14.0	21.4	21.1	16.8	15.5
11. Derived ratio, capital consumption to gross domestic product (%)	8.82	9.22	7.75	5.71	5.33	7.06	3.96	8.82	8.59	5.58	5.83
12. Derived proportion, net domestic capital formation to net domestic product (%)	13.8	15.6	11.7	11.2	13.0	10.4	10.5	13.8	13.7	11.9	10.3
13. Number of countries in lines 14 and 15	8	7	6	11	6	10	8	8	13	17	18
14. Ratio, gross capital formation to gross domestic capital formation	0.995	1.003	0.595	0.921	0.900	0.880	0.735	0.995	0.815	0.913	0.816
15. Proportion, gross capital formation to gross national product (%)	21.0	23.8	10.3	14.5	16.6	14.5	11.4	21.0	17.6	15.2	13.1
16. Derived ratio, capital consumption to gross capital formation (%)	41.4	39.3	70.4	38.0	33.7	48.1	38.5	41.4	49.9	36.4	46.1
17. Derived ratio, capital consumption to gross national product (%)	8.69	9.35	7.25	5.51	5.59	6.97	4.39	8.69	8.78	5.53	6.04

18. Derived proportion, net capital formation to net national product (%)	13.5	15.9	3.3	9.5	11.7	8.1	7.3	13.5	9.7	10.2	7.5
C. Countries Excluding Politically and Financially Dependent Units: Calculation B											
19. Number of countries in line 20	8	7	3	8	5	7	3	8	10	13	10
20. Proportion, gross domestic capital formation to gross domestic product (%)	21.4	23.4	17.2	17.6	17.8	14.6	12.7	21.4	21.5	17.6	14.0
21. Derived ratio, capital consumption to gross domestic product (%)	8.82	9.22	7.21	6.16	5.39	6.18	3.59	8.82	8.75	5.84	5.26
22. Derived proportion, net domestic capital formation to net domestic product (%)	13.8	15.6	10.8	12.2	13.1	9.0	9.4	13.8	14.0	12.5	9.2
23. Number of countries in lines 24 and 25	8	7	3	8	5	7	3	8	10	13	10
24. Ratio, gross capital formation to gross domestic capital formation	0.995	1.003	0.905	0.890	0.977	0.894	0.964	0.995	0.974	0.923	0.915
25. Proportion, gross capital formation to gross national product (%)	21.0	23.8	15.8	15.7	18.2	13.2	12.7	21.0	21.4	16.7	13.0
26. Derived ratio, capital consumption to gross capital formation (%)	41.4	39.3	46.3	39.3	31.0	47.3	29.4	41.4	41.8	36.0	41.1

(Continued on next page)

Table 4 (Cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
27. Derived ratio, capital consumption to gross national product (%)	8.69	9.35	7.32	6.17	5.64	6.24	3.73	8.69	8.95	6.01	5.34
28. Derived proportion, net capital formation to net national product (%)	13.5	15.9	9.2	10.2	13.3	7.4	9.3	13.5	13.7	11.4	8.1

Lines 2, 4, 6, and 8: unweighted arithmetic means of percentages for individual countries given in Appendix Table 2.
Lines 9 and 10: from Table 1, lines 5 and 6.
Line 11: (line 4 x line 10 ÷ 100).
Line 12: (line 10) x (1 - line 4/100) ÷ (1 - line 11/100).
Lines 13-15: from Table 1, lines 7, 8, and 10.
Line 16: (line 4 + line 14).
Line 17: (line 16 x line 15 ÷ 100).
Line 18: (line 15) x (1 - line 16/100) ÷ (1 - line 17/100).
Lines 19-20: from Table 1, lines 19 and 20.
Line 21: (line 20 x line 4 ÷ 100).
Line 22: (line 20) x (1 - line 4/100) ÷ (1 - line 21/100).
Lines 23, 24, and 25: from Table 1, lines 19, 21, and 22.
Line 26: (line 4 + line 24).
Line 27: (line 25 x line 26 ÷ 100).
Line 28: (line 25) x (1 - line 26/100) ÷ (1 - line 27/100).

The derived entries in columns 8-11 were calculated directly from the components in these columns, not by averaging the derived entries in columns 1-7. For example, the entry in line 11, column 9 (8.59) is the product of the entry in line 10, column 9 (21.1) and the entry in line 4, column 9 (40.7), divided by 100.

For countries excluded from Panel C, see notes to Table 1.

well as accidental damage to it." (United Nations, Yearbook of National Accounts Statistics, 1958, New York, 1959, p. xv). The difficulties in making a proper estimate of this elusive process are well-known and need not be discussed here. For a number of countries, notably the United States, the estimates are based on legally permitted depreciation charges, which are calculated at original rather than replacement costs. And, in general, the allowance in question, particularly in the developed and industrialized countries, is largely for technical and demand obsolescence--not for physical wear and tear; so that replacement means additions to rather than mere preservation of productive capacity of capital.

Capital consumption ranges between 31 and 48 percent of current gross fixed capital formation and is, with erratic variations, about the same for high and low income countries (line 2). It is not easy to explain the absence of variation in the fraction. Offhand, one would expect that the secular rate of growth in gross fixed capital formation would be higher in the high income than in the low income countries; and given general similarity in the bases of estimating capital consumption, particularly the assumed economic life spans of durable capital goods, this would yield a lower ratio of capital consumption to gross fixed capital formation in the high income countries. On the other hand, as is noted in Table 6 below, long-lived construction was at least as high a proportion of gross fixed capital formation in the low income as in the high income countries: 61 percent in Groups VI and VII, compared with 59 percent in Group I, 54 percent in Groups II and III, and 57 percent in Groups IV and V. Furthermore, in recent years the growth of gross fixed capital formation may have accelerated more in the less developed countries than in the more developed--which, like the higher share of long-lived construction, would also make for a lower ratio of capital consumption to gross fixed capital formation in the low income countries. But these are conjectures, and an adequate explanation of the findings in Table 4 would require a close examination of the procedures used in estimating capital consumption and of the details underlying them in the individual countries.

Whatever the explanation, if we accept the ratios of capital consumption to gross fixed capital formation and the related ratios to total domestic capital formation, i.e., including inventory accumulation (line 4), we can, for 47 countries derive the average proportions of net domestic capital formation to net domestic product (line 6) and of net capital formation to net national product (line 8). It should be noted that the entries in these lines are unweighted means of the proportions for individual countries.

For the seven groups the movements of the net domestic and national capital formation proportions are erratic: the averages for Groups V and VII are larger than those for Groups III, IV, and VI. The wider groups yield a greater semblance of orderly association: the net domestic capital formation proportion declines from 14 or 14-1/2 percent in Groups I, and II and III, to 12-1/2 percent in Groups IV and V, and about 12 percent in Groups VI and VII; the net national capital formation proportion drops from about 14 percent in Group I to 10 percent in Groups IV and V, and 9-1/2 percent in Groups VI and VII. But the range in these net capital formation proportions is quite narrow and the erratic movement among the seven Roman numeral groups qualifies the association.

One difficulty is that capital consumption data are not available for as many countries as are gross capital formation data--particularly in Group VII with only 4, compared with 8 in Table 1; and if we were to exclude the politically and financially dependent units, the number of countries would be reduced even further. We, therefore, thought it best to accept the estimates in lines 2 and 4 as the best available, based on the most comprehensive coverage; and assume that the ratios of capital consumption to gross domestic capital formation for all countries need not be significantly different from those for countries exclusive of politically and financially dependent units.[4] It thus became possible to apply the average capital consumption ratios to the average gross domestic and national capital formation proportions available for the larger number of countries; and derive an alternative set of net capital formation proportions. In this alternative calculation, designated B, we avoid the errors that could be introduced by the use of the smaller sample in Panel A into the calculation of any fraction other than that of capital consumption to gross domestic capital formation.

The precise steps of calculation B are described in the notes to Table 4, and we need only state here that they involve the linking of the capital consumption ratios of Table 4 to the gross capital formation proportions of Table 1. One point should, however, be noted. The group averages of net capital formation proportions derived from group averages of capital consumption ratios and of gross capital formation proportions--rather than from net capital formation proportions calculated for individual countries--are in fact sets of weighted, rather than unweighted, means. Thus, if we had calculated the ratio of capital consumption to gross domestic product for each country, and then averaged the ratios unweighted, the averages would have been somewhat different from those given in line 11. If only because the weights reflect all countries in a group, the resulting averages may well be less erratic than the unweighted averages.[5]

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4. The comparison is in fact provided in Table 18, line 5. The difference is large only for Groups VI and VII combined (narrower Roman numeral groups cannot be shown because the number of countries is too small). Exclusion of the dependent units would have made it impossible to estimate the ratio of capital consumption to capital formation in Group VII and perhaps in Group VI. We, therefore, retained the assumption; although it could be dropped and alternative calculations for the wider groups carried through. The findings would not be affected much.

5. Let a_1 designate the capital consumption ratio and b_1 the gross domestic capital formation proportion for country 1; a_2 and b_2 for country 2; etc. Then for each country the ratio of capital consumption to gross domestic product is the product ab, and the unweighted mean of the latter for the n countries in calculation A is $(a_1b_1 + a_2b_2 + \ldots + a_nb_n)/n$. In calculation B, the average is $[(a_1+a_2+\ldots a_n)/n \times (b_1+b_2+\ldots b_n)/n]$. The latter result would be obtained in calculation A, if a_1b_1 were weighted by $(b_1+b_2+\ldots+b_n)/b_1$; a_2b_2 by $(b_1+b_2+\ldots+b_n)/b_2$; etc. If b_1 happened to be erratically small (large), a_1b_1 would be raised (depressed) because the fraction used as its weight would be raised (depressed) by the downward (upward) error.

Although the general pattern of the association between per capita income and net capital formation proportions in calculation B is not too different from that in calculation A, it has important advantages. The pattern is more systematic. The exclusion of the politically and financially dependent units from the calculation of the capital formation proportions still leaves an adequate sample. Finally, the range of the net capital formation proportions is wider and less erratic. If then we emphasize the averages for the smaller but more representative sample of countries in Panel C of Table 4, the findings can be simply stated. First, the net domestic capital formation proportion varies from 9 to 16 percent among the countries grouped by per capita income, and there is a significant positive association between it and per capita income (line 22). For the wider groups, the range is from 14 percent for Groups I and II and III, to slightly over 9 percent for Groups VI and VII. Second, the range in the net national capital formation proportion in association with per capita income is even wider (line 28). For the larger groups, it moves from more than 13-1/2 percent in Groups I and II and III, to about 8 percent in Groups VI and VII. In other words, the net capital formation (or savings) proportion in the less developed countries is no more than six-tenths of that in the higher income, more developed countries.

Our review of comparative evidence on the over-all capital formation proportions must include the scattered and uncertain data available for the Communist countries (Table 5). In addition to the general problem of reliability of these data, many of them for countries with relatively brief experience in statistical collection and analysis, there are three bothersome questions. First, for all the countries except the U. S. S. R., for which recalculations have been made by Western economists, capital formation is shown as a proportion of net material product--a nationwide aggregate that excludes services not embodied in commodities, such as government administration, defense, personal services, passenger transportation, and the like. Since the numerator, capital formation, is less affected by such omissions than the denominator, aggregate national product, the ratios shown are exaggerated, compared with the ratios in Tables 1 and 4. Second, since the denominator is net material product, the implication is that the numerator is net capital formation, i.e., after allowance for capital consumption. But we have no information on the derivation of the capital consumption charges; nor is there any evidence of an incentive in the Communist countries for adequate provisions for capital consumption similar to that furnished in the non-Communist countries by the taxation on income of business units, the allowance of capital consumption charges as legitimate deductions for tax purposes, and competition among business units in the free markets. But if we assume that these are net capital formation proportions, they should be reduced by from 10 to 20 percent to allow for a deficient denominator. Their conversion into gross capital formation proportions would involve a rather moderate adjustment since the rate of fixed capital formation in the Communist countries has accelerated markedly and the ratios of depreciation charges to current gross fixed capital formation should be relatively low--perhaps no more than a quarter.

But the major difficulty with these ratios lies in their valuation base, particularly in the comparative pricing of capital formation and the rest of the national product. The Communist countries have the power to change internal price relations; and if they desire to accelerate the rate of capital formation, they can attach higher prices to the factors producing capital goods and lower

Table 5.
Proportions of Capital Accumulation to Net Material Product, Communist Countries, Post-World War II Years (Based on constant price totals except for lines 9-11, which are based on current price totals)

	Country (1)	Period (2)	Proportion (%) (3)
1.	Bulgaria	1952-1957	20.0
2.	China (Mainland)	1952-1956	21.2
3.	Hungary	1951-1954	30.1
4.	Hungary	1955-1957	14.8
5.	Hungary	1951-1957[a]	23.5
6.	Poland	1951-1954	22.9
7.	Poland	1955-1957	21.0
8.	Poland	1951-1957[a]	22.1
9.	Poland	1955-1957[b]	18.8
10.	Yugoslavia, gross	1952-1956[b]	29.7
11.	Yugoslavia, net	1952-1956[b]	21.8
12.	U.S.S.R., gross investment to gross national product	1953	26
13.	U.S.S.R., gross investment to gross national product	1957	25

a. Average of entries in lines 3 and 4 or lines 6 and 7 weighted by number of years.

b. Specific adjustment for net balance of imports and exports.

Lines 1-11: United Nations, Yearbook of National Accounts Statistics, 1958, New York, 1959.
Line 12: Trends in Economic Growth, Joint Committee on the Economic Report Print, 83rd Congress, 2nd Session, Washington, 1955, Table X-3, p. 284.
Line 13: Comparisons of the United States and Soviet Economies, Joint Economic Committee Print, Part II, 86th Congress, 1st Session, Washington, 1959, p. 535, Table 3.

prices to factors producing other, largely consumer, goods. As a result, capital formation will be overvalued and consumption undervalued compared with their valuation in countries where the market is allowed to determine prices. In at least one case, that of Mainland China, Dr. T. C. Liu's calculations show that the ratio of net domestic investment plus government consumption to net domestic expenditures in 1957 was 25 percent when the valuation was in 1933 prices (relatively free market) and as high as 36 percent when the valuation was in 1952 prices (government determined prices under the Communist regime).[6] Conversely, if a Communist regime wishes to eliminate excess purchasing power of consumers, it can attach high turnover taxes to consumer goods, while keeping the prices of capital goods down to permit their easier absorption; and if the components of national product are estimated at final prices, the bias may be in the opposite direction. Finally, the whole problem is complicated by the distortions produced by the lag of price weights behind changes in costs under conditions of marked changes in the scale of production. We are thus dealing with a highly uncertain set of indicators and our conclusions must be taken as suggestive rather than substantive findings. The latter would require an intensive study of the data for each country--a project beyond my competence and the scope of this paper.

Let me then state the tentative findings as follows. First, it seems that the net capital formation proportion, on bases comparable with those observed in Table 4, would range in the neighborhood of about 15 percent. This allows for a reduction of about a tenth to a fifth to offset the omissions in the denominator, and a further reduction of a few percentage points to allow for the price biases. The correct level may well be a little higher or lower; but this figure seems close enough to the 20-odd percent for the net capital formation proportions in Table 5 as well as to the 25 percent for the gross capital formation proportion for the U. S. S. R. Second, the capital formation proportions for the several Communist countries are strikingly similar, if the full period is taken into account. As calculated, they hover around 20 percent--despite the wide range in per capita income from its high in the U. S. S. R. to its low in China and Bulgaria.[7]

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6. See "Structural Changes in the Economy of the Chinese Mainland, 1933 to 1952-57," American Economic Review, Papers and Proceedings, Vol. XLIX, No. 2, May 1959, pp. 84-93, particularly Table 1, p. 86. Another estimate by Choh-Ming Li, yields a net capital formation total (at 1952 prices) of 57.5 billion yuans, and a net national product total of 552.6 billion yuans for 1952-57, or a net capital formation proportion of only 10.4 percent (see Economic Development of Communist China, University of California Press, 1959, Table XXXII, p. 136).

7. This uniformity of capital formation proportions among Communist countries may be a statistical illusion. If the upward bias in the estimates is greater in the low income countries, a correction for it may yield capital formation proportions significantly lower for them than for the high income countries. On the other hand, it may well be that the forced drive for industrialization lifts the capital formation proportions in the low income countries to as high a level as in those already more developed--despite the much lower per capita consumption in the former.

III. The Limits of Capital Formation Proportions

Two questions are suggested by the findings in Tables 1 to 5. First, why is the range in the capital formation proportions, domestic and even national, relatively narrow, even for the non-Communist countries? Second, why have the Communist countries, despite the compulsion and authoritarian drive to maximize capital formation, failed to raise their capital formation proportions above the approximate level of 15 percent on a net basis, or of 25 percent on a gross basis? Both questions can be reformulated for more effective discussion into questions in terms of the lower and upper limits of the capital formation fraction. Apparently, some constraints operate over the long period to prevent the capital formation proportions from either falling below a minimum or rising above a maximum level.

The problem of the lower limit is most directly relevant to the national rather than the domestic capital formation proportions: for the poorer countries the latter are usually higher than the former. It is, therefore, legitimate to ask why their national capital formation proportions (in Tables 1 and 4), the country-wide savings rates, are so high, despite their low per capita incomes. And the question leads to two others. First, is this relatively high nationwide savings fraction in the less developed countries a recent phenomenon not typical of their longer term past? Second, (whether or not the answer to this question is 'yes'), are there lower limits to the long-run national savings fraction?

If we may begin with the latter question, the first relevant observation is that within a country differences in income level among various population groups are associated with a wide range of differences in the savings-income fraction.[8] True, these findings are usually based on size distributions of income affected by transitory elements, and distorted in various other ways. But with all the qualifications recognized, one can hardly doubt that if a country's population were classified by secular levels of income, many important groups at the bottom of the array at any given time would have no savings or actually dissavings; while others in the upper ranges would have quite high savings fractions. There seems little question that the range of the savings fraction among income groups within a country is far wider for the same ranges in per capita income than the range that we found in international comparisons--of less than 2 to 1, while per capita income ranged at least from 10 to 1.

There is no contradiction between these findings. Setting aside for the moment the origin of a country's savings in its non-personal institutions--business corporations, public corporations, and governments--one can reasonably argue that even the personal savings-income fraction varies much less

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8. To cite a single example, for the United States: in 1950 the top tenth of spending units (in the Survey of Consumer Finances) accounted for 29 percent of income, and had a savings-income ratio of 20 percent. The lower nine-tenths of spending units accounted for 71 percent of income and had a savings-income ratio of 3 percent. The range from 3 to 20 percent in the savings-income ratio was thus associated with a range from 0.8 to 2.9, or less than 1 to 4, in income per unit (see Simon Kuznets, Shares of Upper Income Groups in Income and Savings, National Bureau of Economic Research, 1953, Table 54, p. 216).

among countries than among income groups within a country. The members of the latter are at different phases of their secular life cycle and the failure to save in some phases is a rational adjustment either to future prospects or to past performance. Thus, the younger members of the labor force, particularly in the early years of family formation, are often dissaving--drawing partly on their own past savings and partly on credit in expectation of the secular rise of their incomes and eventual reduction of their expenditures; and the retired or near-retired members of the labor force are also dissaving--drawing upon the fruits of their past work. In a sense the international situation is analogous to this differentiation within a country: nations with future prospects and pressing needs may finance much of their domestic capital formation by capital imports, and those that have reached maturity may to some extent draw upon their past external savings. But the analogy is limited since no country can incur net dissavings for any length of time without impairing its economic standing and thus losing these capital imports. Moreover, the very inequality of the size distribution of income within a country makes for positive, rather than negative, aggregate personal savings: the groups at the higher levels of per capita income are in a position to save. Indeed, the general process by which a population adjusts, at different economic levels, to the economic potentials provided by its aggregate product, is such that the consumption levels of contiguous economic levels are closely related and the upper income groups, even in low income countries, perforce have positive savings (although their incomes may be low compared with those of middle or even some low income groups in the developed countries). It is unrealistic to suppose that all such positive personal savings will be absorbed by loans to other members of the community for consumption purposes; part must be used to finance capital formation.

If one adds to personal savings the savings that originate in the business corporations and in the government--under the assumption of political stability and minimal administrative efficiency--it would seem that a positive nationwide savings fraction characterizes any country, no matter how underdeveloped and how low its per capita income. This, of course, would be true of the longer run: in the short run a natural calamity, e.g., a poor crop, or a man-made calamity, e.g., a war, can produce negative countrywide savings--even in highly developed countries, which are subject also to the effects of sharp cyclical contractions.

One final observation on the lower limit of capital formation proportions in the non-Communist countries relates to the pricing problem.[9] The capital components may be valued at higher prices, relative to prices of consumer goods, in the less developed countries than in the more developed countries. The relative cost of producers' durable equipment, particularly, is much lower in the more advanced, industrialized countries. The magnitude of this relative price problem is not negligible and can be illustrated by the figures for 1950 for Italy. In the tabulation below, we show the percentage proportions of gross capital formation to gross national product with Italian price weights, i.e., using Italian prices for capital and consumer goods, and with U.S.A. price weights.

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9. I am indebted to Professor Nicholas Georgescu-Roegen of Vanderbilt University for calling my attention to it.

Percentage Proportion of Gross Capital Formation to Gross National Product for Italy, 1950[10]

	Italian Price Weights	U. S. A. Price Weights
Producers' durable equipment	10.0	4.0
Construction:		
Residential	2.2	3.3
Other	5.6	5.3
Total	7.8	8.6
Gross fixed capital formation	17.8	12.6
Inventory accumulation	1.3	1.1
Net exports	0.1	0.1
Total gross capital formation, sum of above	19.2	13.8

The relative prices of machinery and equipment and, to a much lesser extent, of 'other' construction were much higher in Italy than in the United States; whereas the relative prices of residential construction were lower. The use of the price weights of the higher income country (U. S. A.) not only reduced markedly the aggregate capital formation proportion for Italy but also changed significantly the distribution of capital formation among types of capital goods.

If this bias is generally true, the use of the price weights of the more advanced countries would lower the capital formation proportions we now show for the underdeveloped countries. Therefore, one further explanation of the lower limit of the capital formation proportions in the less developed countries, as they are calculated in Tables 1 and 4, may be that, if some minimum of real capital formation is required, its high relative pricing in the less developed countries magnifies the capital formation proportions. In other words, these proportions, although they may be true as savings proportions, may be exaggerated as measures bearing upon real capital stock and product.

However, this upward bias in the capital formation proportions in the less developed countries may be offset by the failure to record substantial amounts of non-monetary capital formation. Thus for India, Wilfred Malenbaum's estimates suggest that in 1950/51 non-monetized investment constituted over a quarter of total net domestic investment.[11] Omission or understatement

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10. Calculated from Milton Gilbert and Irving B. Kravis, An International Comparison of National Products and the Purchasing Power of Currencies, The Organization for European Economic Cooperation, Paris, no date, Table 30, p. 119.

11. See East and West in India's Economic Development, National Planning Association, Washington, 1959, Tables 1 and 3, pp. 18 and 28.

of such investments in the low income countries, in which the non-monetary sector accounts for a large proportion of total product, is quite likely. But we cannot at present balance the upward bias due to high relative prices of capital goods against the downward bias due to the omission of non-monetized investment.

In any case, illuminating as the preceding observations are for any interpretation of capital investment in real terms, they do not touch upon the lower limit of the national savings fraction--except to suggest that the latter can, in a sense, be propped up by the need for a minimum of supplies of real capital, particularly of the higher priced types of machinery and equipment. We can terminate the discussion of the first question by asserting that under the assumed conditions of political stability and internal and external peace the lower limit of the long-term national savings proportion is significantly above zero.

However, we can argue, in response to the second question, that the fractions shown for the low income, underdeveloped countries for recent years in Tables 1 and 4--omitting the Communist countries for the time being--are too high to be plausible approximations to the fractions in the long run, especially in those countries in Asia and Africa (and some in Latin America) in which long-term population growth was, until the very recent decades, quite moderate. For if we assume that population grew less than 1 percent per year[12] and that per capita income did not rise significantly, a long-term net capital formation proportion as high as 8.1 percent, or a net domestic capital formation proportion as high as 9.2 percent (see Table 4) is inconsistent with what we know, or can reasonably assume, about the reproducible capital-output ratios in the less developed countries. The evidence assembled in Appendix B of Paper IV suggests an average reproducible capital-output ratio for the less developed countries of between 2-1/2 and 3-1/2; and a recent estimate for 1950 for India (1.8) is much lower.[13] A net national capital-output ratio of 3.0 and a net capital formation proportion of 8 percent would mean an annual rate of growth in net national product of 2.7 percent; and with population growing, let us say, 1/2 per cent per year, would mean a rise in real income per capita of about 2.2 percent per year, or doubling in about 32 years. No such rise in per capita income could have occurred from the mid-19th century to the present in the populous countries of Asia (except Japan) or among the indigenous populations of most African and many Latin American countries. Indeed, if we assume no rise in per capita income, a capital-output ratio of 3, and a 0.5 percent per year rise in population, the implicit net capital formation proportion would be 1.5 percent.

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12. From 1850 to 1900 the population of Asia grew at the rate of 5.5% per decade; that of Africa at the rate of 7.1% per decade. For 1900-50 the corresponding rates of growth per decade were 8.2% for Asia and 7.1% for Africa (see United Nations, The Determinants and Consequences of Population Trends, New York, 1953, Table 2, p. 11).

13. See Paper IV, Appendix Tables 2 and 3, pp. 63 and 65. For the recent estimate for India see Raymond Goldsmith and Christopher Saunders, ed., The Measurement of National Wealth, Income and Wealth, Series VIII, International Association for Research in Income and Wealth, London, 1959, Table VII, p. 32.

While this may be too low an estimate, an assumption of insignificant growth of per capita income over the long run, a secular capital-output ratio of between 3 and 5, and a rate of growth of population of 1 percent per year (which is quite high even for some of the less crowded underdeveloped countries), would yield an implicit net capital formation proportion of less than 5 percent. It seems reasonable to suggest that this proportion in the long run must have been not over 5 percent in most of the underdeveloped countries, except those in Latin America. It follows that the international spread in the net (and gross) capital formation proportion over the long period before the recent years was probably much wider than in recent decades--from 5 to 15 percent or more.

However, these greater differences between the high and low income countries in their net capital formation proportions were not necessarily a major factor determining the marked differences in their rates of growth and the growing disparity in their per capita incomes. Despite possible differences in the capital-output ratios, and differing relations between material capital investment and other productive factors, the net capital formation proportions themselves may have been only the symbol, the outward index of far more important underlying factors that determined the rates of growth. And yet it is useful to record that, insofar as the empirical data permit some reasonable inference, the relatively narrow range in the net capital formation proportions among countries grouped by per capita income, shown in Tables 1 and 4, was probably true only for the post-World War II years; and that the range over the longer past, say from the mid-19th century to World War II, must have been much wider.

We turn now to the upper limit on the capital formation proportions, again dealing with the proportion of national capital formation to national product. The first relevant observation is that, given the growth of per capita income noted in the developed countries, net capital formation proportions far higher than 15 percent seem feasible. Thus, if per capita income grew at a rate of some 20 percent per decade, and if the initial capital formation proportion was say 10 percent, within less than 40 years per capita income would have doubled; and if all of the increase in income per capita was used for capital formation, the capital formation proportion at the end of four decades would have been more than 110 over 200, or over 55 percent. Note that in many countries with such rises in per capita income, the initial levels of per capita consumption were satisfactory by the standards of the time, and no apparent great hardship is involved in assuming the allocation of the entire increment in per capita income to capital formation. (We could allow for the gradual rise in the capital formation proportion and its effect on the rise in per capita income; but there is no need to complicate the illustration.) The point is simply that a sharp rise in per capita income even with a relatively moderate net capital formation proportion of 15 percent would permit secularly higher net capital formation proportions than have been recorded.

At best, the net capital formation proportions have not gone much above 15 percent, either in the non-Communist or in the Communist countries. The explanation is perhaps easier for the former than for the latter. After all, in the non-Communist countries personal savings have been a major source of net capital formation financing; and the decisions by individuals on the use of income under conditions of technical progress and social change which supplied continuous stimuli to expanded consumption and reduced the propensity to save, could easily limit the overall national savings fraction. Briefly, the limits on

the national savings rate can be viewed as the result of a complex of factors that restrict net savings by households, net retained profits of corporations, and net savings of governments--all expressed as fractions of national product. In a free market society, the checks upon the net savings of governments can be associated with the effort to limit government's role in economic activity to the indispensable types of overhead capital where the social returns much exceed the private. The limits upon net income retention by business corporations are set partly by the control over corporations of the public security markets, and partly by the income taxing power of government. And the limits upon personal savings stem partly from the restraints upon inequality in the size distribution of income, which prevent the share of upper income groups from rising and, in fact, in many developed countries in recent decades brought about a decline in this share; partly from the fact that savings in the middle and lower income ranges can be justified only in terms of a calculated choice between future and current consumption, a choice that sets a fairly low upper limit to the savings-income rate for groups below the top. It would be a bold analyst indeed who could, with this analytical skeleton at hand, demonstrate that these factors determine a maximum net capital formation proportion of 15, rather than 10 or 30 percent. Yet there is no puzzle about the limit on the national savings rate in countries that are sufficiently free to allow, if not complete consumer sovereignty, at least a dominant weight to personal decisions concerning the allocation of resources between the present and future; and that are sufficiently dynamic and responsive to pressures of economic groups to damp and ameliorate income and other inequalities arising from the operation of free markets.[14]

The case of Communist countries is somewhat more puzzling, for here we have nations which, with ruthless exercise of authoritarian power and with severe curbs on the consumption demand of households, attempt to maximize the production of capital equipment. It is apparently so much a major goal of Communist society that the slogan "Accumulate, accumulate! That is Moses and the prophets!"[14a] appears to be a fair description. Under such conditions why should the net capital formation proportion hover between 15 and 20 percent--even in a country like the U. S. S. R. which presumably has had plenty of experience with centralized planning and emphasis on capital accumulation?

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14. For a more detailed discussion of the factors that limit the national savings or net capital formation rate in a country like the United States see two of my earlier papers: "Proportion of Capital Formation to National Product," American Economic Review, Papers and Proceedings, Vol. XLII, No. 2, May 1952, particularly pp. 509-13 and 521-24; and "International Differences in Capital Formation and Financing," in Moses Abramovitz, ed., Capital Formation and Economic Growth, Princeton University Press for the National Bureau of Economic Research, Princeton, 1956, pp. 19-111, particularly pp. 46-50 and the appendixes referred to therein. Further detailed discussion of the United States record is contained in my Capital in the American Economy: Its Formation and Financing, National Bureau of Economic Research, mimeographed, in press by mid-1960.

14a. Karl Marx, Capital (Modern Library ed.), New York, 1937, p. 652.

We cannot answer the question by a detailed examination of the statistics for the Communist countries. As already indicated, such a task is beyond our competence; and we hope that our inference that the net capital formation proportion even in the Communist countries does not exceed in the long run (at least in the past) about 15 percent (give or take a few percentage points) is consistent with the available evidence. The purpose here is to consider in rather general terms what may be involved. We shall not assume that the initial structure with which we deal is one that follows immediately upon a revolution and collapse of the preceding social order--conditions under which all Communist regimes actually begin. Rather we shall assume fairly normal initial levels, i.e., relatively full utilization of resources within an established social framework, and consumption levels that, if not necessarily ample, are at least adequate for a minimum standard of living.

A hypothetical example can indicate the possible rise in the net capital formation proportion and its implications. In this example we begin with the structure of national product allowing 15 percent for net capital formation, 10 percent for government consumption, and 75 percent for private consumption. The average and marginal capital-product ratios are assumed to be 3. And, to simplify calculations, we hold population constant, and assume that total personal and government consumption will also remain constant and that all the increase in national product will be devoted to capital formation. The results for a few years will then be:

	Year 1	Year 2	Year 3	Year 4
Capital, beginning of year	300	315	335	361.7
Net product	100	105	111.7	120.57
Net capital formation	15	20	26.7	35.57
NCF proportion, %	15.0	19.0	23.9	29.5
Govt. consumption	10	10	10	10
Private consumption	75	75	75	75

The calculation is simple: in each year we derive national product from the stock of reproducible capital available at the beginning of the year and the average capital-product ratio; and we derive the stock of capital at the beginning of the year by adding to the capital stock at the beginning of the preceding year the volume of net capital formation. The example could be expressed algebraically; and it could be made more realistic by allowing population and household and government consumption to grow, the latter even on a per capita basis. But if the other assumptions are retained, and if the rate of growth of consumption is significantly lower than that of national product, the result will be the same--a rapid rise in the net capital formation proportion. In our example the effect is exaggerated; but the more realistic illustration would also reveal a doubling of the initial net capital formation proportion within a decade, if not in three years.

What are the essentially questionable elements in the illustration? The first to be noted is that the marginal (and the average) capital-output ratio remains constant, despite the marked increase in total capital relative to total labor. With full employment of resources assumed, and no trend in the ratio of labor force to population, constant population means constant labor force and labor input. Yet capital increases from 300 to 362. Is it reasonable to assume that capital will increase relative to labor, but that the effect of additions to capital on additions to product will remain unchanged? Obviously, if we assume that the initial combination of capital and labor (i.e., in year 1) is the optimum under the existing technology, and that any rise in the ratio of capital to labor produces a proportional reduction in the contribution of capital (i.e., a proportional rise in the capital-output ratio), the capital-output ratio from year to year will move exactly as the total capital stock moves, i.e., from 3.00 to 3.15 to 3.35 and so on. Net product will then be held down to 100, and the net capital formation proportion to 15 percent.

There is no reason to assume that technological patterns--either changes in production functions or in product mix--could not be modified so that a combination of factors in which capital increases relative to labor will still yield a constantly high addition to product per unit addition to capital. Yet at any given time existing technology does imply, particularly with respect to specific categories of output (e.g., producers' goods so emphasized in the Communist pattern of production), a range of optimal mixtures of capital and labor. A shift from the initial scarcity of capital per labor unit to its relative plenitude would, all other conditions being equal, mean a decreasing net addition to product per unit addition of capital, i.e., an increasing marginal capital-output ratio; and passing the optimal combination may involve, short of major technological changes, a further rise in this ratio. It may well be that the optimal mixture has been set by the technology of the more advanced non-Communist countries, and if it is adopted with only minor adjustments, a proliferation of capital goods relative to labor may mean either a rising capital-output ratio in the sectors saturated with capital goods; or a decline in overall productivity in the sectors starved of capital investment (and perhaps flooded with the overflow of labor from the capital-favored sectors). If this happens, the outward manifestation will be difficulty in raising productivity, and an increasing capital-output ratio whenever the capital formation proportion advances beyond the optimal level in current technology (with whatever modifications are needed in the individual Communist countries).[15]

15. One aspect of the discussion connected with the index number problem should be noted. If the capital goods whose production is stressed in the attempt to raise the capital formation proportion are valued at their high, initial year prices, the increase in this proportion and in the total product will be large. Retention of the initially high prices as the basis of valuation will therefore result in higher capital formation proportions--probably well above the 15 to 20 percent suggested for recent years for the Communist countries. On the other hand, the shift to valuation at terminal prices will tend to keep the capital formation proportions down. One can thus argue that the upper limit on capital formation proportions is to some extent a result of measurement practices--of the use of terminal rather than initial price weights. But this is not as arbitrary as it may seem. An increase in capital relative to labor should lead to a lower valuation of the former--and we are, in a sense, back to the real issue of the optimal combinations of labor and capital under the limiting conditions of existing technology.

A related factor is the possibly higher capital-output ratio for the capital goods sector than for the consumption components of national product. If we assume initially (and continuously) a ratio of 2.6 for the consumption sector and 5.27 for the capital formation (which, weighted, yield 3.0 for the nationwide ratio in year 1), capital stock at the beginning of year 4 would be 354 (not 361.7), the nationwide capital-output ratio (under the assumption of constancy of sectoral ratios) would be 3.2 (not 3.0) in year 4, national product would be 110.2 (not 120.6), and the net capital formation proportion would be 22.9 (not 29.5) percent. The combination of a higher capital-output ratio for capital formation with a possible increase in this ratio because of the increase in the supply of capital relative to labor in this sector, could limit any rise in net capital formation proportions severely.

But the weight of these factors on the supply or production side is an unknown quantity; and I am inclined to assign greater weight to the pressures for a greater consumption share--pressures that, despite the authoritarian ruthlessness of Communist regimes, are effective enough to claim a sufficient share of the national product and set fairly narrow limits to the rise of the capital formation proportions. I cannot identify or quantify the sources of these pressures in detail, but it is not difficult to see where they originate.

There are two broad categories. One stems from what might be called the production implications of the industrialization shifts aimed at by the attempt to maximize capital accumulation under the Communist regimes. Thus, the shift of population from rural to urban communities means necessarily a rise in per capita consumption, in the resources that have to be employed, if the real standard of living is not to decline even moderately. The assurance of shelter, sanitary, and transportation services is far more costly for urban than for rural population. Consequently, constancy of personal consumption per capita (as usually measured) implies a decline in the real levels of living when there is a shift of population to urban communities (or within them to greater metropolitan centers); and the larger the shift, the greater the decline. Second, increasing industrialization requires a more highly skilled and literate labor force, and hence a greater input of resources--on a per capita basis--into some components of consumption expenditures. This also means that with consumption per capita constant, and a greater proportion devoted to education, training, and the related services, certain other elements of consumption are being reduced. Third, since repression of the labor force without differential inducements is highly unproductive, particularly in combination with an increasing stock of capital which renders unresponsive labor all the more expensive, differential compensation in a system of widely ramified incentives to at least a limited part of the labor force is indispensable. But this means a rise in the living standards of some groups in the population (ranging from plant managers to Stakhanovites to other 'heroes' to the more skilled and responsive groups of the Communist labor force) and with a constancy in per capita consumption for total population, the standard of living of other groups must go down--to compensate for the rise in the consumption standards of the favored groups. There may be other aspects of the same broad connection between attempts to force capital accumulation without impairing the overall productivity and consumption of the economy; but it all comes down to the introduction of wide differentials in consumption standards among various groups in the population, and particularly to the increase in the standards of those groups whose contribution is viewed as strategic in assuring the efficiency of capital. Such differentiation implies decline or

reduction in consumption standards of other groups--an absolute reduction if per capita consumption for the country is not allowed to rise. Obviously, there are limits to such a process: if carried too far it would mean either an explosion or an increase in repressive forces needed to hold the lid down--which would raise consumption anyway, since it would necessitate larger outlays on police. Thus mere considerations of capital efficiency might force a substantial rise in per capita consumption; and the assumption in the illustration above of constancy in consumption is unrealistic. A rise in per capita consumption, combined with a rise in population, can account for a large fraction of the marginal increment to national product and thus limit the rise in the net capital formation proportion.

The other source of pressures for rising per capita consumption in the Communist countries is the international demonstration effect (and in some of the satellite countries the remembrance of the past). Since the Communist are follower countries, having come late to the spread of industrialization, they tend to combine imitation with attempts at self-conscious differentiation. Whether the developed non-Communist countries are viewed as something to catch up with or surpass, or as enemies whose strength is to be feared, or as examples of what should be avoided, an attempt is being made constantly to learn from them--if with discrimination. Undoubtedly, the higher consumption standards of the more advanced non-Communist countries are an important element in the situation which, despite the attempts of Communist regimes at isolation, exercise major effects, if not on the broad groups in the population (although even they are being increasingly affected), then on the economic and social elites who have had greater opportunity to observe and learn from the economic and social patterns of other countries and who are more influential in deciding upon the allocation of resources in their own countries. Thus, just as the technological attainments of the more advanced non-Communist countries affect the production patterns of the Communist countries, so do the consumption patterns--whenever the strain of backwardness is sufficiently relieved to allow the operation of competitive patterns of ultimate consumption to assume sufficient prominence.[16]

The preceding, rather general comments, are in the nature of conjectures insufficiently grounded in detailed consideration of the economic statistics for the Communist countries to permit an approximation of the maximum long-term capital formation proportions in these countries. In particular, nothing in these comments suggests that over the long run, given satisfactory consumption standards and compatibility of Communist authoritarian regimes with a plenitude of consumer goods and freedom of consumers to choose what they want (which is a big assumption indeed), a planned direction of the economy could not sustain net capital formation proportions much higher than the 15 to 20 percent prevailing today. But dealing with this question would involve us in speculation on the tenability of the basic assumption that the highly authoritarian type of Communist regime can be retained after the process of initial capital accumulation and of transition to industrialization has been completed. It may well be modified beyond recognition once these transition processes have given place to

16. The official estimates for the Communist countries do show a substantial rise in per capita household consumption for recent post-World War II years (usually from 1952 to 1957); but much of it must be making up for the declines sustained during the war and immediate post-war years.

a high level of production and sufficiently high levels of consumption among the upper economic groups to provide increasing pressure for more freedom of other consumers in determining the allocation of resources in the economy. Such speculation is beyond the scope of the present discussion, but it is not irrelevant--because it points clearly to the connection between such technical matters as capital formation proportions and the whole structure of the social system that allocates resources and the possible responsiveness of this system to changes in absolute and relative levels of economic performance.

IV. Structure of Domestic Capital Formation by Type of Capital Good and by Industrial Use

The present section deals with the structure of domestic rather than national capital formation. Foreign capital imports and exports (i. e., net changes in claims against foreign countries) bear a high ratio to the increment to national product--high relative to the ratio of domestic capital formation to addition to product. Thus, on the generous assumption of a long-term yield of 10 percent, the capital-output ratio for foreign capital is 10, compared with countrywide domestic gross capital-output ratios ranging not much above five and net ratios not much above three. The subtraction of capital imports thus makes the national capital-output ratio too low--compared with exactly the same complex of capital goods financed internally; and the addition of capital exports makes the national capital-output ratio too high--compared with exactly the same amount and structure of domestic capital formation. It is therefore more convenient to deal with the structure of domestic capital formation--if it is of interest in the analysis of effects of capital on the growth of product--although allowance can easily be made for the effect of varying shares of net changes in claims against foreign countries.

Table 6 summarizes the distribution by type of capital good of gross domestic capital formation, since gross volumes are available for many more countries than net. Even so, for most components the number of countries is too small to permit distinction of all seven Roman numeral groups; and we limit the table to the four wider groups. Averages are presented for all countries (columns 1-4) and for the sample excluding politically and financially dependent units (columns 5-8).

Some broad findings can easily be suggested. First, the share of inventory accumulation in gross domestic capital formation varies from 4 to 10 percent or, for the more representative sample, from 5 to 11 percent (line 10). Since the proportion of capital consumption to gross domestic capital formation is about four-tenths (see Table 4, line 4), a 4 percent share of inventory accumulation in gross domestic capital formation means a 7 percent share in net domestic capital formation; and an 11 percent share in the former means a 19 percent share in the latter.

The share of inventory accumulation in gross (and presumably net) domestic capital formation is negatively associated with per capita income: it is somewhat higher in the low income groups. In the smaller and more representative sample, the share for Groups VI and VII is 11 percent whereas that for Group I is 7 and that for Groups II and III, 5 percent. This may be due to the fact that the inventory-domestic product ratio is at least no lower in the less

Table 6.
Distribution of Gross Domestic Capital Formation by Type of Capital Good, Countries Grouped by Per Capita Product, Post-World War II Years (Based on current price totals)

	Groups of Countries by Per Capita Product							
	All Countries				Countries Excluding Politically & Financially Dependent Units			
	I (1)	II & III (2)	IV & V (3)	VI & VII (4)	I (5)	II & III (6)	IV & V (7)	VI & VII (8)
Dwellings								
1. Number of countries	7	9	4	6	7	6	3	3
2. Ratio to gross domestic capital formation (%)	21.9	22.2	19.1	17.2	21.9	20.9	16.2	16.9
Other Construction								
3. Number of countries	6	9	2	6	6	6	1	3
4. Ratio to gross domestic capital formation (%)	33.6	30.7	36.2	39.6	33.6	26.9	42.0	35.3
All Construction								
5. Number of countries	6	11	5	12	6	8	3	7
6. Ratio to gross domestic capital formation (%)	55.5	52.2	50.7	54.6	55.5	48.1	48.9	53.4
Producers' Equipment								
7. Number of countries	5	11	5	11	5	8	3	6
8. Ratio to gross domestic capital formation (%)	38.7	43.6	38.7	34.4	38.7	47.1	43.0	33.6
Increase in Stocks								
9. Number of countries	7	12	14	13	7	9	10	7
10. Ratio to gross domestic capital formation (%)	7.1	4.3	9.4	9.8	7.1	4.9	9.5	10.9

Ratios are unweighted arithmetic means of percentages for individual countries given in Appendix Table 2.
For countries excluded from columns 5-8 see notes to Table 1.

developed countries than in the high income, more developed countries. The greater importance of agriculture with its large seasonal inventories, and the greater difficulties of transportation and communication in the less developed countries would make for a higher countrywide inventory-product ratio; although this may be offset by longer production periods (and hence greater relative volumes of stock in process) in the industrial sectors of the more developed countries. If the countrywide inventory-domestic product ratio is as high in the less developed countries as in the more developed, the ratio of additions to inventories to current product also need not be lower; and, indeed, as we saw in Table 1, the ratio for Groups VI and VII is about the same as that for Group I and somewhat higher than that for Groups II and III. But equality among wide groups of the ratio of inventory change to domestic product combined with a lower ratio of total domestic capital formation to domestic product in the less developed countries than in the more developed necessarily means a higher ratio of inventory change to domestic capital formation in the former. The findings in Table 6 are thus consistent with those in Table 1.

Second, of the 89 to 96 percent of domestic capital formation represented by fixed capital, construction accounts for somewhat under six-tenths and producers' equipment for somewhat over four-tenths. There are some differences in this distribution among groups of countries. Thus for the larger sample of countries the share of construction in gross fixed capital formation shifts from 59 percent in Group I, to 55 percent in Groups II and III, to 57 percent in Groups IV and V, and is as high as 61 percent in Groups VI and VII; the share of producers' equipment varies correspondingly from 45 to 39 percent (based on columns 1-4, lines 6 and 8). But these differences assume significance only if we infer, on the basis of data cited above for Italy, that prices of producers' equipment relative to prices of construction are much higher in the less developed than in the more industrialized countries. This means that conversion to the same relative price structure would yield a distribution of fixed capital formation in which the share of construction would be significantly larger in Groups VI and VII, and perhaps even in Groups IV and V, than in Group I or Groups II and III; and that of producers' equipment correspondingly lower.

Third, the share of residential construction in domestic capital formation ranges from 17 to 22 percent (columns 1-4, line 2); in fixed capital formation from 19 to 23 percent (based on columns 1-4, lines 2, 6, and 8). It is a substantial segment of total capital investment--although in some ways it can be viewed as a consumer rather than a capital good. As estimated in Table 6, the share is somewhat lower in the less developed than in the more developed countries: residential construction in Groups VI and VII is 17 percent of domestic capital formation and 19 percent of fixed capital formation--compared with 22 and 23 percent in Group I. Correspondingly, the shares of other construction in both gross domestic capital formation and fixed capital formation are somewhat higher in the less developed countries: the former is 40 percent in Groups VI and VII, 34 percent in Group I and 31 percent in Groups II and III (columns 1-4, line 4); the latter is 44, 36, and 32 percent respectively (based on columns 1-4, lines 4, 6, and 8). But here again we face the question of the effects of the relative price structure. The illustrative data for Italy suggest that the prices of other construction relative to residential are significantly higher in the low income than in the high income countries. It may well be that the differences among the groups of countries in the distribution between residential and other construction merely reflect relative price differences and would disappear if the estimates were converted to the same price structure.

Thus the findings tentatively suggested by Table 6 are a lower share of producers' equipment, and higher shares of inventory accumulation and of construction in gross domestic capital formation in the low income, less developed countries than in the high income, more developed countries.

It would have been of interest to construct a parallel table for the Communist countries. However, only scraps of information for the U. S. S. R., China, Poland, Hungary, and Yugoslavia are easily available. With the usual allowances for the necessary qualifications, the following observations can be made.

First, the share of inventory accumulation in either net or gross capital formation (almost all of it domestic) is quite high. Thus in the U. S. S. R. the ratio of inventory accumulation to total gross investment is estimated to be 14 percent for 1949-55.[17] In Mainland China, Choh-Ming Li's more detailed estimates, in the source cited in footnote 6 above, indicate a share of inventory accumulation in total net capital formation of over 19 percent for 1952-57. In Hungary, the ratio of inventory accumulation to net domestic capital formation was about 38 percent, either for 1951-54 or 1954-57; in Poland it was 36 percent for 1951-54 and 34 percent for 1954-57; in Yugoslavia it was less than 10 percent for 1952-56.[18] By and large, inventory accumulation seems to be a much higher proportion of domestic capital formation, gross or net, in the Communist than in the non-Communist countries--even the less developed areas within the latter. While in the early post-war years this may have been the result of purposeful replenishment of reserves depleted in the preceding years of war and turmoil, the persistence of the high ratio can reasonably be interpreted as a reflection of the difficulties in centralized planning: of bottlenecks on the one hand and of the accumulation of useless inventories on the other.

Second, we have little information on the distribution of fixed capital formation between construction and producers' equipment. The sources cited in the preceding paragraph suggest about two-thirds for construction and a third for equipment for Mainland China; and about a fifty-fifty division between construction and equipment for Yugoslavia. The distribution is not very different from that in Table 6 for the non-Communist countries, but it may well be that the share of equipment in fixed capital formation is somewhat higher in the Communist countries.

Third, whether construction is a half or two-thirds of fixed capital formation in the Communist countries, the share of residential construction is quite low--much lower than in the non-Communist countries. The estimates by Norman Kaplan for the U. S. S. R. yield a share of residential construction in total gross investment of 9. 2 percent for 1928/29-32, and 9. 1 percent for 1933-37; but rising to 16. 9 percent for 1947-51, the latter figure affected by reconstruction after World War II.[19] I could not find more recent estimates, but the

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17. O. Hoeffding and N. Nimitz, Soviet National Income and Product, 1949-55, Rand Memo, RM - 2101, April 6, 1959, App. Table 36, p. 180.

18. Yearbook of National Accounts Statistics, 1958, United Nations, 1959.

19. See Abram Bergson, ed., Soviet Economic Growth, Conditions and Perspectives, Evanston, 1953, Table 2. 12, p. 61.

data in Hoeffding and Nimitz (cited in footnote 17) on growth of the stock of dwelling units do not suggest any rise in the ratio over that indicated for 1947-51. For Mainland China, Li's estimates indicate a ratio of housing construction to total net capital investment of only 8 percent. For Poland, Alexander Erlich indicates a share of housing in gross fixed investment for 1950-55 of only 10.4 percent, with the plan for 1956-60 scheduling a rise to 16.2 percent.[20] Scattered as the data are, it is clear that residential construction has been a much lower fraction of total capital investment in the Communist countries than in the non-Communist--even the less developed countries among the latter (in Groups VI and VII).

The distribution of domestic capital formation by industrial use is of obvious interest in indicating the most favored industrial sectors in the channeling of investment within the country. Unfortunately, this distribution is available for fixed capital formation alone; and, more important, for only seventeen countries in the post-World War II years. Because there are so few countries, we show the shares of the industrial sectors in gross fixed capital formation for each and also give the unweighted means of the shares for the seven countries in Groups I and II; the six countries in Groups III, IV, and V; and the four countries in Groups VI and VII (Table 7, Panel A).

Despite the small sample, the differences in structure of gross fixed capital formation by industrial use among countries at different levels of per capita income stand out clearly. First, as we move down the array by per capita income, the share of fixed capital formation channeled into the agricultural sector increases, from an average of 8 percent for Groups I and II to 26 percent for Groups VI and VII. Second, the share of fixed capital formation devoted to mining, manufacturing, construction, and power is about the same for the three broad groups of countries--the differences between the 30 percent for Groups I and II, 28.4 percent for Groups III, IV, and V, and 28.1 percent for Groups VI and VII are too small to be significant. Nor are there significant differences among the three groups in the average share of fixed capital formation devoted to the other 'industry' sector--transportation and communication--which is about 15 percent. Thus the share of the M+ sector in fixed capital formation is about 43 to 45 percent for each of the three wide groups of countries. Third, the average share devoted to residential housing drops from over 20 percent of fixed capital formation for Groups I and II, and III, IV, and V, to 14 percent for Groups VI and VII--although the latter is probably an underestimate, in view of the evidence in Table 6. Far more significant is the decline in the share of other services in fixed capital formation, which drops from 17 percent in Groups I and II to 9 percent in Groups VI and VII. This, together with the decline in the share devoted to dwellings, produces a drop in the share of all services (excluding transportation and communication) in fixed capital formation from 47 percent in Groups I and II to 31 percent in Groups VI and VII.

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20. See "The Polish Economy after October 1956: Background and Outlook," American Economic Review, Papers and Proceedings, Vol. XLIX, No. 2, May 1959, Table 3, p. 112.

Table 7.
Distribution of Gross Fixed Capital Formation by Industrial Use Compared With Distribution of Gross Domestic Product by Industrial Origin, Selected Countries, Post-World War II Years (Based on current price totals, 1951-1957 unless otherwise indicated)

	Country and Distribution	Agriculture, Forestry, & Fishing	Mining, Manufact., Const., Elec., Gas, & Water	Transport. & Communication	M+ Sector (2+3)	Dwellings	Public Admin.	Other Services	All Services
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(5+6+7) (8)
A.	Share in Gross Fixed Capital Formation at Market Prices (%)								
	Groups I and II								
1.	United States	5.4	28.3	7.3	35.6	26.1	14.6	18.1	58.8
2.	Canada	8.7	34.2	12.3	46.5	19.9	10.9	14.0	44.8
3.	United Kingdom	3.9	41.7	11.1	52.8	21.7	3.3	18.3	43.3
4.	Netherlands	6.4	31.5	16.8	48.3	20.0[c]	12.2	13.1[c]	45.3
5.	Norway	9.6	28.6	28.0	56.6	17.1	8.3	8.2	33.6
6.	Denmark (1951-56)	8.2[a]	16.0[b]	21.1	37.1[b]	16.0	1.9	36.8[b]	54.7[b]
7.	Finland[d]	12.4	29.9	7.6	37.5	28.4	15.9	5.8	50.1
8.	Average of Groups I and II	7.8	30.0	14.9	44.9	21.5	9.6	16.9	47.2
	Groups III, IV, and V								
9.	Austria	14.5	n.a.	13.0	n.a.	19.8[c]	9.4	n.a.	n.a.
10.	Ireland	9.2	28.5	16.2[c]	44.7[c]	19.3	3.6	23.4[c]	46.3[c]
11.	Israel	22.6	24.5	12.2	36.7	32.8[c]	0.7	7.2[c]	40.7
12.	Italy (1952-56)	13.2	32.3	15.9	48.2	23.6	9.6	5.5	38.7
13.	Greece	7.9	23.4[b]	18.5	41.9[b]	31.9	2.7	15.6[b]	50.2[b]
14.	Portugal	11.6	33.4	16.3	49.7	22.1	5.7	10.9	38.7
15.	Average of Groups III, IV, and V	13.2	28.4	15.2	44.1	24.2	5.3	10.7	42.1

(Continued on next page)

Table 7 (Cont.)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Groups VI and VII								
16.	Ecuador (1951-55)	26.3	30.5	13.4	43.9	11.3	11.7	6.8	29.8
17.	Honduras (1951-55)	33.7	13.2	14.1	27.3	23.5	3.9	11.6	39.0
18.	Taiwan	24.5	38.1	11.6	49.7	n.a.	6.6	n.a.	25.9
19.	South Korea (1955-57)	18.6	30.6	22.0	52.6	6.9	13.5	8.5	28.9
20.	Average of Groups VI and VII	25.8	28.1	15.3	43.4	13.9	8.9	9.0	30.9
B.	Share in Gross Domestic Product at Factor Cost (unless otherwise indicated) (%)								
	Groups I and II								
21.	United States (net domestic product)	5.4	40.8	6.6	47.4	2.5	12.0	32.7	47.2
22.	Canada	10.4	40.7	9.2	49.9	4.1	6.3	29.4	39.8
23.	United Kingdom	4.9	49.0	8.5	57.5	3.1	6.8	27.6	37.5
24.	Netherlands	12.2	41.3	9.5	50.8	n.a.	7.2	n.a.	36.9
25.	Norway (market prices)	13.8	38.4	18.3	56.7	2.0	4.0	23.5	29.5
26.	Denmark (1951-56)	20.2	29.9[b]	9.3	39.2[b]	3.9	8.7	28.0[b]	40.6[b]
27.	Finland	23.5	41.3	7.6	48.7	3.4	9.3	14.9	27.6
28.	Average of Groups I and II	12.9	40.2	9.9	50.1	3.2	7.8	26.0	37.0
	Groups III, IV, and V								
29.	Austria (gross national product, market prices)	14.5	53.6[e]	5.0	58.6[e]	n.a.	7.8	n.a.	27.0[e]
30.	Ireland	32.2	26.7	n.a.	n.a.	1.9	9.4	n.a.	n.a.
31.	Israel (net domestic product)	11.8	29.3	7.8	37.1	n.a.	20.1	n.a.	51.1

32. Italy (1952-56)	23.6	41.4	6.5	47.9	1.7	10.2	16.5	28.4
33. Greece	35.1	21.3[b]	6.3	27.6[b]	6.2	7.8	23.4[b]	37.4[b]
34. Portugal	29.1	37.9	5.0	42.9	4.0	5.1	19.0	28.1
35. Average of Groups III, IV, and V	24.4	31.3	6.1	38.9	3.5	10.1	19.6	36.2
Groups VI and VII								
36. Ecuador (1951-55)	38.9	21.3	5.1	26.4	7.5	5.7	21.4	34.6
37. Honduras (1951-55)	50.8	15.5	5.3	20.8	6.6	3.2	18.6	28.4
38. Taiwan[f]	33.8	25.5	5.2	30.7	n.a.	11.2	n.a.	35.4
39. South Korea (1955-57)	45.8	13.5	2.7	16.2	7.1	7.0	23.8	38.0
40. Average of Groups VI and VII	42.3	19.0	4.6	23.5	7.1	6.8	21.3	34.1
C. Ratio of Share in Gross Fixed Capital Formation to Share in Gross Domestic Product								
Groups I and II								
41. United States	1.00	0.69	1.11	0.75	10.44	1.22	0.55	1.25
42. Canada	0.84	0.84	1.34	0.93	4.85	1.73	0.48	1.13
43. United Kingdom	0.80	0.85	1.31	0.92	7.00	0.49	0.66	1.15
44. Netherlands	0.52	0.76	1.77	0.95	n.a.	1.69	n.a.	1.23
45. Norway	0.70	0.74	1.53	1.00	8.55	2.08	0.35	1.14
46. Denmark	0.41[a]	0.54[b]	2.27	0.95[b]	4.10	0.22	1.31[b]	1.35[b]
47. Finland	0.53	0.72	1.00	0.77	8.35	1.71	0.39	1.82
48. Average of Groups I and II	0.69	0.73	1.48	0.90	7.22	1.31	0.62	1.30
49. Ratio, line 8 to line 28	0.60	0.75	1.51	0.90	6.72	1.23	0.65	1.28

(Continued on next page)

Table 7 (Cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Groups III, IV, and V								
50. Austria	1.00	n.a.	2.60	n.a.	n.a.	1.21	n.a.	n.a.
51. Ireland	0.29	1.07	n.a.	n.a.	10.16	0.38	n.a.	n.a.
52. Israel	1.92	0.84	1.56	0.99	n.a.	0.03	n.a.	0.80
53. Italy	0.56	0.78	2.45	1.01	13.88	0.94	0.33	1.36
54. Greece	0.23	1.10[b]	2.94	1.52[b]	5.15	0.35	0.67[b]	1.34[b]
55. Portugal	0.40	0.88	3.26	1.16	5.52	1.12	0.57	1.38
56. Average of Groups III, IV, and V	0.73	0.93	2.56	1.17	8.68	0.67	0.52	1.22
57. Ratio, line 15 to line 35	0.54	0.91	2.49	1.13	6.91	0.53	0.55	1.16
Groups VI and VII								
58. Ecuador	0.68	1.43	2.63	1.66	1.51	2.05	0.32	0.86
59. Honduras	0.66	0.85	2.66	1.31	3.56	1.22	0.62	1.37
60. Taiwan	0.72	1.49	2.23	1.62	n.a.	0.59	n.a.	0.73
61. South Korea	0.41	2.27	8.15	3.25	0.97	1.93	0.36	0.76
62. Average of Groups VI and VII	0.62	1.51	3.92	1.96	2.01	1.45	0.43	0.93
63. Ratio, line 20 to line 40	0.61	1.48	3.33	1.85	1.96	1.31	0.42	0.91

The underlying data for all countries except Honduras are from United Nations, Yearbook of National Accounts Statistics, 1958, New York, 1959 and for Honduras from ibid., 1957. The totals were added for the period; and percentage shares in the overall gross fixed capital formation and gross domestic product were computed.

The entries in Panel C, except for lines 48, 56, and 62, were derived by dividing the percentages in Panel A by the corresponding percentages in Panel B.

a. Forestry and fisheries were included in services in the distribution of fixed gross capital formation, but not apparently in the distribution of gross domestic product.

b. Construction was included with other services, and excluded from column 2, thus also affecting the shares in columns 4, 7, and 8.

c. Excluded from the average since data for national product are not available.

d. Construction was distributed among all other industries.

e. Excluded from the average since data for capital formation are not available.

f. The distribution of national product excludes income from dwellings.

Some of the differences in the industrial use structure of fixed capital formation among groups of countries in Panel A of Table 7 may be similar to the differences in the industrial origin structure of domestic product; others may not. The comparison is facilitated by calculating the percentage shares of the corresponding industry sectors in domestic product for the same countries and periods (Table 7, Panel B). It should be noted that the shares in gross domestic product are, for most countries, based on totals at factor cost, whereas the shares in fixed capital formation are based on totals at market prices. But this can hardly affect the broad conclusions.

Comparing Panels A and B, we find that the rise, observed as we move down the scale of per capita income, in the share of the A sector in fixed capital formation is similar to the rise in its share in gross domestic product. But this is the only similarity between the broad intergroup differences in Panels A and B. While the share of fixed capital formation going to the M+ sector is about the same for the broad groups of countries, the share of this sector in domestic product drops from 50 percent in Groups I and II to 23-1/2 percent in Groups VI and VII. Likewise, the decline in the share of fixed capital formation devoted to other services or to all services, observed as we move from Groups I and II to Groups VI and VII, is in contrast with the relative constancy of the shares of these sectors in domestic product.

Obviously, whatever the countrywide gross addition to fixed capital per unit of domestic product, it is different for different industrial sectors; and these intersectoral differences in the ratio of gross fixed capital formation to gross domestic product in turn differ among countries grouped by per capita income. Dividing the sectoral shares in Panel A by those in Panel B, we derive relatives of two ratios: the ratio of gross fixed capital formation to gross output in a given sector, and the ratio of gross fixed capital formation to gross output in the economy as a whole. A sector relative of less than 1 means that the share of fixed capital formation that this sector secures is smaller than the share it contributes to the gross domestic output of the country; if the relative is above 1, the sector secures a larger share of the country's fixed capital formation than it contributes to the country's domestic product. Panel C of Table 7 shows these relatives for each sector in each country, as well as two sets of means: one derived by averaging directly the relatives in Panel C, the other calculated from the arithmetic means in Panels A and B.

Since the underlying totals are in current rather than in constant prices, the relative price structure of capital and other goods differs among countries, and the distributions in Panels A and B are based on totals valued on different bases (market prices and factor costs, respectively), the specific values in Panel C cannot be assigned much weight. But the broad conclusions would not be changed radically by refinement to assure greater comparability.

First, in all groups of countries the A sector secured a lower share of fixed capital formation than it contributed to gross domestic product. But there are no significant differences among the broad groups of countries in this shortfall, i. e., in the extent to which the relative for the A sector falls below 1.

Second, in the high income countries, the share of the M sector proper in fixed capital formation is also lower than its share in gross domestic product. But as we descend on the scale of per capita income, the relative rises; and for

countries in Groups VI and VII the average share of this sector in fixed capital formation is distinctly larger than its share in gross domestic product. The relative for the transportation and communications sector follows the same pattern, except that it is well above 1 for all groups of countries. It rises from an average of 1.5 for Groups I and II to about 2.5 for Groups III, IV, and V, and to between 3.3 and 3.9 for Groups VI and VII. For the M+ sector, the relative rises from 0.9 for Groups I and II, to 1.9 for Groups VI and VII--meaning that in the developed countries its share in fixed capital formation is slightly below its share in domestic gross product, whereas in the low income countries its share in fixed capital formation is close to twice its share in gross domestic product.

Third, for the service sector as a whole (excluding transportation and communication) the relative is above 1 for Groups I and II, and Groups III, IV, and V--the effect of the large claims upon fixed capital formation in the form of dwellings. But it drops to 0.9 in Groups VI and VII--partly as a result of the decline in the relative claims of both dwellings and other services.

Setting aside errors of estimation, sampling, and averaging, the differences among the wide groups of countries shown in Panel C may reflect differences in the sectoral fixed capital-gross output ratios, or differences among the sectors in the rates of growth of gross output, or both. Let us assume, and the assumption is subject to serious qualifications both because of the character of the data in Table 7 and because of our scanty knowledge of the phenomena in question, that the necessary incremental gross fixed capital-gross output ratios for each sector are the same for the broad groups of countries distinguished in Panel C. Let us assume further that the average countrywide ratio of gross fixed capital formation to gross domestic product varies (as indicated in Table 1, line 2) from 21 percent in Groups I and II, to 16 percent in Groups III, IV, and V, to 14 percent in Groups VI and VII. Then, the average relative of 0.6 for the A sector in Panel C--which is about the same for the wide groups of countries--would mean that the ratio of gross fixed capital formation (i.e., the addition to gross fixed capital stock) to gross domestic output in the A sector would be 12.6 percent in Groups I and II (i.e., 21 x 0.6) and only 8.4 percent (i.e., 14 x 0.6) in Groups VI and VII. If, as assumed, the incremental gross fixed capital-output ratio for the A sector is the same for all countries, it follows that the rate of growth permitted by the fixed capital formation allocated to the A sector would be greater in Groups I and II than in Groups VI and VII--and by the ratio of 12.6 to 8.4. On the basis of similar calculations, the relatives in Panel C suggest a higher rate of growth in the gross output of both the M sector proper and the M+ sector in Groups VI and VII than in Groups I and II--because the relatives for the former exceed those for the latter by a higher ratio than that of 21 to 14. Finally, the relatives for the S sector as a whole (excluding transportation and communication) are much larger for Groups I and II than for Groups VI and VII, and on the assumptions stated, suggest a rate of growth in the gross product of the S sector twice as high in the high income countries as in the low income countries.

The validity of these inferences as to the rates of growth of the various sectoral products permitted by fixed capital formation in countries grouped by per capita income can be checked only by a test of the assumptions made concerning the capital-output ratios. Some related findings will be discussed in Section VI, but they will not be sufficient for meaningful conclusions. Consequently, the inferences are illustrative rather than substantive--especially since

secular relations between capital and output in the various sectors can hardly be derived over a period as short as the one covered in Table 7.

Before we deal with capital-output ratios directly, we review the scanty data on the industrial use structure of capital formation in the Communist countries (Table 8). Despite the varying definitions of sectors and of underlying national product, and any other numerous qualifications that can be legitimately adduced, the broad conclusions are clear. In general, the industrial use structure of capital formation in the Communist countries is similar to that of the low income non-Communist countries in Groups VI and VII. The share of capital formation going to agriculture (or the A sector more broadly defined to include forestry and fisheries) was, with one exception--the U. S. S. R. for 1955--much lower than the share of national product contributed by agriculture. The share of capital formation going to the M sector proper or to the M+ sector was also, with one exception--Poland--much larger than the share of either of these sectors in national product. Finally, the share of capital formation going to services was about the same as the share of that sector in national product (except in Poland where it was much larger). Since we have no knowledge of the incremental capital-output ratios for each sector, we cannot reach any conclusions concerning differences permitted by capital accumulation in the rate of growth of output among these several sectors (our inferences from Table 7, Panel C related to differences in the rate of growth of output of a given sector among countries grouped by per capita income, not to differences in rate of growth among sectors). But it is well-known, and indicated by some of the data in Table 8, that the rate of growth of the M or M+ sector was much greater than that of the A or the S sector; and clearly, the distinctive industrial use structure of capital formation in the Communist countries contributed to this result.

V. Incremental Capital-Output Ratios

If for a given period we relate additions to reproducible capital stock (i. e., capital formation) to additions to output, we presume an association between the two: the additions to output require the additions to reproducible capital stock, or the latter permit (not necessarily guaranteeing) the additions to output. This presumption can be invalidated for a variety of reasons that come easily to mind. Larger or smaller input of resources other than reproducible capital (natural resources, labor), technological changes, modifications in the productivity-determining social arrangements, changing reliance on foreign markets, can all affect the ratio of additions to reproducible capital to additions to output for a given country--the incremental capital-output ratio. Nevertheless, the association between reproducible capital and output may be sufficiently strong to warrant an interest in and examination of the ratio between the two.

The denominator of the ratio must reflect changes in 'real' product (output in constant prices), for we are not concerned with a rise in product due solely to a price rise. Nor can it be argued that this requirement is satisfied indirectly by the use of both capital formation and additions to product in current prices. To be sure, changing prices affect both but not necessarily to the same extent. Changes in product in current prices reflect price changes not only in the additions to output but also in the initial volume, whereas capital

Table 8.
Distribution of Capital Formation by Industrial Use Compared With Distribution of National Product by Industrial Origin, Selected Communist Countries

		Agriculture (1)	Industry (2)	Transportation & Communication (3)	M+ Sector (2) + (3) (4)	Services (5)
	U.S.S.R.					
	Share in National Product (%)					
1.	1928	42	28	7	35	23
2.	1955	28	40	9	49	23
3.	1937	36	34	7	41	22
4.	1948	28	36	8	44	28
5.	1953	23	46	10	56	21
6.	1955	27	37	5	42	31
	Share in Capital Formation (%)					
7.	1928/29-32	19	41	18.5	59.5	21.5
8.	1933-37	19	37	16.5	53.5	27.5
9.	1948	16	49.5	11	60.5	23.5
10.	1953	18	50	10	60	22
11.	1952-58	24	42	10	52	24
	Poland					
12.	Share in national income, 1952-53 (%)	21.3	50.7	9.3	60.0	18.7
13.	Share in gross fixed investment, 1950-55 (%)	10.0	49.8	12.2	62.0	28.0

	Mainland China					
	Share in National Product (%)					
14.	1952	47	n.a.	n.a.	14	39
15.	1957	41	n.a.	n.a.	24	35
	Share in Capital Formation (%)					
16.	1950-52	33	n.a.	n.a.	37	31
17.	1953-55	28	n.a.	n.a.	36	37
18.	1956-57	27	n.a.	n.a.	45	28

Lines 1 and 2: Soviet Economic Growth: A Comparison with the United States, Joint Economic Committee, Joint Committee Print, 85th Congress, 1st Session, Washington, 1957, Table 2, p. 133. Agriculture includes forestry and fisheries. Industry covers manufacturing, mining, and construction. Estimates are based on current price totals.

Lines 3-5: estimates by Herbert Block in Trends in Economic Growth: A Comparison of the Western Powers and the Soviet Bloc, Joint Committee on the Economic Report, Joint Committee Print, 83rd Congress, 2nd Session, Washington, 1955, Table X-1, p. 284. Industry includes forestry and fisheries, which are excluded from agriculture. Estimates are based on totals at 1937 factor prices.

Line 6: estimates by Morris Bornstein in Comparisons of the United States and Soviet Economies, Part II, Joint Economic Committee, Joint Committee Print, 86th Congress, 1st Session, Washington, 1959, Table 2, p. 383. Estimates are based on current price totals.

Lines 7 and 8: estimates by Norman M. Kaplan in Abram Bergson, ed., Soviet Economic Growth, Conditions and Perspectives, Evanston, 1953, Table 2.7, p. 52. Estimates are based on current price totals.

Lines 9-10: from source cited for lines 3-5, Table X-6, p. 286. Estimates are based on current price totals.

Line 11: Alec Nove, Communist Economic Strategy: Soviet Growth and Capabilities, National Planning Association, Washington, 1959, Table 6, p. 20. Estimates are for fixed investment only.

Line 12: from source cited for lines 3-5, Table XI-1, pp. 287-8. Estimates are based on constant price totals.

Line 13: Alexander Erlich, "The Polish Economy after October 1956: Background and Outlook," American Economic Review, Papers and Proceedings, Vol. XLIX, No. 2, May 1959, Table 3, p. 112. Estimates are based on current price totals.

Lines 14-15: T. C. Liu, "Structural Changes in the Economy of the Chinese Mainland, 1933 to 1952-57," American Economic Review, Papers and Proceedings, Vol. XLIX, No. 2, May 1959, Table 1, p. 86. The modern non-agricultural sector, as defined by Dr. Liu, is here taken to represent the industries to which industrial capital formation should be related. Services are combined with handicraft manufacturing and old-fashioned transportation. Estimates are based on constant price totals.

Lines 16-18: Wilfred Malenbaum, "India and China: Contrasts in Development Performance," American Economic Review, Vol. XLIX, No. 3, June 1959, Table 4, p. 300. Estimates are based on current price totals.

formation in current prices reflect price changes only in the additions to capital stock. Hence a comparison of capital formation in current prices with changes in national product in current prices is misleading: the resulting incremental capital-output ratio is too low if prices are rising, and too high if prices are declining. The denominator is therefore the change in national product in constant prices expressed as an average percentage rise per year.

The numerator is the capital formation proportion over the interval covered by the change in national product. If the capital formation proportion is based on totals in current prices, the ratio indicates the percentage of national product in current prices that is diverted into capital formation to 'produce' the given percentage rise in 'real' national product. For example, if national product in constant prices grew 3 percent per year over a decade, and the average capital formation proportion in current prices during that decade was 15 percent, 5 percent of product in current prices was necessary to yield a rise of 1 percent per year in the product in constant prices. If, on the other hand, we relate the capital formation proportion in constant prices (say of the year 1950) to the annual percentage rate of growth in national product in the same 1950 prices, the ratio reveals the percentage of the national product in 1950 prices (of all goods) that had to be diverted into capital formation to produce a growth of 1 percent per year in national product in 1950 prices. The two percentages will be identical if the capital formation proportions based on totals in current and in constant prices are identical over the period under observation; and they will be, if the average price movements of goods entering capital formation and of those entering additions to national product are the same. [21]

Over long periods the two ratios are likely to differ significantly. However, for the short post-World War II period, the differences between them are so small that we can treat their group averages as interchangeable for the purposes of the present discussion. Table 9 demonstrates this conclusion and illustrates some introductory steps in the analysis that follows.

The table is limited by design to the twenty-three countries for which we have data on both gross domestic product and gross domestic capital formation proportions in current and constant prices. For each country we calculated the gross domestic capital formation proportion in current prices (group averages in line 2), the rate of increase per year in gross domestic product in constant prices (group averages in line 3), and the ratio of the capital formation

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21. The ratio of the capital formation proportion in constant prices to the annual rate of growth of national product in constant prices is a measure of the incremental capital-output ratio as usually understood. The ratio of the capital formation proportion in current prices to the rate of increase of product in current prices is also an incremental capital-output ratio--but one in which capital is valued at original changing cost and product is valued at changing current prices; and such a ratio is of little direct interest in the study of growth. The ratio of the capital formation proportion in current prices to the rate of increase of product in constant prices is in itself not a true incremental capital-output ratio; but it may serve as an approximation to it, given little divergence in movement between prices of capital goods and of all other goods.

Table 9.
Ratios of Gross Domestic Capital Formation Proportion in Current Prices to Rise in Gross Domestic Product in Constant Prices Compared With Ratios of the Former in Constant Prices to the Latter, Identical Countries Grouped by Per Capita Product, Post-World War II Years

	Groups of Countries by Per Capita Product							Wider Groups			
	I (1)	II (2)	III (3)	IV (4)	V (5)	VI (6)	VII (7)	I (8)	II & III (9)	IV & V (10)	VI & VII (11)
1. Number of countries	5	6	5	2	2	2	1	5	11	4	3
2. Proportion, gross domestic capital formation to gross domestic product, current prices (%)	19.3	22.9	17.2	18.8	13.8	13.1	29.1	19.3	20.3	16.3	18.4
3. Rise per year, gross domestic product, constant prices (%)	3.24	5.86	3.12	5.96	4.97	3.17	4.27	3.24	4.61	5.46	3.54
4. Ratio, gross domestic capital formation proportion, current prices, to rise per year, gross domestic product, constant prices	5.98	4.74	7.14	3.22	2.94	4.17	6.81	5.98	5.83	3.08	5.05
5. Alternative for line 4 (line 2 ÷ line 3)	5.96	3.91	5.51	3.15	2.78	4.13	6.81	5.96	4.40	2.99	5.20

(Continued on next page)

Table 9 (Cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
6. Proportion, gross domestic capital formation to gross domestic product, constant prices (%)	18.7	22.9	17.6	18.7	13.2	14.4	32.6	18.7	20.5	16.0	20.5
7. Ratio, gross domestic capital formation proportion, constant prices, to rise per year, gross domestic product, constant prices	5.82	4.73	7.39	3.20	2.84	4.56	7.63	5.82	5.94	3.02	5.58
8. Alternative for line 7 (line 6 + line 3)	5.77	3.91	5.64	3.14	2.66	4.54	7.63	5.77	4.45	2.93	5.79

Lines 2-4 and 6 and 7 are unweighted arithmetic means of proportions or ratios for individual countries.
Line 2: from Appendix Table 1, column 4.
Line 3: from Appendix Table 3, column 1 (or column 2 where column 1 is not available).
Line 4: from Appendix Table 3, column 5.
Line 6: the underlying percentages were derived by the procedure used for Appendix Table 1, column 4 from the sources given in the notes to the latter.
Line 7: from Appendix Table 3, column 6.

proportion to the rate of growth of product (group averages in line 4). Then the calculations were repeated except that the capital formation proportions were based on totals in constant prices (lines 6 and 7).

In both sets of calculations, the capital formation proportions for 1951-57 were related to the rates of growth from 1951 to 1957. No allowance for lag of additions to output behind additions to capital was made; nor were the end years in the period covered by the capital formation proportions weighted by a half, to yield an average for the six-year span covered by the rate of increase. No proper lag can be established without detailed study and we doubt that it is large enough to affect significantly the results for a six or seven-year period. The additional refinement of weighting the capital formation proportions in the end years by half did not seem warranted--for it would have had but trifling effect on the group averages. These comments apply to the calculations not only in Table 9, but also in the tables that follow--unless otherwise qualified.

The ratios described above can be quite erratic. If the percentage rate of growth of product is low, the ratio will be high (and if the rate of growth is 0, the ratio will be infinity). If the percentage rate of growth of product is high, the ratio will be low, although still above 0, unless gross capital formation is negative--which is unlikely. Arithmetic means of such ratios, subject to high positive and limited negative errors naturally tend to be high; and some weighting of the ratios in computing the group averages is desirable. One obvious way of weighting is to calculate the average ratio for each group directly from the average rate of increase per year in output and the average gross capital formation proportion--as is done in lines 5 and 8. This is tantamount to weighting each ratio by the rate of increase underlying it, giving greater weight to the ratios when output increases more and less weight when output increases less. These weighted averages of the ratios of capital formation proportions to rates of increase in product are systematically lower than those in lines 4 and 7 (except in column 7, in which there is only one country, and in column 11, in which the small sample of three countries includes the single country in Group VII with a high ratio and a high rate of increase in product).

But the main finding of Table 9 for our purposes is the similarity between the average ratios based on capital formation proportions in current and in constant prices. The differences in the group averages, whether for the single Roman numeral groups or for the wider groups, are small and the patterns of movement of the two sets of ratios are practically identical. We can, therefore, assume for all analytical purposes that the two sets of ratios here would yield the same result; that they are interchangeable; and that they can be referred to as incremental capital-output ratios.

We can thus begin the analysis in Table 10 with the far larger number of countries for which we can relate capital formation proportions based on totals in current prices to rates of growth of product in constant prices. The procedure summarized in lines 2-5 parallels that for lines 2-5 of Table 9, but it relates to forty-four rather than twenty-three countries. The weighted averages of ratios are again consistently lower than the more erratic unweighted averages.

The calculation for all countries is paralleled by that for countries excluding politically and financially dependent units (lines 6-10). And here again the weighted means are consistently lower than the unweighted.

Table 10.
Ratios of Gross Domestic or National Capital Formation Proportion to Rise in Gross Domestic or National Product, Countries Grouped by Per Capita Product, Post-World War II Years

	Groups of Countries by Per Capita Product							Wider Groups			
	I (1)	II (2)	III (3)	IV (4)	V (5)	VI (6)	VII (7)	I (8)	II & III (9)	IV & V (10)	VI & VII (11)
A. Calculation A											
I All Countries											
1. Number of countries	7	7	6	7	6	8	3	7	13	13	11
2. Proportion, gross domestic capital formation to gross domestic product, current prices (%)	21.1	23.4	18.5	18.4	17.6	14.6	22.5	21.1	21.1	18.1	16.7
3. Rise per year, gross domestic product, constant prices (%)	2.93	5.52	4.02	5.68	8.34	5.10	4.45	2.93	4.83	6.91	4.92
4. Ratio, gross domestic capital formation proportion, current prices, to rise per year, gross domestic product, constant prices	8.09	5.13	6.44	3.28	2.35	3.41	5.42	8.09	5.73	2.85	3.96
5. Alternative for line 4 (line 2 + line 3)	7.20	4.24	4.60	3.24	2.11	2.86	5.06	7.20	4.37	2.62	3.39
II Countries Excluding Politically and Financially Dependent Units											
6. Number of countries	7	7	3	6	5	6	1	7	10	11	7
7. Proportion, gross domestic capital formation to gross domestic product, current prices (%)	21.1	23.4	17.2	18.7	17.8	14.6	19.1	21.1	21.5	18.3	15.2

8. Rise per year, gross domestic product, constant prices (%)	2.93	5.52	3.36	5.53	7.73	4.86	6.01	2.93	4.87	6.53	5.03
9. Ratio, gross domestic capital formation proportion, current prices, to rise per year, gross domestic product, constant prices	8.09	5.13	6.98	3.41	2.53	3.32	3.18	8.09	5.68	3.01	3.30
10. Alternative for line 9 (line 7 + line 8)	7.20	4.24	5.12	3.38	2.30	3.00	3.18	7.20	4.41	2.80	3.02
B. Calculation B											
11. Number of countries in line 12	8	7	6	11	6	10	8	8	13 (10)	17 (13)	18 (10)
12. Proportion, gross domestic capital formation to gross domestic product, current prices (%)	21.4	23.4	18.5	16.3	17.6	16.7	14.0	21.4	21.1 (21.5)	16.8 (17.6)	15.5 (14.0)
13. Number of countries in line 14	7	7	6	8	6	9	7	7	13	14	16
14. Rise per year, gross domestic product, constant prices (%)	2.93	5.52	4.10	5.51	8.41	5.58	3.45	2.93	4.87	6.75	4.65
15. Derived incremental ratio, gross domestic capital to gross domestic product (line 12 + line 14)	7.30	4.24	4.51	2.96	2.09	2.99	4.06	7.30	4.33 (4.41)	2.49 (2.61)	3.33 (3.01)
16. Proportion, gross capital formation to gross national product, current prices (%)	21.0	23.8	10.3	14.5	16.6	14.5	11.4	21.0	17.6 (21.4)	15.2 (16.7)	13.1 (13.0)

(Continued on next page)

Table 10 (Cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
17. Rise per year, gross national product, constant prices (%)	2.93	5.58	3.78	5.65	8.03	5.79	3.43	2.93	4.75	6.67	4.76
18. Derived incremental ratio, gross capital to gross national product (line 16 + line 17)	7.17	4.27	2.72	2.57	2.07	2.50	3.32	7.17	3.71 (4.51)	2.28 (2.50)	2.75 (2.73)

Entries in parentheses are for countries excluding politically and financially dependent units (listed in the notes to Table 1). However, the various measures are not repeated for Group I, from which there are no exclusions.

Lines 2-4 and 7-9 are unweighted arithmetic means of proportions or ratios for individual countries.

Lines 2 and 7: from Appendix Table 1, column 4.

Lines 3 and 8: from Appendix Table 3, column 1 (or column 2 when column 1 is not given).

Lines 4 and 9: from Appendix Table 3, column 5.

Lines 11 and 12: from Table 1, lines 5 and 6 and 19 and 20.

Lines 14 and 17: based on Appendix Table 3, columns 1-4. Starting with the unweighted arithmetic mean of the percentage rise in the national product concept for which the largest number of countries is available, we estimated the average rise in the other concept by means of the relationship of the rise in the former to the rise in the latter for identical countries.

Line 16: from Table 1, lines 9 and 22.

Being much less affected by extremely large items than the unweighted arithmetic means, the weighted means of the ratios are the more acceptable estimates for our purposes. Moreover, such weighted means can be derived from the average capital formation proportions, calculated in the preceding tables, and the average rates of increase in national product, for a somewhat larger number of countries than are covered in lines 1-5. This is a matter of some importance because the small sample for Group VII yields unrepresentative averages and also affects the wider combined Groups VI and VII: the average capital formation proportion for three countries in Group VII is 22.5 percent (Table 10, line 2, column 7) whereas for 8 countries it is only 14.0 percent (Table 1, line 6, column 7). We are, therefore, likely to secure more tenable results if we combine capital formation proportions and rates of growth for the largest possible sample of countries. This derivation of the group averages of incremental capital-output ratios directly from the group averages of annual rates of growth of national product in constant prices and from the group averages of capital formation proportions based on totals in current prices (and assumed to be close to the proportions based on totals in constant prices) is designated calculation B, and its results are used in establishing the substantive findings.

In line 12 we have the average percentage proportions of gross domestic capital formation to gross domestic product, usually for 1951-57, for fifty-five countries. For the wider groups, we also show the average gross domestic capital formation proportions for countries excluding politically and financially dependent units (entries in parentheses, except for Group I where no countries are excluded).

In line 14 we have the group averages of the percentage rise per year in gross domestic product, usually from 1951 to 1957, for fifty countries--some of which are different from those covered in line 12. However, we are treating entries in line 12 as the best estimate now available of average gross domestic capital formation proportions in all non-Communist countries in Groups I - VII; or in all independent countries in the averages for the wider groups. We are treating the entries in line 14 as the best estimates now available of average rates of growth per year in gross domestic product in constant prices of all non-Communist countries in Groups I - VII. Furthermore, a test calculation for rates of growth of gross domestic product, comparing the averages for the wider groups including and excluding politically and financially dependent units, revealed no significant differences between the averages for the more inclusive and less inclusive samples. We are, therefore, treating the entries in line 14, columns 8-11 as representative also of average rates of growth of gross domestic product in countries excluding the politically and financially dependent units. And this means that, at least for the non-Communist countries, the derived averages of incremental gross domestic capital-gross domestic output ratios in line 15, are, with the present data, the best estimates for the period under observation.

These ratios form an intriguing pattern for countries grouped by per capita income--a pattern which, for all countries, is similar to that in line 5, except for Group VII. The ratio is highest for Group I--over 7, meaning that over seven percentage units of the gross domestic capital formation proportion are associated with one percentage unit of growth of gross domestic product. It then declines markedly, and for the sample of all countries, reaches a trough

of 2.1 in Group V, to rise again to 4.1 in Group VII. In the wider groups for all countries, the ratio drops from a high of 7.3 for Group I to a low of 2.5 for Groups IV and V, and rises to 3.3 for Groups VI and VII, still less than half of that for Group I. For countries excluding those politically and financially dependent, the ratio declines from 7.3 to a low of 2.6 for Groups IV and V, and then rises to only 3.0 for Groups VI and VII. In short, the incremental gross domestic capital-output ratios are distinctly lower in the low income, less developed countries--a rise of 1 percent of output in the latter requiring (or being associated with) fewer percentage units of the gross domestic capital formation proportion.

By means of calculation B we also derived the group averages of incremental ratios of gross national capital to gross national product (i.e., of gross national capital formation proportions related to additions to gross national product). The necessary components--averages of gross national capital formation proportions (from Table 1) and of percentage rates of growth of gross national product per year are given in lines 16 and 17, and the derived incremental gross capital-gross national product ratios appear in line 18.

The pattern of these ratios for countries grouped by per capita product is not too different from that shown for the domestic capital-output ratios in line 15. Because of the high proportions of capital imports to gross domestic capital formation in Groups III, VI, and VII (for the sample of all countries), the averages of their capital-output ratios are most markedly reduced when we shift from domestic to national ratios. But for the wider groups for all countries, the incremental gross national capital-output ratio is still above 7 for Group I, drops to 2.3 for Groups IV and V, and rises to 2.8 for Groups VI and VII, well below half of that for Group I. If we exclude politically and financially dependent countries, the range in the national capital-output ratio is slightly wider: it drops from 7.2 for Group I to 2.5 for Groups IV and V, and 2.7 for Groups VI and VII, not much above a third of the ratio for Group I. The association of a one percent rise in output with a smaller number of percentages of the national capital formation proportion in the low income countries than in the high income countries is even more conspicuous than it is for the domestic capital-output ratios.

Before we elaborate upon the pattern of the incremental capital-output ratios found in Table 10, it is desirable to check upon its validity in two ways. First, the percentage rates of increase in gross domestic or national product were derived from comparisons of values for single years, 1951 and 1957; and these may have been affected by transient factors in different ways for the more developed and the less developed countries. It is, therefore, of interest to see whether the findings are changed if we recalculate the rates of increase in gross domestic product, using three-year averages rather than single years for terminal values. Also, we take the opportunity of introducing the additional refinement of weighting by half the terminal year values underlying the capital formation proportions.

The comparison uses calculation A and the estimates refer to gross domestic capital formation and gross domestic product (Table 11). Because the necessary data for some countries are lacking, only thirty-six are included in the new calculation. But even for the smaller number of countries the pattern is the same as that observed in Table 10 (lines 9 and 10). The weighted average

Table 11.
Comparison of Incremental Gross Domestic Capital-Output Ratios in Table 10 With Those Based on Three-Year Averages for Terminal Values of Gross Domestic Product, Calculation A, Countries Grouped by Per Capita Product

		Wider Groups of Countries by Per Capita Product			
		I	II & III	IV & V	VI & VII
		(1)	(2)	(3)	(4)
A.	All Countries				
	Number				
1.	Table 10, line 1	7	13	13	11
2.	New	7	13	9	7
	Proportion, Gross Domestic Capital Formation to Gross Domestic Product, Current Prices (%)				
3.	Table 10, line 2	21.1	21.1	18.1	16.7
4.	New	20.8	20.5	18.5	15.6
	Rise per Year, Gross Domestic Product, Constant Prices (%)				
5.	Table 10, line 3	2.93	4.83	6.91	4.92
6.	New	3.06	4.99	6.32	4.68
	Ratio, Gross Domestic Capital Formation Proportion, Current Prices, to Rise in Gross Domestic Product, Constant Prices				
7.	Table 10, line 4	8.09	5.73	2.85	3.96
8.	New	7.98	5.33	2.97	3.68
	Alternative Incremental Gross Domestic Capital-Output Ratio				
9.	Table 10, line 5	7.20	4.37	2.62	3.39
10.	New (line 4 ÷ line 6)	6.80	4.11	2.93	3.33
B.	Countries Excluding Politically and Financially Dependent Units Alternative Incremental Gross Domestic Capital-Output Ratio				
11.	Table 10, line 10	7.20	4.41	2.80	3.02
12.	New	6.80	4.23	3.04	2.77

Lines 2, 4, 6, 8, 10, and 12: the general procedure is that followed in Table 10, calculation A. Here, however, the capital formation proportion is based on cumulated totals for 1951-56 with the terminal years given half weight; and the rise per year in gross product is calculated from the averages for 1950-52, centered on 1951, and 1955-57, centered on 1956.

For lack of data, the following countries included in Table 10 had to be excluded here: Mexico (Group IV); Iraq, Jamaica, and Portugal (Group V); Egypt, Peru, and Taiwan (Group VI); Morocco (Group VII). For the list of politically and financially dependent countries, see the notes to Table 1.

The underlying estimates are from United Nations, Yearbook of National Accounts Statistics, 1958 and 1957. Where gross product in constant prices was not given it was estimated by deflating the current price value by the cost of living index given in the United Nations, Statistical Yearbook, 1958.

of the incremental gross capital-output ratios for all countries declines from Group I to a low in Groups IV and V and rises again in Groups VI and VII; and the ratio for Groups VI and VII is still less than half of that for Group I. With the exclusion of the politically and financially dependent units, the pattern becomes even more systematic: in the new calculation, the incremental gross capital-output ratio declines steadily from 6.8 in Group I to 2.8 in Groups VI and VII (line 12).

Second, it may be asked to what extent the findings in Table 10 are a result of an accidental combination of circumstances in the six- to seven-year period under observation. If we subdivide the post-World War II period into two, and calculate the capital-output ratios for each subperiod separately, will the pattern of differences among groups of countries classified by per capita income, observed in Table 10, remain?

A tentative answer to this question is provided in Table 12, which is limited to 23 countries, a much smaller sample than that in Table 10. Here we calculate the incremental capital-output ratio for two three-year intervals separately, using three-year averages of gross domestic product to compute the rate of increase per year in the latter. In each three-year period we have the same decline from high capital-output ratios for Group I to the lowest in either Groups IV and V or Groups VI and VII; and the ratio for the low income countries is less than half that for the high income countries (lines 7 and 8). The tests in Tables 11 and 12 thus support the association between the incremental gross capital-output ratios and the grouping of countries by per capita income found in Table 10--at least for the post-World War II decade.

Despite the difficulties of estimating capital depreciation and consumption, analytically the net capital-output ratios are of more interest than the gross: for additions to, not replacement of, capital stock presumably have the most direct bearing upon net additions to product. In the incremental gross capital-output ratio there is an identical element of capital consumption in both the numerator and the denominator on a countrywide basis; and it imparts a degree of constancy to the ratio that may damp differences in space and variations over time and obscure the analysis of effects of capital formation on changes in net output.

In Table 13 we use calculation B, combining the net capital formation proportions from Table 4 with average rates of rise per year in net product--for countries grouped by per capita income, and for the wider groups using both the sample of all countries and that of countries excluding politically and financially dependent units. It must be remembered that the net capital formation proportions in Table 4 were themselves derived--from a combination of capital consumption ratios available for a smaller number of countries with gross capital formation proportions for an appreciably larger number. To these we now add further steps in the sequence of derivation to obtain the results of most interest to us, those in lines 5 and 8. But the broad pattern that emerges is unlikely to be affected by errors of estimation. If we concentrate on the wider groups, the results can be briefly summarized.

First, although Group I for all countries has the highest net domestic capital formation proportion, the rate of growth of its net domestic product is lowest, and consequently its incremental net domestic capital-output ratio, 5.3,

Table 12.
Incremental Gross Domestic Capital-Output Ratios for Two Periods, 1950-1953 and 1953-1956, Calculation A, Countries Grouped by Per Capita Product

		Wider Groups of Countries by Per Capita Product			
		I	II & III	IV & V	VI & VII
	Number of Countries	(1)	(2)	(3)	(4)
1.	1950-53	7	9	4	3
2.	1953-56	7	9	4	3
	Proportion, Gross Domestic Capital Formation to Gross Domestic Product, Current Prices (%)				
3.	1950-53	20.9	20.3	16.4	11.6
4.	1953-56	21.0	20.6	16.3	13.2
	Rise per Year, Gross Domestic Product, Constant Prices (%)				
5.	1950-53	2.56	4.57	6.32	6.97
6.	1953-56	3.70	4.31	6.74	5.09
	Incremental Gross Domestic Capital-Output Ratio				
7.	1950-53 (line 3 ÷ line 5)	8.16	4.44	2.59	1.66
8.	1953-56 (line 4 ÷ line 6)	5.68	4.78	2.42	2.59

The general procedure is that followed in Table 10, calculation A. Here, however, the capital formation proportion is based on cumulated totals for 1950-53 and 1953-56 with the terminal years given half weight; and the rise per year in gross product is calculated between the averages for 1949-51, centered on 1950, and 1952-54, centered on 1953, and between the latter and the averages for 1955-57, centered on 1956.

The coverage here for Group I is the same as in Table 10; for Group II excludes Venezuela; for Group III is Austria, Chile, and Ireland; for Groups IV and V is Colombia, Greece, Guatemala, and Japan; for Groups VI and VII is Ceylon, Philippines, and Burma.

The underlying estimates are from United Nations, Yearbook of National Accounts Statistics, 1958, extrapolated when necessary by estimates in ibid., 1957; and extrapolated further by estimates in the United Nations, Statistical Papers, Series H, No. 9. Where gross product in constant prices was not given it was estimated by deflating the current price value by the cost of living index in the United Nations, Statistical Yearbook, 1958.

Table 13.
Ratios of Net Domestic or National Capital Formation Proportion to Rise in Net Domestic or National Product, Countries Grouped by Per Capita Product, Post-World War II Years

	Groups of Countries by Per Capita Product							Wider Groups			
	I	II	III	IV	V	VI	VII	I	II & III	IV & V	VI & VII
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1. Number of countries in line 2	8	7	6	11	6	10	8	8	13 (10)	17 (13)	18 (10)
2. Proportion, net domestic capital formation to net domestic product, current prices (%)	13.8	15.6	11.7	11.2	13.0	10.4	10.5	13.8	13.7 (14.0)	11.9 (12.5)	10.3 (9.2)
3. Number of countries in line 4	7	7	6	8	6	9	7	7	13	14	16
4. Rise per year, net domestic product, constant prices (%)	2.62	5.45	3.96	5.40	8.21	5.49	3.16	2.62	4.76	6.61	4.47
5. Derived incremental ratio, net domestic capital to net domestic product (line 2 + line 4)	5.27	2.86	2.95	2.07	1.58	1.89	3.32	5.27	2.88 (2.95)	1.80 (1.89)	2.30 (2.06)
6. Proportion, net capital formation to net national product, current prices (%)	13.5	15.9	3.3	9.5	11.7	8.1	7.3	13.5	9.7 (13.7)	10.2 (11.4)	7.5 (8.1)
7. Rise per year, net national product, constant prices (%)	2.61	5.52	3.62	5.53	7.82	5.53	3.16	2.61	4.64	6.51	4.49
8. Derived incremental ratio, net capital to net national product (line 6 + line 7)	5.17	2.88	0.91	1.72	1.50	1.46	2.31	5.17	2.09 (2.95)	1.57 (1.75)	1.67 (1.80)

Notes on next page

is highest (lines 2, 4, and 5). The same is true for the net national capital formation proportion and the net national capital-output ratio (lines 6 and 8).

Second, the net capital-output ratio, for all countries and for domestic capital, drops to a low of 1.8 for Groups IV and V, the groups with the highest rate of growth in net domestic or national product. Then, again for all countries and domestic net capital, the ratio rises to 2.3 for Groups VI and VII, well below half of the ratio for Group I. For the net national capital-output ratio, the decline for all countries is from 5.2 for Group I to 1.6 for Groups IV and V and 1.7 for Groups VI and VII, about a third of the ratio for Group I.

Third, if we exclude the politically and financially dependent units, the range from the high capital-output ratio for Group I, and even Groups II and III, to the low ratios for Groups IV and V, and VI and VII, is about the same. For this smaller sample of countries, the net domestic ratio is 1.9 and 2.1 in the low income countries, compared with 5.3 and 2.9 in Groups I and II and III; the net national capital-output ratios are 1.8 and 1.8, compared with 5.2 and 3.0.

The data on incremental capital-output ratios for the Communist countries, which we ought to consider before discussing some of the questions raised by the findings in Tables 10 and 13, are scarce, relate only to net ratios, and are subject to even more qualifications than the data for the non-Communist countries. Based on the official data in the United Nations, Yearbook of National Accounts Statistics, 1958, the ratio for Mainland China for 1952-56 (taking half of capital accumulation in the terminal years) is 2.3; for Poland for 1951-57 it is 2.4; for Bulgaria for 1952-57 it is 2.4; and only for Hungary, where I averaged the index of net material product for 1951 and 1952 at one end and for 1956 and 1957 at the other end (to remove the effect of annual variations), and related to it capital accumulation for the years 1952-56, is the ratio, 6.4, exceptionally high. It may be assumed that for the U.S.S.R. over periods not marked by any major disturbances, the net capital-output ratio would also be in the neighborhood of 2.0, a level suggested by a net capital formation proportion of 15 percent and a rate of growth of net national product of between 6 and 8 percent per year. If these few scraps of data can be trusted, the net capital-output ratios for the Communist countries are well within the range shown in Table 13, although they must be, generally, much lower than the ratios for Group I.

Notes to Table 13

Entries in parentheses are for countries excluding politically and financially dependent units (listed in the notes to Table 1). However, the various measures are not repeated for Group I, from which there are no exclusions.

Lines 1 and 2: from Table 4, lines 9 or 19 and 12 or 22.
Lines 3, 4, and 7: see notes to Table 10, lines 14 and 17.
Line 6: from Table 4, line 18 or 28.

VI. Industrial Structure and the Capital-Output Ratios

The international differences in the incremental capital-output ratio suggested in Tables 10 and 13 are subject to sizeable statistical errors, which cannot be tested by recalculations of the kind summarized in Tables 11 and 12. The errors in the capital formation proportions for the low income countries due to undercoverage may be so large that correction for them would substantially raise both the proportions and the incremental capital-output ratios. On the other hand, it must be remembered that producers' equipment is valued at appreciably higher relative prices in the underdeveloped countries, and the corresponding adjustment would lower the capital formation proportions in these countries and thus lower their incremental capital-output ratios. At any rate, the statistical errors involved are hardly so substantial as to reduce to insignificance the contrast between the capital-output ratios for Groups I and II and III (which, on a net basis, are 5.2 and 2.1 or 3.0, respectively) and those for the combined Groups VI and VII (which are between 1.7 and 1.8).

If we accept the differences suggested in Tables 10 and 13, a question may be raised as to the significance of this finding--based on observation of a seven-year period--for longer-term movements. Even if we assume that the differences would persist if the period were extended to a decade, their relevance to long-term analysis would not be strengthened appreciably--if incremental capital-output ratios can change materially from one decade to the next. Besides, as we have frequently stressed, inferences from cross-section analysis as to the common pattern of long-term movements within individual countries must be carefully checked. Therefore we make no claim that the international differences suggested for the recent period have a direct bearing on the long-term movement of the average or incremental capital-output ratio in the economic growth of a country.

Nevertheless, it is of interest to explore these international differences in possible relation to the structure of capital formation and of the increase in output. Different types of capital goods are characterized by different ratios to their yield (i.e., their output). For example, we know that, in general, construction results in long-lived capital goods, for which the ratio of current capital formation to additions to output must be high--at least in comparison with producers' equipment which has a much shorter economic life and a lower ratio of gross additions to stock to current additions to output. Could the higher incremental capital-output ratios for Groups I and II be due to a share of construction in their gross capital formation that is much higher than the share in countries with low per capita income?

If Table 6 has any validity this hypothesis is not tenable: the incremental gross domestic capital-output ratio for Group I is 7.3 and for Groups VI and VII it is 3.3 (Table 10, line 15, columns 8 and 11); whereas the share of construction in gross domestic capital formation for Group I is 55.5 percent and for Groups VI and VII it is 54.6 percent (Table 6, line 6, columns 1 and 4). Even if we allow for differences between dwellings and other construction and assume incremental capital-output ratios of say 15 for dwellings, 10 for other construction, 2 for producers' equipment, and 0.5 for stock accumulation, the derived incremental capital-output ratio (using the percentages in Table 6) would work out to 7.4 for Group I and 7.2 for Groups VI and VII. It is clear that differences in the distribution of capital formation among construction, equipment, and

inventory accumulation do not account for a significant part of the differences in the incremental capital-output ratio for the groups distinguished in Tables 10 and 13.

We next consider the structure of capital formation by industrial use, compared with the structure of additions to the country's product by industrial origin. We know that the capital-output ratios for the industrial sectors of an economy differ widely; and differences among countries in their over-all incremental capital-output ratios may be traced to differences in these sectoral ratios as well as to the differing weights of the sectors in the addition to the country's total product. To deal with this question adequately, we need data on movements in both domestic (or national) product and in the product originating in each industrial sector--all in constant prices. In addition, we need data on the distribution of capital formation among the same industrial sectors, the distribution among sector-users. The latter distribution may be based on totals in either current or constant prices, and the resultant two sets of sectoral ratios of the capital formation proportion to the rise in product are comparable to the two sets of countrywide ratios shown in Table 9.

Unfortunately, data are available for only seven countries on the additions to product in constant prices by major sectors and on the distributions of gross fixed capital formation among the same major sectors in both constant and current prices. The purpose of Table 14, which is based on these data, is to ascertain if the incremental ratios of gross fixed capital to gross domestic product (total and sectoral) are the same whether the fixed capital formation proportions are based on constant or current price values. The procedure is parallel to that employed in Table 9 but the number of countries is much smaller and the analysis for each country as a whole is supplemented by the analysis of four major sectors. While there are some differences between the results based on current and constant price fixed capital formation proportions, two findings stand out clearly. First, the incremental capital-output ratios derived from current price capital formation proportions are quite close to those derived from constant price proportions--and the two can be used interchangeably. Second, because the sample is small and because averages of the incremental capital-output ratios calculated separately for each country can be erratic, the weighted averages of such ratios in lines 6 and 7 and 13 and 14 are preferable to the unweighted averages in lines 4 and 5 and 11 and 12.

If then we can use the gross fixed capital formation proportions based on current prices totals, it becomes possible to assemble data for ten countries (Table 15). This is still a limited sample; and its range is mostly from Group II to Group VI (there is only one country in Group I and none in Group VII). Yet, small as the sample is, the movement of the incremental countrywide gross fixed capital-output ratios here--from 6.3 in Groups I and II, to 2.9 in Groups III and IV, and 3.4 in Groups V and VI (line 12)--is quite similar to that shown for the larger sample of countries in Table 10 (which averages out at 5.8 for Groups I and II, 3.7 for Groups III and IV, and 2.5 for Groups V and VI, see line 15). More important, the differences among the three groups of countries with respect to their incremental gross fixed capital-output ratios are quite wide--almost as wide as those based on the larger sample in Table 10. We can, therefore, study the disparities in sectoral structure to see whether they explain the large differences in the countrywide capital-output ratios.

Table 14.
Ratios of Gross Fixed Capital Formation Proportion, Current and Constant Prices, to Rise in Gross Domestic Product, Constant Prices, by Major Sectors, Identical Countries, Post-World War II Years

	A Sector (1)	M Sector (2)	Transport. & Communication (3)	Service Sector (4)	Total (5)
A. High Income Countries (3)					
1. Rise per year, gross domestic product, constant prices (%)	1.33	3.89	4.47	2.04	3.00
Proportion, Gross Fixed Capital Formation To Gross Domestic Product (%)					
2. Based on constant price totals	12.4	13.9	39.5	23.8	20.2
3. Based on current price totals	12.7	14.2	36.0	24.3	20.3
Ratio, Gross Fixed Capital Formation Proportion to Rise in Gross Domestic Product					
4. Based on constant price proportion	16.2	3.5	8.6	11.5	6.7
5. Based on current price proportion	16.4	3.6	8.1	11.7	6.8
Alternative Ratio					
6. Line 2 + line 1	9.3	3.6	8.8	11.7	6.7
7. Line 3 + line 1	9.5	3.7	8.1	11.9	6.8
B. Low Income Countries (4)					
8. Rise per year, gross domestic product, constant prices (%)	3.79	7.81	5.50	4.90	5.80
Proportion, Gross Fixed Capital Formation to Gross Domestic Product (%)					
9. Based on constant price totals	9.7	14.0	50.0	37.6	17.3
10. Based on current price totals	10.1	14.0	48.1	37.7	17.3
Ratio, Gross Fixed Capital Formation Proportion to Rise in Gross Domestic Product					
11. Based on constant price proportion	3.3	1.8	9.3	7.2	3.0
12. Based on current price proportion	3.4	1.8	9.0	7.2	3.0
Alternative Ratio					
13. Line 9 + line 8	2.6	1.8	9.1	7.7	3.0
14. Line 10 + line 8	2.7	1.8	8.7	7.7	3.0

(Notes on next page)

Both the countrywide incremental capital-output ratios and the capital-output ratios for most sectors differ among the three groups of countries (lines 12-16). For the A sector, the average ratio is more than 10 in Groups I and II and less than 3 in the other two groups: and similarly large differences in the sectoral ratios among the three groups of countries are indicated for the M and S sectors. Only in the case of transportation and communication are the average sectoral ratios within a fairly narrow range.

This being the case, the differences in the weight of the sectors in total additions to domestic product could not have much effect on the intergroup differences in the countrywide capital-output ratio. In fact, the differences among groups of countries in the shares of the various sectors in additions to gross domestic product are not large (lines 17-21). The share of the M sector varies from 46 to 54 percent; that of the S sector is about the same in all three groups.

The entries in lines 22 and 23 summarize the results effectively. If differences in the sectoral structure of additions to product were an important factor affecting intercountry differences in the incremental capital-output ratio, use of the average sectoral capital-output ratios in lines 13-16, column 4, with allowance for the different weights of sectors in lines 17-20, columns 1-3, would have resulted in a movement of the capital-output ratio similar to that observed in line 12. But no such movement is found in line 22: the countrywide capital-output ratios are quite similar in the three groups of countries. However, if we allow the sectoral capital-output ratios to differ (using lines 13-16, columns 1-3) and weight them by an identical set of sector shares (lines 17-20, column 4), the intergroup differences in the countrywide capital-output ratios emerge in almost full force (line 23 compared with line 12).

The small sample in Table 15 may have yielded unrepresented averages of sectoral fixed capital-output ratios and of sectoral additions to gross domestic product. We have no data with which to check the former, but we can test the sector weights in lines 17-21: for twenty-three countries for recent post-World War II years, estimates of gross domestic product in constant prices, by sectors, are available. For these countries we calculated the

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Notes to Table 14

Lines 1-3 and 8-10: unweighted arithmetic means of rates and proportions for identical individual countries given in Appendix Table 4.

Lines 4 and 11: unweighted arithmetic means of ratios for individual countries of the gross fixed capital formation proportions, given in Appendix Table 4, lines 11-17, to the rate of growth in gross domestic product, given in ibid., lines 1-10 (for identical countries).

Lines 5 and 12: unweighted arithmetic means of ratios for individual countries of the gross fixed capital formation proportion, given in Appendix Table 4, lines 18-27, to the rate of growth in gross domestic product, given in ibid., lines 1-10, for the countries with capital formation proportions based on constant price values.

Table 15.
Ratios of Gross Fixed Capital Formation Proportion to Rise in Gross Domestic Product, by Major Sectors, Countries Grouped by Per Capita Product, Post-World War II Years

		Wider Groups of Countries by Per Capita Product			
		I & II	III & IV	V & VI	All Countries
		(1)	(2)	(3)	(4)
1.	Number of Countries	4	3	3	10
	Rise per Year, Gross Domestic Product, Constant Prices (%)				
2.	Total	3.45	6.34	3.95	4.46
3.	A sector	1.18	4.07	2.74	2.52
4.	M sector	4.77	8.45	5.70	6.15
5.	T + C sector	4.73	5.93	4.66	5.07
6.	Service sector	2.58	5.47	3.83	3.82
	Proportion, Gross Fixed Capital Formation to Gross Domestic Product, Current Prices (%)				
7.	Total	21.7	18.4	13.4	18.2
8.	A sector	13.0	11.5	7.9	11.0
9.	M sector	15.4	14.4	13.7	14.6
10.	T + C sector	33.2	48.4	38.7	39.4
11.	Service sector	30.1	43.8	16.1	30.0
	Ratio, Gross Fixed Capital Formation Proportion to Rise in Gross Domestic Product				
12.	Total (line 7 ÷ line 2)	6.3	2.9	3.4	4.1
13.	A sector (line 8 ÷ line 3)	11.0	2.8	2.9	4.4
14.	M sector (line 9 ÷ line 4)	3.2	1.7	2.4	2.4
15.	T + C sector (line 10 ÷ line 5)	7.0	8.2	8.3	7.8
16.	Service sector (line 11 ÷ line 6)	11.7	8.0	4.2	7.9
	Share in Total Additions to Gross Domestic Product, Constant Prices (%)				
17.	A sector	6.1	17.7	18.6	13.4
18.	M sector	54.2	50.9	45.6	50.7
19.	T + C sector	14.6	5.6	10.6	10.7
20.	Service sector	25.0	25.7	25.2	25.3
21.	Of which dwellings	2.6(3)	4.2(2)	7.9	5.0
22.	Ratio on assumption of weights in lines 17-20, columns 1-3, and ratios in lines 13-16, column 4	4.68	4.47	4.73	
23.	Ratio on assumption of ratios in lines 13-16, columns 1-3, and weights in lines 17-20, column 4	6.80	4.14	3.56	

Unless otherwise indicated entries are unweighted arithmetic means of measures for individual countries.
Lines 2-6: from Appendix Table 4, lines 1-10.
Lines 7-11: from Appendix Table 4, lines 18-27.
Lines 17-21: the underlying absolutes for individual countries are those used in deriving the annual rate of growth described in the notes to Appendix Table 4, lines 1-10. Line 21, column 1 is available for only 3 of the 4 countries; and column 2 for 2 of the 3 countries.

average weight of each major sector (and of some subsectors) in addition to gross domestic product from 1951 to 1957 (Table 16).

The intergroup differences in the shares of the major sectors in additions to gross domestic product in Table 16 (lines 2-5) are different from those in Table 15 (lines 17-20). Here in the low income countries not only is the share of the A sector higher, but that of the M sector is distinctly lower. Also, the share of the S sector is higher in Groups III and IV than in Groups I and II; and highest in Groups V, VI, and VII. This higher share of the S sector in additions to domestic product in the low income countries is due mainly to the larger shares of trade and finance (line 8) and of public administration (line 10). This may explain the difference in the incremental fixed capital-output ratio for the S sector in Table 15 (line 16): the much lower ratio for Groups V and VI than for Groups I and II may in part be due to the larger share of trade and public administration in the additions to gross domestic product contributed by the S sector.

But this is merely conjecture. The main point here is that the sectoral shares in Table 16 do not help to explain the intergroup differences in countrywide incremental ratios of gross fixed capital to domestic output, if we still accept the sectoral capital-output ratios of Table 15--for which we have no better substitute at present. If we use the new sector shares in Table 16 as weights, and recalculate the averages in line 22 of Table 15--i.e., hold sectoral capital-output ratios constant (at the levels shown in Table 15, lines 13-16, column 4), the derived averages of countrywide incremental ratios of gross fixed capital to gross domestic product become 4.7 for Groups I and II, 5.2 for Groups III and IV, and 5.5 for Groups V and VI. The result thus is the opposite of what we found in Table 15 (line 12, columns 1-3); a rise rather than a decline in the capital-output ratio, as we move from the high to the low income countries. If we use a new fixed set of sector shares as weights (the average for all countries in Table 16) and allow the sectoral capital-output ratios to differ (as they do in Table 15, lines 13-16, columns 1-3)--thus recalculating line 23 of Table 15--the derived countrywide fixed capital-domestic product ratios are 7.9 for Groups I and II, 4.6 for Groups III and IV, and 3.6 for Groups V and VI. The sectoral differences in capital-output ratios thus more than account for the intergroup differences in countrywide capital-output ratios.

In short, on the basis of the available evidence, differences in overall capital-output ratios among countries in recent years have been associated with substantial differences in sectoral capital-output ratios. Hence, the assumption made in our discussion of Table 7 above--that the sectoral capital-output ratios are the same for all groups of countries classified by per capita income--is contradicted by the data in Table 15--particularly for the A, M, and S sectors.

It may well be that the results suggested by Table 15 would be substantially modified with more extensive coverage. Offhand, one would expect that the incremental capital-output ratio for the M+ sector would differ less among countries at different levels of per capita income and development than those for the A and S sectors. The M+ sector, growing within an economy in recent times, requires capital equipment prescribed by prevailing modern technology: it is the modern sector, whether in a developed or underdeveloped economy; and, provided the industry-mixes are similar, the capital-output ratios should not differ materially. In the case of agriculture, the same additions to gross

Table 16.
Shares of Industrial Sectors in the Rise in Gross Domestic Product, Countries Grouped by Per Capita Product, 1951 to 1957 (Based on constant price totals)

	Wider Groups of Countries by Per Capita Product		
	I & II	III & IV	V, VI, & VII
	(1)	(2)	(3)
1. Number of countries	6	7	10
Sector Shares (%)			
2. A sector	7.0	18.5	25.8
3. M sector	53.9	37.4	28.4 (8)
4. T + C sector	12.2	8.5	6.8 (7)
5. Service sector	26.9	35.7	40.8 (7)
6. Mining, manufacturing, electric, gas, & water	46.2	34.6 (6)	23.6 (7)
7. Construction	7.8	4.6 (6)	3.9 (6)
8. Trade & finance	14.2	13.6	17.8 (8)
9. Dwellings	3.1	7.2 (6)	4.9 (6)
10. Public administration & defense	3.9	7.6 (6)	13.5 (8)
11. Other services	5.7	6.4 (6)	7.0 (7)

Entries are unweighted arithmetic means of percentages for individual countries given in Appendix Table 5.
Figures in parentheses are the number of countries covered, when different from the number in line 1.

output in countries differing widely in the level of development, can probably be secured with different amounts of additional capital; and this may be true of the rather heterogeneous S sector, even if we assign little weight to the effect of dwellings on the incremental capital-output ratio. A larger sample might show greater similarity among groups of countries classified by per capita income in their incremental capital-output ratios for the M and M+ sectors, and greater differences in the ratios for the A and S sectors. But these suggestions are only plausible guesses that cannot be tested with the data currently available.

Before concluding the discussion of the evidence on the recent levels of incremental capital-output ratios, we may ask whether the generally lower level of these ratios for the low income countries shown in Tables 10 and 13 are likely to have been true over the long run. That, by and large, the incremental reproducible capital-output ratios may have been, in the long run, lower for the less developed, low income countries than for the high income countries, is suggested by the somewhat lower average capital-output ratios in the former in past years. In 1894-95 the six countries with the lowest per capita income had a ratio of reproducible wealth to income of 2.6 (presumably domestic wealth ratios), compared with 2.9 for the five countries with the highest per capita income (or 3.3, if capital investments abroad for the United Kingdom and France

are included).[22] In 1913-14, the average ratio ranged from 4.3 for the eight countries with higher per capita income to 3.5 for the nine countries with lower per capita income.[23] In a more recent comparison, the domestic reproducible capital-output ratios for the three countries with low per capita income (India, Japan, and Mexico) were all below 2.5, whereas the ratios for twelve other countries were higher (excluding West Germany, for which capital was related to gross rather than net product).[24] But an average capital-output ratio is a cumulation of past incremental capital-output ratios; and if the average ratios of one group of countries are lower than those of another, the implication is that the corresponding incremental ratios must also have been lower in the long period over which national wealth is accumulated.

In this sense, viz., that in general in recent years the incremental capital-output ratios were lower in the low income, less developed countries, the findings of Tables 10 and 13 are not inconsistent with the scanty data on the average reproducible capital-output ratios in the past. But for the magnitude of the differences in these ratios (Table 13 is particularly relevant since the average capital-output ratios are most easily related to incremental net capital-output ratios) we can find no support in the data for the past. In Table 13, the range in the average ratios from Group I to the low income groups was from over 5 to a level not much above a third. No such range is suggested by the average capital-output ratios in the sources cited in footnotes 22-24.

It would seem that, like the high capital formation proportions in recent years in the low income countries, and the limited range in these capital formation proportions among countries grouped by per capita income, the wide range in the incremental capital-output ratios between the high and the low income countries observed for recent years is probably not typical of the longer-range past. The very fact that the annual rate of growth of domestic or national product in Groups VI and VII is 1.7 times the rate in Group I (see Table 13, lines 4 and 7, columns 8 and 11) supports this inference--for surely over the long-term past the rate of growth must have been higher in countries in Group I than in those in Groups VI and VII. Clearly, the rates of increase in domestic or national product (gross or net) were much higher during recent years in the low income countries than they could have been over the long run in the past. The capital formation proportions must also have been significantly higher during recent years. But it also seems likely that the former rose to higher relative levels in recent years than the latter. To illustrate, if we assume that in the past net capital formation proportions in the less developed countries ranged from 3 to 5 percent, and the rates of growth of countrywide net product per year ranged from 1 to 1.5 percent, the incremental net capital-output ratio was about 3.0--somewhat lower than for the more advanced countries. These past capital formation proportions are from less than half to about seven-tenths of those for recent years (7.5 percent for Groups VI and VII in Table 13), whereas the rates of growth are from less than a quarter to about a third of those for

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22. See Paper IV, Appendix Table 2, p. 63.

23. Ibid., Appendix Table 3, p. 65.

24. See Raymond Goldsmith and Christopher Saunders, ed., op. cit., Table VII, p. 32.

recent years (4.5 percent per year for Groups VI and VII in Table 13). In other words, while the recent years were probably marked by a significant rise in capital formation proportions in the low income, less developed countries, there was an even greater relative rise in the rate of growth of countrywide product per year; and as a result, at least for this short recent period, the incremental capital-output ratios were substantially lowered.

VII. Distribution of Gross Domestic Capital Formation by Type of Purchaser and by Source of Financing

For the recent post-World War II years we have the distribution (sometimes incomplete) of gross fixed capital formation by type of purchaser for twenty-four countries (Table 17). But since fixed capital formation accounts for an overwhelming proportion of gross domestic capital formation, the shares in Table 17 can be viewed as approximations to the distribution of the latter.

Private enterprises, largely individual firms and private corporations (including individual owners of dwellings treated as private firms) purchase from six- to seven-tenths of gross fixed, and probably also of gross domestic capital formation (line 2). The share of these private purchasers declines somewhat as we move down to Groups IV and V, and VI and VII, where governments play a larger role as purchasers of durable capital than they do in the high income, more advanced countries. The statements apply, of course, to the non-Communist countries to which Tables 17-19 are limited.

For twenty-one of the twenty-four countries we have direct information on the share of gross fixed capital formation purchased by general government (i.e., excluding public enterprises and corporations). As would be expected from the decline in the share of private purchasers as one moves to the low income, less developed countries, the share purchased by general government is higher in the latter--particularly in Groups VI and VII (line 4). The derived share of public and government enterprises drops sharply from Groups IV and V to Groups VI and VII, but little significance can be attributed to this movement since the share is calculated from subtrahends and diminuends based on different samples (line 5).

It is interesting that government plays a greater role as a purchaser of capital goods in the low income, less developed countries despite the fact that government consumption is a distinctly lower share of gross national product than in the high income countries (line 7). In other words, the reason for the more active role of government in the purchase of capital goods in the less developed countries is not that it needs a higher proportion of capital goods to produce the goods that it consumes. Nor is there a close association between the role of the government as purchaser of gross fixed capital formation and its contribution to gross domestic product: the share of government in gross domestic product in Groups VI and VII is not much greater than it is in Group I (line 9). Presumably, the reason for the large share of capital formation purchased by government in the low income, less developed countries, is that it fosters and directs capital investment.

A somewhat similar pattern emerges when we consider the sources of financing (Table 18). Here we must first take account of the differences, already noted in connection with Table 1, in the extent to which foreign funds finance

Table 17.
Distribution of Gross Fixed Capital Formation by Type of Purchaser, Compared With Shares of Government Consumption in Gross National Product and of the Government Sector Product in Gross Domestic Product, Countries Grouped by Per Capita Product, Post-World War II Years
(Based on current price totals)

	Wider Groups of Countries by Per Capita Product							
	I	II & III		IV & V		VI & VII		
	(1)	(2)		(3)		(4)		
Share in Gross Fixed Capital Formation								
1. Number of countries in line 2	7	3	(2)	4	(3)	10	(4)	
2. Share of purchases by private enterprises (%)	67.3	67.2	(71.4)	63.8	(63.9)	58.9	(61.0)	
3. Number of countries in line 4	5	5	(4)	4	(4)	7	(2)	
4. Share of purchases by general government (%)	12.8	12.8	(13.1)	14.5	(14.5)	26.2	(30.1)	
5. Derived share of purchases by public and government enterprises (%) (100 - line 2 - line 4)	20	20	(16)	22	(22)	15	(9)	
Share in Gross National Product								
6. Number of countries in line 7	8	12	(9)	17	(13)	16	(8)	
7. Share of government consumption expenditures (%)	14.2	14.0	(13.2)	11.6	(11.5)	10.6	(10.5)	
Share in Gross Domestic Product								
8. Number of countries in line 9	6	12	(9)	16	(13)	22	(13)	
9. Share of public administration and defense sector (%)	7.0	10.0	(8.7)	7.0	(7.2)	7.7	(7.8)	

Entries are unweighted arithmetic means of percentages for individual countries. Those in parentheses are for countries excluding politically and financially dependent units (listed in the notes to Table 1 and, in lines 8 and 9, Kenya and Uganda). However, the various measures are not repeated for Group I, from which there are no exclusions.

Lines 1 and 2: based on Appendix Table 3, column 7.
Lines 3 and 4: based on Appendix Table 3, column 8.
Lines 6 and 7: based on Appendix Table 6, column 1.
Lines 8 and 9: based on Appendix Table 6, column 2.

Table 18.
Shares in Gross Domestic Capital Formation Financing, Countries Grouped by Per Capita Product, Post-World War II Years (Based on current price totals)

	Wider Groups of Countries by Per Capita Product			
	I (1)	II & III (2)	IV & V (3)	VI & VII (4)
1. Number of countries in lines 2 and 3	8	13 (10)	17 (13)	18 (10)
2. Share of foreign financing in gross domestic capital formation (%)	0.5	18.5 (2.6)	8.7 (7.7)	18.4 (8.5)
3. Share of gross domestic financing in gross domestic capital formation (%) (100 - line 2)	99.5	81.5 (97.4)	91.3 (92.3)	81.6 (91.5)
4. Number of countries in lines 5 and 6	7	12 (9)	13 (10)	12 (7)
5. Share of capital consumption in gross domestic capital formation (%)	41.2	40.7 (44.8)	33.2 (32.4)	37.6 (45.5)
6. Share of net domestic savings in gross domestic capital formation (%)	57.7	39.0 (51.9)	51.4 (59.5)	49.8 (47.5)
7. Derived share of net domestic in gross domestic savings (%) [line 6 + (line 5 + line 6)]	58.3	48.9 (53.7)	60.8 (64.6)	57.0 (51.1)
8. Number of countries in lines 9 and 10	5	6 (5)	7 (5)	7 (4)
9. Share of net domestic savings in gross domestic capital formation (%)	54.3	58.1 (62.4)	49.8 (61.4)	44.6 (35.1)
10. Share of net savings of households in gross domestic capital formation (%)	31.0	27.9 (27.4)	16.3 (28.4)	12.4 (6.6)
11. Derived share of net savings of households in net domestic savings (%) (line 10 + line 9)	57.1	48.0 (43.9)	32.7 (46.3)	27.8 (18.8)
12. Number of countries in lines 13 and 14	3	7 (6)	8 (5)	8 (4)
13. Share of net domestic savings in gross domestic capital formation (%)	49.0	58.6 (62.3)	43.0 (53.5)	51.4 (50.5)

14. Share of net savings of general government in gross domestic capital formation (%)	5.0	19.2 (23.5)	14.4 (14.5)	15.4 (14.6)
15. Derived share of net savings of general government in net domestic savings (%) (line 14 + line 13)	10.2	32.8 (37.7)	33.5 (27.1)	30.0 (28.9)
16. Derived share of net savings of private and public corporations in net domestic savings (%) (100 - line 11 - line 15)	32.7	19.2 (18.4)	33.8 (26.6)	42.2 (52.3)
17. Number of countries in lines 18 and 19	5	1 (0)	2 (1)	4 (4)
18. Share of net domestic savings in gross domestic capital formation (%)	54.3	66.1	50.6 (76.6)	35.1 (35.1)
19. Share of savings of private corporations in gross domestic capital formation (%)	14.0	18.8	13.8 (14.1)	15.2 (15.2)
20. Derived share of savings of private corporations in net domestic savings (%) (line 19 + line 18)	25.8	28.4	27.3 (18.4)	43.3 (43.3)
21. Derived share of savings of public corporations in net domestic savings (%) (line 16 - line 20)	6.9	-9.2	6.5 (8.2)	-1.1 (9.0)

Shares are unweighted arithmetic means of percentages for individual countries.

Entries in parentheses are for countries excluding politically and financially dependent units (listed in the notes to Table 1). However, the various measures are not repeated for Group I, from which there are no exclusions.

Line 1: from Table 1, lines 7 and 19.
Line 2: from Table 1, lines 8 and 21.
Line 4: from Table 4, line 3.
Line 5: from Table 4, line 4 (and by a similar procedure for countries excluding dependent units).
Lines 6, 9, 13 and 18: based on Appendix Table 6, column 3.
Line 10: based on Appendix Table 6, column 4.
Line 14: based on Appendix Table 6, column 5.
Line 19: based on Appendix Table 6, column 6.

gross domestic capital formation. If we take all countries, including those politically and financially dependent, Groups II and III, and VI and VII show close to a fifth of gross domestic capital formation financed by foreign funds. If we exclude the dependent units, the average share of foreign financing drops materially; but it is still 9 percent of gross domestic capital formation in Groups VI and VII and less than 1 percent in Group I (line 3).

But our main interest here is in domestic financing--which for gross capital formation consists of funds from capital consumption charges and net domestic financing. By and large, the funds derived from provision for capital consumption account for about four-tenths to a half, and net domestic savings account for a half to six-tenths of gross domestic savings or financing (line 7). There appear to be no significant differences among countries grouped by per capita income in the distribution of gross domestic financing or saving between capital consumption funds and net domestic savings.

Capital consumption charges are provided for by all holders of fixed and depreciable capital goods--individuals owning dwellings, private firms, private corporations, general government, and government enterprises and corporations. If the finding in Table 17--that the government purchases a larger share of fixed capital goods in the low income countries than in the high--is valid for a fairly long period, and if government and government enterprises provide for capital consumption in the same fashion as the private sector, the share of government in capital consumption charges in the low income countries would also be larger. But this conjecture is subject to too many qualifications to be given much weight.

Part of capital consumption charges is on account of individuals as owners of dwellings and of private unincorporated firms, but their share in the total in the industrialized countries must be relatively limited: residential construction is about a fifth of total fixed capital formation; its economic life span is much longer than that of other fixed capital goods; a substantial fraction of residential housing is owned by business corporations and governments; and the share of unincorporated business is small. If we allow about a tenth of capital consumption to be credited to households owning their own dwellings and another tenth for unincorporated firms, the 40 to 50 percent share of capital consumption in gross domestic savings would include 32 to 40 percent for private corporations, government corporations, and governments. The other 60 to 70 percent of gross domestic savings is accounted for partly by net savings of non-household units, partly by savings of households.[25] The share of the latter, on a net basis, is available for a few countries. The net savings of households account for between 19 and 57 percent of net domestic savings, declining perceptibly, as we move down the scale of per capita income, from 57 percent in Group I to either 28 or 19 percent in Groups VI and VII (line 11).

Two conclusions are immediately suggested. First, the contribution of individuals and households must account for a rather moderate share of total domestic financing of gross domestic capital formation. Even in Group I, the

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25. These are defined in the estimates to include all individual owners of unincorporated business firms and dwellings--in addition to households not owning a business or a dwelling.

share of savings of households in gross domestic capital formation (which is only half a percent different from gross domestic financing) averages 31 percent (line 10). If we add 8 percent, to allow for capital consumption charges on owner-occupied dwellings and unincorporated business, the percentage becomes 39. Thus, of the total domestic financing of gross domestic capital formation in Group I less than four-tenths is contributed by individuals and households. In Groups VI and VII the contribution of savings by individuals and households is even more moderate. If we exclude politically and financially dependent units, the share of net savings of households in gross domestic financing is about 7 percent (6.6/0.915); and if we add another 5 percent for consumption charges on owner-occupied dwellings and perhaps as much as 20 percent for private unincorporated firms (capital consumption charges), the total becomes 32 percent. The rest of domestic gross savings is presumably contributed by governments, public and government enterprises, and private corporations. Second, the relative contribution of net savings by households to gross domestic capital formation is materially lower in the low income countries than in the high income countries: it drops from 31 percent in Group I to either 12 or 7 percent in Groups VI and VII.

The net savings of governments account for between 5 and 20 percent of gross domestic capital formation, but the movement is from a low of 5 percent in Group I to a high of 15 percent in Groups VI and VII (line 14). Of the 58 to 50 percent share of net domestic savings in gross capital formation (line 6), we are thus left with about 20 percent for the share of net savings of private corporations, public corporations, and government enterprises in gross capital formation in Group I and about 28 to 23 percent in Groups VI and VII. Since private corporations are so much more important relative to public corporations and government enterprises in Group I than in Groups VI and VII, we may assume that the share of these private corporations in the financing of gross capital formation is larger in the high income, developed countries than in the low income, underdeveloped countries. In other words, the difference in the relative contribution of net savings by households to gross domestic capital formation between high and low income countries is made up partly by greater foreign financing in the latter, partly by greater contribution of savings by governments, and partly (probably) by greater contribution of savings by public corporations and government enterprises.

The sharp drop in the share of the savings of households and individuals in gross domestic capital formation as we go down the scale of per capita income (Table 18, line 10) suggests, of course, that the scarcity of household savings sets a limit to the national, and even domestic, capital formation proportions. At any rate, it is of interest to trace the ratio of savings of households to gross domestic capital formation from the relation of income received by households to gross domestic product, and the household savings-disposable income ratio (Table 19).

The calculations are based on data for the same twenty-three countries throughout, but the small number in the groups distinguished by per capita income bars hard and fast inferences. However, a few broad observations can be made.

First, the differences in gross capital formation proportions observed among the wide groups are not large: from 21 percent in Group I to 16 percent

Table 19.
Relation Between Household Income and Savings and Gross Domestic Capital Formation Financing, Countries Grouped by Per Capita Product, Post-World War II Years (Based on current price totals)

		Wider Groups of Countries by Per Capita Product			
		I (1)	II & III (2)	IV & V (3)	VI & VII (4)
1.	Number of countries	6	5 (4)	6 (4)	7 (4)
2.	Ratio, gross domestic capital formation to gross domestic product (%)	20.7	19.5 (20.8)	19.4 (21.6)	21.2 (16.1)
3.	Ratio, income of households to gross domestic product (%)	81.5	85.6 (84.8)	80.1 (79.2)	75.3 (77.8)
4.	Ratio, direct taxes to income of households (%)	12.9	13.7 (15.8)	4.6 (5.4)	2.8 (1.8)
5.	Ratio, disposable income to gross domestic product (%)	71.0	74.0 (71.4)	76.5 (75.0)	73.3 (76.4)
6.	Ratio, household savings to disposable income (%)	8.5	7.1 (7.5)	5.2 (9.0)	3.8 (1.4)
7.	Ratio, household savings to gross domestic product (%)	6.1	5.2 (5.4)	3.8 (6.6)	2.9 (1.2)
8.	Ratio, household savings to gross domestic capital formation (%)	29.7	27.1 (26.4)	15.3 (30.0)	12.4 (6.6)
9.	Derived ratio, household savings to gross domestic capital formation (%) (line 7 ÷ line 2)	29.5	26.7 (26.0)	19.6 (30.6)	13.7 (7.5)

Ratios, except in line 9, are unweighted arithmetic means of percentages for individual countries, given in Appendix Table 1, column 4 and Appendix Table 7.

Entries in parentheses are for countries excluding politically and financially dependent units (listed in the notes to Table 1). However, the various measures are not repeated for Group I, from which there are no exclusions.

in Groups VI and VII, excluding dependent units (line 2). But since the range of differences in these proportions for the larger sample in Table 1 was not much wider, the small sample is not a serious qualification here.

Second, the average ratio of income of households to gross domestic product declines slightly as we move from the high to the low income countries, due to the larger share in the latter of the combined total of government and corporate income, taxes, depreciation, and other differences between income of households and gross domestic product (line 3). This result is somewhat unexpected, and a larger sample might reverse the finding. However, the proportion of direct taxes (deducted from income of households to derive disposable income) to income of households drops perceptibly, in accord with expectation, as we move from the high to the low income countries (line 4). As the conflicting movements in lines 3 and 4 cancel each other, the share of disposable income in gross domestic product shows no significant differences among countries grouped by per capita income and indeed is lowest in Group I (line 5).

Third, the real difference is in the ratio of savings to disposable income--which drops from 8 percent in Group I to slightly over 1 (or under 4) percent in Groups VI and VII (line 6). It is this difference among countries in the savings-disposable income ratio, which--despite the higher incidence of direct taxes in Group I--produces the lower ratio of household savings to gross domestic product (line 7) and the lower ratio of household savings to gross domestic capital formation in the low income countries (line 8). The alternative calculation of the latter ratio (line 9)--from the averages in lines 2 and 7, rather than from the ratios for individual countries--shows results similar to those in line 8: a drop from close to three-tenths in Group I (not much different from the 31 percent in Table 18) to 7 percent in Groups VI and VII if we exclude the politically and financially dependent units (7 percent also in Table 18).

In concluding this section on the distribution of capital formation by type of purchaser and by source of financing, one may ask whether the findings based on the data for the post-World War II years are relevant to the longer run of the pre-World War II past. Was the larger role of the government as a purchaser of fixed capital goods in the less developed countries true of the longer-run past? Was the high proportion of capital consumption charges to gross domestic savings--about four-tenths in both high and low income countries--characteristic of the past? Was the limited share of household savings in net domestic savings--only four-tenths even in the high income countries--true of the past? Was the appreciably lower ratio of household savings to gross domestic capital formation in the low income countries, associated with a lower ratio of household savings to disposable income, representative of a long standing difference between high and low income countries?

In the next paper, which will deal with long-term records, there will be little opportunity to check on any conjectures indulged in here in trying to answer these questions: no long-term data on sources of financing are available, except for one or two countries. But if we consider that the gross domestic capital formation proportions in recent post-World War II years are probably much higher, particularly for the low income countries, than they could have been in the long run; that independent governments in many of these countries are a recent development, as is the acute concern with capital investment and economic growth--the answers must be, if not a flat 'no', a qualified 'unlikely'.

It is not likely that in the past government played a much larger role in the purchase of capital equipment in the less developed than in the high income countries--unless the former were colonies and capital formation was the major concern of the metropolitan government. It is not likely that provisions for capital consumption were a high fraction of the gross sources of funds for financing domestic capital formation in the low income countries; and if one goes far enough back, even in the high income countries. And we cannot be sure that with rather low gross domestic capital formation proportions, the share financed by savings of households was so low in the underdeveloped countries in the past; or, if we go far enough back, in the high income countries. Indeed, the only finding that might reasonably apply to the longer-term past relates to the lower savings-disposable income ratio for the low income countries. It is likely that over the longer-term period, going back to the mid-19th century, or even earlier, the ratio of savings to disposable income was much lower in the less developed, low income countries than it was in the high income countries; and indeed, the absolute, and perhaps relative, disparity in the savings-disposable income ratios might well have been greater in the past than it was during the post-World War II years.

Appendix Table 1.
Gross Capital Formation Proportions and Share of M+ Sector, Averages for Post-World War II Years

Countries Grouped by Per Capita Product	Period Covered (unless otherwise indicated)	% Proportion to Gross Domestic Product of: Gross Fixed Capital Formation	Change in Stocks	Gross Domestic Capital Formation	Change in Foreign Claims as % of Gross Domestic Capital Formation	Gross Capital Formation as % of Gross National Product	Share of M+ Sector in Gross Domestic Product (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Group I							
1. Australia	1951-57	25.8	2.1	27.9	-9.8	25.6	
2. Belgium	1951-57	15.3	0.9	16.1	10.2	17.6	58.6
3. Canada	1951-57	23.5	1.7	25.2	-9.9	23.0	49.8
4. New Zealand	1951-57	21.8	1.6	23.4	-9.7	21.4	(1948-53)39.8
5. Sweden	1951-57	19.9	1.6	21.4	1.3	21.7	(1949-53)54.8
6. Switzerland	1954-57			23.4	6.3	24.4	
7. United Kingdom	1951-57	14.2	1.4	15.7	3.6	16.1	57.6
8. United States	1951-57	16.8	1.3	18.0	3.7	18.6	47.4[a]
Group II							
9. Denmark	1951-57	17.6	0.9	18.5	-0.4	18.5	46.4
10. Finland	1951-57	26.0		26.0[b]	3.5[b]	27.0[c]	48.9
11. France	1951-57	17.3	0.9	18.2	-6.0	17.2	(1947-49)46.8
12. Germany, West	1951-57	21.1	2.3	23.4	13.5	26.6	57.9
13. Netherlands	1951-57	22.4	1.7	24.1	6.0	25.2	50.9
14. Norway	1951-57	28.0	1.6	29.6	-6.2	27.9	56.7
15. Venezuela	1951-57	22.5	1.3	23.7	-8.2	24.4	

(Continued on next page)

Appendix Table 1 (cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Group III							
16. Argentina	1951-57	19.7	0.2	19.9	-8.7	18.2	28.2[e]
17. Austria	1951-57	21.3[d]	0.8[d]	22.1[d]	-5.8	20.8	58.6[d]
18. Chile	1951-57	(1951-54)8.8	(1951-54)0.1	9.5	-13.9	8.4	33.2[a]
19. Ireland	1951-57	14.5	0.2	14.7	-39.3	8.6	26.7[f]
20. Israel	1951-57	(1951-56)24.0	(1951-56)0.6	25.0	-86.8	3.3	(1952-57)37.0[a]
21. Puerto Rico	1951-57	19.1	0.7	19.8	-88.3	2.2	34.1
Group IV							
22. Brazil	1951-57	14.3	2.6	16.8	-5.9	16.0	33.2[a]
23. Colombia	1951-57	11.4	1.0	12.4	-3.5	12.0	27.2[a]
24. Costa Rica	1951-57	18.8	1.6	20.4	-17.7	17.1	18.1[g]
25. Cuba	1951-57	14.8	0.4	15.2	-14.7	13.2	
26. Greece	1951-57	14.4	2.2	16.6	-43.5	9.2	31.5
27. Italy	1951-57	20.1	0.7	20.9	-9.8	18.8	48.2
28. Malaya	1950-53	8.2	0	8.2	81.0	15.9	
29. Mexico	1952-57	14.3[d]	2.2[d]	16.5[d]	-2.6	16.1	(1947-50)28.9[a]
30. Panama	1950-56	11.5	2.1	13.6	-36.4	8.2	(1954-56)18.0
31. Turkey	1951-55	13.1		13.1[b]	-21.5[b]	10.3	25.3
32. Union of South Africa	1951-57	23.9[d]	1.5[d]	25.4[d]	-12.4	22.2	(1950-56)44.7[ag]
Group V							
33. Dominican Rep.	1951-57			17.8[d]	7.7	19.1	(1946)20.5
34. Guatemala	1951-57			11.4	-10.9	10.3	(1949)35.7
35. Iraq	1950-56	14.2	0.6	14.8	19.4	20.6	
36. Jamaica	1951-56	15.5	1.3	16.8	-48.5	8.7	34.3
37. Japan	1951-57	21.7	7.0	28.7	2.4	29.5	41.0[a]
38. Portugal	1952-57	14.5	1.7	16.2	-30.3	11.3	42.9
Group VI							
39. Bolivia[h]	1950-55			14.6	-11.1[i]	13.0[i]	47.2[j]
40. Ceylon	1951-57	10.3	0.8	11.1	12.0	12.6	21.7
41. China (Taiwan)	1951-57	12.4	4.7	17.1	-34.5	11.2	30.7

42.	Ecuador	1951-57	12.3	2.1	14.4	-9.7	13.4	(1951-56)26.6
43.	Egypt	1951-56	11.0	1.2	12.2	-17.3[i]	10.1[i]	(1951-54)19.9[ak]
44.	Ghana	1951-57	11.4	0.4	11.8	23.8	14.9	
45.	Honduras	1951-57	13.9	1.1	15.1	-8.8	14.1	21.0
46.	Peru	1951-56	23.8[d]	2.3[d]	26.1[d]	-13.2	22.6	33.7[l]
47.	Philippines	1951-57	7.2	1.3	8.6	-26.3	6.4	20.6[m]
48.	Rhodesia & Nyasaland	1951-57			35.8	-34.5	26.3	(1948)43.3[a]
	Group VII							
49.	Belgian Congo	1951-57	26.5	2.6	29.1	-9.2	27.9	47.6
50.	Burma	1951-57	16.7	2.4	19.1	8.5	20.8	17.5[n]
51.	Haiti	1953-55			8.2	-11.1	7.3	
52.	India[h]	1950-56			10.8	-8.2	9.9	
53.	Indonesia	1951-52			5.0	-49.7	2.5	14.8[a]
54.	Korea, South	1955-57	10.6	0.2	10.8	-118.8	-2.0	16.2
55.	Morocco	1951-56	18.7	0.6	19.3	-10.2	16.5	29.3[f]
56.	Nigeria	1952 & 1956	9.2	0.5	9.8	-13.3	8.5	12.8[f]

Entries are percentages based on current price values, unless otherwise indicated.

Sources: United Nations, Yearbook of National Accounts Statistics, 1958, New York, 1959 except for lines 28, 51, 52, and 53 and column 7, lines 4, 5, 11, 29, 33, 34, and 48.

Lines 28, 51, and 53 are from ibid., 1957.

Line 52 is based on estimates by Wilfred Malenbaum in "India and China: Contrasts in Development Performance," American Economic Review, Vol. XLIX, No. 3, June 1959, Table 1, p. 287 and text, p. 289.

Column 7, lines 4, 11, 29, 33, and 34 are from Simon Kuznets, "Quantitative Aspects of the Economic Growth of Nations, II. Industrial Distribution of National Product and Labor Force," Economic Development and Cultural Change, Supplement to Vol. V, No. 4, July 1957, App. Table 1, pp. 62 ff.

Column 7, line 5 is from Osten Johansson, "Economic Structure and Growth in Sweden, 1861-1953," mimeographed paper prepared for the 1959 meeting of the International Association for Research in Income and Wealth, held at Portoroz, Yugoslavia, Table 17.

Column 7, line 48, is from United Nations, Statistical Papers, Series H, No. 8 and is based on the sum of the estimates for Nyasaland, Northern Rhodesia, and Southern Rhodesia.

a. Share in NDP.
b. GDCF excludes increase in stocks.
c. GCF excludes increase in stocks.
d. Ratio to GNP.
e. M+ sector excludes utilities and transportation.
f. M+ sector excludes transportation.
g. M+ sector excludes utilities and public enterprises.
h. Based on constant price values.
i. Change in foreign claims excludes net factor income from abroad.
j. M+ sector excludes utilities.
k. M+ sector excludes public enterprises.
l. Share in GNP.
m. Share in NNP.
n. M+ sector excludes private transportation.

Appendix Table 2.
Capital Consumption, Net Capital Formation Proportions, and Distribution of Post-World War II Years

	Countries Grouped by Per Capita Product	Capital Consumption as % of: Gross Fixed Capital Formation (1)	Capital Consumption as % of: Gross Domestic Capital Formation (2)	Net Domestic Capital Formation as % of Net Domestic Product (3)
	Group I			
1.	Australia	21.8	20.2	23.6
2.	Belgium	64.1	60.6	7.0
3.	Canada	46.1	43.0	16.1
4.	New Zealand	30.5	28.4	18.0
5.	Sweden			
6.	Switzerland	35.8	35.8	16.4
7.	United Kingdom	56.9	51.7	8.3
8.	United States	52.1	48.4	10.2
	Group II			
9.	Denmark	35.6	33.8	13.1
10.	Finland	18.5		22.3[a]
11.	France	54.3	51.5	9.7
12.	Germany, West	44.4	40.0	15.5
13.	Netherlands	42.9	39.9	16.0
14.	Norway	33.6	31.7	22.3
15.	Venezuela	41.6	39.4	15.9
	Group III			
16.	Argentina	50.7	50.3	11.0
17.	Austria	32.9	31.8	16.2[b]
18.	Chile		84.4	1.6
19.	Ireland	24.7	24.3	11.6
20.	Israel		29.0	19.1
21.	Puerto Rico	33.0	31.9	14.4
	Group IV			
22.	Brazil	34.8	29.5	12.5
23.	Colombia	48.2	44.3	7.3
24.	Costa Rica	29.4	27.1	15.8
25.	Cuba	36.8	35.9	10.3
26.	Greece	24.5	21.3	13.6
27.	Italy	44.4	42.9	13.1
28.	Malaya			
29.	Mexico			
30.	Panama	(1953-56)53.5	(1953-56)51.3	(1953-56) 6.8
31.	Turkey	30.2		9.5[a]
32.	Union of South Africa	28.9	27.3	19.8[b]

Gross Domestic Capital Formation by Type of Capital Good, Averages for

Net Capital Formation as % of Net National Product	% Share in Gross Domestic Capital Formation of: Residential Construction	Other Construction	Producers' Equipment	Change in Stocks
(4)	(5)	(6)	(7)	(8)
21.1				7.6
8.8	23.3	27.0	44.4	5.4
13.5	18.6	41.3	33.5	6.7
15.7	21.4			6.9
	22.7	35.1	34.9	7.2
17.6	22.9	38.8		
8.8	19.8	24.4	46.8	9.0
10.9	24.3	34.7	34.1	7.0
13.0	15.3	24.8	54.8	5.1
23.3[a]				
8.6	23.0	26.8	45.1	5.2
19.0	42.5		47.5	9.9
17.3	18.6	27.7	46.6	7.1
20.4	16.2	28.3	50.0	5.5
15.6				5.3
9.1	55.7		43.5	0.8
14.8	19.1	28.3	48.9	3.6
0.2	(1951-54)33.0	(1951-54)25.7	(1951-54)40.1	(1951-54)1.3
5.4	19.0	36.8	42.6	1.7
-4.3	(1951-56)33.2	(1951-56)35.1	(1951-56)29.3	(1951-56)2.4
-4.0	22.7	42.9	31.0	3.3
11.5				15.3
6.9	30.1		61.8	8.1
12.1				7.8
8.1				2.5
6.0	27.7	30.4	28.8	13.1
10.8	22.7			3.5
				0
				13.3
(1953-56) 3.2	48.9		35.7	15.5
6.6[a]				
16.4	54.8		39.5	5.7

(Continued on next page)

Appendix Table 2 (Cont.)

		(1)	(2)	(3)
	Group V			
33.	Guatemala		31.9	8.0
34.	Iraq	30.9	29.7	10.9
35.	Jamaica	37.6	34.7	11.7
36.	Japan	33.1	25.0	23.2
37.	Portugal	34.0	30.4	11.8
	Group VI			
38.	Bolivia[c]		73.8	4.3
39.	Ceylon	15.1	14.0	9.7
40.	China (Taiwan)	44.2	32.0	12.3
41.	Ecuador	38.8	33.1	10.1
42.	Egypt			
43.	Ghana			
44.	Honduras	35.7	33.0	10.6
45.	Peru	85.1	77.7	7.3[b]
46.	Philippines	67.4	57.0	3.9
47.	Rhodesia & Nyasaland		17.5	31.5
	Group VII			
48.	Belgian Congo	30.0	27.3	23.0
49.	Burma	34.6	30.2	14.2
50.	India			5.0
51.	Korea, South			
52.	Morocco	30.4	29.4	14.5
53.	Nigeria	27.9	26.4	7.4

Entries are percentages based on current price values for the periods covered in Appendix Table 1 unless otherwise indicated.

Sources: Those given in Appendix Table 1 except for line 50.

Line 50: Net domestic product at factor cost, given in the United Nations, Yearbook of National Accounts Statistics, 1958, was adjusted to the market price basis by the ratio of the latter to the former in Ceylon and Burma, given in ibid., and net national product was derived by the addition of net factor income from abroad, also given in ibid. Net domestic capital formation and net capital formation are from Wilfred Malenbaum, East and West in India's Development, National Planning Association, April 1959, Table 3, p. 28.

a. Capital formation excluding change in stocks.
b. Ratio to NNP.
c. Based on constant price values.
d. Ratio to NDP.

(4)	(5)	(6)	(7)	(8)
6.8				
16.3				3.9
3.0				7.7
24.0	6.1			24.5
6.7	19.8	42.0	27.6	10.5
2.5[d]		43.1		
11.2		69.6	22.9	7.5
6.1		35.6	36.8	27.5
8.9	12.4	29.9	42.9	14.8
				9.8
		62.1	34.5	3.5
9.5	(1951-55)21.6	(1951-55)43.5	(1951-55)26.5	7.5
3.0		42.8	48.4	8.7
1.5	16.8	32.4	35.3	15.5
20.7				
21.4				9.0
15.9		61.6	25.7	12.7
5.1				
	6.7	61.8	29.3	2.2
11.7	22.2	32.6	42.3	3.0
6.1	23.3	37.5	33.9	5.3

Appendix Table 3.
Rise Per Year in National Product, Gross Capital-Output Ratio, and Shares of for Post-World War II Years

	Countries Grouped by Per Capita Product	Percent Rise per Year in: Gross Domestic Product	Gross National Product	Net Domestic Product	Net National Product
		(1)	(2)	(3)	(4)
	Group I				
1.	Australia	1.51	1.52	0.84	0.84
2.	Belgium	2.80	2.86	2.54	2.61
3.	Canada	4.21	4.19	3.95	3.92
4.	New Zealand	2.83	2.80	2.63	2.60
5.	Sweden	3.80	3.83		
6.	United Kingdom	2.45	2.35	2.40	2.30
7.	United States	2.94	2.95	2.57	2.60
	Group II				
8.	Denmark	2.70	2.72	2.45	2.46
9.	Finland	3.48	3.49	2.95	2.97
10.	France	4.66	4.64	4.97	4.95
11.	Germany, West	7.50	7.45	7.60	7.54
12.	Netherlands	5.25	5.23	5.47	5.44
13.	Norway	3.77	3.70	3.49	3.40
14.	Venezuela	11.29	11.86	11.22	11.85
	Group III				
15.	Argentina	1.45	1.47	1.32	1.34
16.	Austria		5.88		5.76
17.	Chile	2.74	2.68	2.76	2.70
18.	Ireland	1.50	1.34	1.27	1.10
19.	Israel	8.52	8.46	8.46	8.38
20.	Puerto Rico	4.02	2.87	3.63	2.43
	Group IV				
21.	Brazil	4.67	4.67	4.67	4.67
22.	Colombia	5.01	5.33	4.66	4.90
23.	Costa Rica	6.76	7.05	6.52	6.83
24.	Greece	6.57	6.83	6.69	6.95
25.	Italy	5.35	5.38	5.36	5.39
26.	Malaya				
27.	Mexico		(1952-57)5.94		
28.	Turkey	(1951-56)4.60	(1951-56)4.56	(1951-56)4.44	(1951-56)4.40
29.	Union of South Africa		5.44		5.27

Private and Government Purchases in Gross Fixed Capital Formation, Averages

	Ratio to Additions to Gross Product in Constant Prices of Gross Domestic Capital Formation in:		Percentage of Gross Fixed Capital Formation Purchased by:	
	Current Prices	Constant Prices	Private Enterprises	General Government
	(5)	(6)	(7)	(8)
	18.48		66.5	
	5.75	5.54	76.9	10.8
	5.99	5.70	74.0	14.3
	8.27		57.8	
	5.63	5.58	59.9	15.6
	6.41	6.24	51.5	10.0
	6.12	6.02	84.7	13.3
	6.85	6.56	77.9	10.6
	7.47			15.9
	3.91	3.90		11.0
	3.12	3.07		
	4.59	4.55	65.0	14.8
	7.85	8.20		
	2.10	2.10		
	13.72	15.17		
	3.76	3.86		
	3.47	3.58		
	9.80	9.53		11.9
	2.93			
	4.93	4.80	58.8	
	3.60			
	2.48			
	3.02			15.2
	2.53	2.56		
	3.91	3.85		12.6
			63.7	
(1952-57)	2.78		62.7	18.6
	4.67		63.9	11.8

(Continued on next page)

Appendix Table 3 (Cont.)

		(1)	(2)	(3)	(4)
	Group V				
30.	Dominican Rep.		8.90		
31.	Guatemala	5.80	5.53	5.84	5.56
32.	Iraq	(1950-56)11.57	(1950-56)10.20	(1950-56)11.59	(1950-56)10.15
33.	Jamaica	(1951-56)11.37	(1951-56)11.22	(1951-56)11.02	(1951-56)10.86
34.	Japan	8.25	8.18	7.61	7.54
35.	Portugal	(1952-57) 4.14	(1952-57) 4.15	(1952-57) 4.11	(1952-57) 4.12
	Group VI				
36.	Bolivia	(1950-55) 1.21		(1950-55) 1.22	
37.	Ceylon	3.32	3.39	3.18	3.25
38.	China (Taiwan)	9.44	9.42	9.52	9.50
39.	Ecuador	5.50	5.31	5.64	5.44
40.	Egypt	(1951-56) 5.92			
41.	Ghana	2.13	2.30		
42.	Honduras	3.02	4.25	2.92	4.21
43.	Paraguay	(1950-55)12.85		(1950-55)12.15	
44.	Peru		(1951-56) 4.62		(1951-56) 3.02
45.	Philippines	6.81	6.70	6.87	6.75
46.	Rhodesia & Nyasaland				
	Group VII				
47.	Belgian Congo	4.27	3.77	3.48	2.90
48.	Burma	6.01	6.04	6.12	6.16
49.	India			(1950-56) 3.65	(1950-56) 3.71
50.	Kenya			3.78	
51.	Korea, South				
52.	Morocco	(1951-56) 3.08	(1951-56) 3.50	(1951-56) 2.65	(1951-56) 3.12
53.	Nigeria				
54.	Pakistan			2.96	2.96
55.	Uganda			-0.51	

Columns 1-4: Entries are geometric means based on the increase in constant market price values from 1951 to 1957, unless otherwise indicated.

Columns 1 and 2: Constant price values are from United Nations, Yearbook of National Accounts Statistics, 1958 except for lines 1; 4; 6, col. 2; 9; 10, col. 1; 19; 21-23; 27; 28, col. 2; 29; 30; 32; 33; 34; 37, col. 1; 38; 39; 40; 41; 44; 45; 47, col. 2; 48, col. 2; and 52, col. 2.

Lines 1, 4, 19, 22, 23, 27, 29, 30, 32, 33, 34, 38, 40, 41, 44, 45 are based on constant price values derived by deflating current price values, given in ibid., by the cost of living indexes, given in the United Nations, Statistical Yearbook, 1958.

Lines 6, 28, 47, 48, 52, col. 2 are based on constant price values derived by deflating current price values by the price index implicit in gross domestic product, both from the Yearbook of National Accounts Statistics, 1958.

Lines 9, 21, 39 are based on constant price values derived by deflating current price values by the price index implicit in either gross domestic product or net domestic product, at factor cost, both from ibid.

Lines 10 and 37, col. 1 are based on constant price values derived by deflating current price values by the price index implicit in gross national product, both from ibid.

Columns 3 and 4: Constant price values were derived by subtracting from columns 1 and 2, respectively, estimated capital consumption. The latter was assumed to be the same percentage of gross domestic product (or gross

(5)	(6)	(7)	(8)
2.00			
1.97	1.76		
(1950-56) 1.28			
(1951-56) 1.48			
3.48		65.1	
(1952-57) 3.91	(1952-57) 3.91		
	15.9		
3.34	3.69		
1.81		50.6	15.4
2.62		(1951-56)64.2	(1951-56)31.3
(1951-56) 2.06			
5.54		47.9	37.9
5.00	5.43		
(1951-56) 5.65			
1.26		71.7	
		(1953-57)62.8	(1953-57)22.9
6.81	7.63	57.9	
3.18		51.1	28.9
		57.2	
		68.4	22.6
(1951-56) 6.27			(1951-55)24.4
		(1950-56)56.9	

national product in lines 16, 29, and 44) as in current prices, for which the values are given in ibid.

For lines 49 and 54 the constant price values are given in ibid.; for lines 50 and 55 they were derived by deflating the current price values, given in ibid., by the cost of living index given in the United Nations, Statistical Yearbook, 1958.

Column 5: Entries are derived by dividing Appendix Table 1, column 4 by column 1 of this table (or column 2 when column 1 is not given).

Column 6: Entries are derived by dividing the proportion of gross domestic capital formation to gross domestic product, both in constant prices, 1951-57 (or years indicated) by column 1 of this table (or column 2 when column 1 is not given). The proportion is based on values given in the United Nations, Yearbook of National Accounts Statistics, 1958.

Columns 7 and 8: Entries are percentages based on current price values for the periods covered in Appendix Table 1 from the sources cited there unless otherwise indicated. In line 46 gross domestic capital formation is used rather than gross fixed capital formation and in line 49 net domestic capital formation (from the source cited for Appendix Table 2, line 50) is used.

Appendix Table 4.
Rise Per Year in Gross Product and Gross Fixed Capital Formation Proportions by Sectors, Post-World War II Years

		Period Covered	Agriculture, Forestry, & Fishing	Mining, Manufacturing, Const., Elec., Gas, & Water	Transportation & Communication	Services	Total
		(1)	(2)	(3)	(4)	(5)	(6)
	Rise per Year, Gross Product in Constant Prices (%)						
	Groups I & II						
1.	United Kingdom	1951-53 to 1955-57	1.86	3.89	2.74	1.73	2.88
2.	Denmark	1951-53 to 1955-57	1.61	2.76[a]	4.18	1.93[a]	2.30
3.	Finland	1951-53 to 1955-57	0.76	7.41	5.51	4.19	4.80
4.	Norway	1951-53 to 1955-57	0.51	5.01	6.50	2.45	3.81
	Groups III & IV						
5.	Austria	1951-53 to 1955-57	3.24	7.60[b]	5.74	7.52[b]	6.83
6.	Greece	1951-53 to 1955-57	6.69	8.56[a]	5.55	5.58[a]	6.60
7.	Italy	1951-53 to 1955-57	2.29	9.18	6.49	3.30	5.59
	Groups V & VI						
8.	Portugal	1952 to 1955-57	2.93	5.90	4.23	3.21	4.19
9.	Ecuador	1951 to 1954-56	5.16	6.46	5.28	7.69	6.33
10.	Honduras	1950-52 to 1954-56	9.12	4.73	4.48	0.58	1.32
	Proportion, Gross Fixed Capital Formation to Gross Domestic Product, Based on Constant Price Totals (%)						
	Groups I & II						
11.	United Kingdom	1952-56	11.5	12.0	18.8	15.8	13.9
12.	Denmark	1952-56	6.0	9.1[a]	43.6	23.5[a]	17.1
13.	Norway	1952-56	19.8	20.6	56.1	32.1	29.6
	Groups III & IV						
14.	Austria	1952-56	19.7	12.1[b]	56.1	84.6[b]	20.8

15.	Greece	1952-56	2.6	16.1[a]	45.5	18.9[a]	14.2
16.	Italy	1952-56[c]	10.6	15.3	50.5	27.8	19.9
	Group V						
17.	Portugal	1952-56	5.9	12.6	47.9	18.9	14.2
	Proportion, Gross Fixed Capital Formation to Gross Domestic Product, Based on Current Price Totals (%)						
	Groups I & II						
18.	United Kingdom	1952-56	11.5	12.2	18.5	16.1	14.2
19.	Denmark	1952-56	6.9	9.5[a]	42.2	23.9[a]	17.9
20.	Finland	1952-56	13.8	18.8	24.9	47.3	25.9
21.	Norway	1952-56	19.7	21.0	47.3	33.0	28.9
	Groups III & IV						
22.	Austria	1952-56	20.6	12.3[b]	57.2	84.4[b]	21.2
23.	Greece	1952-56	2.7	15.5[a]	39.2	19.8[a]	14.0
24.	Italy	1952-56	11.2	15.4	48.9	27.3	19.9
	Groups V & VI						
25.	Portugal	1952-56	5.8	12.7	47.2	19.2	14.2
26.	Ecuador	1951-55	7.9	16.5	29.7	9.9	11.5
27.	Honduras	1951-55	9.9	11.9	39.2	19.3	14.5

Source: United Nations, Yearbook of National Accounts Statistics, 1958, for all countries except Honduras, for which data are from ibid., 1957.

Lines 1-10: Gross domestic product at factor cost except for Austria, for which only gross national product at market prices is available.

Lines 11-27: Terminal years are at half weight in the average for the period. Since the capital formation estimates are given in market prices and the product estimates at factor cost (except for Austria) the latter were adjusted to market prices by the ratio, for the period covered, of the countrywide gross domestic product at market prices to the countrywide gross domestic product at factor cost.

a. Construction is included with services.

b. Trade and services other than finance, public administration, and dwellings are included with manufacturing.

c. Since the industrial distribution of capital formation in constant prices is not available for 1952, we assumed it to be the same as that for 1953.

Appendix Table 5.
Percentage Distribution by Sectors of Additions to Gross Domestic Product in Constant Prices, 1951 to 1957

		Agriculture, Forestry, & Fishing	Mining, Manufacturing, & Elec., Gas, & Water	Construction	M Sector (2 + 3)	Transportation & Communication	Trade & Finance	Dwellings	Public Administration	Other Services	S Sector (6+7+8+9)
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Groups I & II										
1.	Belgium	3.6	49.3	6.1	55.4	10.1	10.9	3.1	2.7	14.2	30.9
2.	United Kingdom	4.9	52.7	8.3	61.0	9.8	14.1[a]	4.9[a]	-2.4	7.8	24.4
3.	Denmark	27.7	25.0	5.3	30.3	14.9	15.1	2.3	9.0	0.6	27.0
4.	Finland	0.9	54.2	12.1	66.3	6.5	12.6	3.4	9.3	0.9	26.2
5.	Germany, West	0.2	57.7	5.4	63.1	6.0	18.0	2.7	4.1	5.9	30.7
6.	Norway	4.4	38.2	9.3	47.5	25.8	14.5	2.2	0.7	4.9	22.3
	Groups III & IV										
7.	Argentina	19.2	21.4[b]	2.5	23.9	7.1[c]	12.6[ac]	10.3[a]			49.8[b]
8.	Austria (gross national product)	9.5	53.3	4.6	57.9	3.6	14.5[d]	[d]	4.3	10.2[d]	29.0
9.	Chile (net domestic product)	0.4	38.1	-7.7	30.4	9.8	18.3	13.2	20.6	7.3	59.4
10.	Brazil (net domestic product)	30.4			26.3	10.9	14.9[e]	4.3	3.2	10.0[e]	32.4
11.	Greece	38.2	26.4	5.6	32.0	4.8	14.2	8.0	0.9	1.8	24.9
12.	Italy	10.6	52.0	12.8	64.8	7.2	9.8	0.7	5.1	1.8	17.4
13.	Turkey	20.9	16.3	9.9	26.2	16.1	11.0	7.0	11.3	7.6	36.9

Groups V, VI, & VII

14. Portugal (1952 to 1957)	22.1			51.6	4.5	14.4	3.2	4.2	0	21.8
15. Ecuador (1951 to 1956)	30.8	17.7	6.1	23.8	3.7	22.5	6.5	7.9	4.7	41.6
16. Honduras	31.4	22.4	3.3	25.7	9.8	14.8	6.1	6.5	5.7	33.1
17. Belgian Congo	21.9	34.4	7.4	41.8	8.9	13.1[e]	2.7	8.4	3.2[e]	27.4
18. Burma	35.6				2.6			15.5		
19. Cambodia	22.7	14.1	3.5	17.6	[f]	17.9[d]	[d]	28.9	12.9[d]	59.7
20. India (net domestic product, 1950 to 1956)	43.2			16.9						
21. Morocco (1951 to 1956)	28.8	30.1	-8.8	21.3		3.7		28.8	17.5	
22. Pakistan (net domestic product)	41.0	30.4	[g]		2.8	10.9	2.5	7.6	4.8[g]	25.8
23. Thailand (1951 to 1956)	-19.8	16.4	12.1	28.5	15.4	45.0[a]	8.3[a]			75.9

Source: United Nations, Yearbook of National Accounts Statistics, 1958. Unless otherwise indicated the percentages are based on the change from 1951 to 1957 in the constant price totals of gross domestic product originating in the given sectors. For the United Kingdom we derived the absolutes by relating the indexes on a 1948 base to the 1954 current price values, both given in ibid.

a. Finance is included with dwellings.
b. Electric, gas, and water are included with services.
c. The total for transportation and communication and trade, as given, was broken down on the basis of the relationship of the two in Chile.
d. Finance and dwellings are included with other services.
e. Finance is included with other services.
f. Transportation is distributed among the other sectors.
g. Construction is included with other services.

Appendix Table 6.
The Government Share and the Financing of Gross Domestic Capital Formation, Averages for Post-World War II Years

	Countries Grouped by Per Capita Product	Government Consumption Expenditures as % of Gross National Product	Government Sector Product as % of Gross Domestic Product	% Shares of Gross Domestic Capital Formation Financed by: Net Domestic Savings	Household Savings	General Government Savings	Private Corporate Savings
		(1)	(2)	(3)	(4)	(5)	(6)
	Group I						
1.	Australia	10.2		70.1	35.7		12.5
2.	Belgium	11.4	6.1	49.7	49.7	-3.4	3.5
3.	Canada	13.9	6.3	46.4	21.6	14.0	9.2
4.	New Zealand	13.2	(1948-53) 3.4	61.9			
5.	Sweden	16.5	(1949-51) 7.1				
6.	Switzerland	12.1		70.5			
7.	United Kingdom	17.7	6.8	50.8	19.2	4.3	32.0
8.	United States	18.3	12.0[b]	54.7	29.0		12.6
	Group II						
9.	Denmark	12.6	8.8	65.8 (65.8)	(1951-55)39.1	(1951-55)19.3	
10.	Finland	12.2	9.3				
11.	France	14.8	(1947-49)12.0	42.5 (43.1)	17.8	11.8	
12.	Germany, West	14.7	8.6	73.5 (74.5)	(1951-56)31.5	(1951-56)35.0	
13.	Netherlands	14.2	7.2	66.1	20.0	26.3	18.8
14.	Norway	11.9	4.0	62.0		23.1	
15.	Venezuela			52.4			
	Group III						
16.	Argentina	13.4	(1947-54) 9.7	41.0			
17.	Austria	13.5	7.8[a]	62.5	28.8	25.7	
18.	Chile	11.9	11.0[b]	1.7			

19.	Ireland	14.3	9.4	36.4	30.1	-6.8	
20.	Israel	21.1	(1952-56)20.1[b]	-15.8			
21.	Puerto Rico	12.9	12.1	-20.2			
	Group IV						
22.	Brazil	12.1	7.8[b]	64.6 (62.2)	19.6	13.7	
23.	Colombia	12.2	6.3[b]	52.2 (52.9)	33.2		
24.	Costa Rica	9.4	8.4	55.2 (51.1)	16.9	20.2	
25.	Cuba	13.3		49.4			
26.	Greece	13.5	7.8	35.2		3.3	
27.	Italy	11.9	10.2	47.3 (50.8)		7.9	
28.	Lebanon		(1951-56) 6.2[b]				
29.	Malaya	10.2					
30.	Mexico	4.8	(1947-50) 4.7				
31.	Panama	13.2	(1954-56) 3.5	24.6	-22.2	33.4	13.4
32.	Turkey	11.6	8.2				
33.	Union of South Africa	11.4	9.5[b]	60.3 (64.3)	(1953-57)33.6	(1953-57)13.3	
	Group V						
34.	Dominican Rep.	12.7	(1946) 8.0				
35.	El Salvador		(1950) 5.7				
36.	Guatemala	11.8	(1949) 7.1	57.2			
37.	Iraq	17.4		89.7			
38.	Jamaica	9.3	6.8	16.9	-6.1	5.7	
39.	Japan	10.5		76.6	38.8		14.1
40.	Nicaragua		(1950) 6.1				
41.	Portugal	11.0	5.1	39.3		17.6	
	Group VI						
42.	Bolivia		3.9[c]	15.1[c]			
43.	Ceylon	13.1	9.8	98.0			
44.	China (Taiwan)	17.8	11.2	33.5 (37.8)		5.5	

(Continued on next page)

Appendix Table 6 (Cont.)	(1)	(2)	(3)	(4)	(5)	(6)
Group VI (Cont.)						
45. Ecuador	13.0	(1951-56) 5.8	57.2 (56.0)	(1951-56)21.8	(1951-56)21.2	(1951-56)13.0
46. Egypt	13.9[d]	(1951-54)15.3[b]				
47. Ghana	6.7	(1948-50) 5.4				
48. Honduras	7.6	3.3	58.2 (58.7)	(1951-55)41.9	(1951-55)12.7	(1951-55) 4.3
49. Paraguay		(1951-56) 4.9				
50. Peru	8.8	14.3[a]	9.1	-8.6	4.1	13.6
51. Philippines	8.1	7.8[e]	16.7	-28.6		29.8
52. Rhodesia & Nyasaland	10.7		48.0	11.3	19.9	
Group VII						
53. Belgian Congo	12.1	9.7	63.5	14.5	17.9	
54. Burma	12.5	8.9	78.3		20.4	
55. Cambodia		(1951-57)11.2[c]				
56. Haiti	7.3					
57. India		5.0[b]				
58. Indonesia	13.6	(1951-52) 6.1				
59. Kenya		(1951-57)10.9[b]				
60. Korea, South	11.5	(1953-57) 7.1				
61. Morocco	8.1	7.2	60.2	34.5	21.4	
62. Nigeria	4.5	5.1	60.3			
63. Pakistan		(1951-57) 5.6[b]				
64. Thailand		(1947-53) 5.4				
65. Uganda		(1950) 5.4				

Entries are percentages based on current price values for the periods covered in Appendix Table 1 from the sources cited there unless otherwise indicated.

Column 2, lines 4, 5, 11, 16, 30, 34, 35, 36, 40, 47 (Gold Coast), 58, 64, and 65 are from Simon Kuznets, "Quantitative Aspects of the Economic Growth of Nations, II. Industrial Distribution of National Product and Labor Force," Economic Development and Cultural Change, Supplement to Vol. V, No. 4, July 1957, App. Table 1, pp. 62 ff.

Line 48, columns 4-6 are from the United Nations, Yearbook of National Accounts Statistics, 1957.

Line 57 is from ibid., 1958.

Column 3, lines 11, 22, 23, 24, and 44 contain two entries because of inconsistencies in the original source; and lines 9, 12, 33, 45, and 48 because of differences in the periods covered. The entries in parentheses are comparable with columns 4-6.

a. Based on GNP.
b. Based on NDP.
c. Based on constant price values.
d. Based on GDP.
e. Based on NNP.

Appendix Table 7.
Share of Gross Domestic Capital Formation Financed by Household Savings and Underlying Series, Averages for Post-World War II Years

Countries Grouped by Per Capita Product	Income of Households as % of Gross Domestic Product	Direct Taxes as % of Income of Households	Disposable Income as % of Gross Domestic Product	Household Savings as % of:		
				Disposable Income	Gross Domestic Product	Gross Domestic Capital Formation
	(1)	(2)	(3)	(4)	(5)	(6)
Group I						
1. Australia	81.2	9.9	73.2	13.6	10.0	35.7
2. Belgium	90.8	12.3	79.7	10.1	8.0	49.7
3. Canada	74.0	8.8	67.5	8.0	5.4	21.3
4. Sweden	82.2	18.4	67.0	7.5	5.1	23.6
5. United Kingdom	80.3	13.0	69.9	4.2	3.0	18.9
6. United States	80.5	14.8	68.6	7.6	5.2	28.8
Group II						
7. Denmark	(1951-55)87.2	12.5	76.3	9.5	7.3	39.1
8. France	82.9	14.3	71.0	4.6	3.2	17.8
9. Netherlands	80.3	17.4	66.3	7.2	4.8	20.0
Group III						
10. Austria	88.8[a]	18.9	72.1[a]	8.8	6.4[a]	28.8
11. Ireland	89.0	5.2	84.4	5.2	4.4	30.0

(Continued on next page)

Appendix Table 7 (Cont.)

		(1)	(2)	(3)	(4)	(5)	(6)
	Group IV						
12.	Colombia	81.5	2.6	79.4	5.3	4.2	33.7
13.	Costa Rica	78.9	4.2	75.6	4.2	3.2	15.5
14.	Panama (1953-56)	81.9	4.1	78.5	-3.6	-2.9	-22.0
15.	Union of South Africa (1953-57)	78.5[a]	5.5	74.2[a]	11.3	8.4[a]	33.6
	Group V						
16.	Jamaica	82.0	1.5	80.8	-1.3	-1.0	-6.2
17.	Japan	78.0	9.4	70.7	15.2	10.7	37.4
	Group VI						
18.	Ecuador (1951-56)	76.9	2.9	74.7	4.2	3.1	21.8
19.	Honduras (1951-55)	83.1	0.5	82.6	7.8	6.5	41.9
20.	Peru	67.8[a]	2.1	66.3[a]	-3.4	-2.2[a]	-8.6
21.	Philippines	83.3	1.5	82.1	-3.0	-2.4	-28.6
22.	Rhodesia & Nyasaland	63.8	5.3	60.4	6.7	4.1	11.3
	Group VII						
23.	Belgian Congo	65.1	6.1	61.1	6.9	4.2	14.5
24.	Morocco	87.2	1.2	86.2	7.7	6.7	34.4

Entries are percentages based on current price values for the periods covered in Appendix Table 1 from the sources cited there unless otherwise indicated.

Wherever possible income of households includes transfers to and from government on a net basis. Where this was not possible, direct taxes include transfers to government and income of households includes transfers from government.

Line 19 is from the United Nations, Yearbook of National Accounts Statistics, 1957.

a. Based on GNP.