population densities in agriculture, seems needlessly large. Moving large numbers of people from rural to urban occupations requires an increase in the supply of foodstuffs and agricultural raw materials to the industrial, urban sector. If these increased requirements for food and agricultural raw materials are not met by increased domestic production, they must be met by imports, increasing the burden on the industrial sector. Any country that ignores agricultural improvement in the course of economic development does so at its peril, as one socialist country after another has learned. In short, industrialization and agricultural improvement are not alternative roads to economic development, but are completely complementary.

15 Balanced versus Unbalanced Growth

The last few years have brought a concentrated attack on "gradualism" and "incrementalism" as an approach to economic development policy. Any such approach is foredoomed to failure, the argument goes: by its very nature, the development process is a series of discontinuous "jumps." The functional relationships among the causal factors in economic growth are full of "lumps" and "discontinuities"; hence a minimum effort or "big push" is needed to overcome the original inertia of the stagnant economy and start it moving toward higher levels of productivity and income. To explain this basic concept, economists often resort to analogy. Leaning on a stalled car with gradually increasing weight will not get it started, for it needs a big push.

Essentially, all the arguments in support of the "big push" are related to the old idea of "external economies": benefits which accrue to the society as a whole, or to some members of it, in a fashion that does not bring a direct return to the investor concerned.[1] The basic concept is thus an old one. What is new is the importance attached to it in theories of development.

[1] This somewhat loose and general definition of external economies has been chosen deliberately over the more rigorous definitions available in the literature. For economic development the important consideration is that certain investments are clearly "profitable" for the society as a whole, but are unprofitable to the individual private investor because the institutional framework does not permit him to charge a price for the by-product benefits his investment brings. It has not seemed worthwhile to digress here on the history of ideas about external economies or to try to unravel the contemporary discussion of the concept.

Rosenstein-Rodan and the Three Indivisibilities

One of the earliest and most often cited statements of the importance of discontinuities, or external economies, in economic development was Paul N. Rosenstein-Rodan's article published in 1943.[2] In this early statement, Rosenstein-Rodan stressed the limitations imposed by the size of the market. More recently, he has restated his argument in terms of "three indivisibilities."[3] The stress upon external economies, Rosenstein-Rodan argues, is a major mark of the difference between static theory and a theory of growth. In static theory, external economies are relatively unimportant. But in a theory of development,

> . . . external economies abound because given the inherent imperfection of the investment market, imperfect knowledge and risks, pecuniary and technological external economies have a similarly disturbing effect on the path towards equilibrium. While the distinction between pecuniary and technological external economies becomes practically irrelevant in the theory of growth, three different kinds of indivisibilities and external economies may be distinguished.
> 1) Indivisibilities in the production function especially the indivisibility of supply of Social Overhead Capital (lumpiness of "capital").
> 2) "Indivisibility" of Demand (complementarity of demand).
> 3) "Indivisibility" (kink in the) "Supply of Savings."
>
> [Because of these indivisibilities] Proceeding "bit by bit" will not add up in its effects to the sum total of the single bits. A minimum quantum of investment is a necessary (though not sufficient) condition of success. This is in a nutshell the contention of the theory of the big push.

Thus in contradiction to traditional static equilibrium theory, development theory maintains that nature does make jumps (*natura facit saltus*). Why the difference? Because development theory is more realistic in taking account of indivisibilities and "non-appropriabilities" in the production functions, because a growth theory must examine the *path* to equilibrium and not just the equilibrium conditions, and because in underdeveloped countries, markets—especially investment markets—are more imperfect than in developed countries.

Indivisibilities in the Production Function (Lumpiness of Capital)

Social overhead capital (power, transport, communications, housing, etc.) is the most important instance of indivisibility and external economies on the supply side. Its most important products "are investment opportunities created in other industries." Moreover, they usually require "a great minimum size," so that "excess capacity will be unavoidable over the initial period in underdeveloped countries." Social overhead capital is irreversible in time. It must precede other directly productive investment.

[2] P. N. Rosenstein-Rodan, "Industrialization of Eastern and Southeastern Europe," *The Economic Journal*, 1943.

[3] P. N. Rosenstein-Rodan, *Notes on the Theory of the "Big Push,"* M.I.T., CIS, March, 1957

Its services cannot be imported. Investments in the "infrastructure"—to use another common term for social overhead capital—have a high minimum durability, a long gestation period, and a minimal "industry mix" of several different kinds of public utilities.

Indivisibility of Demand

The indivisibility of demand was stressed in Rosenstein-Rodan's original article and later given wider publicity by Professor Ragnar Nurkse.[4] The basic idea is that investment decisions are interdependent, and individual investment projects have high risk because of uncertainty as to whether their product will find a market. Rosenstein-Rodan uses an example which has by now become famous:

> Let us restate our old example, at first for a closed economy. If a hundred workers who were in disguised employment (i.e., with marginal productivity of their labor equal to zero) in an underdeveloped country were put into a shoe factory, their wages would constitute additional income. If the newly employed workers spent all of their additional income on shoes they produce, the shoe factory would find a market and would succeed. In fact, however, they would not spend all of their additional income on shoes; there is no "easy" solution of creating in this way an additional market. The risk of not finding a market reduces the incentive to invest—the shoe factory investment project will probably be abandoned. Let us vary the example: instead of a hundred (unemployed) workers in one shoe factory, let us put ten thousand workers in say one hundred factories (and farms) who between them will produce the bulk of such (wage) goods on which the newly employed workers will spend their wages. What was not true in the case of one single shoe factory will become true for the complementary system of one hundred factories (and farms). The new producers would be each others' customers and would verify Say's Law by creating an additional market. The complementarity of demand would reduce the risk of not finding a market. Reducing such interdependent risks increases naturally the incentive to invest.

Rosenstein-Rodan also points out that a minimum quantum of investment is needed to produce a "bundle" of wage goods on which additionally employed workers can spend their income. In general, unless there is assurance that the necessary complementary investments will occur, any single investment project may be considered too risky to be undertaken at all. There is, in other words, an indivisibility in the *decision-making* process. The present writer would be inclined to stress this indivisibility, perhaps more than Rosenstein-Rodan does. Allocation of capital on the basis of individual estimates of short-run returns on various marginal investment projects is the very process by which underdeveloped countries got where they are. The basic reason for government action to promote development is that each of a set of individual private investment decisions may seem unattractive in itself, whereas a large-scale investment program undertaken as a unit may yield substantial increases in national income.

[4] Ragnar Nurske, *Problems of Capital Formation in Underdeveloped Countries* (Oxford, 1953).

True, the government may be able to arrange for this lump-sum investment to be made by groups of private entrepreneurs; whether it should be done this way or through public investment is a matter of administrative convenience, not of economics. But the needed investment is unlikely to take place without government intervention in the decision-making process.

Rosenstein-Rodan makes a related point in referring to the "psychological indivisibilities" involved in development. "Isolated and small efforts may not add up to a sufficient impact on growth," he maintains, and "an atmosphere of development effervescence may also arise only with a minimum speed or size of investment."

Finally, Rosenstein-Rodan agrees with the writers discussed in Chapter 13 that international trade is not always a means of avoiding the necessity of a "big push." International trade may reduce the range of fields in which the big push is required; some of the needed wage goods, for example, can be imported. But the history of the nineteenth century is evidence enough that trade does not eliminate the need altogether.

The Low-level Equilibrium Trap

A similar theory has been developed by Richard R. Nelson. Since Nelson's version of the theory is presented in an article, it is already highly compressed and hence difficult to summarize. Readers who find this summary too sketchy to be persuasive should turn to the original article.[5]

Nelson uses an essentially simple model with three equations. First, there is an income determination equation. This is fundamentally the same as the "production function" which kept recurring in the various models in Part II: income depends on the stock of capital, the size of the population, and the level of technique. (The labor force is assumed to bear a constant relationship to the size of the population.) Second, net investment consists of savings-created capital plus additions to the amount of land under cultivation. The savings-created portion is roughly the same as investment in the industrial sector; it represents additions to stock of tools and equipment. No such investment will take place until income rises above the subsistence level, after which it rises with per capita income. The amount of new land brought under cultivation tends to increase with the population, but cultivating fresh areas becomes more difficult as good land becomes scarce. There is a "floor" to disinvestment; "one cannot eat torn-up railroad track no matter how hungry one gets." Finally, there is a population growth equation:

> In areas with low per capita incomes short-run changes in the rate of population growth are caused by changes in the death rate, and changes in the death rate are caused by changes in the level of per capita income. Yet once per capita income reaches a level well above subsistence requirements, further increases in per capita income have a negligible effect on the death rate. The result is a curve of population growth similar in shape to the dP/P curves [in Figure 15-1. The sharp break] is artificial but simplifies exposition . . . A shift in income distribution towards greater equality (or improved medical technique) shifts the function to the left along the Y/P axis.

[5] R. R. Nelson, "A Theory of the Low-Level Equilibrium Trap," *American Economic Review*, December, 1956, pp. 894–908.

With these three sets of relationships it is easy to see that an economy may be "trapped" at a low level of income, as illustrated in Figure 15–1.

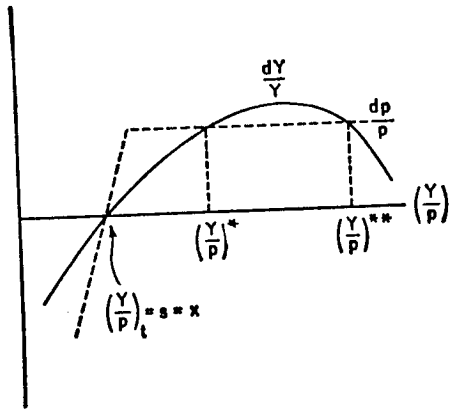

Figure 15–1

It is necessary only for the rate of increase in population, dP/P, to exceed the rate of increase in income, dY/Y, at a level of national income close to subsistence. For the intersection of the dY/Y and dP/P curves at a level of per capita income, Y/P, equal to S provides a stable equilibrium at that level. Any tendency for income to rise leads to a more rapid increase in population, forcing the economy back to S.

The conditions "conducive to trapping," Nelson points out, are (1) a high correlation between the level of per capita income and the rate of population growth; (2) a low propensity to direct additional per capita income to increasing per capita investment; (3) scarcity of uncultivated arable land; and (4) inefficient production methods. Clearly, in a good many underdeveloped countries, these conditions have been met in the past.

Getting out of the trap requires increasing the rate of growth of income to levels higher than the rate of increase in population. The surest way to do this—returning to Leibenstein—is to promote rates of growth of national income in excess of 3 per cent per year. If a jump can be made to the point, Y/P^*, sustained growth will take place, without further government action, until the high level, Y/P^{**}, is reached.

Balanced Growth

In presenting his version of the minimum effort thesis, Ragnar Nurkse advocates "a frontal attack . . . a wave of capital investments in a number of different industries," which he calls "balanced growth." [6] Hans Singer and Albert Hirschman have criticized Nurkse's formulation; they insist that what is needed is not balanced growth but a strategy of judiciously unbalanced growth.

The Nurkse Thesis

Nurkse's basic argument resembles Rosenstein-Rodan's; indeed he cites Rodan's famous example of the shoe factory to support his case. Low real income, Nurkse says, "is a reflection of low productivity, which in turn is due largely to lack of capital. The lack of capital is a result of the small capacity to save, and so the circle is complete." The inducement to invest, in turn, is limited by the size of the market—a "modern variant" of Adam Smith's dictum that "the division of labour is limited by the extent of the market." But a crucial determinant of the size of the market is productivity; capacity to buy means capacity to produce. And productivity "depends largely, though by no means entirely, on the degree to which capital is used in production. . . . But, for any individual entrepreneur, the use of capital is inhibited, to start with, by the small size of the market." Another vicious circle.

How to escape? We cannot count on individual investment decisions to do the trick. "Even though in economically backward areas Say's Law may be valid in the sense that there is no deflationary gap, it never is valid in the sense that the output of any single industry, newly set up with capital equipment, can create its own demand." Technical discontinuities call for "jumps" in the rate of output, but "the small and inelastic demand in a low-income country tends to make such jumps risky, if not altogether unpromising."

Thus the only way out of the dilemma is "more or less synchronized application of capital to a wide range of different industries. Here is an escape from the deadlock; here the result is an over-all enlargement of the market. . . . Most industries catering for mass consumption are complementary in the sense that they provide a market for, and thus support, each other. . . . The case for 'balanced growth' rests on the need for a 'balanced diet.' "

This is the essence of Nurkse's argument. Two subsidiary points might be noted in passing. First, Nurkse contends (correctly, in the opinion of the present writer) that the choice between public and private enterprise for achieving the required bundle of investment is mainly a matter of administrative expediency. Second, Nurkse joins the growing list of "development economists" who deny that international trade provides an automatic escape from the limitations of the domestic market: "To push exports of primary commodities in the face of an inelastic and more or

[6] Nurkse, *op. cit.*, chap. I; see also, p. 5.

less stationary demand would not be a promising line of long-run development." He makes a case for building up import-replacing industries behind a tariff wall and points out that the *ultimate* result need not be a reduction in imports—even of goods first receiving protection. He cites Canada for illustration: there "textile manufacturing was one of the first industries to develop, with the aid of tariff protection from 1879 on; yet Canada to-day is one of the world's biggest importers of textile manufactures." [7]

The Singer Critique

Hans Singer has expressed grave doubts about the applicability of this thesis. To understand the problem of balanced growth, Singer asserts, "we have to construct some kind of fundamental structural picture—model if you like—of an underdeveloped country." [8] He defines an underdeveloped country as one with 70 to 90 per cent of the employed population in agriculture, and adds, "Arthur Lewis has defined the process of economic growth as one of transforming a country from a 5 percent saver to a 15 percent saver. We can, with equal justice, define the process as one of transforming a country from an 80 percent farmer to 15 percent farmer." The high proportion of population in farming is another of the vicious circles: it reflects low productivity. "The low level of productivity in farming decrees that the bulk of the people must be in farming in order to feed and clothe themselves, and that they have little to spare over and above their own needs." By writ of Engel's law, a high percentage of low incomes is spent on food and essential clothing, and the demand for other things is "limited to a very small percentage of a very small income." There is thus only a tiny market for these other things and investment in producing them is not attractive. Underdeveloped countries are also, as a rule, net exporters of agricultural goods and net importers of other products.

To make matters worse, productivity in agriculture is significantly lower than productivity in the small industrial sector. "In fact for a surprising number of countries figures come remarkably close to a constant relation of the form, $A = 2/3\ N$, where 'A' is output per employed person in agriculture and 'N' is output per employed person in the economy as a whole." From this fact follows an arithmetic law "of considerable political and emotional significance: if an 80 percent farmer economy produces only two thirds of its national per capita average in the agricultural sector, the differential between the agricultural sector and the non-agricultural sector will be much larger than will be the case in a 15 percent farmer economy (i.e., a typical advanced economy) which also produces two thirds of its

[7] *Ibid.*, pp. 10, 11, 22. In putting his argument in this unqualified manner, Nurkse opens himself to Haberler's criticisms of the arguments regarding deteriorating terms of trade. Not *all* primary products face an inelastic demand; there is good reason to believe that the demand for natural rubber or petroleum would prove highly elastic in face of significant price reductions. There is still less reason to believe that demand for such products remains "more or less stationary" in an expanding world market.

[8] Hans Singer, "The Concept of Balanced Growth and Economic Development: Theory and Facts," University of Texas Conference on Economic Development, April, 1958, pp. 4, 6.

national average in the agricultural sector. In fact, in the underdeveloped country output per worker outside agriculture compared with agricultural output per worker would be in the ratio of 3:1." Thus a transformation from mainly agriculture to mainly non-agriculture is not only an essential part of the development process, but this structural change also has a "multiplier effect." "As the levels of productivity and of real demand and markets rise, the structural change from an 80 percent farmer economy towards a 15 percent farmer economy, made possible by this rise, will in its turn generate forces which will themselves tend to raise productivity and real incomes." This hen-and-egg riddle, Singer maintains, is "the starting point of the doctrine of balanced growth." The doctrine might be expressed by paraphrasing a metaphor coined in a different context: "100 flowers may grow where a single flower would wither away for lack of nourishment."

Singer agrees that the slogan, "stop thinking piecemeal and start thinking big" is sound advice for underdeveloped countries, but he also feels that there are "several areas of doubt" about the balanced growth theory in its Rodan-Nurkse form. First, if that is interpreted to counsel underdeveloped countries to embark on large and varied packages of *industrial* investment, with no attention to agricultural productivity, it can lead to trouble. Engel's law "certainly does *not* say that the demand for food does not increase at all" when incomes rise, especially when incomes rise from the low levels existing in underdeveloped countries. The big push in industry may have to be accompanied by a big push in agriculture as well, if the country is not to run short of foodstuffs and agricultural raw materials during the transition to an industrialized society that could perhaps obtain these goods in exchange for industrial exports. Once this fact is admitted, the balanced growth doctrine sounds more like the orthodox theory that "structural change must rest on a foundation of raising productivity within the existing structure . . . until real incomes have risen to a level which justifies structural change."

But when we start talking about varied investment packages for industry and "major additional blocks of investment in agriculture" at the same time, we run into serious doubts about the capacity of underdeveloped countries to follow the balanced growth path. Singer quotes Marcus Fleming: "whereas the balanced growth doctrine assumes that the relationship between industries is for the most part complementary, the limitation of factor supply assures that the relationship is for the most part competitive." [9] Singer adds: "the resources required for carrying out the policy of balanced growth . . . are of such an order of magnitude that a country disposing of such resources would in fact not be underdeveloped." The doctrine is premature rather than wrong, Singer concludes; it is applicable to a subsequent stage of sustained growth rather than to the breaking of a deadlock. For *launching* growth "it may well be better development strategy to concentrate available resources on types of investment which help to make the economic system more elastic, more capable

[9] Marcus Fleming, "External Economies and the Doctrine of Balanced Growth," *The Economic Journal*, June, 1958.

of expansion under the stimulus of expanded markets and expanding demand." [10] He instances investment in social overhead capital and removal of specific bottlenecks as examples of such "strategic" investments.

The fundamental trouble with the balanced growth doctrine, Singer concludes, is its failure to come to grips with the true problem of underdeveloped countries, the shortage of resources. "Think Big" is sound advice to underdeveloped countries but "Act Big," is unwise counsel if it spurs them to effort to do more than their resources permit.

One final point of Singer's will serve as a bridge to our next section. The balanced growth doctrine, he says, assumes that an underdeveloped country starts from scratch. In reality, every underdeveloped country starts from a position that reflects previous investment decisions and previous development. Thus at any point of time there are highly desirable investment programs which are not in themselves balanced investment packages, but which represent unbalanced investment to complement existing imbalance. And once such an investment is made, a new imbalance is likely to appear which will require still another "balancing" investment, and so on. Is this not a perfectly good way to develop?

Hirschman's Strategy of Unbalance

Albert Hirschman, at any rate, thinks that it is. He carries Singer's idea further, and contends that *deliberate unbalancing* of the economy, in accordance with a predesigned strategy, is the *best* way to achieve economic growth.[11]

On many points, Hirschman agrees with both Nurkse and Singer. He does not deny the need for a big push. On the contrary, he argues that "ability to invest" is the one serious bottleneck in underdeveloped countries; he readily agrees that ability to invest depends mainly on how much investment has already been made. "The ability to invest," he says, "is acquired and increased primarily by practice; and the amount of practice depends in fact on the size of the modern sector of the economy. In other words, an economy secretes abilities, skills, and attitudes needed for further development roughly in proportion to the size of the sector where these attitudes are being inculcated." He stresses the "complementarity" among investments no less than Nurkse, maintaining that it is of much greater importance in underdeveloped than in advanced countries. He also agrees that analysis based on static assumptions can be very misleading when applied to underdeveloped countries. Thus he says of Aubrey's argument, that industrialization should take the form of small industries in small towns in order to economize on overhead capital outlays,[12]

This position is of course entirely valid on the assumption that the supply of capital is fixed. But if we drop this assumption and let ourselves be guided by

[10] Singer, *op. cit.*, p. 10.

[11] Albert Hirschman, *The Strategy of Economic Development* (New Haven, 1958), p. 36.

[12] H. Aubrey, "Small Industry in Economic Development," *Social Research*, September, 1951.

the rule that during a prolonged phase the essence of development strategy consists in maximizing induced decision-making, then we would favor rather than oppose the establishment of industries in cities precisely because it compels additional or complementary capital formation that otherwise might never have taken place. Obviously, what we are opposing here is not the principle of husbanding capital in general but a policy which in the name of this principle would reduce the stimuli and pressures toward additional capital formation that might emanate from the investments of a given period. Such a policy would . . . "economize" on capital *formation* rather than on capital!

Hirschman also agrees with Singer that application of the balanced growth theory "requires huge amounts of precisely those abilities which we have identified as likely to be very limited in supply in underdeveloped countries." Indeed he quotes an earlier statement of Singer's: "The advantages of multiple development may make interesting reading for economists, but they are gloomy news indeed for the underdeveloped countries." [13] He characterizes the balanced growth doctrine as "the application to underdevelopment of a therapy originally devised for an underemployment situation." In an advanced country during depression, "the industries, machines, managers, and workers, as well as the consumption habits" are all present; in underdeveloped countries "this is obviously not so."

But if we need a big push to get an underdeveloped country off dead center, while at the same time such a country cannot manage simultaneously a balanced "investment package" in industry and the needed investment in agricultural improvements, what are we to do? Hirschman answers: undertake a big push in strategically selected industries or sectors of the economy. After all, he points out, the industrialized countries did not get where they are through "balanced" growth. True, if you compare the economy of the United States in 1950 with the situation in 1850 you will find that many things have grown; but not everything grew at the same rate throughout the whole century. Development has proceeded "with growth being communicated from the leading sectors of the economy to the followers, from one industry to another, from one firm to another." [14] Having concluded that the market mechanism will not guarantee growth in the now underdeveloped countries, we need not take "the defeatist view that growth has to be balanced from the start or cannot take place at all."

One of the shortcomings of traditional theory as a basis for development policy is the underlying assumption that the profitability of different investment projects is independent of the order in which they are undertaken. In fact, Hirschman maintains, such need not be the case. He gives the following example: suppose there are two projects, M and N, requiring equal amounts of capital and yielding 10 per cent and 8 per cent, respectively. Suppose further that the interest rate stands at 9 per cent. If investment is left to the market, only project M will be undertaken. Once it is in operation the return on project N rises to 10 per cent and so it, too, is launched. But it could perfectly well be, Hirschman argues, that if N had been undertaken first, despite the temporary loss in terms of market considerations, the return on M would rise to 14 per cent. Thus investors as a group—or the society as a whole—would be better off if they reversed the process that would result from independent market decisions. Moreover, the subsequent rate of growth would be faster; for once N was in place M would be rushed to completion, and in the next period other investments would become profitable because M was in operation, and so on. Hirschman admits that this example is artificial, but states that it embodies "a number of concepts that are recurring throughout this essay: the difference between 'permissive' and 'compulsive' sequences, the possible rationality of violating 'first things first' norms and the fact that the difficulty of taking a development decision is not necessarily proportional to the amount of capital it requires."

Hirschman analyzes these concepts in more systematic fashion with respect to the relationship between "directly productive activities," *DPA*, and social overhead capital, *SOC*. For this purpose he makes use of a special kind of diagram, reproduced here as Figure 15–2. Costs of new investment in *SOC* are measured on the horizontal axis, and costs of related output of *DPA* on the vertical axis. At the far right, *SOC* is plentiful and costs of

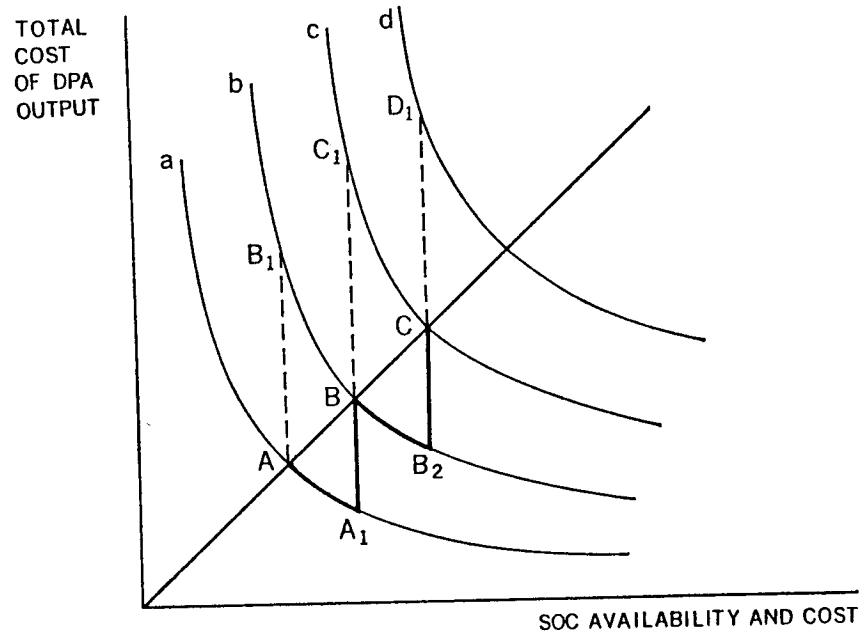

Figure 15–2

[13] Hans Singer, "Economic Progress in Underdeveloped Countries." Cf. Hirschman, *op. cit.*, chap. III.

[14] Hirschman, *op. cit.*, pp. 62–63.

DPA accordingly low. As we move left, costs for any given output of *DPA* rise, first slowly, then more rapidly. For convenience the curves are drawn so that the 45° line through the origin connects the optimal points on the curves. Thus "this line expresses the ideal of balanced growth of *DPA* and *SOC:* a bit of each at each step no doubt would result in the greatest economy of the country's resources."

The trouble is that "poor countries cannot always afford to be economical." The real scarcity, in Hirschman's view, is not the resources themselves "but the ability to bring them into play." To illustrate this principle, he makes the simplifying assumption that *SOC* and *DPA* cannot be expanded simultaneously, because of this limited ability to utilize resources. Thus the planning problem is to determine the *sequence* of expansion that will maximize *induced* decision making.

We might start either by expanding *SOC* or by expanding *DPA*. If we adopt the first course the economy will follow the heavy line AA_1BB_2C. We begin by increasing *SOC* from *A* to A_1, which induces increased *DPA* until balance is restored at *B*, with the whole economy on a higher level of output. We then increase *SOC* further—and can afford to do so because of the higher gross national product already achieved—to B_2; *DPA* follows to point C. Hirschman calls this process "development via excess capacity (of *SOC*)." If we take the other route we follow the dotted line AB_1BC_1C. We begin by increasing *DPA* to B_1; balance requires increasing *SOC* to *B*. Then *DPA* is expanded further to C_1, and *SOC* has to move to *C* to catch up. This route is labeled "development via shortage (of *SOC*)."

Either method of unbalanced growth yields an "extra dividend" of "induced, easy-to-take, or compelled decisions resulting in additional investment and output." Balanced growth (of *SOC* and *DPA*) is not only unattainable in most underdeveloped countries, it may not even be desirable. The rate of growth is likely to be faster with chronic imbalance, precisely because of the "incentives and pressures" it sets up.

Linkage

Having demonstrated the virtues of strategic imbalance, however, we are left with the problem of discovering what kind of imbalance is likely to be most effective. Any particular investment project may have both "forward linkage" (may encourage investment in subsequent stages of production) and "backward linkage" (may encourage investment in earlier stages of production). The task is to find the projects with the greatest *total* linkage. The projects with the greatest linkage will vary from country to country and from time to time, and can be discovered only by empirical studies of the "input-output matrix" variety.

Hirschman thinks that on balance operations that are somewhere in the middle of the production process are likely to have higher total linkage than operations at the beginning or end of the process. He presents a table presenting measurements of "linkage" (Table 15–1). The results must be taken with a grain of salt. The highest backward linkage appears in grain mill products, and one can hardly regard wheat and rice production as being "induced" by the existence of wheat and rice mills. Hirschman

TABLE 15–1

Average Degree of Interdependence of Economic Sectors in Italy, Japan, and and the United States

Sector	*Interdependence through purchases* from other sectors (backward linkage)*	*Interdependence through sales† to other sectors (forward linkage)*
1. "Intermediate manufacture" (backward and forward linkage both high):		
Iron and steel	66	78
Non-ferrous metals	61	81
Paper and products	57	78
Petroleum products	65	68
Coal products	63	67
Chemicals	60	69
Textiles	67	57
Rubber products	51	48
Printing and publishing	49	46
2. "Final manufacture" (backward linkage high, forward linkage low):		
Grain mill products	89	42
Leather and products	66	37
Lumber and wood products	61	38
Apparel	69	12
Transport equipment	60	20
Machinery	51	28
Non-metallic mineral products	47	30
Processed foods	61	15
Shipbuilding	58	14
Miscellaneous industries	43	20
3. "Intermediate primary production" (forward linkage high, backward linkage low):		
Metal mining	21	93
Petroleum and natural gas	15	97
Coal mining	23	87
Agriculture and forestry	31	72
Electric power	27	59
Non-metallic minerals	17	52
4. "Final primary production" (backward and forward linkage both low):		
Fishing	24	36
Transport	31	26
Services	19	34
Trade	16	17

* Percentage ratio of interindustry purchases to total production.

† Percentage ratio of interindustry sales to total demand.

SOURCE: Albert O. Hirschman, *Strategy of Economic Development* (New Haven, 1958).

points out that the highest aggregate linkage occurs for iron and steel, and suggests that perhaps underdeveloped countries are not so foolish or prestige-motivated as some critics have suggested in insisting on having iron and steel mills. Perhaps; but perhaps not. Interindustry tables of the sort shown in Table 15–1 do not really measure "linkage." The only meaningful concept of linkage would be investment-decisions up or down the line, which are prompted by creation of a particular industry. The fact that iron and steel plants, once in existence, buy a great deal from some industries and sell a great deal to others is no guarantee that setting up an iron and steel mill in "Esperanza" will lead to investment either in iron mines or in automobile production in that country.

This analysis leads Hirschman to suggest one more way of characterizing underdeveloped countries; they are countries "weak in interdependence and linkage." A ranking of countries in terms of the proportion of intersectoral transactions to total output would probably show a high correlation with both per capita output and proportion of population in manufacturing. Agriculture, especially peasant agriculture, is short on linkage effects. Primary production is low in backward linkage effects by definition; but agriculture and mining are low in forward linkage too. Here is the intuitive source of "the grudge against the 'enclave' type of development," for output of mines, oil wells, and plantations can "slip out of a country without leaving much trace in the rest of the economy." Similarly, "enclave" development in industries providing "finishing touches" may add little to gross national product or to employment.

However, Hirschman draws a distinction between the long-run effects of enclave export industries and of enclave import industries, a distinction which is of interest in the light of our discussion in Chapter 13 of the impact of foreign trade on development. Enclave export industries, he says, have great difficulty in breaking out of the enclave situation and producing "forward linkage" effects within the country. Such need not be the case with enclave import industries; "much of the recent economic history of some rapidly developing underdeveloped countries can be written in terms of industrialization working its way backward from the 'final touches' stage to domestic production of intermediate, and finally to that of basic, industrial materials." He mentions Brazil, Colombia, and Mexico as examples. He might also have included Japan.

He extends this argument to support of the case for protection or subsidization of import-replacing industries, at the right stage of development. Too early encouragement of import-replacers, he points out, may retard economic growth by depriving the country of the "backward" linkage provided by large-scale imports. And backward linkage is more reliable than forward linkage. There is some reason to believe that investment will take place in any industry where demand reaches a certain "threshold." While that threshold is being reached, it is good policy to leave the market to importers. But "it would be absurd to set up any model that would presume to indicate which kind of metal-fabricating industries would come into existence at what point of time in the wake of the establishment of a basic iron and steel industry." Forward linkage should be regarded as "an important and powerful reinforcement to backward linkage" rather than as "an independent inducement mechanism."

Thus Hirschman envisages a kind of "jacking up" process for the economy, using import industries for their backward linkage effects, and then jumping into the production of the import itself when the market reaches a sufficiently large size. When the "threshold" is reached, protection or sibsidies to import-replacing industries becomes good policy. The process of starting with final touches has brought a good deal of industrialization to underdeveloped countries, but "much is to be said for biting off as large pieces of value added at a time as the underdeveloped country can possibly digest."

When the whole process is put into an appropriately dynamic context, Hirschman concludes, we are led to a principle that could never be derived from traditional theory: countries tend to develop a comparative advantage in the articles they *import*. "If a country does not produce commodities A and B and if it is importing A in more rapidly increasing volume than B, then it is likely to undertake domestic production of A long before that of B and is acting quite rationally in doing so."

Thus foreign trade policy should go through clearly defined stages with respect to any one industry. In the "prenatal" stage "the opposite of the infant industry treatment is called for." It might even be advisable to restrict *other* imports, to build up an artificial market for the commodity "whose eventual domestic production is to be fostered." [15] Infant industry protection should be given only *after* the threshold is reached and a new industry has been established. Tax concessions are an "apt instrument" for such protection.

Balanced or Unbalanced Growth?

On the whole it is unfortunate that the concept of "balanced growth" was ever introduced into the literature of economic development. "Balance" sounds like something "good" in itself. Perhaps our earliest childhood fears are of losing our balance; as adults we tend to like "balanced" people and "balanced" budgets and "balanced" growth. Thus the emphasis on "balance" enables various people to make special pleas for their pet projects or programs within the development budget. Agricultural experts plead for "balanced" agricultural and industrial development, hoping to offset what they consider to be an excessive emphasis on industrialization. People interested in education and public health plead for "balanced" social and economic development, hoping thereby to increase the budgets for health and education. But there is no acceptable concept of "balance" that can be stated *a priori;* what constitutes the proper "balance" among sectors can be determined only after careful analysis. It is too bad that Nurkse did not make his last statement on balanced growth first; it might have saved a good deal of misunderstanding. For in his definitive statement on the subject, Nurkse says clearly that the concept applies only to directly pro-

[15] *Ibid.*, p. 122.

ductive investment and not to the social overhead sector. It applies strictly only to a closed economy, and applies at all only if export markets for major products are not expanding fast enough. It is an essay in development with unlimited supplies of capital. It is an application of the "classical law of markets," that supply creates its own demand. In short, it says that were foreign trade is not "an engine of growth" we cannot concentrate investment in one or a few industries, because the markets created thereby will be inadequate. We need investment on a broad front all at once. Given lumpiness in production functions, it means we need a lot of investment all at once; the "balanced growth" doctrine is another version of "the big push." [16]

In the years following the publication of Keynes' *General Theory*, economists wasted a great deal of time and energy debating the question, "Is savings always equal to investment, or is the difference between savings and investment the determinant of changes in income and employment?" The difference of opinion turned out to rest on nothing more fundamental than definitions of the basic concept; when the distinction was made between *ex ante* (planned) and *ex post* (realized) savings and investment, it became clear that the difference between *ex ante* savings and investment was indeed equal to (not really the cause of) the change in income from one period to the next, whereas *ex post* savings and investment were not merely equal but identical. The way was then cleared for the next step, which was to stop talking about *ex ante* and *ex post* altogether and to talk instead about savings, consumption, and investment functions. Let us hope that the controversy over "balanced versus unbalanced growth" can be solved in the same manner but with less loss of energy. It is important to distinguish between balanced growth as a technique of development and a goal; even Hirschman's zigzag growth must have some kind of "balance" as the ultimate aim. One might, that is, deliberately create *ex ante* imbalances in order to produce subsequent *ex post* balance at a higher level of per capita income. Once we recognize that we are not dealing with an "either-or" proposition, we can stop talking about balanced and unbalanced growth altogether, and talk instead about functional relationships among the major sectors and regions of an economy.[17]

[16] Ragnar Nurkse, *Equilibrium and Growth in the World Economy* (Cambridge, Mass., 1961).

[17] For further discussion of the issues raised in this chapter, see Paul Streeton, "Unbalanced Growth," *Oxford Economic Papers*, June, 1959; Tibor Scitovsky, "Growth: Balanced or Unbalanced," in Moses Abramovitz (ed.), *Allocation of Economic Resources* (Stanford, 1959); and Allyn Young, "Increasing Returns and Economic Progress," *Economic Journal*, December, 1928.

16 A Synthesis of Theories of Underdevelopment

In this chapter we shall endeavor to weave together the major elements of a theory of underdevelopment presented in the five previous chapters, together with some of the wisdom distilled from the general theories outlined in Part II.

Despite the amount of intensive on-the-spot study of underdeveloped countries during the last few years, our chief problem in attempting a synthesis of theories of underdevelopment is still empirical. We do not need elaborate econometric models before we can explain the behavior of underdeveloped economies or prescribe policies. But we do need to know what the strategic functional relations are and we need to know their general shapes. Unfortunately, we are not yet very sure of either of these things. What we have provided in the five previous chapters is a kind of analytical economic history of underdeveloped countries. We have pointed to some strategic relationships which have prevailed in the past. Dare we project them into the future? Let us review briefly the contents of those chapters.

Chapter 14 dealt with the relationship of population growth to industrial development. We showed that in the now underdeveloped countries, investment was made in plantations, mining, petroleum, etc., for the export market, in a way which brought little or no structural change in the economy. It brought rising rates of population growth, but no "built-in habit of technological change," to peasant society.

Concentration of investment in the export sector, combined with population growth, led to increasingly apparent technological dualism. The industrial sector actually was, or was believed to be, capital-intensive and