14

Interactions of Modern and Traditional Sectors

Almost from the beginning of economists' interest in economic fluctuations there was a strong suspicion that the key lay somewhere in the interactions among savings, investment, and consumption, but it took generations of thought before these relationships were sorted out in a form permitting useful recommendations for policy. So today there is an equally strong suspicion that the key to underdevelopment lies somewhere in the interactions between the modern or industrial sector of the economy and the traditional or agricultural sector. A number of two-sector models have been produced to analyze these interactions. It could hardly be said that these models are as successful in providing a foundation for development policy as the savings-consumption-investment models have become for suggesting stabilization policies for advanced countries; however, progress has been made and some insight has been gained. This chapter outlines some of the more important of such two-sector models.

Technological Dualism and the Population Explosion

In many underdeveloped countries the initial favorable impact of industrial investment (including investment in plantations as well as in mines, petroleum, etc.) was swamped by population growth, in a way that did not occur in the currently advanced countries. In most countries, an initial increase in population growth seems to have followed the first wave of rapid industrialization. In the advanced countries of the West, however, the rise in *per capita* income continued long enough to bring subsequent drops in fertility rates and to permit economic growth to be

sustained. The question is why the process in underdeveloped countries was different.

When the colonial powers first came into contact with countries of Asia and Africa, the populations of the latter were apparently not much higher, relative to natural resources, than those of European lands. In the case of Asia, moreover, there is little evidence that the level of technology was markedly below that of Europe in the sixteenth century. India, Indonesia, and China had firearms, navigation instruments, modes of land and water transport, techniques of manufacture and agriculture, and educational systems that compared favorably with Europe's best. We have small evidence that the standard of living of either rich or poor was significantly lower in Asian than in European countries at that time. Like the European countries, the Asian lands were actively engaged in international trade. The sixteenth-century picture would have given little basis for forecasting that in 400 years *per capita* incomes in Europe would be several times as high as in Asia.

During the seventeenth and eighteenth centuries, when the relationship of the colonial powers to Asian and African peoples was mainly a trading one, the countries of Europe seem to have made more progress toward establishing the preconditions for take-off than did those of Asia. In particular, during this period Europe benefited from improvements in agricultural methods and increased transport facilities. Even at the beginning of the nineteenth century, however, populations of many Asian countries were still small relative to resources, and prospects for economic growth would still have been good. By the end of that century, population growth in such countries as Indonesia, India, Japan, and the Philippines was already so high that launching a steady rise in *per capita* incomes had become a difficult problem.

Industrial Investment and Population Growth

The major impact of nineteenth-century industrial investment on rates of population growth probably came through the accompanying reduction in mortality rates. As the colonial powers shifted from trading to settlement, in order to exploit more effectively their new interest in plantations and mines (and later in petroleum), they followed policies that tended to reduce death rates. By maintaining internal law and order the colonial powers hampered the freedom of the native peoples to kill each other. Secondly, when Westerners settled in the country they became more interested in public health. In protecting themselves from malaria, typhoid, plague, and other diseases, they reduced the incidence of these diseases among the native peoples as well. Improved transport lessened the impact of famine. A fourth effect was an initial rise in *per capita* incomes even of native peoples. This improvement in living standards permitted—if it did not cause—a more rapid rise in the size of the population. Educational standards also rose, which may have had an indirect effect on mortality rates.

In some countries, industrial investment may have offered incentives for raising larger families. In Indonesia especially, after the shift from trading

to the "culture system," which involved compulsory deliveries of plantation products to the colonial authorities, the easiest way for the people to maintain their standards of living and leisure, while meeting the levy of the colonial government, was to have more children, occupy more land, and devote a larger proportion of the land to irrigated rice culture, as distinct from the slash-and-burn shifting agriculture. Something similar may be true of other countries. Harvey Leibenstein, who has devoted much study to demographic aspects of economic growth, is quite ready to generalize on this relationship and to argue that initial rises in *per capita* income will tend on balance to bring initial increases in the "demand for children."

We saw in Chapter 2 that a crucial factor in the course of *per capita* income is the length of the lag between the drop in mortality rates in the early stages of industrialization and the subsequent drop in fertility rates. The population explosions of Asian countries reflect a longer lag between the initial drop in mortality rates and subsequent drop in fertility rates than occurred in European countries or in the New World. No one knows for certain why this longer lag appeared. Some evidence suggests that the drop in fertility rates in Europe and the New World was a concomitant of urbanization. Development in Asia and Africa, centered as it was on plantations, mines, oil fields, and exports of raw materials, brought more *industrialization* than *urbanization;* hence the checks on family size enforced by the urban industrialization of Europe and the New World operated less effectively in the underdeveloped countries. Eventually fertility rates did drop in most Asian countries, but in some that drop came too late to prevent serious population pressure from arising before planned economic development began.

Colonial policy may, at least in part, account for the difference in the demographic patterns in the Asian-African countries and in Europe. Initial investment in Europe and the New World was also directed in large measure toward agricultural improvement, mining, and production of raw materials for export. In advanced countries, this investment gave rise to subsequent marked expansion of the secondary and tertiary sectors of the economy. Colonial policy in most of the Asian countries did not permit development of the secondary and tertiary sectors in the colonies themselves. Where domestic entrepreneurship appeared in the "Western" sector, it was usually discouraged. For example, when the development of the sugar plantations and refineries in the mid-nineteenth century in Java led to a shift from rice cultivation to sugar planting on the part of Javanese landowners, the Netherlands East Indies government sought to nip this local industrialization in the bud by imposing a regulation forbidding the sugar refineries to buy cane from native growers. Since the Javanese did not have the capital or the technical skills for large refineries, they had to be content with simple refining methods, producing brown sugar for the local market. Similarly, when smallholders' rubber became an active competitor of plantation rubber, the N.E.I. administration imposed a discriminatory tax on smallholders' rubber (in this case without much success). Thus the secondary and tertiary sectors associated with industrial

investment in the colonies developed in the metropolitan countries rather than in the Asian and African countries themselves. The financing, transporting, storing, insuring, and processing of industrial raw materials took place mainly *outside* the colonial country.

Industrialization which is confined to the production of raw materials does not lead to urbanization. Indeed, it can proceed very far without seriously disrupting the pattern of village life led by most of the people. One may conjecture that the disastrously long lag between the initial drop in mortality rates and the subsequent drop in fertility rates is associated with the peculiar form of industrialization in underdeveloped countries, a form which did not bring with it rapid urbanization.

One may doubt whether the reverse process, urbanization without industrialization, such as has taken place in a number of developing countries since the war, can be expected to have the same effect on fertility rates as the combination of industrialization and urbanization in Europe during the eighteenth and nineteenth centuries. The growth of Calcutta, Bombay, Tokyo, Manila, and Djakarta since World War II reflects the "pull" of employment opportunities in industry less than the "push" of dwindling opportunities for advancement in rural society. There is, of course, no assurance that this kind of urbanization will affect fertility rates in the same way Western urbanization did.

Some sociologists and anthropologists might ask whether there would be any reason for expecting twentieth-century Asian society to behave like eighteenth-century European society even if economic conditions were similar. Two points might be made in reply. First, as a policy prescription no one would recommend urbanization as such; it is industrialization and urbanization together that hold the hope for rising per capita income. Secondly, we have some evidence that even in Asian cities fertility rates tend to fall below those of rural areas in the same country. For one thing, the extended family system tends to break down under urban conditions; indeed, the wish to escape the responsibilities of the extended family system is one of the motives for ambitious young people moving from country to city.

Technological Dualism

If the industrial investment which launched the "population explosions" in Asia, Africa, and Latin America had provided opportunities for productive employment for the whole of the population increase, per capita incomes could still have risen. But industrialization in the form common to underdeveloped countries did not provide a proportionate increase in job opportunities. Analysis of production functions and factor endowment in an economy with two sectors, two factors of production, and two goods, is enlightening in this regard. Although such a model is necessarily simplified, it approximates reality closely enough to provide significant results. The two sectors are the industrial sector (plantations, mines, oil fields, refineries, etc.) and a rural sector engaged in production of foodstuffs and in handicrafts or very small industries. The first of these sectors is capital-intensive. Moreover, it either is characterized in fact by relatively fixed

technical coefficients (fixed proportions in which factors of production must be combined), or is assumed by entrepreneurs to be so. The effect on employment patterns is much the same in either case. The other sector has variable technical coefficients; that is, the products could be produced with a wide range of factor proportions. The two factors of production are labor on the one hand and capital, including improved land, on the other. The two products are industrial raw materials for export and necessities for domestic consumption.

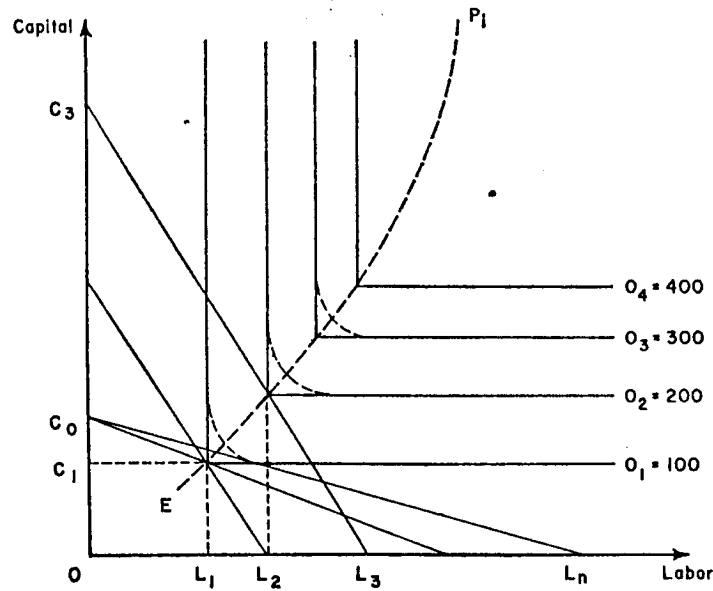Figure 14-1 represents the production function in the industrial sector.

Figure 14-1. The Industrial Sector

Units of capital are measured on the vertical axis, labor on the horizontal axis. Each curve is an *isoquant* representing combinations of labor and capital producing the same output (sometimes called an "isopod"). As we move away from the origin from curve O_1 to curves O_2, O_3, etc., we move up the "hill" of production to higher and higher levels of output. The diagram is thus a kind of contour map.

The solid curves are drawn to conform to the case of "fixed technical coefficients." In this case labor and capital must be combined in fixed proportions to get any output at all. Output can be increased only by increasing the amounts used of *both* factors so as to maintain these proportions. (Some production processes, such as petroleum refining, actually

come very close to having fixed technical coefficients.) The production process in this sector is also capital-intensive; relatively large amounts of capital and relatively small amounts of labor are used. Thus to produce an output of O_1 the industrial sector will use OC_1 units of capital and OL_1 units of labor. If OL_2 units are available, the excess labor supply will have no effect on production techniques, and L_1L_2 units of labor will simply remain unemployed, or must seek employment in the other sector, no matter what the relation of wage rates to capital costs. As more capital becomes available through time, more labor will be employed and output will be expanded. The line EP_i is the expansion path of this industrial sector. However, employment increases relatively little as investment and output in the industrial sector expand along this path.

Perhaps technical coefficients are actually less fixed than entrepreneurs think. If managers and technicians, used to particular methods of production in Western countries which they accept without question as superior, do not look for alternative techniques more suited to the factor endowment, the effect is the same as if coefficients were technologically fixed. The dotted portions of the isopods in Figure 14-1 indicate a situation in which there is actually some flexibility in factor-proportions. It can readily be seen that *small* changes in factor endowments (and in relative prices of factors of production) would not bring marked changes in technique even if entrepreneurs learned that the production function was like the dotted lines rather than the solid ones. But for very large differences in factor endowment (and prices), such as that represented by the line C_nL_n, a more labor-intensive technique would be used if its existence were recognized by the decision makers.

Figure 14-2 represents the production function for the rural sector. Here coefficients are variable: a wide range of techniques and of combinations of labor and capital will give the same output. Accordingly the proportions actually used will be adjusted to the factor endowment (and to the consequent relative prices of labor and capital). In this context capital includes improved land.

Now let us imagine that we begin with production at O_1 in each sector. Then capital begins to flow into the industrial sector, mostly from abroad. The industrial sector expands along EP_i. But we have already seen that this industrialization generates a population explosion. In some countries and some periods, the percentage rate of population increase considerably exceeded the rate at which capital was accumulated in the industrial sector. Because of the actual or accepted fixed technical coefficients in that sector, employment opportunities did not occur at the same rate as that at which the population grew. Far from bringing a shift of population from the rural to the industrial sector, industrialization, after its first impact, may even have brought a relative *decline* in the proportion of total employment in that sector.

Thus the increased population had to seek a livelihood in the other, variable-coefficient sector. At the beginning of the expansion process, no factor of production was relatively abundant or scarce in this sector. For
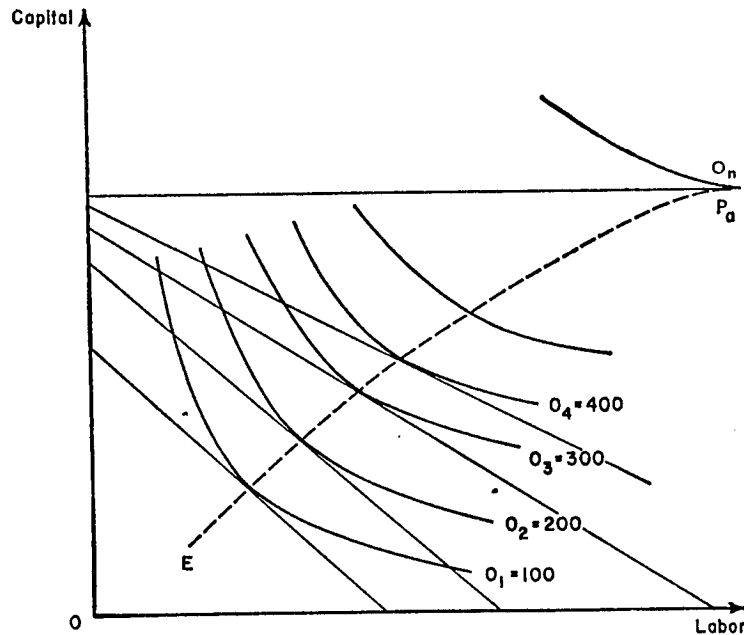
Figure 14–2. The Agricultural Sector

a while, the response to population growth was to bring additional land under cultivation, so as to keep the ratio of labor to land relatively constant; since other forms of capital were not available in any quantity to this sector, the amount of land that could be effectively worked by one family was in any case limited. Thus for a while the "optimal" combination of labor and capital (mostly improved land) could be maintained, as output rose from O_1 to O_3. Eventually, good land tended to become scarce. The ratio of labor to capital available in that sector rose steadily, and since technical coefficients were variable, techniques in that sector became increasingly labor-intensive. For example, irrigated rice culture was substituted for shifting dry rice culture. Finally the point was reached at output O_n where all available land was already cultivated by highly labor-intensive techniques and the marginal productivity of labor fell below zero even with the most labor-intensive techniques available; with continuing population growth, disguised unemployment began to appear.

Under these conditions there was *no incentive* for groups of individual farmers or small enterprises to make marginal and unrelated investments of capital in the labor-intensive sector, even if they had capital to invest. Nor had they any reason to introduce labor-saving innovations, even if they knew about them and could finance them. And as yet there is no technology designed to raise output per man-hour without also raising the

ratio of capital to labor. Labor *as a group* had no incentive to increase its efforts, since the labor supply was already redundant. Thus methods remained labor-intensive and levels of technique, man-hour productivity, and economic and social welfare remained low.

This tendency toward "disguised unemployment" in the rural sector is enhanced if technological progress takes a form favoring the capital-intensive sector. There can be little doubt that this process is what in fact occurred. Indeed, during the last two centuries little or no technological progress has occurred in peasant agriculture and handicrafts, while technological progress in the plantations, mining, and petroleum sector has been rapid. The tendency toward disguised unemployment in the rural sector will also be aggravated if wage rates are kept artificially high by trade-union activities or by government policy. Industrial wage rates that are high relative to productivity provide an incentive for the introduction of labor-saving devices and consequently diminish still further the capacity of the industrialized sector to absorb the population growth.

Esther Boserup suggests that diminishing average returns to labor may set in before land is used really intensively. Shifting agriculture, she suggests, may be quite efficient in terms of manpower productivity; given the possibility of varying periods of fallow, the distinction between cultivated and uncultivated land virtually disappears. We should think in terms of a continuum of types of land use, ranging from still virgin land which is never cropped, through land cropped at shorter and shorter intervals, to land where a new crop is planted as soon as the last one is harvested. The shift to more intensive agriculture as population pressure mounts may bring a decline in man-year productivity even while some land is still under shifting cultivation. Conversely the return from intensive to shifting agriculture in parts of Latin America where population has declined is not retrogression, but a rational adaptation to the factor endowment.[1]

Conclusions

Putting together the theory of the population explosion with the theory of technological dualism we obtain a deeper understanding of some of the "characteristics" of underdeveloped countries. We saw in Chapter 1 there that the proportion of the total labor force in agriculture is virtually a measure of the degree of underdevelopment; the more people in agriculture, the more underdeveloped the country. Yet we also saw that it is precisely in agriculture that the spread in man-year productivity is greatest as between advanced and underdeveloped countries. In the industrial sector, techniques are often advanced and productivity is high; in agriculture, techniques are labor-intensive and simple and productivity is abysmally low. Why does labor not shift from the rural to the industrial sector, from low-yield to high-yield occupations, in accordance with orthodox theory?

[1] Esther Boserup, *The Conditions of Agricultural Growth* (London and Chicago, 1965).

The same sort of question arises with respect to capital. According to orthodox theory, the marginal productivity of capital ought to be higher in the rural sector, where the ratio of labor to capital is high, than in the industrial sector, where it is low. There is evidence that returns to capital actually are higher in the rural sector than in the industrial sector. George Rosen, on the basis of his extensive knowledge of the Indian economy, concludes that an important factor delaying the development of indigenous industry has been the high returns on investment in agricultural credit.[2] Interest rates on loans in the rural sector range from 16 to 100 per cent; in addition, the rural capitalist, who usually makes loans on a sharecropping basis, is frequently in a position to earn a handsome profit on speculative investment in stocks of food crops. It is easy to see why the rural capitalist is not attracted to industrial investment. But why does not industrial capital flow into agriculture, if returns there are really so much higher than on the plantations and in the mines and oil fields?

Here is the most vicious of all the vicious circles encountered in a theory of underdevelopment. Labor does not flow into the industrial sector because the supply of capital to that sector is limited—each investment project in an underdeveloped country competes against projects the world over in the international capital market—and technical coefficients are fixed, or thought to be so. The supply of domestic capital to the rural sector is also limited. It is not directed toward improving techniques, because although the elasticity of substitution of labor for capital may be high, the elasticity of substitution of capital for *land* is low. Relatively small amounts of investment in tools, simple irrigation, seed selection, and fertilizer could bring the *marginal* productivity of capital down to zero, given the present ratio of labor to land. It may well be that in some underdeveloped countries the marginal productivity of both labor and capital is close to zero in the rural sector.

The only way to overcome the redundancy of labor in the rural sector is to increase the supply of the scarce factor. But the *immediately* scarce factor is land. The only way to raise the marginal productivity of capital is to increase the ratio of land to labor a great deal. The production function is highly discontinuous in this respect. Increasing the size of the typical family farm from 2 acres to 3 will not raise the marginal productivity of capital very much. The size must be raised to 20 or 200 acres so that mechanization becomes profitable. With high population densities such increases in size of holding can be attained only by luring people out of peasant agriculture into the industrial sector. For *this* kind of program, however, capital becomes the scarce factor once again. It requires heavy investment in *both* the industrial and agricultural sectors. Neither agricultural improvements on the present holdings nor industrialization will, by itself, break through this particular vicious circle. Industrialization without an agricultural revolution brought the underdeveloped countries where they are.

The failure of foreign capital to flow into peasant agriculture must be

[2] George Rosen, "Capital Markets and Underdeveloped Economies: A Theoretical Frame-Hypothesis for Empirical Research," M.I.T., CENIS, May, 1958.

explained in somewhat different terms. The industrial and rural sectors are not part of the same "economy" in the ordinary sense. Geographically, the plantations, mines, and oil fields are in the same country, but economically they may be more closely tied to the metropolitan country providing the capital, technical knowledge, and managerial skill than to the underdeveloped country in which the operation is located. The men who launch, organize, finance, and manage these enterprises—even when they are urbanites of the country itself—know little of peasant agriculture and village life. The rural capitalist relies for his success on his personal and firsthand knowledge of the villagers with whom he deals; he lends to them, sells to them, and buys from them. This is knowledge of a sort the foreign or urban capitalist does not have and does not wish to acquire. As for a wholesale shift to mechanized commercial agriculture, it is not an operation to be carried out on a piecemeal private enterprise basis.

Indeed here is one of the major reasons for government intervention in the development process. Once countries are in the situation analyzed in this chapter, only a unified and large-scale program involving more rapid industrialization and bold schemes for agricultural improvement can launch cumulative growth. In short, a "big push" is necessary.

Unlimited Supplies of Labor?

W. Arthur Lewis begins his well-known article on "Economic Development with Unlimited Supplies of Labour" by asserting that many underdeveloped countries conform to the Classical model, in which the supply of labor is perfectly elastic at current wage rates.[3] The "widow's cruse" of workers consists of existing farmers, casual workers, petty traders, domestic retainers, and additions to the labor force through population growth. As his conclusions rest on this basic observation, let us begin by examining the premise itself.

Some observers, including the present writer, have pointed out that the optimism concerning development by absorption of disguised unemployment from agriculture was unfounded. It is not possible to transfer large numbers of workers permanently and full time from peasant agriculture to industry without a drop in agricultural output, for during planting and harvesting seasons, which together amount to several weeks per year, the entire labor force is occupied. It may even be necessary to bring back members of the village who have gone off to take casual jobs in the industrial sector. Reorganization of agriculture and a shift to relatively extensive and mechanized techniques could release large numbers of workers from agriculture, to be sure, but that requires a certain amount of investment in the agricultural sector itself. Some observers have suggested that disguised unemployment has moved from country to city, and cite as evidence the host of petty retailers. But even the urban peddler, with three empty bottles in one basket and two right shoes in the other, may be performing a real service, and so may be truly employed, if there

[3] W. Arthur Lewis, "Economic Development with Unlimited Supplies of Labour," *The Manchester School of Economic and Social Studies*, May, 1954.

are customers with left shoes and customers who want empty bottles. Thus, in the static sense, it may be questioned whether supply curves of labor to the industrial sector are perfectly elastic.

If one puts the whole growth process in time, however, as one must to get meaningful results, the Lewis model accords with reality in many underdeveloped countries, as far as *unskilled* labor is concerned. The Lewis argument does not require disguised unemployment. It requires three conditions: that the wage rate in the industrial sector be above the marginal productivity of labor in the rural sector by a small but fixed amount; that investment in the industrial sector be not absolutely large relative to population growth; and that costs of training the necessary numbers of skilled workers be constant through time. The first condition seems to be met in many countries. If the "population multiplier" operates, population growth being accelerated by the very process of industrialization, the second condition is automatically guaranteed. But even if industrial investment does not actually accelerate population growth, the second condition can be met if employment in the industrial sector is a small proportion of the total and population growth is fairly high. Suppose, for example, that the labor force is twenty million, that four million are employed in the industrial sector, that the capital-job ratio in that sector is $2,000 per man, and that the total labor force grows at the rate of 2 per cent per year. To employ the total increase in the labor force in the industrial sector would require net investment of $800 million next year, or 10 per cent of the total stock of capital. Net investment on this scale would double the stock of capital in about seven years, a rate of growth beyond the wildest dreams of most underdeveloped countries. Thus for all practical purposes the supply of unskilled labor to the industrial sector can be treated as perfectly elastic, whereas in the rural sector it is already redundant, in the sense that marginal productivity there is below the subsistence standard of living.

Of course, the industrial employers are interested in skilled labor too. Lewis argues that labor skills are only a "quasi-bottleneck"; if you have unskilled workers, you can convert them into skilled ones.

In the short run, the need to train or import skilled workers may not alter the argument very much; if the cost of training or importing is constant, the elasticity of supply of skilled labor can still be infinite. As we have seen, it is possible that the cost of training or importing technicians may be high enough to induce entrepreneurs to use capital-intensive techniques in those parts of their operation where skill is necessary, but this fact does not change the argument either, unless these costs are rising. The Lewis thesis is of dubious validity even for unskilled workers, if we think in purely static terms, however; and if we think in terms of long-run supply through time, the relevant question about the supply of skills is whether the cost of training or importing is rising through time. The answer will depend on the nature of technological progress; if it is of a sort that reduces both the capital-labor ratio and the capital-output ratio simultaneously, the Lewis thesis may hold for skilled labor as well as

for unskilled.

Now if we accept the thesis, the process of growth will look like Figure 14–3. Here $\bar{w}$ is the productivity per man-hour in peasant agriculture, and w is the conventional wage in the industrial sector. The marginal productivity of labor in industry is M_1M_1, which permits the capitalist to earn a surplus, AM_1s. When he invests this surplus—perhaps improving techniques at the same time—the curve of marginal productivity shifts to M_2M_2 and so on. Industrial employment grows from N_1 to N_2, N_3, etc. The per capita income of workers and peasants remains unchanged, and the entire benefits of development accrue to capitalists. Lewis suggests three ways in which the process might be halted: if the expansion of the industrial sector is rapid enough to reduce the absolute population in the
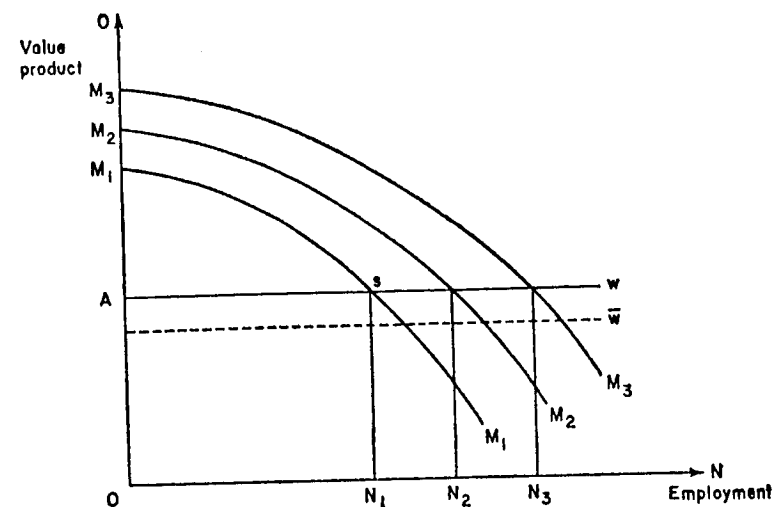
Figure 14-3

rural sector, raising the man-hour productivity in that sector, and so raising $\bar{w}$ and w (this will not happen if the population multiplier is operating); if technological progress in the rural sector raises productivity there, and so raises $\bar{w}$ and w; or if the terms of trade turn against the industrial sector with rising prices of food and raw materials, and so bring a rise in $\bar{w}$ and w (this is the Classical model). The achievement of balanced growth and generally higher living standards requires that the process *must* be halted by either method 1 or method 2, while, at the same time, measures are taken to continue investment in the industrial sector.

Lewis applies his analysis to the impact of international trade. First, he shows that technological progress in the export sector of underdeveloped countries helps only the workers of advanced countries. Suppose one

man-day of labor in the advanced country, A, produces three food or three steel, whereas in the underdeveloped country, B, it produces one food or one rubber. The rates of exchange will then be one food equals one steel equals one rubber. Now assume that productivity in rubber growing trebles. Then one steel will buy three rubber. But the wage in B is still equal to one food (plus the conventional surplus In the industrial sector) because the supply of labor to the rubber industry is unlimited. Thus foreign investment in the industrial sector of B can provide only additional employment and perhaps some tax revenues; in itself it cannot raise per capita incomes.

Now assume a man-day in A produces three food or three cotton manufactures, whereas a man-day in B produces two food or one cotton manufactures. The *marginal* man-day in A produces three food or three cotton, and the *marginal* man-day in B produces zero food and one cotton. On the principle of comparative advantage, B should export cotton manufactures and import food. But *w* in cotton manufactures is two food in country B; and *w* is three to six food in country A. In money terms, it is cheaper for B to export food and import cotton.

Lewis seems to be correct in his conclusion that countries with inadequate agricultural resources relative to their population (India, Japan, Egypt, the United Kingdom) should export manufactures and import agricultural products. It is impossible to imagine India as a truly efficient agricultural country, but it is easy to see India as an efficient producer of steel and textiles. This kind of misallocation of resources occurs in many underdeveloped countries. The implication is that planning must be based on "shadow prices" as they would prevail after a drastic structural change has been achieved.

Finally, Lewis indicates a way out of the vicious circle. Suppose a man-day in A produces five food or five cotton textiles, and a man-day in B produces one food or three cotton. Wages in B are one food, and B will export textiles. Wages in A are five food; A gets all the benefit from trade. Now suppose productivity is raised in B's cotton-manufacturing industry. The wage in B is unchanged, and the entire benefit goes to A, as before. But if productivity is raised in B's food production, B's wage will rise. Then cotton prices will also rise, to the benefit of B and the disadvantage of A. Thus economic development requires raising productivity per man-day—not per acre—in the peasant agriculture sector. Given the rates of population growth in that sector, raising productivity per man-day almost certainly requires—sooner or later—a shift to more extensive and more mechanized agriculture.

One final point may be noted. The current nationalist policies, with their emphasis on training and upgrading domestic labor and their limitations on immigration of skilled workers, managers, and technicians, may mean that skilled workers will be a more serious bottleneck to future expansion than they have been in the past. It is a question whether techniques of training, as well as of production, can be improved sufficiently to keep training costs per unit of *output*, at least, from rising as industry expands.

Development of the Labor Surplus Economy

One of the most ambitious efforts at a theory of underdevelopment to appear in recent years is that of John Fei and Gustav Ranis.[4] It does not pretend to complete generality: "It is the purpose of this book," the authors state in their preface, "to present a theory of development relevant to the typical labor surplus type of underdeveloped economy and to extract some policy conclusions from it." It is time, they say, to "venture beyond the customary eclectic survey of growth problems and ideas and towards the evolution of a particular theory aimed at a particular type of economy." In their view, efforts at a completely general theory are less likely to be fruitful, in our present state of knowledge, than "attempts to generalize from specific country experience." The theory presented in their book, accordingly, is limited to "a particular type of underdeveloped economy, the labor surplus type." It is clear, however, that the authors consider this type of economy common enough; and the theoretical construction they build to analyze this kind of economy is one of the most elaborate yet to be presented in the whole field of economic development.

The Basic Model

The fundamental features of the labor surplus economy, on which the entire analysis rests, are as follows: (1) The supply of land is sharply limited. (2) There is a "constant institutional wage" in the industrial sector. The supply of labor is perfectly elastic to the industrial sector at this wage, which is taken to be slightly above the real wage in the agricultural sector, as in W. Arthur Lewis's "unlimited supply of labor" model. Workers do not have to be "bid away" from the agricultural sector through raising wage rates above current levels, at least in the initial stages of industrialization. (3) Labor is redundant in the agricultural sector. There exists some number of workers in the agricultural sector with zero marginal productivity, who can be transferred—completely, permanently, and full time—without investment in the agricultural sector and without a fall in agricultural output. (4) There are "well-behaved" isoquants in the industrial sector. This assumption is fundamental to the analysis. Any number of workers whatsoever can be absorbed into the industrial sector, with no additions to the stock of capital in that sector, and without innovations, by resorting to known techniques which are increasingly labor-intensive. (5) For this reason, innovation in the industrial sector as such leads to a transfer of workers to the industrial sector. Innovations of any kind raise the marginal physical productivity of labor, and employment will accordingly increase until the marginal physical productivity of labor is once again reduced to the critical minimum wage. The increase in employment depends on the "intensity" of the innovation (the magnitude of the increase in labor productivity) and on its capital-using or labor-using bias. As in the Classical model, innovation seems to be

[4] John C. H. Fei and Gustav Ranis, *Development of the Labor Surplus Economy: Theory and Policy* (Homewood, Ill., 1964).

largely limited to the industrial sector. (6) The transfer of labor to the industrial sector is limited by the size of the agricultural surplus. If the attempt to shift workers from agriculture to industry results in a shift of the terms of trade against the industrial sector, industrial money wage rates must be raised, thus limiting the increase in employment. (7) Capital accumulation as such also increases employment in the industrial sector. The transfer of the agricultural surplus to the industrial sector is easiest if there are "dualistic landlords," who operate in both sectors and invest agricultural profits in industry. (Indeed, it is so much easier if dualistic landlords exist that it is not quite clear from the book how it is to be accomplished otherwise.)

The basic diagram of the Fei-Ranis model is reproduced in Figure 14-4. Both the upper and the lower parts of the diagram apply to the industrial sector of the economy. Each part shows one cross section of the production function: the upper part presents the usual isoquants (or isopods), the curves showing combinations of labor and capital that will produce the same output, with output rising as we move from Q_0 to Q_1 to Q_2; and the lower part is the usual curve of marginal productivity of labor, showing additions to total output as more units of labor are combined with a fixed stock of capital (and land). As the stock of capital is increased from K_0 to K_1 to K_2 in the upper figure, the marginal productivity curve in the lower figure shifts from M_0 to M_1 to M_2, etc. To maximize profits (the shaded area bounded by the marginal productivity curve and the supply curve of labor), employment will be extended to the point where the marginal productivity is equal to the real wage rate. With a capital stock of K_0, this point is reached with employment of L_0. As the stock of capital is increased to K_1, K_2, etc., employment will rise to L_1, L_2, etc., taking us along the expansion path in the upper diagram.

Up to the point L_2 additional labor can be attracted into the industrial sector as a constant real wage. But beyond that point the real wage rate must be raised in order to lure more labor away from the rural sector, either because labor becomes scarce in agriculture or costs of food rise or both. Beyond this "turning point" capital accumulation in the industrial sector must proceed at an ever-faster rate if employment in that sector is to continue expanding at the same rate—or something else must happen to shift the marginal productivity curves upward and to the right.

The various factors influencing the rate of labor absorption into the industrial sector are pulled together in the fundamental equation,

$$\pi L = \pi K + \frac{B_L + J}{\epsilon_{LL}}$$

The dependent variable "πL," is the rate of labor absorption, most easily thought of as the percentage rate of growth of industrial employment through time. The term "πK" is the rate of capital accumulation through time. "B_L" is the degree of labor-using bias, or deviation from "neutrality," of innovations. Completely neutral innovations would leave the ratio of capital to labor unchanged; the more innovations deviate from neutrality in this sense, in the direction of raising the labor-capital ratio, the higher
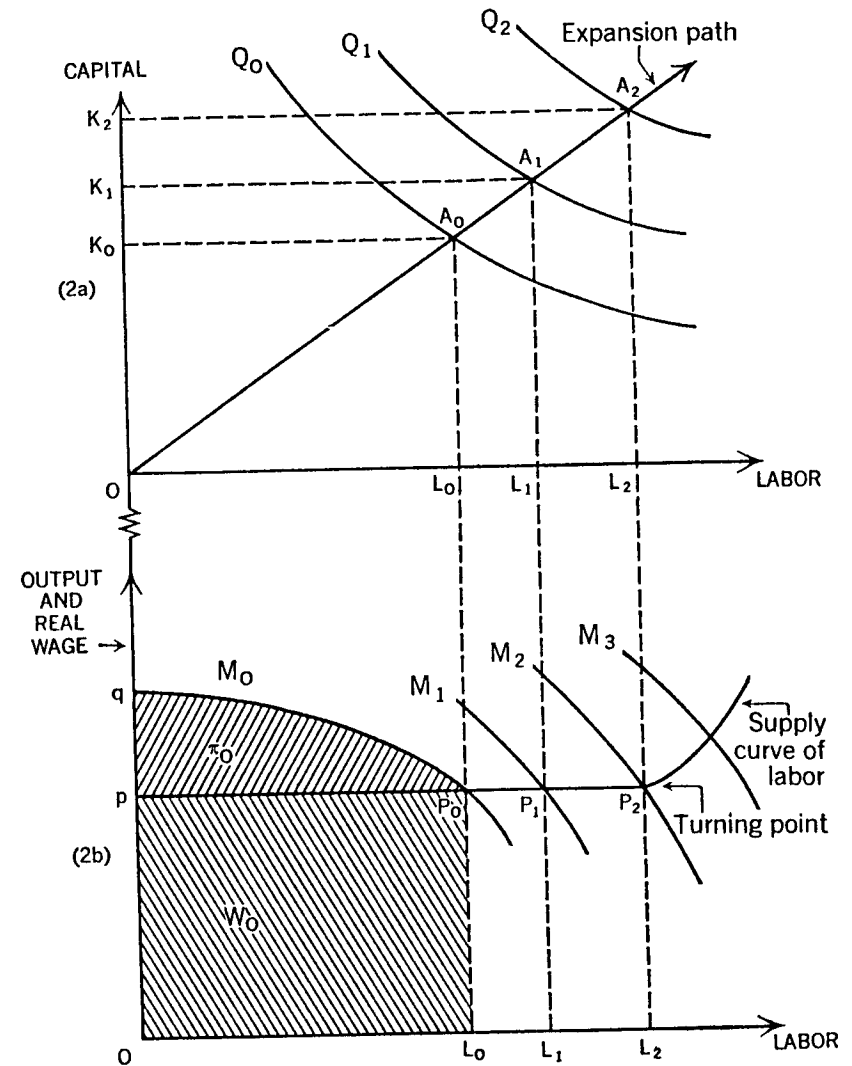
Figure 14-4

is B_L. "J" is the "intensity of innovation," or "the fractional increase in output due entirely to the passage of one unit of time, holding both capital and labor constant." In simpler language, it is the rate at which productivity is raised through time by technological progress, and may be thought of as the rate at which the marginal productivity curve of labor is shifted upward and to the right through innovations. ϵ_{LL} is the rate at which the marginal productivity of labor falls as the ratio of labor to capital is raised. Thus the equation states the truism that the rate of growth of industrial employment depends on the rate at which marginal pro-

ductivity of labor falls with increased employment (other things being equal), on the rate of capital accumulation in the industrial sector, on the extent to which innovations release or absorb labor, and on the rate at which productivity is raised by technological progress.

The concepts and their interactions are illustrated further in Figure 14-5, which is an elaboration of Figure 14-4. We have added a curve showing the shift in the curve of marginal productivity of labor that would constitute a "neutral" innovation, with which actual shifts may be compared. We begin with a stock of capital K_1 and employment L_1. Then

Figure 14-5. Production Contour Map Industrial Sector

technological progress raises the marginal productivity of labor to the dotted curve M'_1. Because the innovation is labor-absorbing in character, employment rises to L'_1 even without any capital accumulation. In the upper diagram this shift is shown by redrawing Q_1 and Q'_1. If in addition the stock of capital is increased to K_2, the equilibrium position shifts to E'_2 and employment increases to L'_2.

Reiterating the fundamental equation in terms of this diagram, the authors state that the rate of labor absorption depends partly on the rate of capital accumulation, whereas the absorption due to innovations alone, with fixed capital stock, depends in turn on three factors:

1. The "height" of point F relative to point E_1, representing the intensity of the innovation, that is, how much the original production contour has been blown up.

2. The "height" of point G relative to point F, representing the degree of labor-using bias of the innovation.

3. The "steepness" or "flatness" of the M'_1 curve representing the relative strength or weakness of the law of diminishing returns to labor. (The "flatter" M'_1 the further to the right equilibrium point E'_1.)

Successful economic development requires "structural change" in the sense of growth of industrial employment more rapid than the growth of total employment. This condition can be expressed as a "critical minimum effort criterion" derived from the basic equation above, letting "π_P" stand for the rate of growth of total employment through time:

$$\pi_P < \pi_L = \pi_K + \frac{B_L + J}{\epsilon_{LL}}$$

Thus for "success" we need capital accumulation, technological progress in the modern sector, preferably of a labor-absorbing type, and improvement in agricultural productivity, to prevent excessive increases in the industrial real wage which would slow down the relative transfer of labor from the traditional agricultural to the modern industrial sector.

From this model the authors derive a simple and not very original formula for launching economic development. First, the total agricultural surplus should be raised; and then there should be as much investment and capital-saving (labor-absorbing) innovation in the industrial sector as possible. "Our analysis indicates," the authors conclude, "that besides accumulating as much capital as possible [either domestically or via foreign aid] the economy should seek innovations of as high intensity as possible and, given intensity, subject to as high a labor-using bias as possible." No one could quarrel with this formula; the problem is to arrange its application in particular cases.

Major Questions of Fact

The validity and applicability of the model, of course, depends on the extent to which the basic assumptions conform to reality. The authors

would no doubt agree that all developing countries are not fundamentally short of land; slash-and-burn agriculture still exists in a number of developing countries, including Brazil and Thailand. More serious questions arise regarding the "redundancy of labor." The question of "disguised underemployment" or "redundancy of labor" is a complex one that has given rise to a substantial literature, some of which will be considered below. This literature is ignored by Fei and Ranis, who simply state the existence of redundant labor as though it were a well-known fact. As already suggested, however, the truth is that redundant labor of the kind assumed by the authors is probably non-existent; Dr. Yong Sam Cho, whose study is outlined in the following section, found none in Korea. Even in so densely populated an area as Java there are still labor shortages in planting and harvest seasons. The same is true of small and rapidly industrializing countries like Greece. What one finds is not chronic underemployment, but extreme seasonal variations, combined with work-sharing devices and short hours during the off-seasons.

Fei and Ranis fail to make the all-important distinction, on which Cho's analysis rests so heavily, between marginal productivity in terms of numbers of workers, and marginal productivity in terms of hours per worker. The work-sharing devices typical of Asian countries are such, and the hours so short, that the marginal productivity of individual workers is not zero. Labor is "redundant" only in the sense that if real wages could be raised so as to permit more *hours* of work to be undertaken per man, the same agricultural output could be produced for smaller *numbers* of people. Moreover, not all of those who could be released, even in this sense, are actually available at the "constant institutional wage"; only those who are, in Cho's terms, "marginal men" in both economic and social terms are thus available. No country has a "reserve army" of agricultural workers, completely unemployed, who can be transferred the year around with no rise in industrial wages, no investment in the agricultural sector, and no drop in agricultural output.

In particular the assumption that any number of workers can be combined with a fixed stock of capital is unrealistic and misleading. We have seen above that it is a good deal more useful, in explaining how underdevelopment and technological dualism have appeared, to make the reverse assumption of fixed technical coefficients in the industrial sector. Of the two extreme assumptions, the latter explains a wider range of reality. If, for example, the modern sector consists mainly of rubber plantations, tin and bauxite mines, and petroleum fields and refineries, how is one to combine an unlimited number of workers with a fixed stock of capital in these industries, and still achieve enough increase in output to justify the increase in employment? Much depends on the particular product-mix in the actual modern industrial sector of the country concerned.

Historically, innovations in the modern sector have been labor-saving to a substantial degree. Fei and Ranis seem to regard this fact as a matter for regret, if not actually a sign of perverseness on the part of entrepreneurs and government authorities concerned with industrial investment. Throughout their analysis, they miss the fundamental point that

innovations can be both labor-saving and capital-saving, and still be labor-absorbing and capital-absorbing during the gestation period. In the United States even the railroad, certainly a heavy absorber of capital and a significant creator of employment during the period of railroad construction in the nineteenth century, was both labor-saving and capital-saving once in place; both labor costs and capital costs per ton-mile were lower in railway freight trains than in wagon trains. If investment is maintained on a high and increasing level, employment can go on increasing even if each successive individual innovation is labor-saving, in the sense that it reduces labor costs and increases output per man-hour. If at the same time the ratio of capital to labor goes up, this incidental result seems little reason for concern.

Fei and Ranis also overlook the fundamental fact that a good many small-scale and labor-intensive activities have high capital-output ratios. They seem to take it for granted that if the capital-labor ratio is reduced the capital-output ratio will be reduced as well. The limited results of research undertaken thus far, however, suggest that over a very wide range of industrial activity the reverse is the case. One of the many "vicious circles" with which "the road to development is paved" is this one: underdeveloped countries cannot afford "labor-intensive" techniques, in the sense of low capital-labor ratios, because they are too expensive in terms of capital—they have high capital-output ratios. This fact is surely at least one part of the explanation of the famous "Leontief paradox," the discovery that through its international trade the United States exports labor and imports capital.

As for their "dualistic landlords," these no doubt existed in Japan, and they exist today in the Philippines and to some degree in the Brazilian State of São Paulo. But they do not exist everywhere, and they are not easy to create where they do not exist. The alternative, of course, is for the state itself to play the role of "dualistic landlord," shifting agricultural surpluses to the industrial sector. But that is precisely what all governments interested in development are trying to do, and it is precisely what proves to be so difficult from a political and administrative point of view.

Success and Failure

Fei and Ranis apply their theory to cases of success and failure. In the "success story," an original rise in the total agricultural surplus raises the real income of industrial workers, thus "shaking loose" labor from agriculture, and as an impact effect, raising the return to investment in industry relative to investment in agriculture. Indeed the return to investment in agriculture actually falls initially. Thus the dualistic landlord shifts capital from agriculture to industry. As employment in the industrial sector rises, the marginal productivity of labor industry falls, and eventually the industrial real wage returns to the customary institutional wage. The terms of trade shift back to agriculture again, and the incentive to raise total agricultural surplus further is restored. Thus a new cycle of development begins and the process becomes cumulative.

In the failure case, there is no rise in the marketable technical total agri-

cultural surplus. Thus the effort to expand the industrial sector entails a continuous worsening of the terms of trade of the industrial sector and a rise in the industrial real wage. This rise in the industrial real wage in turn leads to the introduction of labor-saving innovations in the industrial sector, thus choking off the increase in industrial employment.

Once again, this case of "failure" seems oversimplified and does not fit the cases of "failure" most familiar to this writer. It overlooks, for example, the fact that the product of the industrial sector is frequently sold in the world market, whereas the product of the agricultural sector is sold in the domestic market. Indonesia is as clear-cut a case of failure as one could find, but there is no evidence of improving terms of trade between the agricultural and industrial sectors of Indonesia itself; indeed, the evidence suggests just the reverse. What has happened in Indonesia is that because of the very low elasticity of substitution of labor for capital in the industrial sector, the capital-intensive nature of the most efficient technology in that sector (efficient in terms of capital-output ratios), the limitation of technological progress of the industrial sector, and the nature of the technological progress, the absorption of labor into the industrial sector—despite rapid expansion of that sector—never kept pace with population growth in the country as a whole. When World War II began, only 7 per cent of the labor force had been absorbed into the modern sector. The other 93 per cent of a large and rapidly growing population had to find a livelihood in the traditional sector, where their productivity was inevitably low.

Population growth is a factor that seems not to enter into the Fei-Ranis model. Despite the complexity of the diagrams, and the emphasis on innovation, the whole analysis remains essentially neoclassical and static.

The analysis includes two case studies, Japan as a "success story" and India as a failure. Japan's success is attributed mainly to a rapid rate of innovation, initially of a capital-saving and labor-absorbing nature. About 80 per cent of the total growth of the industrial labor force is attributed to such innovation, capital accumulation accounting for the other 20 per cent. According to the figures presented, the capital-labor ratio actually fell in Japan between 1888 and World War I, and this fact is given high marks in explaining the success of Japan. Japan also succeeded in reducing the absolute size of its agricultural labor force after 1898.

On the other hand, in India there was a "premature deepening" of capital, with an increase in the capital-labor ratio throughout the whole period, 1949–60. The industrial labor force grew very slowly, and the agricultural labor force continued to increase. Thus India has yet to reach a critical minimum effort.

The authors summarize the comparison as follows:

The contrast between these two historical cases is unmistakably clear. Continuous capital shallowing in Japanese industry between 1888 and the end of World War I is evidence that Japan made maximum use of her abundant factor, surplus agricultural labor, while adopting labor using (or, at least, not very labor-saving) innovations. The continuously positive labor absorption due to

innovations corroborates this finding. India, on the other hand, seems to have resorted to very labor saving innovations from the very beginning of her development effort, thus yielding to the temptation of an increasingly capital-intensive industrial structure and neglecting the potentialities of a maximum utilization of her abundant, and rapidly growing, surplus agricultural labor force.

This statement of the contrast between Japan and India is a distortion of the facts. Has India stubbornly and misguidedly refused to use capital-cheap, labor-intensive techniques? On the contrary, the second Indian Five-Year Plan states clearly that if it is a choice between employment and income, employment should be given preference; and a good deal of experimentation and research has been conducted in India with small-scale, labor-intensive activities. The point is that these proved to be too expensive in terms of capital—as stated above; the products and technologies with the low capital-labor ratios turned out to have high capital-output ratios. Moreover, the statement ignores both the difference between the choice of technology and the choice of product-mix, and the difference between launching industrialization in 1888 and launching it in 1949. It seems likely that the change in the product-mix had more to do with the drop in capital-labor ratios in Japan than any ingenious and insistent use of labor-using, capital-saving innovations. Industrialization on the basis of toys and silk scarves is not a process that other countries can follow, launching their industrialization today.[5] For some countries, comparative advantage forces them into industries where the most efficient technology—efficient even in terms of capital-output ratios—is one that is highly capital-intensive.

In any case, the figures themselves are suspect. The authors have elected to use a depreciation rate of 20 per cent in calculating the rate of capital accumulation in Japan. For the kind of industrialization that was taking place, and for the rate at which new plants and equipment were being built up, this rate of depreciation is surely too high. Obviously, selection of a lower depreciation rate would assign a greater role to capital accumulation in the explanation of Japan's growth, and a smaller one to innovations. Moreover, the estimate of the stock of capital excluded land. Even with a realistic "shadow price" for improved rice land (which could be rather high) the capital-labor ratio for the economy as a whole no doubt rose in Japan during the first phase of industrialization. The impression left by Fei and Ranis that growth can be achieved with relatively little capital accumulation, provided only that decision-makers are diligent in introducing innovations of a labor-saving nature, is quite misleading. Of course, there is no reason to suppose that the "residual factor" was not high in Japan as elsewhere; but the "residual factor" does not operate by itself; it needs capital accumulation and resource discovery to make it operate. There are still no primrose paths to prosperity.

In any case, the model does not lend to fundamentally new prescriptions for policy. Government action to create the preconditions of growth, to

[5] The Japanese "success story" is outlined in Part VI, Case Studies.

provide the necessary social overhead facilities and infant-industry protection, to give the economy the necessary psychological impetus and thus supplement the contribution of the dualistic landlords, these policy conclusions would be obtained without the authors' very laborious analysis.

General Appraisal

These flaws do not completely destroy the Fei-Ranis model. It contains elements of fundamental truth, and with modifications can still cast light on the problem of underdevelopment. The rate of structural change (relative growth of industrial as compared to agricultural employment) is indeed a fundamental aspect of the development process. The rate of such structural change is surely limited by the degree of success in raising agricultural output. The rate of capital accumulation in the modern (and traditional) sector, the pace and nature of technological progress, and the speed with which the marginal productivity of labor falls with increased industrial employment are obviously important factors in the outcome. But the whole process of launching and sustaining economic development in countries with a large volume of low-productivity employment in a traditional agricultural sector is a good deal more complex than the Fei-Ranis analysis would suggest.

Does Disguised Unemployment Exist?

The extent to which "disguised unemployment" exists in underdeveloped countries, and the degree to which it offers a source of "free" increases in our gross national product, is one of the major questions that recur in the literature on development of underdeveloped countries. At the beginning of his thoughtful book, Dr. Yong Sam Cho states that his objectives are "to examine the most respected concepts in theories on surplus labor in underdeveloped agricultural economies, particularly in the literature on 'disguised unemployment' and to point out their flaws." [6] He also endeavors to measure surplus labor in rural Korea.

Dr. Cho notes the vagueness and ambiguities in current concepts of disguised unemployment: the amount of capital stock available is "more or less" fixed; population growth reduces the marginal productivity of employed labor "to zero or to near zero (or even to a negative value)." His own basic definition, however, is also subject to ambiguities. "In my analysis," he says, "such limited changes (as reshuffling of workers, replacing one person with another, etc.) are purposely assumed to be compatible with the *ceteris paribus* assumption. However, the following changes are considered to be incompatible with the assumption: a decrease in total farm output; an increase in capital (monetary or real); the introduction of new technologies, including the adoption of improved seeds or new crops; the diversification of agriculture to compensate for its seasonal nature; and the consolidation of scattered and fragmented land hold-

[6] Yong Sam Cho, *Disguised Unemployment in Underdeveloped Areas, With Special Reference to South Korean Agriculture* (Berkeley, 1963).

ings. A change in social institutions is, of course, not compatible with the *ceteris paribus* assumption." With these restrictions, it is a little hard to envisage what the "limited changes" compatible with the *ceteris paribus* assumption may be.

Dr. Cho reminds us that the term "disguised unemployment" was first applied by Joan Robinson to those workers in advanced countries during the Great Depression who were driven into such occupations as selling matchboxes in the Strand, where their productivity was much lower than in the occupations they had left. Dr. Cho complains that Mrs. Robinson's definition is unusable because the distinction between regular and inferior occupations is not clear-cut. This observation is no doubt correct for occupations but within Mrs. Robinson's context the distinction between "inferior" and "regular" occupation was not so difficult.

Dr. Cho points out early in the book that the problem of manpower utilization in underdeveloped agricultural countries is not cyclical or chronic unemployment, but underemployment reflected in the willingness of agricultural workers, who do not have regular employment during the whole year, to work at existing wage rates. This so-called structural underemployment, he says correctly, "is no more than open (and visible) unemployment which arises from seasonal variations of agricultural operation." "The position taken by Alfredo and Ifigenia de Navarrete on this point," he says, "is no different from saying that disguised underemployment in underdeveloped agricultural countries is the same as open unemployment in economically advanced countries. To claim that hidden (or disguised) unemployment *are* identical is absurd." [7]

Nurkse's definition of disguised unemployment is clear enough: the agricultural population that can be removed from the land with unchanged agricultural techniques and without reducing agricultural output. Nurkse believed that "a large part of the population engaged in agriculture" fell into this category. Such is not the case: as Cho rightly points out, "Almost every point in Nurkse's analysis fails to be congruent with the facts." Very few countries indeed have surplus agricultural population in this sense.

Rosenstein-Rodan avoids this particular trap, defining disguised underemployment as the amount of idle work force, in terms of man-equivalent hours, that exists at the peak of the agricultural operation. Rosenstein-Rodan's "removable disguised underemployment" consists of workers who are employed less than fifty-one days per year (or less than two calendar months). [8] "Fractional disguised underemployment" consists of people who are partially employed for more than fifty-one days during the year. The latter, says Rosenstein-Rodan, are not removable. Thus Rosenstein-Rodan's underemployed are not "disguised" but are visible, chronic idle labor. Cho also maintains that even the fractional disguised

[7] Alfredo and Ifigenia de Navarrete, "Underemployment in Underdeveloped Economies," in A. N. Agarwala and S. P. Singh (Eds.), *The Economics of Underdevelopment* (Bombay, 1958), pp. 342–43.

[8] P. N. Rosenstein-Rodan, "Disguised Unemployment and Underemployment in Agriculture," *Monthly Bulletin of Agricultural Economics and Statistics*, VI (July–August, 1957).

underemployment could be utilized for economic development projects in and near the villages; in this sense these are also removable.

Dr. Harvey Leibenstein has still another concept of disguised unemployment: with additional resources or means of creating additional employment opportunities of the right kind, more effort could be obtained from the existing labor force. This type of unemployment is due to the seasonal nature of the production process in agriculture. Thus, says Liebenstein, agricultural labor suffers from disguised unemployment in the same sense that taxi drivers do. Leibenstein might have added "directors of companies," who may work only a few hours a week, and would be capable of putting in more hours if need be, although their incomes are very high. Cho rejects this concept too as essentially useless and misleading.[9]

For some obscure reason, Dr. Cho also rejects the effort of K. N. Raj to associate disguised unemployment with the social organization.[10] According to Cho, this attempt "adds further confusion," overlooking the fact that visible idle labor resulting from technical and institutional conditions exists in various types of social organizations. Yet Cho himself regards the "tradition-directed society" as a major part of the explanation of the existence of disguised underemployment. Certainly, there can be no doubt that work-spreading devices do exist in village societies where there is a redundance of labor.

Disguised Unemployment or Low-Productivity Employment?

Having shown the welter of confusion surrounding the concept of disguised unemployment, Dr. Cho might well have concluded, as does the report of the ILO Expert Group on *Employment Objectives in Economic Development*, that the whole concept was a nuisance and better eradicated from the literature altogether. As K. N. Raj pointed out during the discussions of the ILO Expert Group, all concepts of disguised unemployment really reduce to "employed unemployed." The nature of the problem is made much clearer if so-called disguised unemployment is referred to simply as low-productivity employment.

The Cho Model

Although Dr. Cho's concept and measure of disguised unemployment are not free from the shortcomings inherent in the concept itself, his analysis makes a fundamental contribution to the understanding of underdevelopment. The basic idea is that the number of hours of work provided by individual workers is a function of the level of wages. His analysis relates to societies where agricultural incomes are so low that only an increase in agricultural wage rates will permit the increase in caloric intake necessary for a man to work additional hours. Cho maintains that in such countries we may even have "disguised employment," in the sense that the caloric intake is too low for the number of hours work put forth,

[9] Harvey Leibenstein, *Economic Backwardness and Economic Growth: Studies in the Theory of Economic Development* (New York, 1960), pp. 62–66.
[10] K. N. Raj, *Employment Aspects of Planning in Underdeveloped Economies* (Cairo, 1957), pp. 4–5.

resulting in malnutrition and excessive fatigue. It is clear, therefore, that the whole analysis applies only to the poorer countries of Asia, Africa, and Latin America; many countries commonly regarded as underdeveloped would not be included.

Cho introduces the concept of a "marginal individual" who is "poised in uncertainty between two or more apparently different social worlds." These are people on the farms wondering if they should go to the city, and people who have gone to the city wondering if they should go back to the village. The economically marginal individuals are those who are tempted by a higher level of living in another occupation. To be considered withdrawable surplus labor, Cho insists, individuals must be marginal in both the economic and the social sense.

Cho next defines a "technical wage" as the minimum wage needed to sustain an employed worker, in a biological sense. In Cho's analysis the supply of labor is divided into the number of hours per worker, dependent on the wage level, and on the number of workers.

Another fundamental feature of Cho's model is that the position and shape of the marginal productivity curve of labor is also a function of the wage rate. His marginal productivity curves refer only to the number of workers. With a higher wage rate, each man works more hours. Therefore the marginal productivity curve starts higher, but falls more rapidly, the higher the wage rate. In Cho's own words, "This higher marginal productivity declines more rapidly because, given a total output to be produced, the aggregate number of workers required to accomplish the task decreases as the wage rate rises (or increases as the wage rate falls)." [11] The restriction of "a total output to be produced" may seem an excessive one, although it is a part of the Cho analysis that a given output must be produced to provide the biologically minimum wage for the number of hours of work expended, plus a margin for necessary saving. The analysis could be made more general, however, if instead of fixing total output, he simply fixed the total land supply. In a good many Asian societies, the assumption that the supply of land is fixed is realistic enough.

In a "capitalistic" system, the entrepreneur will choose a wage level that will maximize the ratio of the number of hours of work offered to the wage bill, thus maximizing output per unit of wage paid, or minimizing wages per hour. Under those conditions there can be only open unemployment representing the difference between the number of workers willing to work at that wage, for the number of hours that are biologically possible at that wage, and the number of workers the employer wishes to engage.

In a traditional society, however, a system of work-sharing is in effect, so that all workers are absorbed. Limitations are imposed on the level of total output-and-consumption by the necessity of providing savings (in the form of seed, for example) for next year's cultivation. The argument here seems to be that an increase in output requires an increase in consumption, and at some point the increase in consumption needed for additional hours of work for each member of the labor force exceeds the increase in output

[11] Cho, *op. cit.*, p. 41.

obtained by the increase in hours. We are confronted here with a question of fact. It is doubtful whether, even in so densely populated an area as Java, for example, caloric intake ever rises faster than output, as the number of hours of work per day increases, within the range of positive marginal productivity for numbers of workers. It may be a more accurate description of what takes place to say that the marginal productivity of labor really does fall to zero, in the sense that more workers added to the fixed amount of land can bring no increase in total output, except of course during the planting and harvesting seasons. (Seasonal underemployment is common to agriculture everywhere—including large-scale wheat farming in Canada or sheep grazing in Australia.)

Dr. Cho's argument, in any case, is that in traditional societies the wage level is set so that the supply of labor hours is restricted to a point where the marginal productivity of labor is still positive, with all members of the labor force employed. In this equilibrium position there is surplus labor (and zero marginal productivity) only in the sense that the numbers of workers could be reduced and their hours increased by raising the wage rate (leaving the wages bill unchanged) if the social system did not require work-sharing among all members of the labor force. But this surplus is effective, and thus true disguised underemployment exists only if some of the workers are "marginal" in both the economic and social sense.

Cho's fundamental diagram is reproduced in Figure 14-6. On the horizontal axis the number of hours worked per day (or week) by each

WAGE PER MAN PER DAY

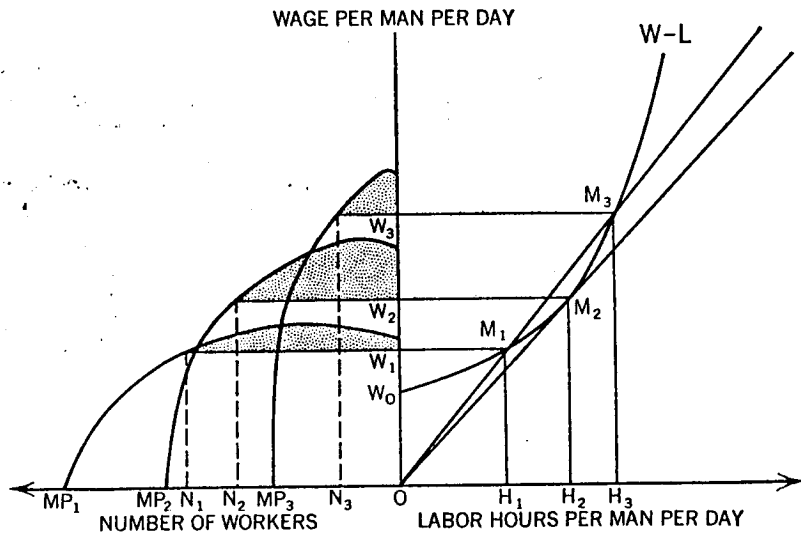**NUMBER OF WORKERS** **LABOR HOURS PER MAN PER DAY**

Figure 14-6. Wage-productivity relationship of wage labor.

man is measured to the right of the origin, and the number of workers engaged is measured to the left of the origin. On the vertical axis is measured the daily (or weekly) wage per man. The slope of the straight lines through the origin measures the wage per hour—wages per man-day divided by hours worked per man-day. At point H_2, for example, the number of hours worked per man is OH_2, the wage per man is H_2M_2 and the hourly wage is H_2M_2/OH_2. The W-L curve shows the relationship between the number of hours worked by each man and the wage rate per man-day (week). As the wage per day (week) rises from OW_0 to OW_1 to OW_2 the hours worked per day (week) rises from zero to OH_1 to OH_2, etc.

In the left-hand portion of the diagram is shown the marginal productivity of additional workers (with fixed land and capital) at different levels of wages per man-day (week). At the low wage OW_1 the marginal productivity starts low and falls slowly, as shown by curve MP_1. The reason is that each man can work only a few hours per day (or week) at that low wage, and adding more men adds little more output but also little more in the way of effective labor to be combined with the fixed stock of land and capital. At the higher wage per day (week) OW_2, the marginal productivity starts higher but falls more rapidly, because each man adds a larger number of man-hours, as shown by MP_2. With a still higher wage rate OW_3, the marginal productivity curve is MP_3.

Under "capitalistic" conditions employers will seek to maximize profits, which requires minimizing the ratio of wages per man-hour to output per man-hour. This equilibrium position will be achieved with a wage per day (week) of OW_2, and a work day (week) of OH_2 hours and employment of ON_2 workers. In this position the straight line through the origin, showing wages per hour, is just tangent to the W-L curve showing hours per man. It therefore represents the lowest possible *hourly* wage, expressed in terms of wage per man-day (or man-week). The level of employment will be ON_2 even if the number of workers is larger. If, for example, the labor force is ON_1, unemployment will be N_1N_2 and the presence of unemployment cannot reduce the wage rate. Profits are shown by the shaded areas in the left-hand portion of the diagram and are maximized at the wage W_2.

In the tradition-directed society, on the other hand, the institution of work-sharing and income-sharing prevails, and wholly unemployed *persons* are not permitted. The solution is to lower the daily (weekly) wage rate to W_1, which reduces the hours worked per day (week) to OH_1 but shifts the marginal productivity curve to MP_1 and permits a level of employment ON_1. Output and income of those employed is reduced, and the phenomenon of low-productivity employment appears. Profits will be lower. It cannot be said from the diagram alone whether or not total output will be less; it depends on the production functions. If we liked, we might define N_1N_2 as the volume of disguised unemployment, equal to the amount of open unemployment that would appear in a "capitalistic," profit-maximizing society. Dr. Cho does not choose to do so, because we

do not yet know whether or not N_1N_2 workers are actually "marginal" and transferable.

In his conclusions, Dr. Cho states his position as follows: "Marginal men are those who are most susceptible to making new adjustments in situations of change, owing to their marginal economic and social situations. Therefore, only the idle labor of marginal men may be considered as true surplus labor which can be removed from the land without creating problems. Self-supporting family workers are not socially marginal individuals because they are steeped in tradition and, by and large, prefer the security, the personal dignity, and the lack of imposed pressures which accompany land ownership and self employment." [12] Dr. Cho reiterates that if there is chronic open unemployment, in the sense of excess labor over and above the peak requirements, it can be withdrawn without difficulty; but if there is only seasonal unemployment, then permanent removal of the unemployed is impossible. Thus in estimating the numbers of workers who can be removed, seasonal unemployment must be sharply differentiated from chronic unemployment. "In the tradition-directed society, in which open unemployment is not acceptable, under-employment is characteristic, and the system of earnings is based on the practice of sharing. We have deduced in our model that the openly un-employed under the hypothetical capitalistic society would be true surplus labor (of the technical type), but that current underemployment under the traditional social arrangement is not true surplus labor (of the technical type)." Finally, "Technical underemployment is true (or removable) surplus labor when it is chronic, but tradition-directed underemployment is not true surplus labor even when it is chronic under the *ceteris-paribus* assumption." [13]

Underemployment in Korea

Having cleared away the concept and analysis of disguised underem-ployment, Dr. Cho proceeds to measure the amount of surplus labor in the South Korean economy. This measurement first requires a statement of statistical sources and concepts. Active population, for example, is defined as those persons between fifteen and fifty-nine years of age. The estimated work year is 280 days for men and 268 for women. Cho has some difficulty in deciding what is a normal work day, but ends by accepting "the rigid Western standard of eight hours a day." The labor force participation rates are similarly estimated, and also the amount of labor available. Dr. Cho assumes a labor participation rate of 1.0 for all male farm workers in the fifteen to fifty-nine age range and 0.6 for female workers in the same age range.

On this basis he reaches the following conclusions: First, there is much seasonal variation in employment in Korean agriculture; second, there are shortages of family labor in the peak agricultural seasons—there is no chronic underemployment, only seasonal underemployment; third, self-supporting family workers suffer relatively more underemployment than

[12] *Ibid.*, p. 141.
[13] *Ibid.*, pp. 49-50.

attached wage workers. About 32 per cent of the total labor time available annually is unutilized, but disguised unemployment in the sense of chronic idle labor does not exist. Approximately 62 per cent of the unutilized labor (or about 19 per cent of the total labor available) represents tradition (or about 19 per cent of the total labor available) represents tradition directed underemployment. Technical underemployment is approximately 12 per cent of the total labor available, or 38 per cent of total unutilized labor.

Cho rejects Nurkse's scheme for transferring surplus labor to the indus-trial sector as inapplicable in the Korean context. "It is impossible to with-draw any labor permanently if, as in Korea, there could be an actual seasonal shortage of labor. Only if the labor shortage during peak seasons were eliminated would there be any chronic underemployment that could be permanently withdrawn." He suggests that this objective might be achieved by providing more and better food during these peak months, so that farm workers could work longer hours during these peak seasons. He also recommends that subsidies to promote agricultural production should be allocated to a fund for community capital improvement projects, rather than being given to individual farm households. He further recommends that some of the rent paid to absentee landlords should be retained for rural capital projects. He prefers a land property tax to an income tax on incentive grounds. He believes that this development program "would not only put to work unutilized labor in much-needed rural capital improve-ment projects, but could also pave the way to the gradual dissolution of those traditions and institutions that contribute so heavily to the economic stagnation of a typical underdeveloped world community."

The proposal for using surplus labor in the off-season for development work projects in the neighborhood of the same villages is, of course, not new; as far as it goes is beyond reproach. The really important conclusion, however, is that disguised unemployment or underemployment in rural areas does not provide the basis for an "up by the bootstraps" approach to economic development. Releasing any significant number of workers permanently from rural areas will require capital investment in the agri-cultural sector, to raise productivity and permit (in Cho's model) longer hours to replace larger numbers, while at the same time investment is made in the industrial sector to provide alternative job opportunities. Thus, we are led once again to the "big push" as the sole recipe for launching sus-tained economic growth.

The Agricultural Lag

All this is not to say that increases in agricultural productivity are unimportant in the development process. On the contrary, increasing con-cern is being expressed among development economists regarding the "agricultural lag." This lag is particularly striking in Latin America. Agri-cultural productivity is low in all developing countries, almost by defini-tion; but in some countries the low output per man-year reflects over-crowding on the land, a phenomenon which is still relatively rare in Latin America. In Latin America more than any developing region, perhaps, the gap between actual and potential agricultural productivity, with existing

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.