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"The Role of Capital in Economic Development"
(Capítulo 5 de: "Economic Development for Latin America")

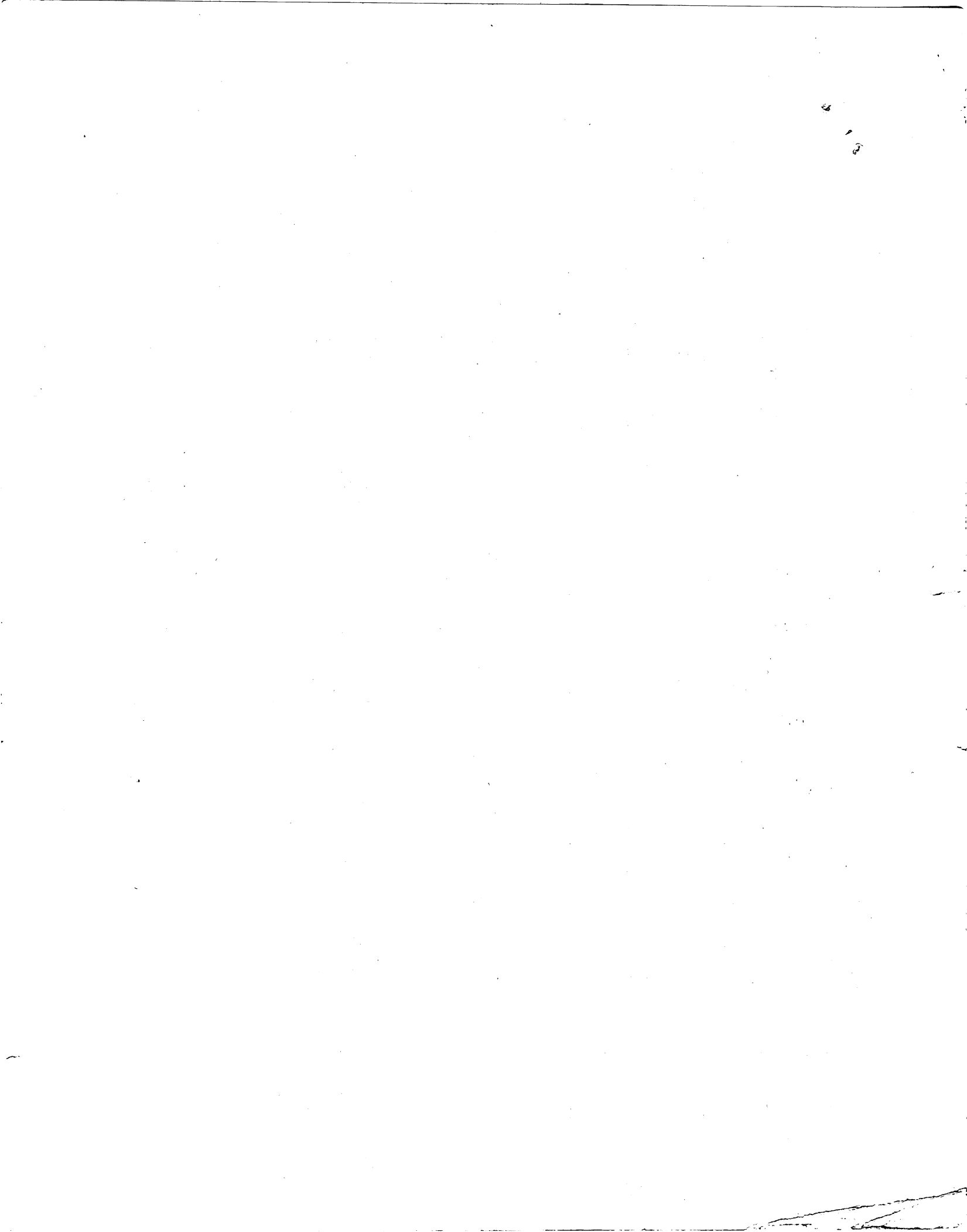
Edited by: Howard S. Ellis
Assisted by: Henry C. Wallich.

Mac Millan & Co Ltd.
New York. St. Martin's Press.

CURSO: DESARROLLO ECONOMICO

PROF : JORGE AHUMADA

Sólo para distribución interna



Chapter 5

THE ROLE OF CAPITAL IN ECONOMIC DEVELOPMENT¹

by

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1. Introduction

In this paper I propose to discuss principles only.

a) The Distinction between Development and Other Similar Concepts, in particular, Growth

The growth of a quantity is its increase. Growth of national per capita income is increase of national per capita income. The growth of an economy is generally characterized by growth of net national income per capita.²

Any economic system, for example a national economy, may experience growth either while its structure remains unaltered or while its structure changes. The development of an economy is its growth in conditions of changing structure. It is the transition from a structure with relatively low per capita productivity to a structure with relatively higher per capita productivity. An economy is fully developed when its structure is such that per capita productivity is as high as it can be with given national and world resources and given technical knowledge. In the contrary case we speak of an under-developed economy.

Thus, a poor economy does not necessarily mean an under-developed one. Nor is every economy under-developed which lags behind in growth. It is true that the problems of development cannot entirely be dissociated from problems of growth, because growth always implies some structural change.

1/ Translated from the French by Elizabeth Henderson.

2/ On this point see four papers by Francois Perroux: La Generalisation de la general theory, (Istanbul, 1950); Materiaux pour une analyse de la croissance économique, Cahiers de l' I.S.E.A., Series F, N° 1, 1955; Les Mesures des progres économiques et l'idée d'économie progressive', Paris, cahiers de l' I.S.E.A ., Series 1, N° 1, 1956.

But developed countries are capable of strong growth with little structural change, while under-developed countries are capable of even modest growth only by means of considerable structural change.

The distinction, which is much the same as Perroux's, enables us to advance two propositions. First, the problems of the development of under-developed economies are very different from those of the growth of developed ones; and second, low per capita income is a very inadequate standard of classification. Not only are the development problems of the Middle East profoundly different from those of Latin America, but even within Latin America the differences between the various countries' economic and social structures are such that we cannot really speak of under-development in all cases, notwithstanding the fact that all these countries are definitely back-ward in growth.

b) The Differing Roles of Capital in Economic Development and in Economic Growth.

First of all, what are we to understand by capital? Any definition of capital is arbitrary and must depend upon the purpose at hand. If we mean by development the transition to a more productive structure, we must define capital as everything which increases the productivity of society. Besides investment goods in the proper sense of the term, capital must therefore include also durable consumer goods, such as housing, as well as services apt to promote technical advance, such as education. However much I regret having to disagree with an authority such as Kuznets, I cannot include military investment in my definition of capital, because its relation to social productivity is too uncertain.¹

Second, are we to consider gross or net figures? It seems to me that since development is very often a matter of replacing existing equipment by better equipment, depreciation cannot be regarded as neutral. Depreciation policy is one of the aspects of the behaviour of firms and governments. For our purposes gross figures seem much more indicative than net ones.

¹ / On the concept of capital see Simon Kuznets, "Population income and Capital", in L.H Dupriez, ed., Economic Progress (Louvain, 1955); see also Kuznets, "International Differences in Capital Formation and Financing", National Bureau of Economic Research, Capital Formation and Economic Growth. (Princeton, 1955)

c) What is a structure?

For our purpose it will suffice to distinguish two concepts. In the perspective of the market, a structure is a set of proportions and relations capable of being represented, at least in part, by input-output tables. But important as these tables are, they are not enough for an analysis of development. The inequality of decision centres, their "integrating capacity" the effectiveness of their plans and periods of anticipation cannot be measured in quantitative flows. We shall have to say, then, that a structure is a system of constraints between specific decision centres.

To this specific concept of structure there corresponds a specific concept of capital, such as that which Lachmann has developed.¹ Capital is the use of non-specific services for the creation of specific producer goods. Capital is heterogeneous by nature.

Now if we have to apply a heterogeneous concept of capital to a heterogeneous concept of development, any a priori definition of the role of capital in economic development becomes impossible and the problem cannot be solved purely in terms of aggregate quantities. The structural changes characterizing development can be properly analysed only by considering the effects of each use of capital by each decision centre, or type of decision centre.

In this context I shall discuss in Section II the shortcomings of growth analysis in aggregate terms; in Section III, the specific use of capital in various sectors and inter-sectoral relations; and in Section IV, the conditions of the effect of capital on structural changes.

II. The Shortcomings Of Aggregate Analysis

The growth models with which we are familiar from the work of Harrod, Domar, and Hicks establish relations between the saving coefficient (domestic and imported saving income) and the capital coefficient (capital/output)²

¹ On the heterogeneity of capital see L. M. Lachmann, *Capital and Its Structure* (London 1956), p. 11; A. J. Youngson "The Disaggregation of Investment in the Study of Economic Growth", *Economic Journal*, June 1956.

² For a critical review of these models see Francois Perroux "The Quest for Stability; The Real Factors", in Douglas Hague, ed, *Stability and Progress in the World Economy* (London, 1958).

These models are useful enough for a short-period determination of the internal and external conditions of equilibrium growth, but they say nothing about changes in the coefficients, Yet structural change, that is, development, implies changes in these coefficients,. No distinctions can be made in this respect between so-called structural coefficients such as the average propensity to import, technical coefficients such as the capital -output ratio, and behavioural coefficients such as the average propensity to save. All the coefficients are affected by structural changes. Let us consider the capital coefficient. It might seem logical to argue that the capital -output ratio is initially low, capital being applied first where its productivity is highest, and that the ratio assumes higher values as development proceeds. This, it is often pointed out, agrees both with the marginal principle and, by satisfying the law of factor proportions, with the theory of international specialization. Nevertheless, it is in actual fact a very doubtful proposition.

We possess only a few series going back for any length of time and they give no very clear indications about long-term movements of the capital-output ratio in either direction.¹ In a United Nations study we find that the capital -output ratio has remained relatively constant in the United States, the effects of technical improvements having been offset by other effects. In Europe, the capital -output ratio seems to move in one direction or the other according to the choice of periods.²

From such few reliable figures as are available from countries in the early stages of development, it seems that the capital-output ratio depends upon the nature of the production which is the first to develop, which in

1 / See the figures furnished by S. Kuznets, Economic Progress, op.cit., p.46.

2 / In the United States the product-capital ratio, notwithstanding continual fluctuations over short periods, tends to remain constant, owing to factors of another order. This would appear to indicate that those effects of an improvement in technique which tend to increase the product-capital ratio have been offset by other having the opposite results: United Nations, Analyses and Projections of Economic Development I, An Introduction to the Technique of Programming, p. 7.

turn depends upon everything but the law of factor proportions. We need only look at the difference of the capital -output ratio in Venezuela ,Colombia and Brazil, according as initial development is in agriculture,mining, or manufacturing.

The average propensity to save depends upon the country's social structure and the size of its firms. It is not at all clear that the savings ratio increases with development. Personal saving in a subsistence economy is, as Yamey has shown, larger than used to be thought and it may occasionally shrink with development, either because of the disappearance of tertiary producers or local artisans, or as a result of the demonstration effect. Thus, in the United States the average propensity to save fell from 16.2 in the period 1889-98 to 10.2 in the period 1919-28.³

The applicability of growth models in terms of aggregate quantities to development problems is further limited by the interdependence of changes in the saving and capital coefficients. It is a fact that saving by firms is at least in part determined by the firms' own capital needs for re-equipment or market expansion.

For all these reasons we must disallow any long-term forecasts based on coefficients which are stable only in the short term. We cannot discuss structural change with the help of tools devised for the study of growth in conditions of unchanging structures. We need to consider not society as a whole ,but the action of the decision centres or groups of decision centres making up that society.

111. Development and Specific Capital

If the existence of non-communicating sectors is an essential feature of under - developed economies, we have to define these sectors. Input- out - put tables tend to define sectors in terms of frontiers between real flows .

¹ / W. Fellner , " The Capital -Output Ratio in Dynamic Economics", in Money Trade and Economic Growth , in Honour of J. H. Williams (New York, 1951) table on p. 131 ,calculated from Kuznets figures.

For our purposes it is more appropriate to consider the frontiers between sources of finance. One sector's saving finances that, and only that, sector's investment. We may speak of closed investment sectors, or sectoral investment autonomy.

Where such closed investment sectors exist, the economy as a whole is not integrated. We speak of an integrated economy when the plans of all its decision centres are subject to the same determinants and constraints. This, in Perroux's terminology, makes the plans compatible. From the point of view of decision centres an economy is non-integrated when the plans of each sector (group of decision centres) are determined by expectations regarding independent variables,

This can happen when each sector's saving is tailored to its own investment needs. In these circumstances the marginal productivity of capital applied to various uses can never be expected to become equal. Indeed, it is immediately obvious that the divergences in the average efficiency of capital are so great that they certainly imply differences in marginal efficiency as well. For instance, in 1954, North American capital invested in Latin America yielded 17 per cent. in the oil industry and only 6 per cent. in manufacturing industry.¹ The non-integration of closed investment sectors is, in our view, a characteristic structural feature of under-developed economies. This concept is wider than Boecke's or Myrdal's concept of dualism characterized by the failure of real flows to pass from a subsistence sector to a monetary sector.²

1/ Calculated from Tables 3 and 10, Samuel Pizer and Frederick Cutler, "Growth of Foreign Investments in the United States", Survey Of Current Business, August 1956.

2/ See, particularly, United Nations, Enlargement of the Exchange Economy in Tropical Africa; United Nations, The Scope and Structure of Monetary Economies in Tropical Africa; G. Myrdal, Development and Under-Development, National Bank of Egypt, Fiftieth Anniversary Commemoration Lectures (Cairo, 1956).

Unless sectoral investment autonomy is reduced, a less productive structure cannot be transformed into a more productive one. If the saving of a sector with low marginal efficiency of capital cannot move to a sector with higher efficiency, it will in some way find its way into consumption, speculation, or investment abroad. Growth will be checked, Thus there can be development only if an economy characterized by non-communicating investment sectors can be transformed into an integrated economy.

Three sectors may become the leading sectors of growth and development: export, agriculture, export industry, and domestic industry.

a) Export Agriculture.

Neo-classical tradition, the United Nations studies of tropical Africa and, one would think, common sense, all concur in looking to export agriculture for the development of very backward countries. At any rate, development hinged on export agriculture has two important advantages from the point of view here under discussion. First, it attracts foreign capital toward the public services necessary for export agriculture such as railways or ports. Second, it determines the progressive formation of domestic capital. The capital coefficient in agriculture is very variable, ranging from near zero in under-developed and overpopulated countries to a value somewhere in between that for heavy industry and that for many light industries in the United States.¹ Consequently, the "colonization" of subsistence agriculture by export agriculture is generally possible by means of investment in transport and education, and, above all, by means of some system of stabilizing agricultural incomes, the latter being rather difficult to achieve.

Most under-developed countries, and particularly those where more land is available, thus stand to gain from the impulse of export agriculture and should in any case expand it to the point where its marginal productivity equals that of other branches of production. Development founded on export agriculture, however, has the drawback that that sector's saving is highly specific. Not only is agricultural saving in search of productive use generally placed in agriculture itself, but indeed in the same branch of agricul

¹ / In the United States the capital-output ratio is 1.4 in agriculture, lying between that of heavy industry (petroleum: 4.3) and those of many light industries (sugar refining : 0.3) ; see W. Leontief, "Studies in the Structure of the American Economy (New York, 1953).

tural production whence it came in the first place. It follows that countries, such as Brazil, where cycles of production succeed each other, have known successive phases of investment and disinvestment in sugar, cotton, and coffee, without any considerable amount of these specific sectors' saving having found a new home elsewhere in the same country.¹

Furthermore, if agricultural saving looks for non-agricultural uses, it is often either invested abroad or spent on durable consumer goods, such as residential buildings. Although, therefore, the capital-output ratio in export agriculture may seem low and hence initially desirable, the capital output ratio in sectors of induced activity, such as residential building, may be much higher and altogether undesirable. For example, in Egypt, where the capital -output ratio is generally 2 : 1, it is 8 :1 in residential building financed mainly by the profits of cotton exporters.²

b) Export industry

In a poor country an industry working for foreign demand is often an extractive industry with a high capital-output ratio. Its position is that of a branch of a foreign firm. The large interregional unit of which that industry is part appears as an autonomous centre of saving and investment acting throughout the world according to its own plan.³ For example, copper mining in Chile and in Canada, or oil drilling in Saudi Arabia and in the United States, employ the same techniques and have the same capital - output ratios regardless of country. The saving originating in such an industry may be transferred from the under-developed to the developed country just as much as in the opposite direction, but will only in exceptional cases move spontaneously to other sectors, agriculture or industry, of the same country.

1 / Joao F. Normano, Brazil, A Study of Economic Types (Chapel Hill, 1935; R. Courtin, Le Problème de la civilisation économique au Brésil (Paris 1941) ; J. Lambert, le Brésil (Paris 1953); A. Barrere, "A Teoria do crescimento et do desenvolvimento economico", Revista Brasileira de Economia, June 1953.

2 / G. Myrdal, op.cit.

3 / M. Byé, "L'Autofinancement de la grande unité interterritoriale et les dimensions temporelles de son plan", Revue d'Economie Politique, May-June 1957.

The law of factor proportions is thereby violated only in appearance. What happens is that the law of factor proportions operates within the sphere of action of the decision centre, and the territories which an international firm controls may be situated in several different countries.

c) Domestic industry

There are some apparent contradictions with respect to the role of Capital in industries working for home demand, even within Latin America or within one country of Latin America. On the one hand, the requirements of balanced growth in a country lacking capital make it seem logical that the first to develop should be either industries with low capital intensity or else those techniques in any particular industry which have low capital intensity - and in theory, this applies to nearly all industries.¹ In this manner the scarce capital would be used to best effect.

It does in fact appear that before and during the last war the textile industry was the typical new industry in countries lacking capital and that, in Latin America, it was often launched with second-hand equipment. But this apparently logical rule has naturally never applied to the investment of public funds and only infrequently to branch establishments of foreign firms (tariff factories), these subsidiaries generally tending to employ the same techniques wherever they happen to be.

The advantages of long-term planning by firms are such that an industry financed by local capital and faced with the prospect of rapidly becoming obsolete and being squeezed out of the market, ultimately has the choice only between starting out with modern equipment or not starting at all. Thus the effects of capital scarcity on the modernness of equipment vary widely according to branches, countries, and periods. In this respect the conditions of anticipation count much more than the law of factor proportions in its static aspect. The average capacity of blast furnaces in India is 800 tons, in Great Britain 660 tons. The average capacity of a cement mill is 400,000 tons a year in Chile, and 258,000 tons in the United States. The Peruvian textile industry has installed automatic looms requiring 65 per cent. less labour than non-automatic ones, and 35 per cent. of all looms

¹ / R. Nurkse, Problems of Capital Formation in Underdeveloped Countries (Oxford, 1953).

are automatic. The capital coefficient of cotton spinning is lower in Mexico than in the United States.¹ Thus the apparently logical connection between disguised under-employment and technique adopted seems in fact rather doubtful.

It also happens that in one and the same branch there are the same time firms with low and with high capital-output ratios, as a result of heterogeneity in the origin of the capital, the time of establishment, the wealth or temperament of the entrepreneur. Disparities of this kind are not unusual, particularly in the Latin American textile industry. It would seem at first sight that in a competitive market competition, within one and the same branch of industry, between firms with a low capital-output ratio and firms with a high one, the latter should squeeze out the former. But in economies with little domestic saving the acquisition of modern equipment represents a heavy financial charge which firms cannot meet unless they maintain an oligopolistic structure and high prices. Thereby they may for quite some time save the plants working with obsolete equipment. Thus the fact that a branch of industry has to rely on its own saving may be at least partly responsible for the low productivity of that branch.

III. Capital and Structural Change.

If we want to consider the problems of development and of growth together and to concentrate on the former, we have to ask ourselves how structural changes are induced by growth, which is mainly capital formation, and how in turn structural changes induce growth.²

In passing from growth to development, we have to consider not only

¹ / V.V Bhatt "Capital Intensity of Industries", Bulletin of the Oxford University Institute of Statistics, May 1956; see also Netherlands Economic Institute, The Economics of Mill vs. Handloom-Weave in India (Rotterdam, September 1956) mimeographed.

² / A closer analysis will show that it is only by studying the transformation with which economic growth is combined that we can find the key to the problem of determining the level of investment, Ingvar Svernilson, Growth and Stagnation in the European Economy (Geneva, 1954), p. 7.

the incompatibility of plans and the checks to which it may lead, but also disequilibria in the social structure. It has been shown that social asymmetries and their economic consequences, far from straightening themselves out in the long run, tend to become aggravated by cumulative processes. Whenever, therefore, the disintegrating forces which we have tried to describe come into play, no spontaneous development process can at first sight be expected.

The essential factors here are the differences in the geographical or sociological position of peoples commonly described as equally developed or equally under-developed by the standard of an average level of income. These differences explain why it is impossible to establish any rule either about the historical trend of capital-output ratios in growth or retrogression, or about the choice between more and less capitalistic investment. The answer always depends on circumstances.

If a country's economic sectors are on the road to imperfect integration or even disintegration, only the intervention of a large decision and planning centre can establish the necessary growth relations.

a) The Consequences of Non-communicating Sources of Finance

Sectors which are closed off against each other so far as sources of finance are concerned may be related indirectly through labour, demand, or the monetary system. This inter-relation may lead: first, to integration under the lead of one sector, with "progressive" results, that is to say, results favouring growth and development in the national economy; second, to integration with "retrogressive" results; or, third, to an "explosive" pattern implying a check on growth.

Progressive Patterns. Optimum conditions of progress were achieved in the nineteenth century in certain thinly populated areas occupied by European immigrants. I have in mind the United States and Canada. The immigration of people was accompanied by an influx of capital and technical knowledge. A complex society was created, of which only a moderate proportion worked directly on the land. Cultivation of high marginal productivity was made possible by the abundance of land. A sufficient level of develop-

ment was reached by transmitted growth

Retrogressive Patterns. Several types of retrogressive patterns are known. If they have not in fact all led to actual retrogression, the danger was avoided only by constructive policies. The risk of retrogression is especially inherent in the following situations:

(i) If mobile labour moves into speculative employments, abandoning lines of production or regions where it would have been more useful in the long run. For instance, the economic history of Brazil is a succession of periods of monoculture, each entailing the abandonment or under employment of previous investment for the benefit of new production which itself was doomed to failure.

(ii) If agricultural labour is drawn into industrial employment without raising the productivity of agriculture. This may be done for the purpose of increasing the output of an industry protected by oligopoly or tariffs, and is by no means an hypothetical case, as Eugenio Gudín has pointed out¹.

(iii) If the balance of payments effect of one export product (oil) tends to raise the rate of exchange so much that export by other sectors ceases to be viable. For instance, in some countries where mineral exports earn the bulk of foreign exchange, certain traditional exports can be maintained only by some form of subsidy.² In such circumstances the decline of the domestic sector can be compensated for by the progress of the sector financed by foreign capital only if a fiscal policy which taxes the latter sector and makes appropriate use of the revenue is adopted.

Explosive Patterns. Certain explosive patterns in agriculture and export industry tend to obstruct the whole economy. If, for example, the growth of export agriculture is limited by foreign demand or by deficient domestic demand, the decreasing inducement to invest ceases to match the sector's own savings ratio. The same generally happens in export indus-

1/ Eugenio Gudín "O caso das nações subdesenvolvidas", Revista Brasileira de Economia, September 1952, and "Orientação e programação do desenvolvimento econômico" ibid., September 1956, especially p. 29.

2/ It seems that by leading to 'too high' a rate of exchange, the development of oil production and export caused a contraction in the traditional cocoa and coffee exports.

tries working with foreign capital. In either case the excess saving is used in accordance with the originating sector's own interests which do not necessarily coincide with the national interest. Investment with high capital-output ratios springs up; for instance, residential building.

Moreover, capital tends to leave the under-developed countries for more active economies which are world development poles. This centripetal movement is contrary to optimum distribution of capital throughout the world, but it corresponds to the actual existence of active poles enjoying external economies and capable of innovation.

Even in periods of complete political calm saving has sometimes flowed from dependent African territories to France. And United States statistics show that while in 1955 United States assets grew by \$589 million in Latin America and by \$661 million in Asia and Africa, there is also an opposite movement of foreign assets to the United States, Latin America accounting for \$263 million and Asia and Africa for \$448 million.

a) Inflationary Pressure

Inter-sectoral pressures capable of arresting growth find expression in inflationary situations and in a tendency towards permanent external deficit, as Raul Prebisch has pointed out.

Inflationary situations are common to economies possessing non-integrated sector, that is, both to under-developed economies and to certain mature ones afflicted by partial inertia. If inflationary pressure leads to open inflation it will arrest growth at a lower level that could have been attained without open inflation and import restrictions. This has been seen in certain Latin American countries as well as in France.

b) The Aims of Development

The aims of controlled growth cannot be the same in various phases of development, even if one could be sure about the succession of these phases. We must in the first place distinguish between economies whose essential problem is to build a sizeable subsistence sector into the market, and others where it is mainly a matter of co-ordinating different sectors of the market type.

From the purely economic point of view investment with a very low capital-output ratio would be the most effective for giving impulsion to the subsistence sector. An example is the diffusion of simple agricultural tools in French Tropical Africa, which serves a number of purposes at the same time. It helps to transform local production into export production, raises the productivity of production for home consumption, promotes the technical training of agricultural labourers, and gives them an incentive to save a little,¹

On the other hand, if the creation of new inflationary pressure is to be avoided, a considerable part of the available funds will have to be devoted to developing the transport system, to improving the commercial sector, which must cease to be monopolistic, and also to stabilizing prices by accumulation of stocks. Such stabilization is indispensable for the containment of inflationary pressures, but it is difficult to protect against abuses by vested interests which would perpetuate obsolete structures.

Finally, organic development, especially of agriculture, in a poor country in which marginal demand is mainly for foodstuffs, cannot neglect certain facts. First in certain areas rural overpopulation blocks the slightest agricultural progress. There must be some industrialization before there can be any agricultural progress. Second, certain systems of feudal structure, where the main source of income is land rent, cannot in practice be altered. One must try to transform the social structure by the creation of urban settlements. Third, for all its arbitrariness, the myth of industrialization has such compelling force that it cannot be ignored by any policy designed to transform mental attitudes.

In economies which are already largely market economies, government action aimed at integration takes the form of development plans such as are a common feature of our times. These plans are made up of specific

¹ / United Nations, Enlargement of the Exchange Economy in Tropical Africa;

United Nations, The Scope and Structure of Monetary Economies in Tropical Africa; United Nations, Processes and Problems of Industrialization of Under-Developed Countries, 1955; A Lawrence, "Les Investissements dans les territoires d'outremer", Journal Officiel de la Republique Francaise, Avis et Rapports du Conseil Economique, March 7 1956.

development schemes, such as have been so well described in the valuable reports of the Economic Commission for Latin America on economic development in that area. However, such programmes can be executed only on certain conditions.¹ First, in large countries such as Brazil, programmes must be on a regional and local industrial basis. This has been attempted for the State of Minas Gerais in Brazil;² Second, the chosen development objective must fit in with the national specialization which the principle of comparative advantage is expected to impose upon the country in the near future. Third, the investment of public or foreign capital must not lose sight of the aim of sectoral integration and must not in effect discourage saving, but must collect it and channel it into a national capital market.

c) The Means

It is impossible to over-emphasize the importance of education and training for escaping from the kind of stranglehold from which non-integrated economies suffer. Saving, too, may be a necessary condition of any break with the traditions of a society based on land rent.

Fiscal policy must not remain neutral. Its task is to integrate each sector's saving capacity into the national economy. It may depend on fiscal policy whether a certain structure ends up in complete deadlock or be-

1 / Celso Furtado 'Capital Formation and Economic Development', International Economic Papers, N° 4 (translated from revista Brasileira de Economia, September 1952, by J. Cairncross); Celso Furtado, A economia Brasileira (Rio de Janeiro, 1954); R. Nurkse, 'Notas sobre o trabalho do Sr. Furtado', Revista Brasileira de Economia, March 1953; M. Fleming 'External Economies and the Doctrine of Balanced Growth', Economic Journal, June 1955; H. Aubrey, 'Investment Decisions in Underdeveloped Countries', National Bureau of Economic Research, Capital Formation and Economic Growth (Princeton, 1955); M. J. Levy, 'Some Social Obstacles to Capital Formation in Underdeveloped Areas', *ibid.*; J. Mouly, 'Note sur les proportions de facteurs et l'intensité capitaliste des investissements dans les pays sous-développés', in Cahiers de L'I.S.E.S. Series F., N° 3; United Nations, Analyses and Projections of Economic Development, 11, The Economic Development of Brazil, 1956; J. P. De Almeida Magalhaes, A teoria moderna do crescimento e o problema do desenvolvimento, Rio de Janeiro, 1954; A. Barrere, *op. cit.*

2 / G. F. Loeb, 'Numeros indices do desenvolvimento fisico da producao industrial do Brasil', Revista Brasileira de Economia, March 1953; J. Boudeville, 'Contribution a l'etude des poles de croissance bresiliens Une industrie motrice. La siderurgie du Minas Gerais', Cahiers de L'I.S.E., A., Series F., N° 10.

comes a source of development. We have only to think of the very different uses made of the tax revenue from the great extractive industries operated by foreign capital in various countries. If a development policy taking a sufficiently long view acts on the principle of 'sowing the oil' this may lead to diversification and development of the economy.¹

Any policy making a choice of objectives must be selective in its means. If a certain source of saving is to be encouraged and certain uses of it discouraged, the best tax system is one with very unequal rates, combining a tax on high-productivity incomes with a tax on expenditure. It is essential, however, to remember that in such cases efficiency of enforcement is at least as important as the nominal figure of the tax rate.²

While integration demands the creation of a homogeneous money and capital market under the leadership of a central bank in the true sense of word, this requirement must be reconciled with the need for a very unequal supply of credit to various sectors in certain phase of development.

Finally, multiple exchange rates, while implying much arbitrariness and a host of controls, seem to be well suited to a policy of choice and transformation of structures, provided that these long-run objectives are not violated. Indeed the practice may be applied both in young countries and in mature ones which, like France, are in need of a fundamental transformation of their foreign trade structure.³

But nothing must ever obscure the point that while domestic capital formation is always indispensable for development, it is equally necessary to have the help of foreign capital, which, throughout history, has brought economic development with it. No doubt the most desirable form of development requires conditions which are not those proper to a market economy. No doubt also the great financial centres in the rich countries have little resemblance to that ideal capital market sustained by innumerable small savings, which may have existed in the nineteenth century. But all this only accentuates the need for organized international capital move-

1 / M. Byé, op. cit. p. 307.

2 / United Nations, The Economic Development of Latin America and its Principal Problems, 1954.

3 / Eugenio Gudín, 'Multiple Exchange Rates: The Brazilian Experience', *Economia Internazionale*, August 1956.

ments.

Neither the increase of savings in the developed countries nor the execution of development plans in the so-called under-developed areas can be treated in isolation. We must hope that a new spirit will be born within nations and between nations, which will reconcile the principle of national sovereignty and the desire of democratic countries to choose their own development aims with the need for interdependence of saving and investment and long-term specialization.

IV - CONCLUSIONS

It was not the purpose of this paper to raise innumerable problems, let alone to discuss them. The suggestions it contains may be imprudent—they were made with one sole end in view. I wished to show that under-development is not simply a matter of backwardness in quantitative terms, but that this backwardness is connected with certain structural features, more particularly with insufficient integration of the various sectors of the economy. In these circumstances the theory of development, as distinct from the theory of growth, cannot be based on one single model for all economies and all the stages of their transformation. Nor can such a model be established in terms of aggregate quantities,.

We are led to the idea of a morphology classifying various types of under-development. We should, above all, abandon discussion in terms of averages, we should take account of economic and sociological discontinuities, and we should study sectoral coefficients and their movements.

My subject was: 'What is the role of capital in development?' To my regret, I must give a somewhat vague answer. Neither the amount of capital to be used, nor the forms of its use, nor the optimum origin of saving can be the same in various types of economy seeking development. This may seem negative. I believe it to be true, and therefore useful.

COMMENTS ON PROFESSOR BYE'S PAPER

by

J. H. Adler and K.S.Krishnaswamy

1. Introduction.

Throughout Professor Bye's paper the reader is made aware of the difficulty of arriving at satisfactory generalizations, not only when he speaks about the role of capital but also when he deals with other aspects of the development process. There is, of course virtue in any attempt to get away from the generalized models of the pure theorist and to take account of the social, institutional, and cultural differences between economies. This is particularly important if we want to move from analytical reasoning to the more difficult but, in practice more important plane of policy advising and policy making. But, like any other virtue, it can be overdone. The economist who is circumspect, who takes account of more than the two or three variables which make up the moving parts of a model, who lifts the veil of the ceteris paribus stipulations and breaks down such convenient aggregates as consumption and capital formation, deserves our approval and applause. But the economist who substitutes such concepts as socio-cultural differences and dynamic group equilibrium for supply and demand, the size of the market, income flows and income distribution, is bound to get lost in the maze of ill-defined sociological notions, and does not come to grips with the problems of economic growth.

The lack of easily discernible central tendencies, and of conformity to a pattern, has led some students of the processes and problems of economic development to treat each economy as sui generis to which the general propositions of theory do not apply. This kind of approach represents, we suggest, an abdication of systematic enquiry, an essential ingredient of economic analysis. The intellectual dissatisfaction with this method of approach has led to attempts to analyse the process of economic growth, and to develop a theory of economic development on the basis of historical data. In practice, this means that the long time series for a handful of advanced countries are worked over and over and the firm parameters that

emerge—the capital-output ratios, the savings ratios, the monetary and balance of payments patterns - are accepted as if their validity were timeless and economic development in the middle of the twentieth century could proceed, and succeed, only if the same pattern of behaviour and the same set of institutions that characterized the economies of the United States and of Western Europe in the last fifty years before the First World War were adopted.

This is not to deny the important contribution that an analysis of the historical process of economic growth and development can make to an understanding of the problems of economic development today. But we are rather uneasy about the indiscriminate application of the old rules to the new problems, an application which fails to take account of the changes which have occurred in the last hundred years in national and international political institutions, in the role of governments, in the concept of a desirable income distribution, and in the pattern of international trade and capital movements. And we wonder whether it would not be a most rewarding extension of historical enquiry to scrutinize the development process of the last ten or fifteen years in the countries of Latin America, Asia, and Africa to determine what the relation between capital and the growth of output has been, how and where saving has been generated, and what investment patterns have produced the best results in terms of income growth and income distribution. It may well be that the results of such an enquiry would permit us to modify the lessons of the nineteenth century and to apply them less indiscriminately and more fruitfully to an understanding of today's development process, and to the formulation of economic policies which economists are, rightly or wrongly, expected to devise.

11. The Supply of Capital and The Supply of other factors.

Given the diversity of development aims and the structural changes required to attain them, what can we say, in general terms, about the role of capital formation in the development process? We may start from two limiting positions. At the Santa Margherita meeting of the International Economic Association, Professor Cairncross expressed, and elaborated, the view that in the light of the experience of the Victorian era, capital formation was a concomitant phenomenon of the process of economic growth

and not a causal impelling factor. The driving forces of growth were technological innovations on the supply side and steadily widening markets on the demand side, which resulted in large business profits, which in turn financed capital formation. Professor Cairncross concluded, or, at any rate, came close to the conclusion, that the level of aggregate capital formation was not the key variable, perhaps not even one of the key variables determining the rate of economic growth, but that changes in productive efficiency, the compounded result of technological change, the growth of markets, and entrepreneurial ingenuity and daring, were responsible for the economic advancement of the period.

On the opposite extreme of the spectrum of views is the proposition that the rate of economic growth and development is uniquely determined by the level of new investment. It is not surprising that this view is expressed, with a frequency that makes it monotonous, at international political conferences and meetings, in the debates of the United Nations and the Organization of American States, and in the various documents prepared for such conferences and debates. But it is surprising that in technical discussions and writings, in analytical models as well as in policy papers, the relationship between capital formation and economic development is stressed to the exclusion of all other causal factors and relations.

We submit that two issues must be distinguished- and kept apart. One is the problem of capital formation, to which we shall return later; the other is the meaning of the capital-output ratio. Professor Rosenstein Rodan has pointed out that the marginal productivity of capital is a partial derivative, the supply of all factors other than capital remaining constant, while the marginal capital-output ratio is a full derivative, the supply of all factors other than capital being variable. In other words, the increase in total output associated with an addition to the stock of capital is determined not only by the amount of additional capital but also by additions of some other units- labour, land, technical skill, management, Only if it is assumed that the supply of these other factors is infinitely elastic, is the increase in output determined solely by the amount of additional capital. If we do not make this assumption- which gives us an analytical description of a limiting case- we become immediately concerned with the elas-

ticity of supply of other factors or, more generally, with the responsiveness of other factors to economic incentives.

In recent years, a great deal of attention has been given to the supply of entrepreneurship as the strategic factor which, aside from capital, determines the rate of growth and development. Without in any way denying the importance of entrepreneurship, we suggest that the emphasis on this single factor has led to a neglect of the analysis of the supply conditions of other factors. How does the subsistence farmer, whom we usually do not include in the entrepreneurial class, respond to higher prices of commodities which he could produce for the market? How does entrepreneurship enter into the picture if a large proportion of total saving accumulates in the hands of the government? Or conversely, what is the role of entrepreneurship if the most important factor limiting the development of a region is the lack of transportation facilities and the government does not have enough funds (capital) to build highways? Can entrepreneurship make up for lack of technical knowledge and productive skills?

These questions suggest that for an understanding of the process of development it is insufficient to concentrate on an analysis of entrepreneurship. It is essential to broaden the analysis into a more general enquiry into economic incentives and the response of various factors to them. It is equally necessary to determine perhaps in general terms and perhaps case by case—under what institutional arrangements and under what economic and social conditions the supply of capital and entrepreneurship and technical skill can best be matched. There are numerous examples of economies where capital is held idle. —for example, in the form of foreign balances— by a group of capitalists while entrepreneurial talent and technical skill go begging. There are cases in which capital and entrepreneurship are available but technical skills are lacking, or are so expensive as to make production unprofitable. Finally, there are instances in which both entrepreneurship and technical skills are available but capital is lacking.

Thus, the conceptual link between the marginal productivity of capital and the capital-output ratio is the fact that the magnitude of both depends on the supply of all other factors of production; the greater the supply,

the higher the marginal productivity and the lower the capital-output ratio.

Limitations on the supply of factors other than capital explain, at least in part, a phenomenon which is characteristic of under-developed economies. On the one hand, we find that the return on capital in established enterprises is remarkably high—rates of return of 30 or even 50 per cent. are frequently mentioned as typical of some economies. On the other hand, we find that the expected return on new ventures is low, or even negative. This apparent paradox can be explained only by the difference in the supply conditions of factors other than capital. Old enterprises have solved their supply problem. Knowledgeable management knows the conditions in the input and the output markets, it has been able to acquire the necessary labour skills, and it has found the right technology which permits that combination of inputs which corresponds to the price relations among inputs. All or most of these conditions are absent when it comes to the setting up of new enterprises. Management lacks experience and knowledge of the market, skilled labour is expensive or simply not available and therefore has to be trained, and the technology appropriate for the size of the market and for the supply conditions of the non-capital inputs is untried or has not even been invented. In technical terms, we could say that we are faced with a steeply down-sloping marginal productivity curve of capital, or a pronounced discontinuity. But the technical terms do not give an indication of the fact that this sharp drop in the productivity curve is due to the limitations on the supply of factors other than capital.

How does the argument so far developed affect the magnitudes of the marginal capital-output ratio? When we turn from the concept of marginal productivity to the capital-output ratio, we have to drop the assumption that the supply of all other factors is given and have to think in terms of a flow. As long as the rate of capital formation remains constant and the distribution of capital among its various uses remains the same, and there is a steady automatic growth in the supply of all other factors, we should expect the capital-output ratio to remain unchanged, or, if external economies make themselves felt, to decline gradually. If, however, the supply of capital expands suddenly—for instance, as an indirect result of

a drastic improvement in the terms of trade, or because of a sudden increase in government revenues such as oil revenues-while the rate of supply of all other factors remains constant, the capital-output ratio is likely to increase because the efficiency of utilizing additional capital is bound to decline. Some capital is poorly used, or goes to waste, or remains idle, accumulating in the form of bank deposits or foreign balances.

If, on the other hand, the supply of factors other than capital increases more rapidly than the stock of capital, we should expect an improvement in the efficiency of the utilization of capital, and a decrease in the capital-output ratio. With management improving, labour becoming more efficient, and technical skills increasing, capital "goes further". Since the existing stock of capital is committed to particular uses, and is combined with other factors in rather inflexible proportions, an improvement in the supply conditions for the non-capital factors will be reflected primarily in the marginal capital-output ratio, the relation of new, additional capital to additional output. But there may be some improvement in the use of existing capital as well. As in the case of a sudden spurt in the supply of capital, an at least temporary oversupply of non-capital factors may occur. Entrepreneurship may be frustrated, and labour skills may go to waste.

The relationship between new capital and additional output is a complex relationship since it depends not only on the composition of investment, which may change over time and cause an increase or decrease in the capital-output ratio, but also on the supply of all non-capital factors. Given a certain rate of capital formation and, we may add, a certain state of technology, there is an appropriate, or optimum, flow in the supply of all non-capital factors of production which corresponds to it.

III. Importance of Capital Formation in Determining the
Rate of Growth of Total Output in
Under Developed Countries

The preceding observations modify, but do not destroy, the emphasis which much of the literature has put on the role of the rate of capital formation as determining the rate of growth of total output. For it may still be argued that conditions in most under-developed countries today are such that the supply of non-capital factors is adequate to take care of a considerable increase in the rate of capital formation; or that an increase in the rate of capital formation is more difficult to bring about than an increase in the supply of the non-capital factors and therefore deserves most attention; or- and this seems to us to be the most pertinent argument- that we are dealing in reality with conditions of joint supply of capital and non-capital factors. Professor Cairncross has emphasized the fact that in the nineteenth century entrepreneurship provided its own capital by ploughing entrepreneurial income back into the economy. But just as entrepreneurship creates its own capital, the availability of additional capital permits the exploitation of economies of scale in larger productive units and the use of technological improvements. It also creates new markets for technical skills and managerial talent, and provides new opportunities for skilled and unskilled labour. An increase in the supply of one factor of production sets in motion a complex rearrangement of the flow of all other factors and brings about an increase in their supply.

This increase in the supply of non-capital factors is not automatic in the sense that economic policy can be concerned only with the rate of capital formation and that the supply of non-capital factors will take care of itself. But it is automatic in the sense in which the term is used in economic theory. An increase in the supply of capital brings into play new incentives and new market forces changing the demand for non-capital factors of production. It depends on the speed and intensity of the response on the supply side whether the flow of non-capital factors can be left alone, or whether some form of intervention is called for. It is

impossible to generalize on this point: The conditions as to the responsiveness of the non-capital factors to economic incentives (that is, higher rewards or more demand at the existing level of rewards) differ from economy to economy, and, within each economy from factor to factor. Where the response is spotty and sluggish, as, for instance, in societies in which the attractiveness of leisure is greater than the attractiveness of higher income, or where mobility is impeded by social and cultural institutions, intervention- in the form of measures to eliminate those impediments and to reinforce incentives- is called for. But whatever the specific shortage -of particular skills, of technical knowledge, of institutions to bring capital and entrepreneurial talent together- its elimination will in most instances result in an increase of output only if it is accompanied by an increased availability of capital.

The emphasis on capital requirement and capital formation and, as a supplement, on the inflow of foreign capital, is particularly justified in those under-developed countries where productive techniques have not kept pace with the advances in technology elsewhere. In order to absorb, with appropriate adaptations, the technological advances of the last fifty or eighty years - which according to the studies of the National Bureau of Economic Research account for the major part of the annual increase in productivity of 1 1/2 per cent.- substantial amounts of capital are required, not only to increase the total capital stock (or capital per worker) but also to replace that part of capital stock, including economic overhead capital, that has become obsolete.

IV. CAPITAL FORMATION AND THE PATTERN OF INCOME DISTRIBUTION

Let us turn now to a brief consideration of the supply of capital, that is, the process of capital formation. It will be agreed that an increase in the aggregate savings-income ratio is a necessary, though not a sufficient, condition for economic growth in under-developed countries. If we hold with Professor Byé that the essence of economic development is structural change of a type that tends to be progressive, a major manifestation of this will have to be an increase in the supply of capital, or in saving as

a proportion of national income. Thus the argument for structural change itself derives, at least in part, from the fact that the prevalent economic and social structure in under-developed countries is such as to perpetuate a relative shortage of capital. Further, for the policy-maker at any rate, some guide is necessary to judge whether the changes that are occurring in the structure are conducive to growth or not. From this point of view capital growth is something which, despite its complicated character, is less difficult to handle than, say, spread of technology or change in social attitudes.

The changes which occur in an under-developed country in the process of raising its savings ratio from, say, 5 to 12 per cent. of national income are, or ought to be, a vital part of the argument of those who stress capital growth as the prime mover in the situation. This becomes apparent when one looks at the so-called paradox referred to by Professor Lewis: "Because the rich save more than the poor, it used to be expected that every country must save more as income per head rises. It was found, however, that in the wealthier countries, real income per head doubled in fifty to seventy years without any increase in the savings-ratio". Professor Lewis's explanation of this is that "the rate of savings is determined not by whether are rich or poor, but by the ratio profits to national income, and both these ratios cease to increase once a certain stage of development has been reached."¹

We may or may not agree with all that Professor Lewis has said in this context. But it serves to bring out the fact that an increase in savings-ratio in under-developed countries is important because the process of achieving it necessarily involves a change in the structure of income and economic relationships. That is why it constitutes a major target in the programmes of under-developed countries. Advanced countries are able to maintain a high savings-ratio because, presumably, the economic and sociological changes necessary for it have already occurred there. As observed earlier, it is futile to try to determine which came first in the developed countries, greater additions to the stock of capital or all the other things

¹ / W. Arthur Lewis, Theory of Economic Growth (London, 1954), pp. 238-239.

that help the better utilization of productive equipment. The two had to go hand in hand, and either of these by itself would not have led to economic development. But greater availability of capital was an indispensable element in the process.

Raising the relative share of what Professor Lewis calls capitalists profits- or incomes out of which more is saved for productive investment- is not an easy thing for under-developed countries to do. This is a question not of making prices rise faster than costs, but of making the productivity of factors increase more rapidly than costs. It is this difference that gives rise to a surplus out of which capital is accumulated, particularly when it accrues to sectors of the community with a high propensity to save and invest. It involves, among other things, restraint in transferring an increasing part of the national income to those whose standards of consumption are low and need to be raised rapidly. Politically and socially, this is a hard policy to implement, since it clashes with modern conceptions of equity and social justice, . But under-developed countries have to try to resolve this conflict between greater saving and more equal distribution of income in some way.

There is considerable need for a clearer appreciation of the relation between capital growth and income distribution in under-developed countries and of all the structural changes that an adjustment in the latter implies,. With so many of the people in under-developed countries having incomes barely sufficient for subsistence, all or most of the saving will have to be done by a small group of high-income earners, business firms, and the government. Clearly, the smaller the relative share in national income of this small group of savers, the larger must be the difference between average income in the subsistence sector for a given level of the aggregate savings-income ratio in the economy. If the relative share of the savers in the national income remains unchanged any increase in the savings-income ratio can only come about through a widening of the difference between average individual incomes in the two sectors.

Two corollaries follow from this. If for political and humanitarian reasons a widening of individual income differences cannot be countenanced,

stepping up the savings-income ratio becomes a function of reducing the relative share of the so-called subsistence sector in national income. This must inevitably be a comparatively slow process. Further, since the process cannot go so far as to reduce the absolute income of the subsistence sector- except in the unlikely event of a fall in the number of income-earners in that sector- there is clearly a limit set to the increase in the savings-income ratio, given the initial pattern of relative shares. And the faster the growth of population in the subsistence sector, the lower this limit is likely to be.

Second, it adds point to the importance of public saving in underdeveloped countries. Fiscal policy directed towards reducing inequalities in individual incomes cannot contribute to additional savings and capital formation unless it also contributes inter alia to a shift in the relative share of the savers in national income. One of the ways in which this double condition is sought to be met is through the government's appropriating an increasing proportion of the additional income generated in the economy for purposes of public investment. If there is to be a net gain from such a policy, the greater portion of the additional income diverted to government must come from the potential consumers rather than the potential savers outside government. How this can be done and in what measure are questions that have to be judged against the circumstances of each country. But the basic problem of having to alter the pattern of income remains, and it is not rendered any easier by the effect different patterns of income-distribution could have on the supply of factors of production that are co-operant with capital.

FURTHER COMMENTS ON PROFESSOR

BYE'S PAPER

By

Joseph A. Kershaw

1. Structural Change

Professor Byé states that the process of development is a change in economic structure rather than a mere growth in income, total or per ca-

pita. Professor Byé defines a structure as a "system of relations and constraints between centres of decision", This phrase conveys little or nothing to me. But perhaps what is meant by structure is the usual notion of relative emphasis on different economic sectors. I think it can be established that economic growth invariably brings with it a shift of the labour force out of agriculture into non-agriculture, and an increasing relative importance of tertiary industries. These are certainly structural economic changes in income, with which of course they are usually associated.

In this connection it is interesting to point to the experience of the Soviet Union. Here is an economy which, since the Plan period began in 1928, has experienced development on a tremendous scale. Since that time, to be sure, there has been an increase in income per capita though probably rather little in consumption. The striking feature of this economic development, however, is that there were great and continuous structural shifts so that the economy is now scarcely recognizable as having evolved from what it was in 1928. Incidentally, I would argue that, notwithstanding the tremendous industrial growth, the Soviet Union is still under-developed, as evidence by the fact that about half the labour force is still in agriculture.

There is one other lesson that the Soviet experience can teach students of economic development. Professor Byé tells us that "while domestic capital formation is always indispensable for development, it is equally necessary to have the help of foreign capital- which, throughout history, has brought economic development with it". I believe that Soviet experience refutes this statement. While there was some capital imported in the early and middle thirties, this was minimal, and can hardly be regarded as having been critical. The Russians have demonstrated that if a government is willing and able to interfere sufficiently with consumer time preferences, the necessary volume of saving and investment can be generated internally. The current efforts of China to emulate this experience, and the political importance of the race between India and China, lend special significance to this observation.

11. The Savings-Income Ratio and the Capital -Output Ratio

I would like to turn now to the question of what analytical or predictive use can be made of aggregates, specifically the savings-income and the capital-output ratios. In good part I share Professor Byé's scepticism of their utility, although I should have been less hard on the savings ratio and even harder on the capital-output ratio.

Professor Byé is agnostic on the utility of these ratios on the grounds that development brings substantial structural changes, a fact which is surely beyond dispute. He feels that as economic structure changes, the meaning of these aggregate ratios becomes at best ambiguous, at worst quite misleading. Furthermore, they shift substantially over time, largely as a result of these structural changes, and hence one cannot be quite sure how they will behave during the process of development.

With respect to the savings-income ratio, most of this is true enough. Even so, I feel that the analyst must pay attention to the ratio. In particular, he must consider ways of influencing it. Once there is any monetary sector at all in an economy, the process of growth requires a certain minimum, and approximately specifiable, share of non-consumption. I think this is true regardless of the stage of development or of the structure of an economy. It is quite true that the ratio will change in the process, but I think that these changes may well be predictable. Furthermore, and most important, we know the direction in which we want the ratio to move as an aid to development, and governments can induce it to move in that direction as indeed Professor Byé points out. Such a minor effort as the establishment of a rural savings system seems to me a constructive step in most under-developed economies, because it induces the aggregate savings ratio to rise. The Indians are stressing this in their second Five-Year Plan.

Professor Byé is troubled by the fact that many savings decisions are not independent of investment decisions. A farmer decides to refrain from consumption in order to build a barn or invest in an irrigation ditch; he would not make the savings decision except for the specific investment decision. I agree that this diminishes the analytical utility of the ratio, but, as Professor Byé says, many modern investment-saving decisions are

also of this sort. I think one can believe that highly developed capital markets are much to be desired without being driven to the conclusion that their absence renders the savings-income ratio analytically valueless.

Finally, let me say a few things about capital-output ratios. I gather that Professor Byé dislikes and distrusts them in large part because they are so variable. My own distrust goes a good deal deeper than this. I feel that they may even detract from, rather than add to, our understanding of the development process. There is nothing inherently wrong with expressing two economic variables in the form of a ratio. If the variables are carefully enough refined, a capital-output ratio can tell us that so much investment will bring so much output. Such an impeccable arithmetic statement can sometimes be useful.

However, people who make use of capital-output ratios seem inevitably to introduce a normative aspect which seems unwarranted. They talk about favourable and unfavourable capital-output ratios, and they frequently recommend choice among projects in accordance with their capital-output ratios. Professor Byé's paper illustrates some of the confusion which results from this. In it there are passages which suggest approval of high ratios (pp. 115, 118) and other which suggest approval of low ratios (pp. 116, 120). My own conviction is that, although some ratios are high and others low, they are not favourable or unfavourable, good or bad.

In this connection I want to make two general points. The first has to do with the use of capital-output ratios as an aid to investment decisions. It seems to me that one runs a danger of paying insufficient attention to the time dimension. It is not enough to know that a given investment will generate so much output in this or the following year. The important point is how long the stream of outputs will continue to flow from this investment. It is quite possible that two investment projects have identical capital-output ratios, but that one is much more durable than the other. If we try to define the capital-output ratio to take this into account, we move towards a rate or return concept. Perhaps this is a way in which the capital-output ratio can be usefully rehabilitated.

Capital-output ratios also ignore other variables, in particular, the

impact population growth of various types of investment may be quite critical. Professor Leibenstein seems to make a lot of sense when he writes about the interaction between economic and population growth. I hope he will have something to say on this during the conference.

My second general point concerns capital-output ratios for broad aggregates, including the economy as a whole. Here I am troubled by the fact that, at least where governments take an active role in the planning process, the capital-output ratios turn out to be in good part the result of planning policy decisions, and hence are not technologically determined. Although the data are hard to come by, I think that both average and marginal capital-output ratios in the Soviet Union for industry as a whole have been consistently lower than in the United States, or in most other Western economies. Does this mean that the Russians are more efficient in their investment? Not at all. Soviet planners long ago make a decision to favour certain areas, such as heavy industry, and to slight other, such as housing and other social overhead. In the former sector capital-output ratios are relatively low, in the latter they are high. In the United States we pay more attention to consumer preferences, and housing is a very important investment sector. The only conclusion one can draw, therefore, from the fact that the capital-output ratios are different in the two countries is that they have elected different policies. This means that where governments take an active part in directing the development process and they do everywhere these days, it is idle to hope to find numerical values for the capital-output ratio which will be characteristic of stated stages of economic development.

III. Inter-Sectoral Relationships

Perhaps I may conclude with an observation on the inter-sectoral problem posed by Professor Byé. If I understand him correctly, he tells us that we cannot profitably use aggregate models of the Harrold-Domar type, that sectoral analysis is dangerous because the inter-sectoral questions are likely to be overlooked, and that the real problem is to integrate and control the sectors so that none becomes a brake on the other. One can agree with the diagnosis while lamenting the lack of a helpful prescription. It is true that various sectors of the economy play different roles in economic

development. Heavy industry provides capital goods for future growth. Light industry provides consumer goods for the population. Agriculture provides labour for industry and consumer goods, some indirectly via light industry. Transport provides services to industry. Housing provides consumer services and permits the urbanization necessary for industrialization. These inter-relationships are complex and imperfectly understood. We are indebted to Professor Byé for reminding us that our planning and predictive models should take these things into account. Unfortunately, it is not yet clear how such models should be constructed and without them, predicting may be as hazardous as with the over simplified aggregative Harrod -Domar models.

DISCUSSION OF PROFESSOR BYE'S PAPER

Professor Byé's paper produced a variety of reactions, which found expression in the succeeding discussion. Opinions differed widely as regards the relation between investment and economic growth. Among the possibilities discussed, the following three were particularly characteristic: (1) the rate of growth may be in large measure independent of the rate of investment; (2) growth and investment may move together, but the chain of causation may run from growth to investment, rather than the other way about; and (3) the classical case in which saving and investment are causes and growth the effect. In addition, the discussion threw interesting sidelights upon the capital-output ratio and the saving-income ratio.

1. Growth without Corresponding Investment.

Professor Schultz took the position that, in the United States, a large and perhaps dominant proportion of the growth that had occurred since 1870 could not be attributed to traditional investments. He based his view upon studies by Abramovitz and Kendrick, as well as on an unpublished paper by Robert Solow. These studies suggested that 50 per cent. of her capital growth could not be explained by additions to the traditional capital stock

alone. Analogous results, he said had been obtained from a study of Mexican agricultural development. Further evidence of the subordinate role of this capital came from the experience of American agriculture during the 1930s, when a rapid expansion in output had gone hand in hand with a reduction in the amount of capital employed.

Various explanations were volunteered. Technological improvements ranked high among these, although Professor Schultz warned that the investigators whom he had quoted stopped short of assigning full responsibility to technology. Dr. Adler pointed out that technological improvements affected growth in proportion to gross investment, while additions to the capital stock represented only net investment. Investment in human resources was cited by Professors Schultz and Brahmananda and Dr Adler. Dr Adler qualified the "investment in human resources" thesis however, by arguing that the utilization of such improvements was nevertheless inseparable from the application of additional capital. Professor Hirschman mentioned the "Leontief paradox" which asserts the seemingly illogical fact that the United States, a capital-rich country, exports principally labour intensive commodities, as possible evidence that the United States had made large though non-statistical investments in the quality of the labour force. The proponents of this point of view - not including Dr Adler- joined in the comment that "we are taking capital much too seriously"

11. Investment as the Causal Factor

Dr Adler, after saying that investment was not uniquely related growth, nevertheless went on to argue that it deserved special attention because it represented the most manageable focus for policy. The public authorities could do something about capital formation while they could do little about entrepreneurship and similar growth factors. He warned, however, that aggressive policy measures to lift capital formation might unfavourably affect the distribution of income. Professors Kershaw and Wallich, in their analysis of the Russian and German advances, left room for the interpretation that, despite all qualifications, investment has played a strong initiating role. Professor Wallich added that it would be unfortunate if the present debate were interpreted to mean that "investment did not matter".

III. The Role of Capital at Different Stages of Development

No specific view points emerged with regard to possible differences in capital requirements at different stages of development. Professor Kershaw observed that Russia had enjoyed a low capital-output ratio but did not argue that this necessarily reflected a condition typical of under-developed economies. Russia's low capital-output ratio, he said, was the result of decisions taken by the Russian planners that were not necessarily inherent in the process of development. Dr. Adler felt that in under-developed economies a relatively large amount of capital might be required in order to make use of available advanced techniques. Much of the existing equipment, including parts of the economic overhead capital, was obsolete, he said. Professor Boudeville thought that there were differences between capital-output ratios not only among the various sectors of an economy, but also within each sector, and that such differences made generalizations impracticable. Professor Ellis observed that the stage of development might make some difference with regard to the relation might close, while in capital-rich countries the causal contribution of capital to growth might be rather low.

IV. Saving-Income Ratio and Capital -Output Ratio

A variety of doubts were expressed regarding two familiar tools of analysis : the saving-income ratio and the capital -output ratio. Particularly the latter received adverse comment, in line with the doubts expressed regarding the closeness of the relation between investment and growth. Nevertheless, the capital-output ratio found some defenders. Dr. Adler argued that while it was no tool of forecasting, it constituted a "handy concept". It could also be made to serve in analysing the operation of other factors affecting growth, whose impact would change the ratio. He was concerned that changes in the ratio were frequently interpreted as reflecting merely shifts in the composition of investment, when changes in the supply of co-operating factors were a more fundamental explanation.

Professor Kershaw voiced sympathy with the views of the sceptics. Nevertheless, he said, such were the sort of tools economists had to work with, and we would just have to keep trying. The saving-income ratio he regarded

as more solidly founded than the capital-output ratio. Professor Byé, whose paper had been interpreted by some as rejecting both ratios altogether, corrected this impression by saying that he did not think them analytically useless and that observed changes in them required investigation of the underlying causes, which would probably lead to interesting results.