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PROBLEMS AND USES OF NATIONAL WEALTH ESTIMATES IN LATIN AMERICA

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I. ROLE AND IMPORTANCE OF ESTIMATES OF NATIONAL WEALTH IN LATIN AMERICA

INVESTMENT and capital accumulation are the main basis for economic development. In under-developed Latin American countries, whose main preoccupation is the acceleration of growth in *per capita* product and the narrowing of the gap in the standard of living of Latin America and the advanced industrialized countries, the study of capital formation, capital accumulation, investment needs, the role of foreign capital and the use of investment resources has been undoubtedly the most important economic theme of concern to government economic policy, academic study, as well as the work of international organizations such as ECLA.

In contrast with industrialized countries, where labour scarcity may be the most important factor limiting growth, in underdeveloped Latin American countries the shortage of capital in relation to development needs, the low level of capital per worker, as well as the problem of allocation of investment resources, are the most important limiting factors. The urgency of this question may be said to have come on the scene in full force in Latin America in the 1930s, coincident with the decline of world demand and prices for primary materials, and the decline in foreign investment. These factors had the effect of loosening ties with industrial countries and encouraging a change in the direction of resources. The fall in foreign exchange resources available for imports, and the corollary *de facto* protection of domestic manufacturing industry fostered the development of the Latin American industrial entrepreneur. Programmes of investment in basic social capital by Latin American Governments, as part of a newly developed counter-cyclical policy, enhanced growth and demand, and facilitated the development of industry.

[1] It should be noted that while this paper has been prepared on the basis of studies of the Economic Commission for Latin America (in which the author of this paper participated actively), the responsibility for the opinions expressed is exclusively that of the author.

While the beginnings of industrial growth and the acquisition of capital goods had occurred in the 1920s and even earlier in some countries, the dominance of export products in the shaping of economic policy, and the prevalence of low tariffs and a wide-open policy on imports, meant that domestic industry had a very difficult competitive position, the degree of utilization of industrial capital was low, and incentives and resources for industrial development were few. The world economic crisis of the 1930s was accompanied almost everywhere in Latin America by a change in governments, where exporter and foreign investment interests (geared to export of primary materials) were supplanted by domestic industrial entrepreneur and popular interests committed to fostering industrial development, protecting domestic industry, and expanding basic social capital in road transport, electric power and health, education and sanitation services, necessary for industrial development. This phase of economic growth relied heavily on the more intensive utilization of existing capital resources in manufacturing.

During World War II, Latin America was cut off from the traditional suppliers of manufactured goods and capital goods, at the same time that it became an expanded supplier of food and raw materials. Domestic manufacturing industry received a very strong stimulus, both in production of goods traditionally imported and in response to the expanded domestic demand arising from the expanded national income and its more equal distribution. Productive capacity was used very intensively. Machinery and equipment continued to be used for periods substantially beyond the usual estimated period of useful life. Internal relative price trends favoured manufacturing industry in this period as well as in the earlier period.

The accumulation of foreign-exchange resources, which could not be spent during the war, and the early post-war favourable trend in the terms of trade of exports, together with an exchange-control policy which favoured imports of capital goods and raw materials and intermediate products for industry, made possible a phenomenal era of investment in manufacturing industry in the early post-war years, Governments adopted economic development programmes geared to facilitate the expansion of manufacturing industry, including basic industries, such as iron and steel, chemicals, petroleum, machinery and equipment, as well as food processing and clothing.

With industrial development, investment and capital accumulation, and a relative transfer of man-power from primary-materials production activities to manufacturing, construction, transport, electricity, and communications services, as well as trade, government, professional and personal services, productivity (gross product per worker) and *per capita* product increased. The increase in *per capita* product was accompanied by an improvement in the equality of distribution of income arising from the relative shift of man-power, capital, and production to manufacturing and service activities. This expansion in *per capita* income and improvement in its distribution created a new and expanded level of domestic demand, fundamentally different from that existing heretofore. For the first time, a considerable number of Latin American countries had a sizeable domestic market. Increasingly, production has been geared to the domestic market. At the average *per capita* product level of $300, prevailing in 1956, the income elasticity of demand for food is already declining and that for manufactures and services is increasing. Thus, this growth in productivity and income has meant an accelerated demand for manufactures and services. One of the most striking effects has been the basic difference in the orientation of foreign capital in the post-war period; apart from unique cases, such as Venezuela and Peru, foreign capital is increasingly dedicated to manufacturing production for the domestic market as a means of obtaining access to a market within a tariff wall. The change in orientation of foreign capital from the production and export of primary materials to manufacturing for the local domestic market has meant that foreign capital has a greater and more fundamental interest in the expansion of the Latin American domestic market.

While the post-war years have represented a period of intense investment in manufacturing activity, not only to replace out-worn equipment, but to expand manufacturing capacity, investment in basic social capital in transport and energy lagged behind the rapidly growing demand and needs.

The rate of government investment in basic social capital in transport and energy, as well as in autonomous or mixed enterprises, has declined, partly as a consequence of the expanding burden of subsidies and transfer payments on government revenue resources, whose elasticity of growth was adversely affected by price inflation. In the earlier post-war years government

economic policy, almost everywhere in Latin America, was committed to fostering industrialization and economic development, and ambitious investment programmes were adopted, financed in part by an implicit export tax deriving from exchange-control policy. This was feasible because of the post-war improvement in export terms of trade. Since 1950, the decline in export terms of trade and currency devaluation required to maintain production incentives for export products, and to price exports competitively in the world market, not only nullified indirect export taxes as a revenue source, but, in important instances, required the subsidization of exports. This became a serious drain on public revenues, especially in those countries which attempted to maintain a subsidized exchange rate for imports of industrial intermediate products and capital goods. At the same time, government transport and electric enterprises, with low, fixed rates, were adversely affected by post-war price inflation, which affected costs of operation, and which outran the tardy adjustment of utility rates. Operating deficits of government enterprises became an expanding charge on public revenues. Social-security programmes, adopted in the 1930s and early 1940s, without proper investment of contributions in inflation-proof assets, and without adequate actuarial estimation of benefit payments, are absorbing an expanding share of public revenue. Military expenditures expanded sharply with the adoption of 'continental defense' programmes after 1948, and have become an especially voracious consumer of public revenues.

The consequent decline in the rate of public investment has meant an increasing shortage of basic social capital in transport and energy, and this has recently become an important limiting factor in industrial development and the growth of industrial production.

While private foreign investment flowed readily into manufacturing enterprises, in which the rate of return compared more than favourably with that in industrialized countries, virtually no *new* foreign capital has gone into private electric-power production or railroad transport, since the traditional rate fixing in these activities concerned with the public interest precludes rates of return attractive to private foreign investment. Public international capital has filled a small part of the gap, especially in financing the equipment of electric power stations and the re-equipment of railroads.

The shortage of public investment in basic social capital has been further aggravated, in some important notable instances, by a misdirection of public investment resources. The backlog of needs for basic social capital, accumulated from the foreign-exchange shortage era of the 1930s and the cutting-off of imports during the war, were generally underestimated, and the series of present and prospective shortages was not well appreciated. This may be understandable, since the shortages themselves are a function of industrialization, economic growth and improvement in the standard of living, which are accompanied by an even more rapid growth in the need and demand for transport and energy. In addition, the basic social changes which have accompanied industrialization and the expansion of *per capita* income, especially urban growth, together with the shift in the centre of political power, added an element of urgency in the reduction of the backlog of social needs for hospitals, schools, water-works, housing, street paving, recreation facilities. Consequently, public investment resources were not always directed to economic projects having the first order of priority.

The shortage of basic social capital and the misdirection of public investment resources points vividly to the urgent need for a more complete and adequate information and analysis of capital formation, capital accumulation, the use of investment resources and their effect on growth and productivity if Latin American countries are to accomplish their goals of accelerated growth and expansion in *per capita* income. Such basic information is presently needed as a guide to economic policy, including questions of utilization of capital resources, needs for basic social capital, the degree of utilization of capital resources, productivity implications of alternative uses, role of foreign capital, capital needs and import limitations. In the work of ECLA, the study of investment and capital has proven to be useful in the analysis of the incidence of Government economic policy.

It should also be noted that Latin America has a significant saving and investment capacity, associated with its average *per capita* product of $300, in comparison with less than $100 for South-East Asia. Given optimum utilization of these resources, together with a margin of foreign capital that may be expected to be attracted to a developing and expanding market, the attainment of a satisfactory rate of growth is a real possibility.

Latin America today has an urgent need for good statistics on

capital formation and the stock of capital. Where such adequate statistics have been developed, they have been immensely useful in the analysis of problems of economic development and as a guide to government investment policy, as will be shown, Nevertheless, the development of adequate statistics in this field has lagged behind needs. The consequent improvisation has led to some basic and costly errors of economic policy, as will be indicated.

Because of the importance of basic information on the stock of capital, the Economic Commission for Latin America has long been interested in estimating and analysing the stock of capital, and has long encouraged and aided work in this field in Latin America.[1]

In this paper, an attempt will be made to draw upon this experience to discuss:

(1) some significant conclusions based on the analysis of estimates of the stock of capital in some Latin American countries and in the region as a whole;
(2) problems of data, concept and method in the estimation of the stock of capital in Latin America;
(3) an evaluation of work done in the field of national-wealth estimation and analysis in Latin America.

II. SOME SIGNIFICANT CONCLUSIONS BASED ON THE ANALYSIS OF THE STOCK OF CAPITAL IN SOME LATIN AMERICAN COUNTRIES AND IN THE REGION AS A WHOLE

In the preceding section of this paper the role of investment and capital in the economic growth and structural change of Latin American economies in the last quarter century were dis-

[1] See *Economic Survey of Latin America, 1951–52, 1953, 1954, 1955, 1956*, United Nations Economic Commission for Latin America, Santiago, Chile; *Analysis and Projections of Economic Development: I. An Introduction to the Technique of Programming; II. The Economic Development of Brazil; III. The Economic Development of Colombia; IV. The Economic Development of Argentina* (unpublished); United Nations Economic Commission for Latin America, Santiago, Chile. *Fixed Reproducible Capital in Argentina, 1935–55*, Manuel Balboa and Alberto Fracchia, Argentine Government, United Nations Joint Study Group, United Nations Economic Commission for Latin America. *External Disequilibrium and the Economic Development of Latin America; The Case of Mexico*, United Nations Economic Commission for Latin America, Mexico City; *The Role of Economic Statistics in the Formulation of Economic Development Programs*, paper presented at the III Inter-American Statistical Conference, Quitandinha, Petropolis, Brazil, June 1955, by the United Nations Economic Commission for Latin America; *Selective Expansion of Agricultural Production in Latin America and its Relationship to Economic Development*, United Nations Economic Commission for Latin America, Santiago, Chile.

cussed. It was noted that the world economic crisis indirectly fostered Latin American industrialization through the loosening of foreign-trade and investment ties, decline in internal relative prices and relative importance of the primary materials export sectors, the protection of domestic industry, and the dedication of public economic policy and investment to industrialization, economic development, and the expansion of basic social capital. While the decline in export earnings and the terms of trade adversely affected capital-goods imports in the 1930s, tariff protection of domestic industry made it possible to use more intensively and more efficiently the industrial production capacity created in the 1920s and earlier. It was seen how World War II, and the cutting off of Latin America from traditional sources of import supply, together with the increase and more equal distribution of income which accompanied the structural change of the 1930s, had the effect of further stimulating industrial production and the more intensive use of industrial capacity, as well as basic social capital in electricity and transport. The use of war-accumulated export earnings and the post-war favourable export terms of trade to create a phenomenal era of investment in manufacturing industry, and to finance economic development programmes, was noted. The recent decline in the rate of public investment, parallel with the increasing shortage of basic capital in electricity and transport, and the restrictive effect on industrial production and economic growth, was seen. The increasingly serious problem of adequate and appropriate direction of public investment resources was touched on.

Attention will now be given to the presentation of some significant conclusions based on the analysis of estimates of the stock of capital in some Latin American countries and in the region as a whole.

1. *Long-term increase in the productivity of capital, and change in economic structure of the labour force, capital, and production*

The analysis of estimates of the stock of capital and capital formation in Latin American countries on the threshold of economic development and industrialization gives a basic insight to the understanding of the processes and patterns of economic development and economic growth. New long-term economic time series for Latin American countries, including

TABLE I

Gross Product, Fixed Reproducible Capital (at Depreciated Replacement Cost), and the Product–Capital Ratio in Latin America, 1925–56

(Millions of dollars at 1950 prices)

	Gross Domestic Product	Fixed Reproducible Capital	Product–Capital Ratio
1925	16,229	55,607	0·29
1926	16,172	57,237	0·28
1927	17,015	59,376	0·29
1928	18,578	61,906	0·30
1929	18,874	64,678	0·29
1930	17,409	66,663	0·26
1931	17,318	67,333	0·26
1932	17,221	67,348	0·26
1933	17,314	67,483	0·26
1934	19,527	68,147	0·29
1935	20,440	69,224	0·29
1936	21,589	70,048	0·31
1937	22,494	71,387	0·31
1938	22,920	73,562	0·31
1939	23,848	75,047	0·32
1940	24,174	76,253	0·32
1941	25,915	77,435	0·33
1942	25,920	78,429	0·33
1943	26,990	79,273	0·34
1944	29,311	80,393	0·36
1945	30,335	81,906	0·37
1946	32,870	83,932	0·39
1947	34,503	87,498	0·39
1948	36,448	91,786	0·40
1949	37,685	95,945	0·39
1950	39,791	100,598	0·40
1951	42,029	105,366	0·40
1952	42,907	108,407	0·40
1953	44,258	112,613	0·39
1954	47,071	117,272	0·40
1955	49,324	122,030	0·40
1956	50·858	126,987	0·40

Sources: *Economic Survey of Latin America, 1951–52, 1954, 1956*, United Nations Economic Commission for Latin America, Santiago, Chile; *Analysis and Projections of Economic Development;* I. *An Introduction to the Technique of Programming;* II. *The Economic Development of Brazil;* III. *The Economic Development of Colombia;* IV. *The Economic Development of Argentina* (unpublished), United Nations Economic Development for Latin America, Santiago, Chile. *Fixed Reproducible Capital in Argentina, 1935–55*, Manuel Balboa and Alberto Fracchia, Argentine Government – United Nations Study Group, United Nations Economic Commission for Latin America. *External Disequilibrium and the Economic Development of Latin America; The Case of Mexico*, Economic Commission for Latin America, Mexico City.

Note: In some cases, previously published series have been up-dated and revised, and new unpublished series have been used. For reference to concept and methods, see Parts III and IV of this Study.

TABLE II

Gross Product, Fixed Reproducible Capital, and the Product–Capital Ratio in Latin America and Five Selected Countries, 1925–55

(Millions of dollars at 1950 prices)

Five-year Periods	Annual Averages					
	Latin America	Argentina	Brazil	Chile	Colombia	Mexico
			A. *Gross Product*			
1925–29	17,374	5,485	4,540	932	957	1,418
1930–34	17,758	5,277	4,898	921	1,135	1,584
1935–39	22,258	6,310	6,128	1,155	1,409	2,329
1940–44	26,462	7,287	7,198	1,372	1,639	3,199
1945–49	34,368	9,049	8,598	1,678	2,135	4,449
1950–54	43,211	10,024	11,337	1,998	2,697	6,031
1955	49,324	10,916	13,167	2,142	3,089	7,216
			B. *Fixed Reproducible Capital*			
1925–29	59,761	22,267	11,505	[2]	4,203	5,213
1930–34	67,395	25,440	12,364	2,310	4,675	5,674
1935–39	71,944	26,345	13,848	2,458	5,123	6,096
1940–44	78,357	27,481	15,841	2,626	5,839	6,886
1945–49	88,213	29,835	18,096	2,920	6,734	8,467
1950–54	108,851	34,534	23,348 [1]	3,377 [1]	7,840 [1]	11,477
1955	122,030	36,784	[2]	[2]	[2]	13,731
			C. *Product–Capital Ratio*			
1925–29	0·29	0·25	0·39	[2]	0·23	0·27
1930–34	0·26	0·21	0·40	0·40	0·24	0·28
1935–39	0·31	0·24	0·44	0·47	0·27	0·38
1940–44	0·34	0·27	0·45	0·52	0·28	0·46
1945–49	0·39	0·30	0·48	0·57	0·32	0·53
1950–54	0·40	0·29	0·49	0·59	0·34	0·53
1955	0·40	0·30	[2]	[2]	[2]	0·53

Sources: *Economic Survey of Latin America, 1951–52, 1954, 1956,* United Nations Economic Commission for Latin America, Santiago, Chile; *Analysis and Projections of Economic Development;* II. *An Introduction to the Technique of Programming;* II. *The Economic Development of Brazil;* III. *The Economic Development of Colombia;* IV. *The Economic Development of Argentina* (unpublished), United Nations Economic Development for Latin America, Santiago, Chile. *Fixed Reproducible Capital in Argentina, 1935–55,* Manuel Balboa and Alberto Fracchai, Argentine Government – United Nations Study Group, United Nations Economic Commission for Latin America. *External Disequilibrium and the Economic Development of Latin America; The Case of Mexico,* Economic Commission for Latin America, Mexico City.

Note: In some cases, previously published series have been up-dated and revised, and new unpublished series have been used. For reference to concept and methods, see Parts III and IV of this Study.

[1] Annual average calculated for years 1950–53.

[2] Not available.

reliable, homogeneous, and detailed data on the gross product, capital formation and the stock of capital, labour force, and trade and payments, and covering periods up to thirty years (fifty-five years in the case of Argentina), demonstrate that the

TABLE III

Gross Product Per Capita *in Latin America, 1925–56*

Years	Gross Domestic Product (Millions of dollars at 1950 prices)	Population (Millions of persons)	Gross Domestic Product *Per Capita* (Dollars at 1950 prices)
1925	16,229	96·4	168
1926	16,172	98·1	165
1927	17,015	99·7	171
1928	18,578	101·4	183
1929	18,874	103·2	183
1930	17,409	105·0	166
1931	17,318	106·7	162
1932	17,221	108·4	159
1933	17,314	110·1	157
1934	19,527	111·8	175
1935	20,440	113·6	180
1936	21,589	115·5	187
1937	22,494	117·9	191
1938	22,920	120·2	191
1939	23,848	122·5	195
1940	24,174	125·0	193
1941	25,915	127·4	203
1942	25,920	129·9	200
1943	26,990	132·7	203
1944	29,311	135·4	216
1945	30,335	137·5	221
1946	32,870	140·6	234
1947	34,503	143·8	240
1948	36,448	147·3	247
1949	37,685	150·8	250
1950	39,791	154·5	258
1951	42,029	158·3	265
1952	42,907	162·1	265
1953	44,258	166·0	267
1954	47,071	170·0	277
1955	49,324	174·1	283
1956	50,858	178·3	285

Source: See Note to Table I.

process of economic development and industrialization involves a broad and basic improvement in the efficiency of utilization (productivity) of investment and capital resources, as well as the increase in the efficiency of utilization of man-power resources. This may appear to be repeating the obvious, but the significance of this new body of data lies in the quantitative measure of this

process and the new light it throws on the problem and cost of economic development.

For the region as a whole, the gross product per unit of capital, in the five-year period 1950–54, was almost 40 per cent greater than in the years 1925–29 (see Table I). The long-term

TABLE IV

Gross Product, Labour Force Composition and Productivity, by Economic Activity, in Latin America in 1940 and 1955

	Gross Product		Labour Force		Gross Product per Worker	
	1940	1955	1940	1955	1940	1955
	(Millions of dollars at 1950 prices)		(Thousands of persons)		(Dollars at 1950 prices)	
Total	*24,174*	*49,324*	*44,300*	*59,900*	*546*	*823*
Agriculture	7,131	11,887	27,510	30,309	259	392
Mining	894	2,220	443	599	2,018	3,706
Manufacturing and construction	4,617	11,492	5,980	11,022	772	1,043
Government and other services	11,531	23,725	10,366	17,970	1,112	1,320
	(Percentage distribution)		(Percentage distribution)		(Indices: Total = 100)	
Total	*100·0*	*100·0*	*100·0*	*100·0*	*100*	*100*
Agriculture	29·5	24·1	62·1	50·6	47	48
Mining	3·7	4·5	1·0	1·0	370	450
Manufacturing and construction	19·1	23·3	13·5	18·4	141	127
Government and other services	47·7	48·1	23·4	30·0	204	160

Sources: *The Selective Expansion of Agricultural Production in Latin America and its Relationship to Economic Development*, United Nations, ECLA, Santiago, Chile, 1955; *Economic Bulletin for Latin America, Vol. II, No. 1*, Santiago, Chile, February 1957, article entitled 'Charges in Employment Structure in Latin America, 1945–55'; *Economic Survey of Latin America, 1955*, op. cit. *Study on Manpower in Latin America*, United Nations ECLA, Santiago, Chile, 1957; 'The relationship between population growth, capital formation and employment opportunities in Underdeveloped Countries', by Dr. Raul Prebisch, paper presented at the World Population Conference, Rome, 1954.

improvement in the productivity of capital resources was experienced by at least four countries, Argentina, Brazil, Colombia, and Mexico, whose gross product and stock of capital represent approximately 70 per cent of that of Latin America as a whole (see Table II). For two of these countries – Argentina and Colombia – detailed long-term series on investment and capital,

by economic sector, and by type of capital good, are available, and make possible a detailed analysis and interpretation which will be referred to later in this section. While much remains to be done to round out the statistical record, there appears to be no doubt as to the validity of this basic conclusion on the long-term improvement in the efficiency of utilization of investment and capital resources, in the economic growth of Latin America. It is now also possible from the new historical record to clarify the nature of the process.

As will be shown, the long-term increase in the overall productivity of capital derives from the change in the economic structure of production, man-power and capital, the heart of the process of economic development and industrialization. In effect, the relative transfer of investment and capital resources, as well as labour force, to industry, signifies a more productive use of capital as well as labour, and raises the level of productivity in the economy as a whole (see Tables III and IV).

2. *Significance with respect to problem and social cost of economic development*

It has long been recognized that a prerequisite for development and industrialization is the prior creation of basic social capital in transport, communications and energy, housing, commerce, and services, including government services, which have a low capital productivity. The low product–capital ratio in basic social capital is not principally a matter of internal relative prices (although this may be a contributing factor), but is related basically to the length of life of the capital good, and the annual cost and rate of return based on the average expected length of life.[1] Conversely, the high product–capital ratio in manufacturing is related to the relatively short length of life of machinery and equipment, and the annual cost and rate of return related to it.

Other factors involved in the long-term improvement in the gross product per unit of fixed reproducible capital (at depre-

[1] See for example, 'Theoretical Aspects of Quality Change, Capital Consumption and Net Capital Formation', Edward F. Denison, *Problems of Capital Formation, Studies in Income and Wealth*, Volume Nineteen, National Bureau of Economic Research, New York, 1957, pp. 236 and 237. As Denison states, '. . . long life is an undesirable property of a capital good if the investment per year of service is the same. If the cost of capital goods were proportionate to their lives, then the shorter the lives of capital goods the larger would tend to be total output per unit of net capital'.

ciated replacement cost) in Latin America, in the period 1925–56, include: (1) the fuller and more intensive utilization of basic social capital as well as agricultural and industrial production capacity, and economies of scale deriving from the growth and expansion of the market; (2) the effect of external terms of trade and export demand on imports of capital goods and, consequently, the level and composition of investment and capital; (3) the changing role of foreign capital; (4) the effect of the rate

TABLE V

Fixed Reproducible Capital in Latin America and Selected Countries by Economic Sector, 1950

	Latin America	Argentina	Brazil	Chile	Colombia	Mexico
	(Thousand millions of dollars)					
Total fixed reproducible capital	*100·6*	*33·0*	*21·3*	*3·2*	*7·5*	*10·3*
Agriculture	26·1	5·2	5·3	0·5	2·9	1·3
Industry	15·1	5·0	3·6	0·8	1·0	1·1
Transportation, electricity, and communications	11·6	4·7	3·2	0·5	0·7	1·2
Non-farm housing, trade, services, and government	47·8	18·1	9·2	1·4	2·9	6·7
	(Percentage distribution)					
Total	*100*	*100*	*100*	*100*	*100*	*100*
Agriculture	26	16	25	16	39	13
Industry	15	15	17	25	13	11
Transportation, electricity, and communications	12	14	15	16	9	12
Non-farm housing, trade, services, and government	47	55	43	43	39	65

Source: See note to Table I.

of growth on the relative importance of depreciation in the investment effort; (5) the incidence of internal relative prices on the saving and investment capacity of the industrial sector; and (6) the greater efficiency of new capital goods replacing older similar goods – the benefits of technological progress.

Nevertheless, as will be shown, the main factor explaining the development process is the change in economic structure and the growth in the relative importance of investment and capital in those economic sectors which, by the nature of the type of

capital, represent an increase in the overall efficiency in the utilization of investment and capital resources (see Tables V and VI).

It is now possible to show, on the basis of the record of economic history, that economic development requires a tremendous social force, as can be appreciated in an economy 'starting'

TABLE VI

Gross Product and the Product–Capital Ratio, by Economic Sector, in Latin America and Selected Countries, by Economic Sector, 1950

(Millions of dollars)

	Latin America	Argentina	Brazil	Chile	Colombia	Mexico
A. *Gross Domestic Product*						
Total	*39,791*	*9,887*[1]	*10,120*	*1,872*	*2,383*	*5,412*
Agriculture	10,545	1,451	2,937	280	945	1,030
Industry	10,226	2,952	2,166	483	682	1,522
Transportation, electricity, and communications	2,348	1,037	866	140	175	261
Non-farm housing, trade, services, and government	16,672	3,861	4,151	969	581	2,599
B. *Product–Capital Ratio*						
Total	*0·40*	*0·30*	*0·48*	*0·59*	*0·32*	*0·53*
Agriculture	0·40	0·28	0·55	0·53	0·32	0·78
Industry	0·68	0·59	0·61	0·63	0·68	1·40
Transportation, electricity, and communications	0·20	0·22	0·27	0·30	0·18	0·22
Non-farm housing, trade, services, and government	0·35	0·21	0·45	0·69	0·18	0·39

Source: See note to Table I.

[1] Total at market prices, economic sectors at factor cost.

with a product–capital ratio of 0·25. In effect, under-developed countries need more capital per unit of product than do developed countries; a comparable investment effort yields less. For a full appreciation of the social force required in the process of economic development, there must be added to this basic factor the vulnerability of economic growth of under-developed countries to fluctuations in the terms of trade of primary materials; internal relative prices and income distribution which may not favour an appropriate allocation of resources – especi-

ally investment resources; the small size of market, consonant with a low *per capita* product, which limits the economies from scale of operations; the susceptibility of capital-goods imports to fluctuations in trade and foreign-exchange earnings; and fluctuations in the rate of growth, which, when declining, have the effect of increasing the relative burden of depreciation in the overall investment effort.

3. *Factors contributing to the increase in the efficiency, utilization, and productivity of capital in Latin America in the last quarter century*

Despite the relatively greater social force required, and the factors of vulnerability and susceptibility referred to above, Latin America has, in fact, experienced a significant rate of growth in the *per capita* product in the last thirty years, deriving in substantial part from a broad improvement in the efficiency of utilization of investment and capital resources (productivity of capital), as will be shown. The basic factors in the increase in the efficiency of utilization of investment and capital resources was the broad change in the economic sector structure of capital. The increase in the relative importance of manufacturing productive capacity, with its higher capital productivity deriving from the characteristic type of capital good with its advance in technology and shorter life span, was the basic factor which contributed to the increase in the efficiency and productivity of capital in the economy as a whole. A number of important factors facilitated the change in the economic sector structure of capital, and other factors, independent of the change in structure, also contributed to the increase in the efficiency, utilization, and productivity of investment and capital resources. These include the following:

(1) The relative decline in export demand and relative prices for agricultural products and raw materials, during the 1930s and during the war, together with policies of import restriction and exchange control adopted by main Latin American governments, had the effect of improving internal relative prices for the manufacturing sector, as well as its saving and investment capacity. This factor, together with the decline in the relative importance of foreign investment in this period, facilitated the relative shift of

investment and manpower resources to manufacturing (see Table VII). Restriction of imports of luxury consumer goods and improvement in the distribution of income (which accompanied political changes that paralleled the decline in the economic importance of agricultural and raw-materials exports and foreign investment) tended to enhance saving and investment in manufacturing, and to create a new market for manufactured goods.

TABLE VII

Foreign Investment and Fixed Reproducible Capital in Latin America, 1929, 1940, 1950, 1955

(Thousands of millions of dollars at 1950 prices)

Year	Foreign Investment	Fixed Reproducible Capital	Foreign Investment as a Percentage of Fixed Reproducible Capital
1929	16	65	25
1940	13	76	17
1950	11	101	11
1955	15	122	12

Sources: *Inversiones Internacionales en América Latina*, Javier Marquez, Bank of Mexico, Mexico City, 1945; *The United States and Foreign Investment Problems*, Cleora Lewis, The Brookings Institution, Washington, 1948; *International Transactions of the United States, during the War, 1940–45*, U.S. Department of Commerce, Washington, D.C. 1948; *The Balance of Payments of the United States, 1946–48*, U.S. Department of Commerce, Washington, D.C., 1950, and other publications, 1950–57; *Foreign Capital in Latin America*, United Nations Department of Economic and Social Affairs, New York, 1955.

See also Table I.

(2) The decline in exports, terms of trade, and the outflow of foreign capital adversely affected import capacity, in the period 1930–45, and made its greatest impact on capital-goods imports, which were sharply reduced. This seriously affected the composition and level of investment and capital, in these years. The reverse occurred in the period 1945–55, and on a much larger scale; the post-war expansion of exports and improvement in the terms of trade resulted in a phenomenal expansion in capital-goods imports, and Latin American manufacturing capacity more than doubled in the post-war years, while the stock of fixed capital rose by more than one-half.

(3) The degree of utilization of productive capacity expanded significantly; this was especially true in manufacturing,

but also occurred in transport, energy, and communications, as well as government capital in public works and welfare services. This expanding degree of utilization, which enhanced capital productivity, derived from the protection of manufacturing activity already referred to, the increase in domestic demand, and economies deriving from the expanding scale of operation. In addition, partly as a counter-cyclical device, and partly as an overt effort to spur industrialization, governments expanded basic social capital in roads, streets, water-works, and schools, and this expansion of basic social capital favoured the expansion of manufacturing output. All these factors made it possible to use more fully the existing productive capacity accumulated in the 1920s and earlier.

(4) In an expanding economy the share of the gross product absorbed in off-setting depreciation of the stock of capital declines, as has been demonstrated by Robert Eisner and others. Under these conditions the relative burden of depreciation and replacement charges in the overall investment effort is reduced. A given investment effort – a given gross investment rate – signifies a greater net investment content and a larger growth in the stock of fixed capital. This, in effect, has been the experience of Latin America in the last twenty-five years.

(5) As has been demonstrated in the case of capital in manufacturing, railroads, and public utilities in the United States, new capital is more efficient and productive than old capital, in the sense of greater yield and product per unit cost of capital. The productivity of fixed reproducible capital in Latin America has benefited from this increased efficiency of new capital goods replacing older similar goods and, thereby, without the need for pioneering, has benefited from technological progress.

Since World War II, foreign capital in Latin America has again been expanding; this time, with the outstanding exception of petroleum investment in Venezuela, new foreign investment has gone predominantly into manufacturing enterprises, in most Latin American countries, and has thereby contributed to the introduction of modern technology in the form of more efficient and productive capital equipment. (For Latin America, this

development signifies a fundamental change in the role of foreign capital, since the new emphasis on investment in manufacturing enterprises reflects the growing domestic market, and the now united interest in its growth and expansion.)

4. *Factors affecting adversely the efficiency, utilization, and productivity of fixed reproducible capital in Latin America*

Even with the overall long-term improvement in the efficiency, utilization, and productivity of capital in Latin America, it should be noted that the product per unit of capital in the region has remained static since 1948 and in some important countries (Argentina, for example) has fallen below the 1948 level. A number of problems have contributed to this circumstance, including the following factors:

(1) inefficient use of land resources;
(2) mis-utilization of public investment resources;
(3) decline in the rate of government resources available for public investment;
(4) incidence of inadequate growth of export earnings on capital-goods imports and the level and composition of investment;
(5) problems of minimum economic scale of operations confronting economies on the threshold of industrial production of consumers' durable goods, capital goods, and the more complex metals, machinery, and chemical products.

The following examples of inefficient use of land resources and mis-utilization of public investment resources may be cited:

(a) *Inefficient use of land resources.* As is discussed more fully in the section on 'Problems of data, concepts, and methods', the detailed and adequate measure of agricultural improvement, including valuation at depreciated replacement cost of land clearing and levelling and other soil improvements, buildings, installations and fencing, plantations and permanent crops, cultivated forests and cultivated pasture, as well as machinery, equipment, and cattle, is fundamental to the analysis of investment, capital, productivity, and economic growth in Latin America. For this reason, the estimation of investment and capital in agricultural improvements has been the subject of special attention in our studies of development, especially in the case of Argentina and Colombia.

In the study of agricultural development in Colombia it was possible to make a very detailed cross-section analysis of value added, man-power, and fixed reproducible capital by main types of agricultural production, providing estimates of labour, land, and capital productivity.[1] As may be seen in Table VIII, land, labour, and capital productivity (value added per worker, per unit of land, and per unit of capital) was consistently and substantially lower in cattle-raising than in the cultivation of crops. In effect, the data revealed a low level of efficiency in the utiliza-

TABLE VIII

Colombia; Productivity in the Utilization of Agricultural Land, Labour, and Capital Resources in 1953

	Agriculture			
	Total	Coffee	Other Crops	Cattle
Gross value of production (millions of pesos)	3,785·2	899·7	1,497·0	1,388·5
Value of materials and service inputs originating in non-agricultural sectors (millions of pesos)	447·3	56·4	187·0	203·9
Gross product (millions of pesos)	3,337·9	843·3	1,310·0	1,184·6
Labour force (thousands of persons)	2,214·6	335·9	822·3	1,056·4
Gross product per worker (pesos)	1,507	2,511	1,593	1,121
Fixed reproducible capital, total (millions of pesos) [2]	8,236	1,092	1,334	5,810
Land improvements	2,342	166	545	1,631
Plantations and cultivated pasture	687	312	123	252
Buildings, installations, and fencing	1,458	609	519	330
Stock of cattle	3,585	—	—	3,585
Machinery and equipment	164	5	147	12
Product–capital ratio	0·405	0·772	0·982	0·204
Area cultivated (millions of hectares)	29,770	831	2,069	26,870
Gross product per hectare (pesos)	112·1	1,014·8	633·2	44·1

Source: Economic Development of Colombia, op. cit., pp. 190–195.

tion of man-power, land, and capital resources in cattle-raising, in comparison with other types of agricultural production; cattle-raising in Colombia was, in fact, a capital-intensive activity. This analysis provided a useful quantification of what was recognized [3] as one of the most serious problems of Colombian agriculture – namely, the anti-economic distortion in land

[1] *Economic Development of Colombia, op. cit.*, pp. 187–195, 376–383.

[2] At depreciated replacement cost.

[3] *Economic Development of Colombia*, Lauchlin Currie and collaborators, International Bank for Reconstruction and Development, Washington, 1951.

use. The prevailing practice in 1953 was the use of the few fertile, temperate, level, plain regions surrounding principal cities in mountainous, tropical Colombia for extensive cattle exploitation. The needs of the urban population, in comparison, indicated the need for intensive use of these lands for dairy and truck-crop cultivation, and the raising of cattle in other regions. This distortion in land use, with its anti-economic incidence on land, labour, and capital productivity, derived from the misapplication of the land reform law of 1936, which was substantially evaded by the eviction of agricultural labourers from the best lands. The result has been a serious shortage in food production,[1] substantial dietary and nutritional deficiency, and high relative prices for food, in a country combining tropical, sub-tropical, and temperate zones, and capable of producing all kinds of food. The estimates of fixed, reproducible capital provide a quantitative tool for evaluating and projecting the effect of alternative policies and measures aimed at solving this inefficient use of basic resources and its adverse consequences.

The study of the economic development of Argentina also analyses the incidence of mis-utilization of land resources involved in the post-war decline by one-third in area cultivated to permanent crops, excluding feed crops, and the giving over of this land to extensive cattle-raising. In this case, contributing factors included low, fixed prices for agricultural crops, and an increasing shortage of farm workers, without a compensating increase in agricultural mechanization. This decline in area cultivated to crops has resulted in a serious fall in Argentine exports, foreign-exchange earnings, imports of raw materials as well as capital goods, and has been a main factor in the post-1948 economic stagnation. The programme for economic recovery aims at bringing back into cultivation a large part of this land, and raising more cattle on less land through the use of cultivated feed crops.

(b) *Mis-utilization of public investment resources.* As has been indicated, the expanding role of Latin American governments since the 1930s in fostering economic development and industrialization through public investment in basic social capital and other aspects of economic policy has been accompanied in recent years, in some countries, by problems of mis-direction and mis-utilization of public investment resources, in relation to

[1] See *Economic Development of Colombia, op. cit.*, pp. 137–141.

needs, as well as a decline in the rate of public investment. In a number of countries a large share of public investment resources is going to military, administrative, and costly social-welfare projects, while the functioning and growth of the economy is hampered and limited by increasingly severe shortages of basic social capital in energy, transport, and other essential public services. An interesting example, for which quantitative data on investment and capital are available, is the case of Argentina.[1]

Argentina's post-1948 economic stagnation derived, in great part, from a mis-utilization of basic resources of land, labour, and capital, which resulted in imbalance and distortions in the structure of production, investment, and employment, and an overall decline in labour productivity, land productivity, and capital productivity. The post-revolution economic recovery programme, adopted in 1956, is based on the possibility of a rapid short-term recovery of productivity in land, labour, and capital through an economic policy and investment programme calculated to correct these distortions in the structure of production, investment, and employment. Attention will here be given to one aspect of these distortions – namely, the post-war mis-utilization of public investment.

Despite the relatively large investment resources available to the Argentine Government at the end of World War II, basic social capital in electricity, railroads, roads, petroleum, and coal exploitation, as well as iron and steel production capacity, were seriously neglected. As a consequence, fixed reproducible capital in railroad installations and rolling stock, which had already been seriously neglected by their foreign owners in the 1930s and during the war, continued to decline. No net new road construction (in terms of depreciated replacement cost) was undertaken after 1943. Expansion of electric-power capacity was only a fraction of needs, and industrial production, whose electricity supply was severely rationed, was seriously hampered. The failure to develop petroleum and coal exploitation and iron and steel capacity in line with expanding needs placed an impossible burden on import requirements, and forced severe restriction of imports of raw materials and intermediate products for industrial

[1] See *Economic Development of Argentina, op. cit.; Fixed Reproducible Capital in Argentina, 1935–55, op. cit.*, and following section of this paper, 'Capital formation, fixed reproducible capital, and economic growth in Argentina, 1900–1955'.

TABLE IX

Argentina; Composition of Real Investment of the National Government

(Percentage distribution of total)

	Historical Period [1] (Fixed Reproducible Capital in 1948)	1945–46	1947–51	1952–55	Projected Distribution of Investment Based on Investment Programmes [2] to 1961
		Investment			
Total	*100·0*	*100·0*	*100·0*	*100·0*	*100·0*
A. *Investment of an economic character*	*67·5*	*33·4*	*53·6*	*72·6*	*78·0*
I. *Transport*	*41·1*	*26·2*	*27·4*	*29·0*	*40·6*
Roads	18·4	12·9	8·6	12·3	18·0
Railroads	11·9	3·6	7·2	8·8	14·1
River and maritime shipping	8·2	5·8	8·8	4·7	5·7
Air transport	1·7	3·9	2·1	1·2	0·8
Urban transport	0·9	—	0·6	2·0	2·0
II. *Energy and communications*	*21·9*	*3·2*	*16·7*	*24·4*	*23·7*
Petroleum and coal	14·9	—	4·9	8·6	8·9
Water, electricity, and communications	7·0	3·2	11·8	15·8	14·8
III. *Agriculture*	*0·8*	*0·9*	*0·7*	*1·7*	*3·3*
Research and experiment	...	—	0·1	1·0	2·3
Silos and grain elevators	...	0·9	0·5	0·7	0·5
Meat-packing plants	...	—	0·1	—	0·5
IV. *Industry*	*3·7*	*0·7*	*1·8*	*6·2*	*7·1*
Iron and steel	...	—	0·5	2·1	5·6
Other	...	0·7	1·3	4·1	1·5
V. *Contribution to regional development*	...	*2·4*	*7·0*	*11·3*	*3·3*
B. *Investment of a social character*	*28·0*	*14·8*	*18·3*	*12·5*	*11·4*
Housing and other buildings	11·9	8·5	13·7	8·4	7·6
Health projects	12·6	5·9	3·6	3·7	3·5
Other	3·5	0·4	1·0	0·4	0·3
C. *Investment in national defence*	*2·1*	*50·7*	*23·5*	*9·7*	*6·0*
D. *Investment of an administrative character*	*2·4*	*1·1*	*4·6*	*5·2*	*4·6*

Source: Economic Development of Argentina, op. cit.

[1] The historical period is calculated on the basis of the Census of Government Property made in 1948, excluding land and inventories of raw materials and inter-

production, as well as imports of new capital goods and replacement parts. Both agriculture and industry were severely hindered by shortages of transport facilities.[1]

The post-war distortion in the composition of public investment in Argentina, and the neglect of basic social capital, may be seen in Table IX, which compares the percentage distribution of fixed reproducible capital, at depreciated replacement cost, in 1948, reflecting the composition of public investment in earlier decades with that in the years 1945–46, the period of the first five-year plan, 1947–51, the years 1952–55, and the present investment programme, to the year 1961. In a developing economy, priorities in public investment in basic social capital change, but, as may be seen, the changes in the composition of public investment in the years 1945–46 and 1947–51 were contrary to the development needs of the country. As may be seen whereas in the historical period public investment of an economic character had represented 67 per cent of total investment, this share fell to 33 per cent in 1945–46 and 54 per cent in 1947–51; the proportion in transport fell from 41 to 26 per cent and 27 per cent, respectively; that in roads fell from 18 to 13 per cent and 9 per cent; railroad investment fell from 12 to 3 per cent and 7 per cent; petroleum and coal were neglected; electricity investment was far below needs; and basic iron and steel investment was not undertaken until after 1950. On the other hand, investment in national defence rose to 51 per cent of all national government investment in 1945–46, and 23 per cent in the period of the first five-year plan, 1947–51. With the onset of economic stagnation, especially after 1951, a frantic effort was made to change the direction of public investment, as may be seen in the increased share dedicated to projects of an economic character in the period 1952–55. An appreciation of the distortions in the composition of public investment may also be obtained by comparing the composition of present and projected investment

mediate products. The percentage distribution of the depreciated replacement value of government property in 1948, as adjusted, is considered a valid measure of the channelling of investment in the historical period. Investment in national defence in this period is probably underestimated, because some items are probably included in buildings and river and maritime shipping. Similarly, the group 'Petroleum and coal' may include investment in other mining activity.

[2] The projected distribution of investment is based on estimated investment needs and investment programmes actually under way, in accordance with the evaluation of existing shortages and the needs of an expanding economy.

[1] See *Plan de restablecimiento económico*, Raúl Prebisch, Economic Adviser to the President of the Provisional Government, Buenos Aires, January 1956.

programmes of the Argentine Government (to 1961), based on a detailed examination of needs and the fixing of priorities.

5. *Future outlook for Latin American economic growth, capital requirements, and capital productivity*

We may ask what does the foregoing analysis imply with respect to the future outlook for Latin American economic growth, capital requirements, and capital productivity? Without pretending to sketch the future pattern of Latin American economic growth, some important elements which appear clearly in the picture may be noted. The immediate future will be an era of concentration on the solution of production-hampering shortages of basic social capital in transport and energy. In a number of important countries basic new progress has already been made. This, together with expanded iron and steel and other intermediate materials production, should facilitate the greater concentration of import capacity on new capital goods and intermediate products for expanding industry. Progress may be expected in the development of a regional multi-lateral payments system, and regional market, which will provide a solution to some problems of adequate size of market for economies of scale. With such a development, the composition of Latin American exports will change, favouring manufactures, and the region's ability to absorb new foreign capital, also favouring manufactures, will increase. Thus, after a continued pause in the level of the gross product per unit of capital, which has been stagnant since 1948, further progress may be expected.

6. *Hypothesis with respect to the differences in the rate of increase and in the level of the product–capital ratio and the rate of economic growth of Argentina and Colombia*

Since 1929, the rate of economic growth in Colombia has been spectacular, while that in Argentina, for example, has been low. Whereas Colombia experienced an annual rate of growth in the *per capita* gross product of 1·9 per cent in the period 1929–55, that in Argentina was only 0·5 per cent. In effect, Colombia experienced a greater rate of increase in product per unit of capital, as well as capital *per capita*, and achieved a higher absolute level of product per unit of capital (as may be seen in Table X), and, *in relative terms, experienced a more balanced rate of change* in the structure of investment and capital. While post-war dis-

tortions in the direction of resources contributed to this relative imbalance and low rate of growth in Argentina, detailed long-term data on the economic sector composition of fixed reproducible capital in Argentina and Colombia, as well as data on the structural composition of capital for a number of other Latin American countries for the year 1950, suggest that more basic factors were involved. The data suggest that *relative changes in* the structure of investment and capital, and in the level of the gross product per unit of capital, reflect the era in which capital accumulation began to accelerate, the nature of basic resources, and the level of technology in this era, as well as the social structure and the pattern of demand.

TABLE X

Relative Importance of Change in Fixed Reproducible Capital Per Capita *and Increase in the Product per Unit of Capital in the Increase in Gross Domestic Product* Per Capita *in Argentina and Colombia, from 1929 to 1955*

(Dollars at 1950 prices)

	Argentina	Colombia
Gross product per capita:		
1929	505	148
1955	571	244
Annual rate of change (in per cent)	*0·5*	*1·9*
Fixed reproducible capital per capita:		
1929	2,111	622
1955	1,925	683
Annual rate of change (in per cent)	*—0·3*	*0·4*
Product per unit of capital:		
1929	0·24	0·24
1955	0·30	0·36
Annual rate of change (in per cent)	*0·9*	*1·6*

Source: See notes to Table I.

To put the matter in its most elemental terms, the quality and condition of housing, schools, hospitals, streets, parks, sanitary services, theatres, and recreation facilities in Argentina are relatively high and compare favourably with that in cities of Western Europe and the United States. This is not the case with Colombia, which, on the other hand, has a basic iron and steel industry – a factor of industrial development which Argentina will not have until 1961. This example may be said to have the following implications.

Newly developing economies have a simpler problem in attaining balance in the structure of growth than do older

economies, and have been able to incorporate newer and more efficient capital, and concentrate a relatively greater share of the investment effort in expanding capacity in agriculture, industry, energy, and transport, in comparison with housing and other public social services. Argentina, for example, whose *per capita* gross product in 1900 was already $330 (at 1950 prices), and whose basic capital structure was established by 1915, has an old capital structure in industry, transport, electricity, and agriculture. Argentina has not been able to scrap or replace old capital to install new capital, in great part because of the great burden involved in financing investment for replacement as well as new growth. Colombia, a newly developing economy, on the other hand, has no such burden, and new investment goes for modern, efficient equipment.

These factors affecting the relative change in the structural balance of fixed reproducible capital may, therefore, be an important element of explanation of differences in the rate of increase in product per unit of capital, as well as differences in their absolute level.

7. *Capital formation, fixed reproducible capital, and economic growth in Argentina, 1900–55* [1]

In the period 1900–29 Argentina experienced an extraordinary rate of development in its gross product, fixed reproducible capital, and population, which increased at the annual rate of 5·1, 4·9, and 3·3 per cent, respectively. This impressive rate of growth was related to the extraordinary expansion of exports and improvement in the external terms of trade (see Table XI), which, together with a massive inflow of foreign capital and a heavy programme of public works, made possible an extremely high rate of investment (see Tables XII and XIII). This involved not only investment in agriculture and industry but also in railroad transport, roads, shipping, electric power, residential housing, commerce, and public administrative, social and welfare services (see Tables XIV and XV). Between the periods 1900–4 and 1925–29, fixed reproducible capital in agriculture doubled, that in industry expanded three times as great, while that in transport, communications, electricity, housing, commerce, and

[1] Minor differences from the data in the paper (following) by Balboa and Fracchia derive from differences in classification and the inclusion of cattle stocks. In addition, in the calculation of a long-term series from 1900 there is a slight difference in the treatment of depreciation.

TABLE XI

Argentina: Exports, Effect of the Terms of Trade, and the Gross Product, 1900–55

(Five-year averages)

Periods	Exports	Effect of the Terms of Trade in Relation to 1950	Gross Domestic Product	Exports	Effect of the Terms of Trade in Relation to 1950
	Millions of pesos at 1950 prices			As a percentage of the gross product	
1900–4	2,915	318	10,756	27·1	3·0
1905–9	4,036	1,219	15,890	25·4	7·7
1910–14	4,480	1,313	19,896	22·5	6·6
1915–19	4,601	888	19,131	24·0	4·6
1920–24	6,393	— 346	25,491	25·1	—1·4
1925–29	7,913	1,998	33,184	23·8	6·0
1930–34	7,405	—1,337	33,863	21·9	—3·9
1935–39	7,397	602	39,754	19·1	1·5
1940–44	5,963	—1,024	45,908	13·0	—2·2
1945–49	5,900	1,339	57,009	10·3	2·3
1950–54	4,685	— 175	63,150	7·4	—0·3
1955	4,697	— 563	68,769	6·8	—0·8

Source: Economic Development of Argentina, Argentina Government–United Nations Joint Study Group, *op. cit.*

TABLE XII

Argentina: Public and Private Investment, National and Foreign Investment, as a Percentage of Gross Domestic Product

(Five-year averages)

Period	Total	Public	Private	National	Foreign
1900–4. .	25·9	2·9	23·0	14·1	11·8
1905–9. .	48·2	5·3	42·9	30·2	18·0
1910–14 .	42·2	4·7	37·5	21·4	20·8
1915–19 .	13·0	1·7	11·3	9·6	3·4
1920–24 .	26·4	2·1	24·3	22·8	3·6
1925–29 .	33·3	3·6	29·7	28·5	4·8
1930–34 .	22·2	3·7	18·5	19·0	3·2
1935–39 .	23·7	6·0	17·7	21·2	2·5
1940–44 .	18·2	4·6	13·6	16·7	1·5
1945–49 .	24·4	8·7	15·7	24·3	0·1
1950–54 .	22·5	7·9	14·6	21·8	0·7
1955 . .	22·4	5·9	16·5	22·1	0·3

Source: See Table XI.

TABLE XIII

Argentina: Gross Fixed Domestic Investment, by Economic Sector, as a Percentage of Gross Domestic Product, by Economic Sector

Period	Total	Agriculture	Manufacturing, Mining, and Construction	Transport, Communications, and Electricity	Housing, Commerce, Finance, and Personal Services	Government
1900–4	25·9	9·9	24·7	87·5	33·5	59·7
1905–9	48·2	18·4	24·8	237·7	57·2	142·6
1910–14	42·2	18·4	25·8	136·4	50·9	114·7
1915–19	13·0	13·6	11·4	19·5	12·5	22·4
1920–24	26·4	16·7	19·5	57·4	34·9	34·0
1925–29	33·3	22·5	23·0	88·7	34·7	71·6
1930–34	22·2	12·4	15·0	50·6	25·0	57·0
1935–39	23·7	14·6	15·7	97·9	18·4	39·1
1940–44	18·2	7·5	10·8	51·1	21·8	41·5
1945–49	24·4	13·3	18·5	54·9	25·1	48·1
1950–54	22·5	13·4	15·3	34·5	26·8	47·3
1955	22·4	13·6	14·3	42·7	26·8	41·5

Source: See Table XI.

TABLE XIV

Argentina: Percentage Distribution of Gross Fixed Domestic Investment, 1900–55

(Five-year averages)

Period	Total	Agriculture	Manufacturing, Mining, and Construction	Transport, Communications, and Electricity	Housing, Commerce, Finance, and Personal Services	Government
1900–4	100·0	12·0	18·5	13·4	44·2	11·9
1905–9	100·0	10·0	12·8	23·7	40·0	13·5
1910–14	100·0	10·3	15·3	19·6	41·4	13·4
1915–19	100·0	30·4	14·9	10·6	33·3	10·8
1920–24	100·0	16·8	15·4	15·5	45·1	7·2
1925–29	100·0	16·3	16·0	21·5	35·1	11·1
1930–34	100·0	13·2	15·4	20·0	36·3	15·1
1935–39	100·0	14·1	16·9	34·8	24·3	9·9
1940–44	100·0	9·6	15·4	24·7	35·7	14·6
1945–49	100·0	9·5	21·9	21·8	31·2	15·6
1950–54	100·0	9·3	19·4	16·4	35·9	19·0
1955	100·0	9·8	18·3	19·8	35·7	16·4

Source: See Table XI; also *Fixed Reproducible Capital in Argentina, 1935–45,* Manuel Balboa and Alberto Fracchia, *op. cit.*

TABLE XV

Argentina: Fixed Reproducible Capital, by Economic Sector, 1900–55

(Millions of pesos at 1950 prices; five-year averages)

Period	Total	Agriculture	Manufacturing, Mining, and Construction	Transport, Communications, and Electricity	Housing, Commerce, Finance, and Personal Services	Government
1900–4	44,606	12,850	4,001	7,795	16,137	3,823
1905–9	68,274	16,698	6,974	12,867	24,694	7,041
1910–14	102,131	19,574	11,286	19,633	39,709	11,929
1915–19	110,151	22,335	12,251	20,014	42,383	13,168
1920–24	116,354	25,493	12,996	19,212	45,687	12,966
1925–29	140,280	29,281	16,763	22,805	56,322	15,109
1930–34	160,275	31,490	19,891	25,656	63,895	19,343
1935–39	165,975	31,307	21,193	29,194	63,346	20,935
1940–44	173,130	31,067	22,428	30,067	64,545	25,023
1945–49	187,963	31,622	26,000	28,895	70,558	30,888
1950–54	217,566	33,048	33,294	29,038	81,216	40,970
1955	231,737	34,068	35,496	29,322	87,500	45,351

Source: See Tables XI and XIV.

TABLE XVI

Argentina: Gross Domestic Product, by Economic Sector, 1900–55

(Millions of pesos at 1950 prices; five-year averages)

Period	Gross Domestic Product at Market Price, Total	Gross Domestic Product, Total	Agriculture	Manufacturing, Mining, and Construction	Transport, Communications, and Electricity	Housing, Commerce, Finance, and Personal Services	Government
		(At factor cost)					
1900–4	10,756	10,119	3,367	2,086	426	3,686	554
1905–9	15,890	14,949	4,155	3,944	762	5,362	726
1910–14	19,896	18,718	4,715	4,996	1,205	6,817	985
1915–19	19,131	17,999	5,586	3,235	1,359	6,618	1,201
1920–24	25,491	23,981	6,779	5,287	1,816	8,680	1,419
1925–29	33,184	31,218	8,010	7,694	2,680	11,120	1,714
1930–34	33,863	31,658	7,996	7,744	2,966	10,960	1,992
1935–39	39,754	37,406	9,080	10,120	3,352	12,477	2,377
1940–44	45,908	43,189	10,669	11,897	4,033	13,653	2,937
1945–49	57,009	53,630	9,940	16,427	5,510	17,265	4,488
1950–54	63,150	59,400	9,858	17,997	6,761	19,083	5,701
1955	68,769	64,661	11,165	19,729	7,157	20,500	6,110

Source: See Tables XI and XIV.

government services increased two-fold. This was an era of broad expansion in population, labour force, cultivated area, agricultural production, industrial production and capacity, and basic social capital in transport and electricity, as well as housing and public services. The expansion in fixed reproducible capital was accompanied by an almost parallel increase in the production of goods and services by economic sector (see Table XVI).

TABLE XVII

Argentina: Gross Domestic Product per Unit of Fixed Reproducible Capital, by Economic Sector, 1900–55

(Five-year averages)

Period	Total	Agriculture	Manufacturing, Mining, and Construction	Transport, Communications, and Electricity	Housing, Commerce, Finance, and Personal Services	Government
1900–4	0·241	0·262	0·521	0·055	0·228	0·145
1905–9	0·233	0·249	0·566	0·059	0·217	0·103
1910–14	0·195	0·241	0·443	0·061	0·172	0·083
1915–19	0·174	0·250	0·264	0·068	0·156	0·091
1920–24	0·219	0·266	0·407	0·095	0·190	0·109
1925–29	0·237	0·274	0·459	0·118	0·197	0·113
1930–34	0·211	0·254	0·389	0·116	0·172	0·103
1935–39	0·240	0·290	0·478	0·115	0·197	0·114
1940–44	0·265	0·343	0·530	0·134	0·212	0·117
1945–49	0·303	0·314	0·632	0·191	0·245	0·145
1950–54	0·290	0·298	0·541	0·233	0·235	0·139
1955	0·297	0·328	0·556	0·244	0·234	0·135

Source: See Table XI.

Nevertheless, the social force required was also extraordinary, as may be appreciated in an economy with a gross product per unit of capital which ranged from 0·244 in the period 1900–4, to 0·237 in the period 1925–29 [1] (see Table XVII). The relatively low level of the product–capital ratio derived from the 'underdeveloped' structure of production and fixed reproducible capital (see Tables XVIII and XIX), limitations of the size of the economy on achieving economies of scale, and some degree of

[1] In the United States, for example, the long-term level of the product–capital ratio (comparing the similar concept used here, excluding consumers' durable goods, inventories, monetary metals, and foreign investment), is approximately 0·40. See 'The Growth of Reproducible Wealth in the United States, 1805 to 1950', Raymond Goldsmith, *Income and Wealth Series II, Income and Wealth of the United States*, International Association for Research in Income and Wealth, Cambridge, England, 1952; also *Financial Research and The Problems of The Day, Thirty-Seventh Annual Report*, National Bureau of Economic Research, Inc., New York, May 1957, Part III, Table 1, p. 34.

TABLE XVIII

Argentina: Percentage Distribution of the Gross Product at Factor Cost, by Economic Sector, 1900–55

(Five-year averages)

Period	Total	Agriculture	Manufacturing, Mining, and Construction	Transport, Communications, and Electricity	Housing, Commerce, Finance, and Personal Services	Government
1900–4	100·0	33·3	20·6	4·2	36·4	5·5
1905–9	100·0	27·8	26·4	5·1	35·9	4·8
1910–14	100·0	25·2	26·7	6·4	36·4	5·3
1915–19	100·0	31·0	18·0	7·5	36·8	6·7
1920–24	100·0	28·3	22·0	7·6	36·2	5·9
1925–29	100·0	25·7	24·6	8·6	35·6	5·5
1930–34	100·0	25·2	24·5	9·4	34·6	6·3
1935–39	100·0	24·3	27·0	9·0	33·3	6·4
1940–44	100·0	24·7	27·5	9·3	31·7	6·8
1945–49	100·0	18·5	30·6	10·3	32·2	8·4
1950–54	100·0	16·6	30·3	11·4	32·1	9·6
1955	100·0	17·3	30·5	11·1	31·7	9·4

Source: See Table XI.

TABLE XIX

Argentina: Percentage Distribution of Fixed Reproducible Capital, by Economic Sector, 1900–55

(Five-year averages)

Period	Total	Agriculture	Manufacturing, Mining, and Construction	Transport, Communications, and Electricity	Housing, Commerce, Finance, and Personal Services	Government
1900–4	100·0	28·8	9·0	17·5	36·1	8·6
1905–9	100·0	24·5	10·2	18·8	36·2	10·3
1910–14	100·0	19·2	11·0	19·2	38·9	11·7
1915–19	100·0	20·3	11·1	18·2	38·4	12·0
1920–24	100·0	21·9	11·2	16·5	39·3	11·1
1925–29	100·0	20·9	11·9	16·3	40·1	10·8
1930–34	100·0	19·6	12·4	16·0	39·9	12·1
1935–39	100·0	18·9	12·8	17·6	38·1	12·6
1940–44	100·0	17·9	13·0	17·4	37·3	14·4
1945–49	100·0	16·8	13·8	15·4	37·6	16·4
1950–54	100·0	15·2	15·3	13·3	37·4	18·8
1955	100·0	14·7	15·3	12·6	37·8	19·6

Source: See Table XI.

under-utilization of manufacturing capacity due to the low level of tariff protection and the wide-open policy on imports, in this period.

The low level of the product–capital ratio in the period 1900–4 to 1925–29 is also notable when, added to the high rate of investment, account is taken of the favourable effect of the accelerated rate of growth on the proportion of the total investment effort required for maintenance and replacement of depreciated capital.

TABLE XX

Argentina: Relative Importance of Depreciation and Net Investment in the Gross Fixed Domestic Investment Effort, 1900–55

Period	Gross Fixed Domestic Investment	Depreciation	Net Investment	Depreciation	Net Investment
	As a percentage of gross product			As a percentage of gross investment	
	(Five-year averages)				
1900–4	25·9	2·3	23·7	9	91
1905–9	48·2	7·9	40·3	16	84
1910–14	42·2	12·3	29·9	29	71
1915–19	13·0	16·1	−3·1	124	−24
1920–24	26·4	13·5	12·9	51	49
1925–29	33·3	15·7	17·6	47	53
1930–34	22·2	18·5	3·7	83	17
1935–39	23·7	18·2	5·5	77	23
1940–44	18·2	17·0	1·2	93	7
1945–49	24·4	14·5	9·9	59	41
1950–54	22·5	15·0	7·5	67	33
1955	22·4	14·2	8·2	63	37
	(Period averages)				
1900–29	31·4	12·6	18·8	40	60
1930–55	22·3	16·2	6·1	73	27

Source: See Table XI.

In effect, mainly because of the accelerated rate of growth in the period 1900–29, only 40 per cent of the total gross fixed domestic investment effort was absorbed by maintenance, replacement, and depreciation of existing fixed capital; 60 per cent of the total investment effort was dedicated to net new investment. Other factors involved include the relative high gross investment rate and the relatively low depreciation rate associated

with the relatively long average length of useful life of the structural composition of capital in this period (see Table XX).

This appreciation of the social force required for economic development under the conditions of the Argentine economy in the period 1900–29 represents an interesting quantitative demonstration of the difficulty and great social cost of economic development.

In the period since 1929 the Argentine economy has experienced basic structural changes in the economic composition of production, capital, and labour force. Exports, terms of trade, and foreign capital have declined, and industrial development has advanced, favoured by a protectionist policy, internal relative prices, government economic policy in the 1930s, which expanded basic social capital, and heavy post-war imports of productive machinery and equipment for industry. With the process of economic development and structural change, the gross product per unit of capital expanded. Despite this, the rate of growth of capital lagged behind, and serious distortions developed in the economic sector allocation of capital, especially in the post-war years.

In contrast with the period 1900–29, which had experienced an even more rapid rate of growth in the stock of capital than in the population (with annual rates of increase of 4·9 and 3·3 per cent, respectively), in the period 1929–55, the rate of growth of capital lagged behind (with annual rates of growth of 1·5 per cent in capital and 1·9 per cent in population), so that the level of fixed reproducible capital *per capita* declined at an annual rate of 0·3 per cent in this latter period. The annual rate of growth of the *per capita* gross product, which was 1·7 per cent in the period 1900–29, declined to 0·5 per cent in the period 1929–55.

The decline in the rate of growth of the *per capita* gross product would have been greater but for the increase in the gross product per unit of capital, which rose from 0·24 in 1929 to a peak of 0·32 in 1948, and fell thereafter to 0·30 in 1955.

The expansion of capital productivity, from 1929 to 1948, derived from the basic changes in economic structure, the process of economic development and industrialization, benefits of economy of scale, fuller utilization of manufacturing capacity, and the increased efficiency of new capital.

Since 1948, the Argentine economy has stagnated, capital

productivity and the *per capita* gross product have fallen, and broad distortions have developed in the structure of production, employment, investment, and capital.

These distortions in the utilization of resources of land, labour, and capital involved: (1) inefficient utilization of land, and consequent decline in agricultural production and exports, and export earnings; (2) crippling of manufacturing production as a consequence of shortages of imported raw materials and capital goods; (3) failure adequately to maintain and expand basic social capital in transport and energy, and the consequent hindering of agricultural and industrial production; and (4) with industrial employment declining, the increasing absorption of the urban labour force in service activities, which experienced a severe decline in productivity. These distortions in the use of resources may be attributed to the following factors: the misutilization of public investment funds, alluded to earlier; the drain on public revenue deriving from increases in transfer payments, including expanding deficits of government enterprises affected by the economic stagnation and faulty price policy; the inappropriate economic policy with respect to agricultural prices and mechanization to offset the outflow of labour force; the insufficiency of import capacity to provide minimum needs for the functioning of the economy, due to failure to push earlier and more seriously the establishment of a domestic iron and steel industry, and production of oil and coal, so that import capacity could be dedicated to imports of other intermediate products and capital goods. In addition, the post-1948 stagnation has had the effect of increasing the depreciation and replacement burden on the gross product and minimizing the net new investment in the given total investment effort. Of the post-war net increase in capital, less than one-third went to directly productive activities; more than one-third has gone to government administrative, social, and military services; and the remainder has gone to housing, commerce and financial services, and personal services. The post-war dedication of one-third of investment resources to government administrative, social, and military services represents a calamitous mis-direction of the country's vital investment resources. While this had represented 15 per cent of total fixed reproducible capital in 1944, by 1948 the proportion had risen to 32 per cent. In fact, the *per capita* stock of capital in government administrative, social, and military services was the

only category of increase in capital *per capita* in comparison with the pre-war period. In 1955 directly productive capital *per capita*, including that in agriculture, industry, transport, communications, and electricity, was 20 per cent below the level of 1929; that in transport, communications, and electricity has fallen by 30 per cent. While capital per worker in industry more than recovered the effect of the depression and the war, that in agriculture has not recovered the 1929 level. The fall in basic social capital *per capita* in transport, communications, and electricity has represented a basic structural error in the use of investment

TABLE XXI

Argentina: Gross Fixed Domestic Investment, by Economic Activity, 1900–55

(Millions of pesos at 1950 prices; five-year averages)

Period	Total	Agriculture	Manufacturing, Mining, and Construction	Transport, Communications, and Electricity	Housing, Commerce, Finance, and Personal Services	Government
1900–4	2,789	335	515	373	1,235	331
1905–9	7,658	764	980	1,812	3,066	1,036
1910–14	8,403	868	1,287	1,644	3,474	1,130
1915–19	2,490	757	370	265	829	269
1920–24	6,718	1,130	1,032	1,042	3,031	483
1925–29	11,046	1,806	1,772	2,378	3,863	1,227
1930–34	7,528	994	1,160	1,502	2,736	1,136
1935–39	9,422	1,325	1,592	3,283	2,293	929
1940–44	8,344	804	1,282	2,062	2,976	1,220
1945–49	13,891	1,318	3,046	3,027	4,340	2,160
1950–54	14,236	1,318	2,760	2,336	5,123	2,699
1955	15,427	1,515	2,818	3,054	5,504	2,536

Source: See Tables XI and XIV.

and capital resources, and has been one of the main limiting factors with respect to the growth in industrial production and the gross product as a whole. This shortage of basic social capital in transport and electricity has been accompanied by significant under-utilization of capital in some sectors of industry and agriculture due, in part, to the shortages of basic social capital.

8. *Capital formation, fixed reproducible capital, and economic growth in Colombia, 1925–53*

The study of the economic development of Colombia, in the period 1925–53, including new, homogeneous, detailed quantum

estimates of the gross product, investment, and fixed reproducible capital, by economic sector, and by type of capital good, also demonstrates that the process of economic growth signifies a broad improvement in the efficiency, productivity, and utilization of investment and capital, in addition to man-power. The case of Colombia holds special interest, because it represents an economy expanding from a gross product *per capita* level of approximately $100 in 1925 to $300 in 1953; in the case of Argentina, the gross product *per capita* rose from approximately $330 in 1900 to almost $600 in 1956.[1]

In the period 1925–53 Colombia experienced an annual rate of growth of 2 per cent in the *per capita* gross product. This reflected a significant process of economic development and industrialization, including changes in the economic structure distribution of production, labour force, investment, and productive capacity, which was accompanied by a persistent improvement in the product–capital ratio. In 1925 production capacity was mainly confined to agricultural improvements, housing, and government administrative and social services, which represented 84 per cent of the total stock of fixed reproducible capital. In the same year the stock of capital in manufacturing, mining, transport, and electricity comprised only 16 per cent of total productive capacity. From then to 1953 the stock of capital in the economy as a whole doubled, but that corresponding to the first group of sectors mentioned increased by only 70 per cent, while that in the other sectors increased by three-fold. In this way the stock of capital in agriculture, housing, and government administrative and social services declined in relative importance, from 84 to 69 per cent, in comparison with that in the economy as a whole. This represents not only a quantitative change but also an important qualitative change in the composition of fixed reproducible capital, with the increase in the relative importance of those sectors which represent a higher level of technology.

These important modifications in the distribution of the stock of capital by economic activities were the result of divergent

[1] It should be noted that the conversion of Latin American gross product, investment, and fixed reproducible capital series from national currencies, expressed in prices of 1950, to U.S. dollars, expressed in prices of 1950, has been made on the basis of purchasing-power parity rates of exchange, based on pre-war, pre-exchange-control era, exchanges. For a discussion of the implications of this method, see Part III-B of this paper, 'Problem of International Comparison of Investment and Capital'.

trends in the investment rate for the various economic sectors. While the average overall investment rate stood at 26·1 per cent in the period 1925–29, at 16·1 per cent in the years 1930–44, and at 19·9 per cent in the period 1945–53, the investment rate for agriculture was barely 13·4, 12·8, and 12·3 per cent in each of the periods mentioned, respectively. So low a rate of gross fixed investment did no more than allow agriculture's stock of capital to be replaced and maintained, and, at the most, an exceedingly slow rate of increase to be achieved.

The reverse took place in the manufacturing, mining, transport, and energy sectors, where the investment coefficient was very high, and a substantial increase in the stock of capital of these activities thus became possible.

In the case of industry (manufacturing, mining, and construction), the investment rate attained the high level of 48 per cent in the period 1925–29. During the 1930s and the war years industrial investment was severely affected, first by the reduced capacity to import and then by the restriction of maritime transport and the difficulties of purchasing capital goods from the more highly developed countries. The investment rate underwent a considerable decline, falling to as low as 13 per cent, in this period. In the post-war years the investment rate in industry recovered, attaining an average of 24 per cent, whereby the stock of capital in industry more than doubled. This high industrial investment coefficient was vital to the rapid progress made by Colombia's economy.

In comparison with the sector just analysed, transport and energy investment attained substantially higher investment rates on account of the heavy public investment in these branches. During the period 1925–44 more than two-thirds of total investment in transport – including roads, railways, ports, oil-pipes, airports, and also rolling stock and railway equipment – were financed by the Government. During the post-war period, this outlay amounted to more than half the investment in the sectors mentioned, and represented more than 40 per cent of total public investment during the post-war period. Public investment in electric-power installations, and in other services, has also assumed considerable dimensions in recent years.

Public investment has played an important role in the economic development of Colombia, both in the provision of basic social capital, as well as an element of compensatory economic

policy, increasing in relative importance in periods of economic contraction, and declining in relative importance in periods of economic expansion.

Fluctuations in export earnings and the terms of trade, and their effect on the import capacity, have also had a considerable incidence on the level and composition of investment and capital, by economic sectors, as well as by type of capital good. This is due to the low level of domestic production of productive machinery and equipment, whose supply depends mainly on imports.

This situation affects the different economic sectors in different ways. In the case of agriculture, for example, less than one-fifth of total investment comprises machinery and equipment, while the greater part consists of direct use of man-power in land clearing, maintenance, and improvement, as well as for the establishment of plantations and perennial crops. In the case of the manufacturing sector, on the contrary, the situation is quite different, since productive machinery and equipment represents a substantial part of all investment. In these circumstances the great sensitivity of imports of productive machinery and equipment to fluctuations in the import capacity has had powerful influence on the variation of the rate of investment in the industrial sector.

In addition, the proportion of machinery and equipment in total investment has a determining influence on the degree of technological advance which that investment represents, and also influences the product–capital ratio. During the years 1925–29 the proportion of productive machinery and equipment in total fixed domestic investment reached 36 per cent; afterwards, due to the contraction in the capacity to import, the proportion fell to 22 per cent in the period 1930–38 and to only 17 per cent in the years 1939–45. This accentuated decline explains, in good measure, apart from the saving and investment capacity of the country, the fall in the overall investment rate from 26 per cent in 1925–29 to 16 per cent in the years 1930–44. The substantial improvement in the import capacity in the post-war years favoured an increase in the proportion of machinery and equipment in total investment, which rose to 35 per cent in the years 1946–53.

A close parallel may be observed between the variations in the proportion mentioned and the economic sector distribution of

investment (see tables which follow). Investment in machinery and equipment for the manufacturing sector represented approximately 15 per cent of total investment in the periods 1925–29 and 1946–53, and only 9 and 7 per cent, respectively, in the periods 1930–38 and 1939–45. Similarly, in the case of transport, investment in rolling stock comprised 8 per cent of total investment for the economy as a whole in the period 1925–29, and 9 per cent in the years 1946–53, while in the intermediate periods the proportion fell to 4 per cent.

As might be expected, these tendencies had an important effect on the composition of the stock of capital. The modifications in the stock of capital which took place in the period 1925–53 represent not only a change in economic structure but also basic qualitative differences.

The proportion of productive machinery and equipment in the total stock of capital in 1925 was only 13·2 per cent. After rising to 16·4 per cent in 1929, the incidence of the curtailment of the capacity to import resulted in a decline to 15·9 per cent in 1938 and 14·3 per cent in 1945. In the post-war period the proportion rose rapidly, so that in 1953 the share of productive machinery and equipment represented 19·5 per cent of the total stock of capital.

The role of industrial development may be clearly appreciated in a comparison of the share of capital in productive machinery and equipment represented by industry with that in the economy as a whole. This share rose from 5·6 per cent in 1925 to 8·7 per cent in 1953.

This expanding importance of investment in machinery and equipment, with respect to that in construction and improvements, has been an important element in obtaining an improved utilization and productivity of investment and capital resources.

Changes in the composition of production, labour force, and capital by economic activity have signified a broad improvement in the efficiency and utilization of productive resources. The expanding productivity of labour is reflected in the increase in the gross product per worker and that of capital in persistent improvement in the product–capital ratio. In addition, the level of capital per worker is one of the basic determining factors in the level of the gross product per worker.

While the principal element in the long-term increase in the productivity of the Colombian economy has been the relative

transfer of resources of man-power and capital to activities representing a more advanced technology and higher level of productivity, this has not been all. To this must be added the improvement – in some cases substantial – in labour and capital productivity within each economic activity sector. These improvements, in the case of capital productivity, derive from economies of scale arising with the expansion of the market, fuller degree of utilization, and a greater efficiency of new capital.

9. *Investment priority: case of the Cauca Valley Authority of Colombia*

In 1955 and 1956 David Lillienthal, former Director of the Tennessee Valley Authority in the United States and the International Bank, participated in the creation of the Cauca Valley Authority, a regional development body set up by several of the departments (provinces) of Colombia for the purpose of organizing a gigantic hydro-electric and irrigation development. In supporting the work of the Authority, Lillienthal had in mind the role of the Tennessee Valley Authority in spurring the economic development of the south-east region of the United States. Upon close examination, however, it soon became apparent that the cases of the Cauca Valley and the Tennessee Valley were quite different, that the Cauca Valley project would have represented a serious diversion of public investment resources from higher investment priority projects and, subsequently, the Cauca Valley Authority closed shop.

Large public investment in the Tennessee Valley, especially in the 1930s, had served as an important investment outlet in a country suffering in the throes of a severe business cycle characterized by a contraction in private investment, which adversely affected total demand and employment. The TVA project was one of a large number of public-works projects undertaken with the primary purpose of stimulating the economy, by offsetting the fall in private investment and providing employment. The TVA project was also undertaken in one of the most economically backward and under-developed regions of the United States. Subsequently, this large investment in basic social capital, with its sizeable energy and water resources, made possible the expansion of war production through the establishment of a broad range of manufacturing enterprises and, thereby,

TABLE XXII

Colombia: Growth and Composition of the Production of Goods and Services, 1925–53

	Composition of Gross Product by Economic Activity			Annual Rate of Growth	
	1925	1945	1953	1925–53	1945–53
Total	100·0	100·0	100·0	4·6	5·9
Agriculture	58·8	47·0	36·9	2·9	2·7
Mining	1·5	3·7	3·7	8·1	5·7
Manufacturing	7·6	13·4	17·2	7·7	9·2
Artisan industry	2·9	3·1	3·8	5·6	8·4
Construction	2·6	6·1	4·8	7·0	2·7
Transport	2·3	4·2	7·4	9·1	13·7
Energy, communications, and public services	0·4	0·7	1·2	8·7	12·7
Government	5·7	5·5	6·9	5·4	8·9
Commerce, finance, and services	8·7	10·2	12·9	6·1	9·0
Rental income	9·5	6·1	5·2	2·3	3·8

Source: Economic Development of Colombia, United Nations, *op. cit.*

TABLE XXIII

Colombia: Population Growth and Distribution, by Economic Activity

	Percentage Distribution			Annual Rate of Growth	
	1925	1945	1953	1925–53	1945–53
Total population	100·0	100·0	100·0	2·1	2·2
Active population	37·2	35·9	34·0	1·6	1·5
Inactive population	62·8	64·1	66·0	2·3	2·6
Urban population	23·2	34·0	42·7	4·4	5·2
Rural population	76·8	66·0	57·3	1·1	0·4
Active population	100·0	100·0	100·0	1·6	1·5
Agriculture	68·5	59·9	53·8	1·4	1·7
Mining	1·6	2·1	2·0	2·5	0·6
(a) Mining proper	0·4	0·5	0·5	0·3	—
(b) Artisan mining	1·2	1·6	1·5	2·5	0·6
Manufacturing	3·4	5·2	6·4	4·1	4·2
Artisan industry	7·9	7·3	8·5	2·1	3·5
Construction	1·8	2·7	3·6	4·3	5·1
Transport, communications, and energy	16·8	2·5	3·2		4·9
Commerce and finances		5·8	6·4		2·8
Government		2·4	3·7		7·2
Services		12·1	12·4		1·8

Source: See Table XXII.

significantly changed the economic structure of the region, as well as the productivity and efficiency of utilization of manpower resources.

Cauca Valley, on the other hand, is one of the most advanced and most rapidly developing regions of Colombia, combining a

TABLE XXIV

Colombia: Stock of Capital and Investment Rate by Economic Activity

	Stock of Capital (Millions of pesos at 1950 prices)			Investment Rate	
	1925	1945	1953	1925–29	1945–53
Total	10,553	16,776	22,262	26·1	19·9
Agriculture	4,287	7,008	7,924	13·4	12·3
Mining	206	360	483	24·3	10·0
Industry	845	1,445	3,183	48·1	23·8
Transport	620	1,748	2,723	321·2	61·5
Energy	[1]	208	424	609·1	199·4
Housing	1,823	2,624	3,521	18·0	45·1
Services	2,762	3,383	4,004	7·6	10·5

Source: See Table XXII.

[1] Not available.

TABLE XXV

Colombia: Participation of Public Investment in Total Investment, by Economic Activity

(Percentages)

	1925–29	1930–38	1939–44	1945–53
Total	29·4	27·1	36·4	21·9
Agriculture	0·3	3·1	25·5	13·5
Industry	—	—	4·6	7·1
Transport	74·9	77·9	82·2	50·9
Energy	—	0·6	9·0	52·7
Others	32·6	44·9	33·4	21·7

Source: See Table XXII.

booming manufacturing and distribution centre (Cali), a rich coffee- and tropical-fruit-growing region, and a potentially rich coal-mining area. Expansion of energy facilities, the development of coal-mining, the improvement of transportation facilities (both road, rail, and air), had already been programmed by the national government planning council, in projects which equated needs and priorities for the country as a whole with

TABLE XXVI

Colombia: Composition of Gross Fixed Investment, by Type of Investment and Activity

(Annual averages; millions of pesos at 1950 prices)

	1925–29	1930–38	1939–44	1945–53
Gross fixed investment	680	532	730	1,236
Machinery and equipment	247	117	118	427
Agriculture	22	15	12	23
Mining	20	14	18	24
Industry	103	49	50	181
Transports	57	22	25	112
Communications and energy	23	8	3	12
Services	22	9	11	76
Construction of buildings	83	87	169	298
Urban housing	38	51	112	156
Rural housing	2	2	4	6
Factories	17	5	12	81
Offices and commerce	2	3	10	18
Other	24	27	30	35
Other constructions and improvements	349	328	443	511
Agriculture	150	184	247	273
Transports	160	73	107	110
Other	39	71	89	128

Source: See Table XXII.

TABLE XXVII

Colombia: Stock of Capital, by Type of Capital and by Activity, 1925–53

(Millions of pesos at 1950 prices)

	1925	1929	1938	1945	1953
Stock of capital	10,553	12,185	14,093	16,776	22,262
Cattle	1,609	1,760	2,205	2,833	3,076
Machinery and equipment	1,384	1,996	2,232	2,393	4,335
Agriculture	104	129	110	92	144
Mining	154	199	238	270	362
Manufacturing	590	880	935	999	1,926
Transport	122	330	375	421	1,094
Communications and energy	—	—	96	104	212
Services	414	459	478	507	596
Constructions and improvements	7,560	8,429	9,656	11,550	14,851
Agriculture	2,574	2,777	3,351	4,083	4,704
Mining	52	66	80	90	121
Manufacturing	255	313	313	446	1,257
Transport	498	765	1,016	1,327	1,629
Communications and energy	—	—	96	104	212
Urban housing	1,833	1,899	2,084	2,624	3,521
Services	2,348	2,609	2,716	2,876	3,407

Source: See Table XXII.

available resources for investment, and in the light of growth in consumer demand, export demand, and total investment requirements. On the basis of these criteria, it was clear that the Cauca Valley Project would have introduced a great imbalance in the absorption of investment resources, with respect to overall needs for energy, and with respect to a volume of agricultural production out of proportion with foreseeable demand. With respect to public investment resources of the national government, it became a question of either rejecting the request of the Cauca Valley Authority for important resources or shelving the projected expansion of basic iron and steel production facilities of the Paz del Rio Iron and Steel Company, an autonomous,

TABLE XXVIII

Colombia: Gross Product and Fixed Reproducible Capital per Worker and the Product–Capital Ratio, by Economic Activity, 1925, 1945, and 1953

Gross Product per Worker (pesos at 1950 prices)	Total	Agriculture	Mining	Industry	Artisan Industry	Transport, Communications, and Services	Other Services
1925	874	750	800	1,930	325	..	..
1945	1,347	1,055	2,390	3,489	581	2,678	1,628
1953	1,882	1,293	3,575	5,057	842	5,061	2,141
Stock of capital per worker (pesos at 1950 prices):							
1925	4,213	2,497	5,150	2,986	..	..	..
1945	4,600	3,206	4,675	3,190	..	21,733	7,143
1953	5,406	3,577	6,038	5,201	..	23,841	6,974
Product–capital ratio:							
1925	0·21	0·30	0·16	0·27	..	0·08 [1]	0·13 [2]
1945	0·29	0·33	0·51	0·56	..	0·12 [1]	0·23 [2]
1953	0·35	0·36	0·59	0·51	..	0·21 [1]	0·30 [2]

Source: See Table XXII.

[1] Transport only.

[2] Includes communications and public services, commerce, finances, housing, and other services.

government-financed, steel-producing enterprise. On the basis of criteria of optimum use of investment and capital resources, based on overall analysis of the structure of investment and fixed reproducible capital, in part, the national government denied the Cauca Valley Authority request for investment resources.

III. PROBLEMS OF DATA, CONCEPT, AND METHOD IN THE ESTIMATION OF THE STOCK OF FIXED REPRODUCIBLE CAPITAL IN LATIN AMERICA

In the preceding section of this paper attention was given to the insight on the processes and problems of economic growth

in Latin America obtained through the analysis of newly developed information on fixed reproducible capital in Latin America. The basic characteristic of 'under-developedness' as signifying inefficient use of investment and capital resources, as well as man-power resources was indicated. The long-term trend of increase in the productivity of capital, deriving principally from the change in economic structure, the heart of the process of economic development and industrialization, was demonstrated.

The role of increased utilization of basic social capital as well as industrial production capacity, and economies of scale deriving from growth and expansion of markets was also noted. The effect of external terms of trade and export demand on imports of capital goods and, consequently, the level and composition of investment and capital was shown, and reference was made to the changing role of foreign investment.

The effect of the rate of growth on the relative importance of depreciation in the investment effort was seen. The incidence of internal relative prices on the saving and investment capacity of the individual economic sectors was mentioned. Problems of inefficient utilization of land resources were presented. The growing importance of adequate and appropriate use of public investment and capital resources was treated. A hypothesis explaining the differences in the level of the product–capital ratio in a number of Latin American countries was discussed. The present critical shortage of basic social capital in transport and energy, the lag in export growth behind import requirements, and the potential contribution of a Latin American multilateral payments system to the capacity to import, the ability to absorb foreign capital, and the problem of economy of scale and degree of utilization of productive capacity were stated.

The purpose of the present section of this paper is to present and discuss problems of data, concept, and method in the estimation of the stock of fixed reproducible capital in Latin America, based on the work experience of the Economic Commission for Latin America in this field.

1. *Problems of data concept and method*

The research work experience of the Economic Commission for Latin America in the analysis of economic growth, capital formation, and wealth has favoured the basic concept and

methods of Raymond Goldsmith's perpetual-inventory system, and has also followed, in general, the concepts and estimating criteria recommended by Edward Denison. Our work in the estimation of capital is based on the accumulation of depreciated investment, in constant prices, with the use of Census bench-mark data most often as a point of reference and not as an estimating bench-mark. The preference for these concepts and methods is related to the problems of data as well as the analytical purpose in mind, including the following factors:

(1) the relative abundance of reliable data availabilities for estimating investment in constant prices, by type of good and by economic sector;
(2) the scarcity, incompleteness, and unreliability of census data, as well as its susceptibility to broad variation in reporting original cost and replacement cost, on account of the general inflation of prices;
(3) the primary interest in analysing investment and capital data for implications with respect to the efficiency, degree of utilization, and productivity in the channelling of investment resources;
(4) the convenience of carrying out basic research in investment and capital as an integral part of national income work.

The following comments may be made with respect to these factors which have favoured our preference for the concepts and methods of Raymond Goldsmith's perpetual-inventory method and Edward Denison's recommendation for a system based integrally on the accumulation of depreciated investments which are derived from national income estimation.

(a) *Relative abundance of reliable data availabilities for estimating investment in constant prices, by type of good, and by economic sector*

Data availabilities for the estimation of investment and capital are such that these statistics could be among the best and most reliable statistics in the region.[1] Investment in Latin America,

[1] *Economic Survey of Latin America 1951–52*, pp. 30–5, 38–9, 48, 53, 64, 69, 76, United Nations Economic Commission for Latin America, Santiago, Chile, 1953; *The Role of Economic Statistics in the Formulation of Economic Development Programs*, paper presented at the III Inter-American Statistical Conference, Quitandinha, Petropolis, Brazil, June 1955.

even in such rapidly industrializing countries as Argentine and Brazil, is based in large part on imports of capital goods. Trade statistics, including quantum estimates, classified by industry of origin, as well as by final destination for consumption, investment, or intermediate product use, as well developed and available for long time spans. Production statistics, especially capital goods production comprising a relatively new activity, are readily available. Quantum residential construction data are also generally available, as is the case with non-residential building. In most countries data on government income and expenditures permits the division of expenditure accounts into components of current-account expenditures for goods and services, transfer payments and financial services, and investment expenditures.[1]

In addition, quantum data on specific types of public investment is frequently available. It has also been possible to estimate agricultural improvements.[2]

In addition, in some countries, especially those in which the greatest advances in the field of income and wealth have been made, the estimation of investment and capital is carried on integrally as part of the national-income estimation work.

We have already published detailed estimates of gross investment and fixed reproducible capital, by type of good and by economic sector, in constant prices, for Colombia for the period 1925–53.[3] The series on capital is integrally based on the series on gross investment, with census and census-type estimates used as points of reference, and in some cases as bench-marks – housing, electric power stations, railroads, shipping. Similar, more detailed and more comprehensive, estimates for Argentina have been prepared for the period 1900–55. Long-term series on gross investment have been prepared for all important countries of the region, with most series extending from 1925.

[1] See *Economic Survey for Latin America, 1955*, Part II, United Nations Economic Commission for Latin America, Santiago, Chile, 1956.

[2] See *Analisis y Proyecciones del Desarrollo Económico; III, El Desarrollo Económico de Colombia*, pp. 222–227, 376–381, United Nations Economic Commission for Latin America, Santiago, Chile, 1956.
Selective Expansion of Agricultural Production in Latin America and its Relationship to Economic Development, United Nations Economic Commission for Latin America, Santiago, Chile, 1955.

[3] *Economic Development of Colombia, op. cit.*

(b) *The scarcity, incompleteness, and unreliability of census data, as well as its susceptibility to broad variation in reporting original cost and replacement cost, on account of the general inflation of prices*

While census methods have improved considerably in Latin America, especially in the last decade, census data are still relatively scarce, covers only a part of the universe of economic sectors, and generally omits an important part of the universe of manufacturing activity – namely, handicraft, artisan, and small-scale industry, in establishments of less than five workers. Even where censuses report on the stock of equipment, in quantity terms, or by value assets, there is generally little or no information on average age, or condition and degree of maintenance. Exceptions to this, of course, apply mainly to important capital goods, such as improved agricultural land, tractors, textile spindles, petroleum-refining capacity, basic iron and steel capacity, motors and generators, passenger cars, trucks, locomotives and railroad rolling stock, ships, aeroplanes, housing, and buildings; but this is not equivalent to a measure of the universe, in contrast to data on production and imports of capital goods, and construction and improvements – main elements in the flow of goods estimation of gross investment. Census data on the value of assets and buildings also generally does not separate the value of land from the value of construction. Most important of all, however, is the effect of the general price inflation in Latin American countries in the last twenty years on the reliability of census data on the value of capital assets. Whether census questionnaires call for the reporting of original cost or replacement cost, it is very difficult to evaluate the significance of the resulting data without knowing the age of equipment, in economies in which prices have increased ten-fold or more in the last twenty years, where obsolescence covers a longer time span, major rebuilding and repairing of equipment is the general practice, and where the sharp susceptibility of the composition and level of investment to fluctuations in import capacity make for a discontinuous investment process.

Nevertheless, when census or census-type data are available or can be developed, they are clearly useful and of vital importance as an independent check on the validity of estimates of capital stock, and as a point of reference and element in the estimation

process. In the last analysis it is incumbent on the estimator to reconcile and explain the difference between an estimate of fixed reproducible capital, based on the accumulation of depreciated investment, with a census figure; otherwise there is no assurance that the estimate reflects reality.

(c) *The primary interest in analysing investment and capital data for implications with respect to the efficiency, degree of utilization, and productivity in the channelling of investment resources*

As was indicated in the preceding section of this paper, a basic characteristic of 'under-developedness' signifies an inefficient use of investment and capital resources, and that the process of development itself involves an improvement in the efficiency, utilization, and productivity of investment and capital resources. It was noted that the level of efficiency and rate of improvement in the use of these resources was subject to the effects of export earnings and the terms of trade on capital-goods imports, the changing role of foreign investment, increased degree of utilization and economies of scale deriving from market growth, the impact of the rate of growth on the relative burden of depreciation, the incidence of internal relative prices on the saving and investment capacity of economic sectors, the efficiency in utilization of land resources, the role of public investment. Two basic factors limiting the rate of growth of Latin American countries at the present moment were discussed: the critical shortage of basic social capital in energy and transport and the lag in export growth behind import requirements.

It may be readily seen, therefore, that one of the primary interests in analysing investment and capital data lies in its usefulness in evaluating quantitatively the efficiency, utilization, and productivity of investment and capital resources, and the contributing factors involved. This is important not only in the analysis of long-term growth, as well as short-term problems of stagnation, deflation, disequilibrium, and distortion, but is also a principle basis for projecting short-term and long-term economic policy – especially investment policy.

For this purpose, the main interest is the analysis, in constant prices, of alternative resource input and the resultant, or expectant, alternative resource output. For this purpose, a useful operational concept of fixed reproducible capital is the one based

on accumulation of depreciated investment, without adjustment for quality change. Improved quality and efficiency of capital goods, and the consequent contribution to productivity, is precisely one of the important elements to be revealed.

(d) *The convenience of carrying out basic research in investment and capital as an integral part of national income work*

The analysis of the process, problems, and perspectives of economic growth is best carried out on the basis of homogeneous, internally consistent, basic macro-economic statistics, including the gross product, by industry of origin and destination, and by consumption and investment composition, together with estimates of fixed reproducible capital based on the accumulation of depreciated investment data. This tends to ensure the validity and reliability of analysis of the growth in output as well as the growth in capital. The process of estimation itself thereby provides a useful check on the validity and reliability of the series.

2. *Problem of international comparison of investment and capital*

Latin America contains some 180 million people divided into twenty countries. The problem of inadequate size of market for economies of scale, despite the impressive rate of growth in the last quarter-century, is already pressing and limiting the economic growth of many countries of the region. The problems and possibilities of the development of a regional market are the subject of active study. These considerations highlight the urgent need for an adequately comparable body of statistics on the gross product, investment, and capital, since any consideration of the growth and structure of a regional market, its investment requirements, and trade potential must be made on the basis of a common denominator of the purchasing power of national currencies in a base year. In addition, the relative importance of comparative investment efforts is insufficiently known.

Available methods of comparing levels of gross product and investment, as well as the rate of investment, have serious shortcomings, however. The general use of exchange controls with multiple exchange rates, together with the broad inflation in prices, and their effect on relative costs and relative prices, makes the use of exchange rates, as a comparison factor, very

inadequate, even when exchange rates are adjusted on the basis of parity criteria.[1]

Two examples touching two important aspects of the problem may be shown to illustrate the nature of the matter. Official statistics indicate a very high investment rate in Argentina in the last twenty years, and a very low investment rate for Chile. When, however, adjustments are made to express the Argentine investment rate in terms of 1946 prices, for example, in place of 1950 prices as shown in the accompanying table, the Argentine

Argentina: Gross Domestic Investment as a Percentage of Gross Domestic Product, 1935–45

Year	Calculated in prices of:	
	1950	1946
1935	21·0	16·2
36	20·4	15·7
37	23·3	18·0
38	29·3	22·6
39	22·3	17·2
1940	19·5	15·1
41	20·6	15·9
42	17·6	13·6
43	16·6	12·8
44	15·9	12·3
1945	14·8	11·4
46	21·8	16·8
47	31·7	24·5
48	30·7	23·7
49	22·5	17·4
1950	21·8	16·8
51	24·8	19·1
52	24·1	18·6
53	18·3	14·1
1954	21·3	16·4

Source: Producto e Ingreso de la República Argentina, en el periodo 1935–54, República Argentina, Poder Ejecutivo Nacional, Buenos Aires, 1955, pp. 125, 133, 136, 137, and 157.

investment rate is lower by one-fifth. This reflects the fact that the price of investment goods rose much more rapidly than the general level of prices in the early post-war years, a result of the great scarcity of capital goods and the existence of an active internal market for capital goods. Since 1950, with some advance towards the normalization of supply in relation to demand, the disparity in prices has been reduced.

[1] See *Economic Survey of Latin America, 1951–52, op. cit.*, p. 33.

In the case of Chile the investment rate, as reported in official statistics, seriously understates the real investment of the country, and makes difficult the understanding of how the country could have experienced a 55 per cent increase in the real gross product in the twelve-year period 1940–52. This understatement of investment derives, in part, from the valuation of imported capital goods at a subsidized exchange rate, which, in 1950, in effect valued imported capital goods at approximately one-third of their purchasing-power parity value. If an indicated adjustment is made to value of imported capital goods, as is shown in the accompanying table, the resultant investment rate is substantially higher in the post-war years (during the war, Chile had been cut off from normal sources of supply of imported capital goods, and for this period, and consequently, both methods of estimation yield similar results for the war years).

Chile: Gross Domestic Investment as a Percentage of Gross Domestic Product, 1940–52

(Prices of 1950)

	Based on Official *statistics* [1]	As adjusted by ECLA [2]
	(Annual averages)	
1940–42 . . .	9·8	9·9
1943–45 . . .	9·3	9·3
1946–48 . . .	10·9	12·5
1949–52 . . .	10·3	13·2

[1] *Cuentas Nacionales de Chile, 1940–54*, Corporación de Fomento de Chile, 1956, pp. 15 and 17.

[2] *Economic Survey of Latin America, 1954*, United Nations Economic Commission for Latin America, Santiago, Chile, 1955, pp. 24 and 26.

To these examples of problems of comparison arising from price inflation and exchange controls may be added the indicated serious underestimation of the level of *per capita* gross product, investment, and capital in Latin American countries. The conversion of Latin American gross product, investment, and fixed reproducible capital series from national currencies, expressed in prices of 1950, to U.S. dollars, expressed in prices of 1950 has been made on the basis of purchasing-power parity rates of exchange, based on pre-war, pre-exchange-control-era exchange rates. It is recognized that this method probably understates the level of *per capita* gross product, investment, and capital by one-

fourth to one-third. As is demonstrated in the study of Gilbert and Kravis,[1] the use of United States prices for the valuation of consumption and investment for lesser-developed countries, in which food consumption has a greater relative importance, and in which relative prices for food are low, has the effect of raising the level of the *per capita* gross product by as much as one-third, in comparison with estimates derived by the use of exchange rates. In the case of Latin American countries, with one-third to one-half of total consumption expenditures devoted to food, in comparison with less than one-fourth for the United States, and with low relative prices for food, it is estimated that the use of parity exchange rates to express national currencies in dollars has the effect of substantially understating Latin American *per capita* product in comparison with that for the United States.

The effects of price inflation, exchange controls, and of a pattern of internal relative prices different from more developed countries on international comparative analyses indicate the urgent need to renew efforts to develop an adequate measure of the purchasing power of national currencies, by main types of production and products. National product, investment, and capital should be estimated on the basis of a standardized method of accounts, expressing the parameters in terms of national currency, as well as the currency of a base country of comparison. Care must be taken in the selection of a base year to minimize distortions arising from the selection of 'problem' years. It is obvious that no serious evaluation of requirements and demand for capital in the region as a whole, or for groups of countries in the region, can be made until these problems are adequately solved.

3. *Importance of adequately measuring land improvements*

Fixed reproducible capital in agriculture, especially in land improvements, continues to represent an important share of all fixed reproducible investment in Latin America. In addition, serious problems of inefficient use of land resources have arisen in a number of Latin American countries in recent years. Examples of inefficient land use have derived from faulty application of land-reform programmes, internal price policy, labour shortages insufficiently offset by farm mechanization, and mis-

[1] *An International Comparison of National Products and the Purchasing Power of Currencies*, Milton Gilbert and Irving B. Kravis, Paris, OEEC, 1954.

guided trade and domestic industry protection policy. The serious consequences have included the critical decline in export earnings and shortages of food for the domestic population. These examples highlight the need and importance of adequately measuring land improvements, for which annual depreciated investment data are not generally available. The method used in ECLA studies is based on Census-type estimates of the fixed reproducible capital in land in a base year, as well as in one or more historical years.[1] In effect, the depreciated base-year cost of land clearing and preparation, by type of use, the construction of irrigation and drainage works, fencing, rural housing, farm buildings and other installations, buildings and equipment for the primary preparation of agricultural products, perennial crops, permanent plantations, and cultivated forests is estimated, always excluding the original value of the land. As in the case of machinery and equipment, no attempt is made to adjust for the 'quality' of the land – differences in quality, thereby, are reflected, along with other factors, in the product per unit of capital in land improvements. This is not to say there is no interest in a quantification of differences in quality. On the contrary, the studies referred to reveal that great pains have been taken to measure and describe the character of land resources. Since the main interest centres, however, in analysing changes in the efficiency, utilization, and productivity of land resources, as well the factors contributing to these changes, it is not desirable to adjust the depreciated, replacement value of land improvements for quality, even if this were operationally possible.

4. *Treatment of obsolescence and estimated useful life of fixed reproducible capital*

The effect of the world economic crisis of the 1930s and World War II was to severely reduce the flow of imported capital goods to many Latin American countries. This factor combined with the still small domestic production of productive machinery and equipment, and the substantial economic growth experienced by Latin American countries in the last quarter century, has resulted in a chronic shortage of productive machinery and equipment. In these circumstances the practice has been to continue to use productive machinery and equipment long beyond the usual useful life, through substantial repairing and rebuild-

[1] See especially *El Desarrollo Económico de Colombia, op. cit.*, pp. 376–384.

ing, and to continue to use old, inefficient equipment, made obsolescent by age and wear, as well as the development of improved and more efficient techniques. In addition to the incidence on productivity involved in continuing to use antiquated machinery and equipment, there arises the problem of measurement of useful life, as well as the treatment of substantial repairs and maintenance. While attempts have been made to adequately adjust for these phenomena,[1] this remains one of the important problems of concept and method.

5. Problem and importance of estimating inventories

While it has been possible to develop reliable series on gross fixed investment and fixed reproducible capital, this is not the case with inventories and inventory changes. There are virtually no comprehensive, reliable series on inventories and inventory changes. At most, published series are partial and cover main agricultural grains and inventories of corporations.

This is a serious shortcoming, since partial data tend to indicate that the rate of inventory turnover is substantially lower in underdeveloped countries than in developed countries.[2]

This need to maintain relatively larger stocks of inventories arises from the relative importance of imports in total goods availabilities, the effect of transportation time and distance, less-integrated supplier–user relationships, lesser-developed internal transport and distribution systems, and uncertainty with respect to foreign-exchange availabilities. Partial data suggest that the value of inventories may represent as much as one-fourth to one-third the value of fixed capital in underdeveloped countries in comparison to 10 per cent for the United States. This heavier inventory load represents an important capital cost whose magnitude may be said to seriously affect the rate of economic growth. For this reason, this remains an important area for future serious research and measurement.

IV. PRESENT STATUS OF WORK IN THE FIELD OF NATIONAL-WEALTH ESTIMATION AND ANALYSIS IN LATIN AMERICA

Following is a brief summary of the present status of research and analysis work in the field of national-wealth estimation in

[1] See *Fixed Reproducible Capital in Argentina, 1935–55*, Manuel Balboa and Alberto Fracchia, United Nations Economic Commission for Latin America, Santiago, Chile, August 1957, pp. 7–9.

[2] See *El Desarrollo Económico de Colombia, op. cit.*, pp. 121–123.

Latin America, together with an abbreviated roster of Latin American economists working in this field.

1. *ECLA's work on Latin America as a whole*

In 1952 and 1953 basic data and analyses were prepared for seven countries (in varying stages of quality and detail) in order to have a preliminary estimate for the region as a whole. The seven countries – Argentina, Brazil, Chile, Colombia, Cuba, Mexico, and Venezuela – account for approximately 90 per cent of the gross product and wealth of the region as a whole. By-products of this work have appeared in the following ECLA publications:

Economic Survey of Latin America, 1951–52, 1953, 1954, 1955, 1956, op. cit.
Analysis and Projections of Economic Development: I. An Introduction to the Technique of Programming, op. cit.
Selective Expansion of Agricultural Production in Latin America and Its Relationship to Economic Development, op. cit.

In 1954 and 1955 work on wealth estimates for Brazil and Colombia was substantially intensified, with significant improvement in detail and quality in connection with two major studies completed. It may be noted that, in connection with the study on Colombia, the wealth concept was refined to include careful estimates of land improvements, at depreciated replacement cost.

Economic Development of Brazil, op. cit.
Economic Development of Colombia, op. cit.

In 1956 and 1957 intensive work was carried on in the preparation of estimates of wealth for Argentina, Bolivia, Mexico, and Peru, in connection with major studies undertaken by separate teams in these countries.

Economic Development of Argentina, op. cit.
Economic Development of Bolivia, op. cit.
External Disequilibrium and the Economic Development of Latin America: The Case of Mexico, op. cit.
Economic Development of Peru (in preparation), United Nations Economic Commission for Latin America, Santiago, Chile.

In the remainder of 1957 and 1958 attention will be given to the refinement and extension of wealth estimates for the region as a whole, in connection with the study of the growth perspective of the region, trade perspectives, and capital requirements.

ECLA economists who have been working in this field include, in addition to the author: Manuel Balboa, Celso Furtado, Juan Noyola, Raul Prebisch, Hugo Trivelli, Victor Urquidi, Pedro Vuskovic, and Pierre Van der Meiren.

2. *Work in Argentina*

Alberto Fracchia, co-author, with Manuel Balboa, of *Fixed Reproducible Capital in Argentina, 1935–55, op. cit.*

Cesar Belaunde has prepared long-term estimates of capital formation, which are referred to in the *Economic Survey of Latin America, 1951–52, op. cit.*

3. *Work in Brazil*

Americo Barbosa, formerly with the Banco do Desenvolvimento Economico, prepared estimates used in *The Economic Development of Brazil, op. cit.*

4. *Work in Chile*

Ewald Hasche, of the Corporación de Fomento de la Producción, is author of the study referred to in *Economic Survey of Latin America, op. cit.* At the present time, new series are being prepared for the Chilean economy.

5. *Work in Colombia*

The ECLA group and its work benefited greatly from an earlier work prepared by *Jacques Torfs* and *Alberto Zuluaga* of the government economic programming council.

6. *Work in Cuba*

Regino Boti, Dean of the Economics School of the Universidad del Oriente, has made estimates of the wealth of Cuba.

7. *Work in Venezuela*

Bernardo Ferran has made some partial estimates of wealth of Venezuela.