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Underdeveloped Economies

Both general and specific evidence refutes the thesis of the vicious circle of poverty and stagnation.

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The underdeveloped countries and their economic problems have attracted increasing interest and attention during the last 15 years. A large flow of publications has appeared; and in view of the general and political interest in the subject, much of this literature is addressed, in part at least, to nonprofessional readers. At the same time, the work of economists has not yielded many illuminating insights or significant generalizations commensurate either with the effort in this sphere or with the volume of output. Yet there is one thesis or explanatory generalization which predominates the literature of the subject, both professional and popular. Most nonprofessional readers, if questioned in a free-association test, would call to mind this thesis of the vicious circle of poverty begetting poverty, with its important policy corollaries that underdeveloped countries can escape the constricting chains of poverty only by means of heroic efforts involving large-scale present sacrifices, with or without large-scale foreign aid. We need make no apology for devoting this article to an analysis of this thesis.

"Poverty Begets Poverty"

The reasoning underlying the thesis that poverty itself sets up well-nigh insurmountable obstacles to its own conquest can be cast in the form of a model, a device frequently and successfully used in other branches of economics. A model sets out the relationships between a limited number of economic variables selected for their supposed importance in the explanation of particular phenomena such as, say, the rate of economic growth. Although the precise formulation may vary from one source to another, the essential variables and relationships in most models of economic growth are as follows: the growth of income is a function of the rate of capital accumulation, that is, of investment; investment depends on saving; and saving is a function of income. Hence the growth of income depends on the growth of capital, and the growth of capital depends on the growth of income. These growth models are dynamic models purporting to show how one situation grows out of another, notably in this context explaining the factors behind changes through time in income and in the volume of production.

The model of the vicious circle of poverty or underdevelopment is a particular model to explain the continuation, through time, of a zero (or insignificant) rate of economic growth. Its mechanism pivots on a postulated low level of income per head which does not permit capital accumulation to take place and hence does not contain the motive power for an increase in the level of income. Here are two of the many formulations of this thesis.

The first formulation is that by the late Ragnar Nurkse. In his book *Problems of Capital Formation in Under-Developed Countries* he writes under the heading "The vicious circle of poverty":

"In discussions of the problem of economic development, a phrase that crops up frequently is 'the vicious circle of poverty.'. . . .

"A situation of this sort (a vicious circle of poverty), relating to a country as a whole, can be summed up in the trite proposition: 'a country is poor because it is poor.'

"Perhaps the most important circular relationships of this kind are those that afflict the accumulation of capital in economically backward countries. The supply of capital is governed by the ability and willingness to save; the demand for capital is governed by the incentives to invest. A circular relationship exists on both sides of the problem of capital formation in the poverty-ridden areas of the world.

"On the supply side, there is the small capacity to save, resulting from the low level of real income. The low real income is a reflection of low productivity, which in its turn is due largely to the lack of capital. The lack of capital is a result of the small capacity to save, and so the circle is complete.

"On the demand side, the inducement to invest may be low because of the small buying power of the people, which is due to their small real income, which again is due to low productivity. The low level of productivity, however, is a result of the small amount of capital used in production, which in its turn may be caused at least partly by the small inducement to invest.

"The low level of real income, reflecting low productivity, is a point that is common to both circles" (*1*).

For the second formulation we turn

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to the study submitted by the Center for International Studies of the Massachusetts Institute of Technology for the Special Senate Committee on Foreign Aid:

". . . the general scarcity relative to population of nearly all resources creates a self-perpetuating vicious circle of poverty. Additional capital is necessary . . . to increase output, but poverty itself makes it impossible to carry out the required saving and investment by a voluntary reduction in consumption" (*2*).

The usefulness in economics of any particular model cannot be stated a priori. An infinite number of models can be devised for one situation. The relevant question is the illuminating nature of the model. This depends on its success in identifying the important variables and assessing their relationships. Ultimately the success and usefulness of the model depends on its value in explaining the past and also in predicting hitherto unobserved results.

We propose to test the model of the vicious circle of poverty in underdeveloped countries, to show that it is deficient, and to suggest why it is defective and misleading. In reaching the latter conclusion, however, we do not wish to be understood as implying that no country has ever been in a situation of which the model is a fairly exact image, or that there are no elements of truth in the component parts of the model. But we will attempt to show that the choice of variables and relationships between variables incorporated in the model rules out the possibility of explaining a great deal that has happened and is happening.

Evidence against the Model

It is indeed remarkable that the thesis of the vicious circle of underdevelopment should have been so widely espoused and accepted when it is amply refuted by the most obvious empirical evidence. It is refuted, first of all, by the very existence of developed countries. All of these started by being underdeveloped, that is, by having the economic features which define underdeveloped countries today: low average per capita incomes and low levels of accumulated capital; and yet they progressed, in most instances without appreciable external capital and invariably without grants from abroad. On the strict argument of the vicious circle of poverty, such development would have been impossible. The details of the process of growth in the now developed countries obviously vary greatly, and different interpretations of the process in a particular country are possible. But the evidence of growth is indisputable. This evidence is in itself sufficient to dispose of the thesis of the vicious circle of poverty as a firm generalization of wide applicability.

Moreover, the thesis is also refuted by the rapid economic advance apparent in many underdeveloped countries in recent decades. For example, the total gross national product of the Latin American countries covered by the annual reports of the Economic Commission for Latin America increased over the period 1935 through 1953 at an annual rate of over 4 percent, while output per head increased by over 2 percent. In more recent years the growth of output has been even faster, and the rates of growth in the aggregate and per head have exceeded the comparable figures in the United States.

Southeast Asia and West Africa are other regions which have developed very rapidly in the last 50 or 60 years. For these areas there are no series of national income figures going back before World War II. At present the national income of Malaya is around 300 U.S. dollars per head per annum, and that of Ghana (formerly the Gold Coast) around 200 U.S. dollars. These are low figures, but they nevertheless reflect substantial advances over the last half century or so, for at the turn of the century these were substantially subsistence economies. There is much other information on the rapid advance of these regions. The rubber industry of Southeast Asia began only around 1900, while today it produces close to 2 million tons of natural rubber, almost two-thirds of which is produced on Asian-owned properties. In the 1890's there were no exports of cocoa, groundnuts, or cotton from Nigeria and Ghana, and the exports of oil palm produce were about one-tenth of their present volume. Today, these are leading staples of world commerce, and total annual exports from these two countries are not far short of a billion dollars. In 1900 there were no (or only negligible) imports into these countries of flour, sugar, cigarettes, cement, petroleum products, or iron and steel. Today these commodities are imported on an impressive scale. It is of some interest that almost all West African agricultural exports are produced by Africans and practically all imports are destined for their use. Statistics of public revenue, infant mortality, literacy, railway transport, and the like, fill out the picture of rapid economic development.

Hong Kong provides another specific illustration of rapid growth, despite the presence within its boundaries of three of the features often said to reinforce the cumulative process of poverty perpetuating itself, namely, lack of natural resources, heavy pressure of population, and very restricted domestic markets.

Sources of Confusion

It is tempting to consider the reasons for the apparent rejection of the evidence of past and contemporary economic experience which is implicit in the espousal of the model of stagnation. But this is not the occasion to venture on the perilous seas of the sociology of knowledge. One point, however, may be made. The underdeveloped countries are clearly poor by the standards of North America and Western Europe; indeed, this constitutes the definition of underdevelopment. The tenor of the discussions centering around the vicious circle of poverty suggests a confusion between a low level of economic achievement and a zero (or low) rate of change in economic performance. It is clearly improper to identify a *level* with a *rate of change*. The unwarranted identification of a level and rate of change, or rather the confusion of the two, is especially remarkable at a time when mathematical techniques are being widely used by economists, including writers on underdeveloped countries who espouse the notion of the vicious circle of poverty and stagnation. Such a confusion is analogous to an identification of a child and a dwarf.

In many underdeveloped countries, with low levels of real income, some of the most burning and difficult problems of policy derive in fact from the rapidity of economic advance, particularly where, as is almost invariably and necessarily the case, growth does not manifest itself equally in all sectors or regions of an economy. Rapid and uneven change presents formidable problems to governments; but these problems are entirely different from those of

stagnation. Problems of changes in land tenure arrangements and in property rights and inheritance, problems of congestion and delay in ports and on the railroads, and problems of detribalization and the transformation of a subsistence into a money economy—these are pressing problems in a number of underdeveloped countries, and they would not arise in a stagnant economy caught within the coils of a vicious circle of poverty.

Reference should be made, in parentheses, to the measurement of economic progress. It is customary to use the yardstick of national income per head of population. This is perhaps convenient to indicate orders of magnitude. But too much must not be read into such indices of levels of economic achievement, or into derived statistics of rates of change. In many parts of the world economic progress has meant the suppression of slavery, tribal warfare, and the worst epidemic and endemic diseases; moreover, the whole flavor of life has been changed with the growth of cities and the development of communications, and with the replacement of local self-sufficiency by the possibilities of exchange. The qualitative nature of these changes cannot be reflected in statistics of national income, and the achievements of growth are likely to be understated. Moreover, emphasis on *per capita* income diverts attention from changes in the number of people sustained in an economy. Yet it is surely an achievement for an economy to sustain a larger population at a given average standard of living, just as it is an achievement to sustain the same number at a higher average standard of living. Increases in population throughout the underdeveloped world during the last half century largely reflect a fall in the death rate, itself more or less directly the consequence of economic advance. This is not reflected, however, in statistics of *per capita* national incomes; yet the position of those who have failed to die has certainly improved, as has the situation of those whose children continue to live. Concentration on per capita income figures implies a criterion of economic advance which registers the birth of a calf or the survival of a cow as a contribution to economic progress (since it constitutes capital formation), but the birth of a child or the survival of a person as a detraction from it, since the denominator in the index is enlarged.

Relationship between Capital and Growth

In the model of the vicious circle, capital formation appears as the engine of economic growth; and it is the low-income obstacle to capital formation which obstructs growth. No one would wish to dispute that there is a strong link between capital accumulation and economic growth or level of economic achievement, and that the level of capital is relatively low in underdeveloped countries (*3*). But the functional relationship between capital (as the independent variable) and economic growth (as the dependent variable) is seriously open to question; and it is this relationship which is implicit in the model. A few points will illustrate the shortcomings of this approach.

In the course of economic development many changes take place in the factors of production other than in the volume of capital. The aggregate size and the regional distribution of population change; wants, values, techniques, and attitudes are modified, including the attitude toward work and leisure; and skills are acquired. Some of these changes call for additional capital; others enable capital to be used productively; yet others require comparatively little additional capital, or may indeed economize in capital. And almost invariably there also occur major changes in the composition of both the stock of capital and of investment (*4*). Moreover, much of capital formation is not designed or destined to increase production, and hence future incomes, but represents expenditure of present income on durable goods. Examples include investment in houses, schools, public buildings, automobiles, and domestic equipment. This type of capital formation is a function of income, rather than the other way round. Capital formation and changes in the composition of capital are elements in the complicated web of economic change. It is misleading to single out capital formation as the key causal element or independent variable in the process. It is more illuminating to suggest that capital is created in the process of development rather than to suggest that development is a function of capital accumulation.

The assignment to capital of the key causal role in economic development has sometimes had unfortunate practical effects. The difficult problems connected with the *investment* of capital—for example, the selection of projects and undertakings—are apt to be ignored or treated lightly when it is believed that the *quantity* of capital accumulated and invested is what really matters. The aggregation of numerous acts of investment into a single aggregate, called capital formation, is expedient for the builder of models or the national planners; but it may lead to a misplaced emphasis on quantitative totals rather than on qualitative composition, which is conducive to waste of scarce resources. A specific example may illustrate these points. It is a familiar feature in many underdeveloped countries that it is easier for government departments to secure official approval to spend large sums on a specific investment project than it is for them to obtain approval for much smaller amounts for the investigation of possible investment projects or for maintenance expenditures to keep existing projects going.

Indeed, the habit of regarding development as dependent on investment has been responsible for much waste in the underdeveloped world. It has encouraged investment expenditure, especially by public bodies, practically regardless of cost in terms of alternative uses of resources, and regardless also of the repercussions of the taxation required for the collection of these funds. Yet expenditure does not become productive simply by being termed investment. This attitude of mind also tends to issue in a neglect of various government functions essential to economic development, but not requiring large-scale investment. The maintenance of law and order, the extension of knowledge, the efficient management of the supply of money, are among such functions.

Relationship between Saving and Income

The usual growth models, and notably that underlying the vicious circle of poverty, regard saving as an increasing function of income. While this is often a reasonable first approximation, the nature of the link is not so simple or general as is postulated in these models. Throughout the world innumerable originally poor individuals and groups have improved their economic position by foresight, thrift, and

the perception and exploitation of economic opportunity, which shows that low incomes do not set up an inexorable constraint on saving. An important set of examples of much significance in economic development is the rise to prosperity of communities of originally penniless immigrants. This is a familiar phenomenon, nowhere more in evidence, of course, than in North America. The contribution to capital formation of formerly indigent immigrant communities of Chinese, Indians and Lebanese in parts of Southeast Asia and Africa is more recent but just as striking. But there is no need to confine examples to immigrant communities. The establishment and extension of peasant small holdings on previously uncultivated land for the cultivation of crops for consumption by the cultivators or for sale, represents capital formation which both precedes and promotes a subsequent growth of income.

Thus, even in closed economies, that is, economies unaffected by economic intercourse with other economies, the model underlying the vicious circle of poverty fails to account for important factors and developments. And these defects are underlined and reinforced by the implications of international economic intercourse.

Beyond Conventional Economic Analysis

In a closed society operating at a low level of achievement, the model may indeed truly represent the basic facts of the situation in the absence of internal disturbing forces and of international contacts. If there is nothing to change the nature of the chosen relationships, then the results postulated by them will follow. But once the possibility, or indeed the likelihood, of internal disturbances or of external contacts is recognized, the low level stagnation no longer represents a stable equilibrium, and, as already noted, both the existence of developed countries and recent progress in many underdeveloped countries are ample evidence of the importance of such internal or external disturbances practically throughout the world. The emergence of opportunities originating from abroad in the form of new markets, new techniques, or new wants, is important among the influences upsetting stable relationships and leading to economic development. The emergence of these opportunities is essentially outside the range of the conventional tools of economic analysis, which makes it difficult to fit them into conventional economic models. But to deny their relevance and importance, as is implicit in the model of the vicious circle of poverty, is to assume away the problem. Also, it is historically inaccurate to suggest, as do some economists, that only a large-scale disturbance introduced by the state itself (usually by means of public investment financed from the proceeds of taxation or foreign aid) can successfully break the circle. Such a policy may succeed, though it need not necessarily succeed. Much more important, on both theoretical and practical grounds, is the fact that, as we have noted, other less spectacular methods have frequently, indeed generally, achieved the same purpose.

Economic development has often been stimulated and promoted by new and enlarged opportunities for the production or sale of goods and services, or for increased or more varied consumption. Such opportunities have often arisen through contacts with more advanced economies, which have stimulated new wants, brought new methods or crops to the notice of the population, or encouraged new sources of supply or opened up new markets for the disposal of output. Again, new opportunities for production, exchange, and consumption have emerged following the establishment of law and order, or the unification of a territory through the introduction of a common currency. Communities, groups, and individuals have differed widely in their responses to such new prospects and opportunities in effecting the required changes in modes of behavior and in institutional arrangements. These differences are obviously of great importance; yet the economist is not specially equipped to account for them.

But whenever there is some response, as is usually the case, these opportunities promote economic development by influencing the relationships between the variables isolated in the model of the vicious circle. For instance, the rate of saving does not depend simply on the level of income (as is generally implied in the usual formulation of the thesis of the vicious circle of poverty and stagnation), but is also much affected by investment opportunities. In the words of Albert O. Hirschman, "Additions to savings depend more on the opening up of investment opportunities and on the removal of various obstacles to investment activity than on increased income" (*5*). Because people invest to secure higher incomes, the relevance of investment opportunities is clear. Again, saving and investment can be promoted by the expectation of a higher and more varied level of consumption. People often save in order to invest to secure subsequently a higher income and improved standard of consumption. The prospects of a higher and more varied level of consumption depend partly on the range of available goods and services. The knowledge of new and attractive consumer goods often stimulates a higher rate of saving and investment out of a given income, and also often induces additional effort; in other words, it stimulates higher economic performance. In short, when new opportunities are available, and are pursued, it is inappropriate to work with a model which implies a static relationship between income, saving, and consumption.

Economic Analysis and Policy Prescription

The observed growth in many underdeveloped countries, without drastic internal measures or massive foreign aid, destroys the validity of propositions which often serve as bases for policy proposals; but it does not in itself resolve problems of economic policy in this sphere. In any event, prescriptions for policy, especially when these are so far-reaching as to affect the fabric of society, cannot be drawn directly from economic analysis. In the economics of underdeveloped countries, even more than in other branches of the subject, analysis and prescription have been confused, and this confusion has seriously impeded the development of analysis. The desire to offer prescriptions for policy seems to have caused many economists in this field to skimp on the work of observation and the testing of hypotheses, an attitude which has been reinforced by the tendency in economics to consider careful observation of phenomena and the testing of hypotheses (where it is possible) as trivial activity. These defects in approach largely explain the persistence of the manifestly untenable hypothesis of the vicious circle of poverty and stagnation. It is not necessary to dwell on the misleading nature of this kind

of approach in a journal addressed primarily to natural scientists. Students of applied economics have much to learn from the careful, painstaking, and patient researches of the natural scientists. We may fittingly conclude with some observations by Herbert Dingle, one of the most perceptive British historians of science, whose exhortations economists, especially those working in the sphere of underdeveloped countries, will do well to remember:

"We need to cultivate the restraint of Galileo, who left the world of angels and spirits until the time should come when it could be explored, and contented himself with such principles as he could extract with confidence from experience, though the resolution committed him to such trivialities as the timing of balls rolling down grooves. It is that self-control—the voluntary restriction to the task of extending knowledge outwards from the observed to the unobserved instead of imposing imagined universal principles inwards on the world of observation—that is the essential hallmark of the man of science, distinguishing him most fundamentally from the non-scientific philosopher" (*6*).

References and Notes

1. R. Nurkse, *Problems of Capital Formation in Under-Developed Countries* (Oxford Univ. Press, Oxford, England, 1953), pp. 4–5.
2. "A study prepared at the request of the Special Committee to Study the Foreign Aid Program, United States Senate, by the Center for International Studies, Massachusetts Institute of Technology" (Washington, D.C., 1957), p. 37.
3. The level of capital formation in underdeveloped countries is often understated, because of the exclusion from the statistics of agricultural capital formation by small farmers. This exclusion reflects either the practical difficulty of measuring capital formation in this type of activity or the tendency to equate capital formation with investment in large-scale or otherwise easily identifiable undertakings. (This latter tendency, in turn, may reflect the common but often mistaken view that peasant farmers are too poor, too hidebound by tradition, and too limited in foresight to save and invest productively.) The seriousness of this omission is clear from the development of peasant agricultural production for sale (both for local consumption and for export) in many underdeveloped countries; and this implies the development of large areas of peasant holdings under cash crops—that is, substantial direct investment in agriculture.
4. The importance of changes in the composition of capital may be illustrated by reference to the Industrial Revolution in England. T. S. Ashton, a distinguished British economic historian, writes of 18th-century England that ". . . the speeding up of production and distribution by the new machines and new means of transport made it possible to transmute circulating into fixed capital. The process is at the centre of what is called the industrial revolution." [*An Economic History of England: The Eighteenth Century* (Methuen, London, 1955), p. 112.]
5. A. O. Hirschman, *The Strategy of Economic Development* (Yale Univ. Press, New Haven, Conn., 1958), p. 32.
6. H. Dingle, *Monthly Notices Roy. Astronom. Soc.* **113**, 407 (1953).

Reoviruses

A new group of respiratory and enteric viruses formerly classified as ECHO type 10 is described.

Albert B. Sabin

The prototype (originally designated HE type 4 virus) of ECHO type 10 virus ("Lang" strain) (*1*) and four other closely related strains were first isolated and identified in this laboratory in 1954, from the stools of healthy children in Cincinnati (*2*) and Mexico (*3*). Subsequently, antigenically related strains were recovered from a spontaneous outbreak of rhinitis in chimpanzees (*4*), from a family outbreak of steatorrheic enteritis (*4*), from children with diarrhea (*5*), and from several outbreaks of illness in a nursery in Washington, D.C. (*6*). The sera of most human adults as well as of some monkeys, rabbits, and guinea pigs contain neutralizing antibodies, and antigenically related viruses have been recovered from monkeys (*7, 8*) and recently also from naturally infected calves (*9*).

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Differentiation from Other Viruses

The inclusion of this virus in the ECHO group was originally based on its origin from human stools, its optimal isolation in monkey-kidney tissue cultures, and the lack of pathogenicity of the initial strains for newborn mice, guinea pigs, rabbits, and monkeys. It was soon found (*10*), however, that the viruses of the ECHO 10 group were much larger (about 75 mμ) than the other ECHO viruses, the Coxsackie viruses, and the polioviruses in the group of enteroviruses that had been measured by filtration through gradocol membranes (about 18 mμ or smaller).

The cytopathogenic effect in monkey-kidney tissue cultures produced by strains of the ECHO 10 group was distinctive and different from that produced by all other enteroviruses. Furthermore, ECHO 10 virus was found to have a cytopathogenic effect in primary cultures from the kidneys of guinea pigs, cats, and dogs, and to a lesser extent from those of rabbits and calves, in which the other enteroviruses were without effect (*11*). Subsequent work also indicated that the prototype ECHO 10 virus was capable of yielding a variant that was pathogenic for newborn mice, with production of lesions in the brain, myocardium, and liver (*10, 12*), and that large doses of tissue-culture virus of some other strains exhibited a similar pathogenic effect on primary inoculation in newborn mice (*13*). It was also reported that low concentrations of periodate which were without effect on the receptors of human group O erythrocytes for the hemagglutinins of other ECHO viruses, as well as for those of influenza virus, completely destroyed the receptors for the ECHO 10 virus hemagglutinin (*14*).

Of all the properties which distinguished the ECHO 10 group of viruses from the other members in the group of enteroviruses, its large size seemed most important. Since the size of many of the Coxsackie and ECHO viruses was not known, and since size was not