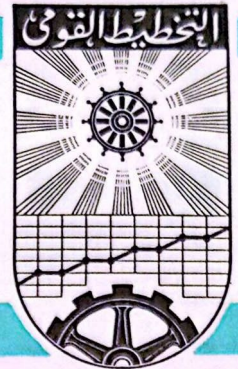


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REGIONAL INTEGRATION
& NATIONAL DEVELOPMENT

by

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LECTURE III. REGIONAL INTEGRATION & NATIONAL DEVELOPMENT

It was, I believe, professor Gunnar Myrdal who first suggested that underdeveloped countries are characterized by large & increasing gaps in productivity & income among major regions, & advanced countries by small & diminishing ones. So general & so important is this phenomenon of regional disintegration, in fact, that it can serve almost as a definition & measure of underdevelopment. The correlation between the degree of regional integration & maturity of the occupational structure, & between both of these & per capita income, is very high. Even small underdeveloped countries such as Ceylon or Greece have leading & lagging regions, & in bigger ones such as Brazil, Mexico, Indonesia & Italy the regional contrasts are dramatic.

THE UNITED STATES

Historically the United States has been more successful in achieving regional integration of its economy than any other country comparable in size and geographic diversity. During the period 1840-1860 the changes in relative per capita income among major regions were small and diverse; but because of the stagnation in the Southern regions the overall tendency was centrifugal - that is, the gaps in per capita income among regions tended to increase. Between 1860 and 1880 the movements were more marked, and the general trend more clearly centrifugal, partly because of the addition of the Rocky Mountain and Pacific Coast regions at very high initial levels of per capita income, and partly because of the continuing lag of the Southeast and Southwest behind the Northeast, Middle Atlantic, and West North Central regions. From 1880 to 1920, however, there was a strong centripetal tendency in regional incomes per capita. From 1920 to 1930 the overall tendency was mildly centrifugal; the Southeast and Southwest did not share proportionately in the boom of the 1920's.

From 1930 to 1950 the trend was strongly centripetal. Indeed, for this period there is an almost perfect inverse rank correlation among regions-and even among states-between the levels of per capita income in 1930 and rates of increase of per capita income since. The Southeast was the poorest region in 1930, but enjoyed the most rapid rate of growth in the following two decades. The Southwest was second lowest in 1930, but had the second highest rate of growth between 1930 and 1950. The regions that were richest in 1930, on the other hand, had relatively slow rates of growth in the following two decades.

For the 1950's the picture is mixed, with relatively small difference in rates of growth in per capita income among regions. The Southeast continued to enjoy the highest rate of growth of all regions during this decade, but growth in the Southwest slowed down to approximately the national average. Given the differences in levels of income in 1950, spreads in real per capita income among regions increased during the decade. The overall tendency might be described as mildly centrifugal.

The whole history of interregional relations in the U.S. resembles a colossal game of "follow the leader" in which one region after another takes a turn at being a leader. "Backwash effects" of the opening of new regions on the older ones have never for long outweighed the "spread effects"; somehow or other lagging regions have always been converted into leading regions again. It is almost as though Adam Smith's "invisible hand" were operating in the American economy in a fashion never envisioned by Adam Smith himself. A consequence of this tendency for centripetal movements to appear and reappear is that the United States has eliminated the vast regional differences in per capita income that still plague other large, regionalized countries of recent settlement.

In 1880, for example, the United States average level of per capita incomes was about double that of the South (poorest region) and about 165 percent of that of the Southwest (the second poorest region). By 1960 the United States average was only 43 percent above the South - still the poorest region - and only 116 percent of the Southwest, still the second poorest region. In 1880, the Far West, then the richest region, had a per capita income more than four times that of the South and 384 percent of the personal income per capita in the Southwest. By 1960, the Far West - still the richest region - had a per capita personal income only 70 percent above that of the South, and only 138 percent above that of the Southwest.

Economic growth of any country involves leading and lagging sectors, frequently identified with leading and lagging regions. Healthy growth, however, seems to require that the lagging sectors and regions be converted into leading ones before too much time has gone by - as has been repeatedly the case in the United States. Otherwise the agglomerative pull of the leading sectors may become so strong that lagging sectors are converted into regressive ones, like the Italian South, or the Brazilian Northeast. The problem seems to be especially acute when sectors and regions overlap as they do in many underdeveloped countries. At best, identification of lagging and leading sectors with lagging and leading regions aggravates the problem of reallocation of resources. In many cases the leading sector is identified not merely with a region but with a few cities. Latin American countries are already substantially urbanized and are rapidly becoming more so. Asian cities have grown fantastically since 1940. The agglomerative pull of the capital cities is particularly strong, but in some cases (such as São Paulo, Medellín and Bombay) there are commercial, financial, and industrial centers in addition to the capital city that show rapid rates of growth.

Under conditions of technological dualism it is possible to have very substantial investment in the modern sector and quite satisfactory increases in per capita income in that sector, without making any dent in the problem of poverty in the traditional sector and region. That is precisely the situation in Brazil, Italy and Mexico today. Impressive though it is, the investment taking place in the modern sector does not provide new employment opportunities at a rate high enough to permit even a relative decline in the proportion of population living in the traditional sector and

region, let alone to permit an absolute decline in population of that region, which may prove necessary for a solution to the problem of poverty in that region.

In the worst cases the lagging sectors and regions are associated with less highly developed social groups as well. In these cases, moving people from low-productivity occupations to more highly productive ones is not only a matter of moving them from one part of the country to another; it is also a matter of moving them from one socio-cultural framework to another. For a Brazilian peasant in the Northeast or a Mexican peasant in the South both the geographic and cultural distances that many people must move to obtain jobs in the progressing sector of the society may be very great indeed. Once technological and sociological dualism set in together, a "feedback" mechanism tends to appear, for the simple reason that the pattern of emigration tends to dilute the quality of the population--without sufficiently reducing its quantity. The best educated, best trained, most progressive, most ambitious, men and women -- those with the highest level of "need-achievement" in McClelland's terminology -- will be the ones who will leave the lagging region for the progressive one. Thus the lagging region is denuded of the very qualities that are needed to reconstruct it and reverse the trend, launching a process that will narrow the gaps in productivity and income. Meanwhile, at the other end of the miratory goute, underdeveloped countries suffer from urban congestion, slums, urban underemployment and urban parasitism. In underdeveloped countries there is insistence on the need for "balanced growth," which in some cases includes sectoral and regional balance. Italy, Mexico, and Brazil, Indonesia, Ceylon, the Philippines, and other countries have launched special programs for accelerating growth in their lagging regions, on the grounds that accelerated growth rates for the economy as a whole require the elimination of marked disparities in per capita incomes and current growth rates between leading and lagging regions.

Entrepreneurship , the
Frontier, and Economic
Growth

How has the United States avoided such extremes of regional disintegration ? The argument presented here is that the process of regional

integration has consisted in a wave after wave of frontier development in one part of the country after another, until finally old frontiers have become new frontiers again.² By the same talking, the absence of a frontier of the U.S. type helps to explain regional disintegration and relatively low standards of living in other countries, and particularly in large, highly regionalized underdeveloped countries such as Brazil, India, Mexico, Chile, Colombia, Indonesia, and Libya.

^{2/} The term "frontier" is not used here in a geographic sense, such as an area with 2 to 6 people per square mile. It means rather an area of net immigration associated with utilization of new resources, establishment of new industries, and urbanization resulting from these industries. The concept of frontier receives fuller treatment below.

For some 350 years the United States enjoyed more or less continuous frontier development. Between 1890 and 1900, and again between 1910 and 1940, the process slowed down. The latter retardation contributed to the Great Depression of the 1930's. Since 1940 frontier development has been accelerated again, but instead of taking the form of an essentially westward movement, it has been dispersed. This acceleration of frontier development, in turn, has contributed to the relatively limited fluctuations of income and employment maintained since World War II, as compared to the interwar period.

This record of centuries-long frontier development is itself unmatched by any other country-with the possible exception of the Soviet Union and Eastern Europe. Moreover, in contrast to most other countries, the "backwash" effects on older regions of rapid growth of a new region have never for long outweighed the "spread effects." Lagging regions have somehow always become leading regions again. The regeneration of the Southeast took longest, but that region is now the most rapidly growing in the country. There has never been in the United States anything quite like the empty center of Australia or the chronically lagging regions of the Maritimes and the Prairies of Canada, let alone the stagnant South in Italy and Mexico or the retrogressive North and Northwest in Brazil. In the United States, population growth, frontier development and resource discovery have moved together, amplifying the effects of each on economic growth. Both flattened out between the wars and both have accelerated since.

Moreover, the American frontier has been a "small man's frontier" providing continuously changing "lands of opportunity" for men with little or no capital. This unique American experience with frontier development has given content to the "log-cabin-to riches" legend, and has given rise to a confidence in free private enterprise, both as an avenue for individual self-expression and as a device for national economic development, which does not exist and which might be misplaced in countries where the nature of the frontier has been totally different.

A Comparison with Canada and Australia

No other country has enjoyed quite this pattern of interregional relations. The industrial revolution in Europe was not accompanied by such mass movements of population and frontier development. By the time the industrial revolution came along, most of the centers of European population had already been established, and while there were differences in rates of growth, urbanization took place simultaneously throughout most of Europe.

Canada

Even in neighbouring Canada, which shares so much of the American cultural heritage and history, the picture is very different. In Canada there has been a single shift of industry away from the Maritime Provinces

where it began to Ontario and Quebec, and more recently to British Columbia; but there has been no industrialization nor urbanization in the Canadian Middlewest. The whole vast stretch from Toronto to Vancouver is still essentially empty. Even now, with the petroleum discoveries in Alberta, the biggest city of the Canadian Midwest, Winnipeg, gives the impression of being a decadent rather than a burgeoning urban center. The impact of the postwar oil and iron booms seems to be felt more in Toronto and Montreal than in cities nearer the actual mining operations. Urban development has been confined to a narrow strip within a few hundred miles of the United States border, and there are only three large cities in all -- one in Quebec, one in Ontario and one in British Columbia.

As may be seen from Tables IV-1 and IV-2, Canada shows none of the marked centripetal tendency that has marked the growth of regional incomes in the United States during the last three decades. Over the thirty year period following 1926, real per capita personal income in Ontario grew faster than in any other region, moving Ontario from second place in 1926 to first place in 1955. The second highest rate of growth, it is true, occurred in the Maritime Province, which were the poorest region in 1926. They remained the poorest region in 1955, and the absolute gap in real per capita income between the Maritimes and the richest region widened considerably. Quebec had the third highest growth rate, but its position as the second poorest (excluding Newfoundland and Labrador, which became part of the Dominion in 1951) was unchanged -- a striking fact, given Quebec's vast mineral and forest resources and its tremendous supplies of hydroelectric power. The Prairie Provinces had the slowest rate of growth, despite the oil discoveries in the early postwar years, and retained the middle position among major regions in the country. Its rate of growth was about half that of Ontario. Finally, British Columbia had the second slowest growth rate, and slipped from first to second place.

Australia

When we come to Australia, the contrast with the United States is even more striking. The opening up of the Australian center led to no urbanization in the interior, but rather to population growth in the handful of cities on the coast, particularly in the two great metropolitan centers of Melbourne and Sydney. Moreover, the Australian frontier, such as it was, was always a "rich man's frontier." The Gold Rush lasted barely a decade as a small man's operation; after that it was a matter of corporate enterprise crushing quartz. In any case, the mineral discoveries in Australia were almost in the backyards of the great cities. The center itself is dead, consisting of unattractive desert. Frontier development in Australia consisted of "rich-squatters" acquiring huge tracts of land, hiring a very small labor force, and running large numbers of animals. This sort of development created employment opportunities in the suburbs of Melbourne and Sydney but not in the center of the country.

Clearly, it requires a different sort of attitude to set up a grocery shop in a suburb of Sydney than to move hundreds of miles to the

westward and launch a new enterprise in a strange new territory. Moreover, the opportunity to start a small business and watch it grow into a large one as the city grew around you was confined to a few coastal centers. The "log-cabin-to-riches" legend had less meaning in Australia than in the United States. As Professor Fred Alexander put it. "use of the term (frontier) to cover gold rushes to such places as Ballarat and Bendigo, not far distant from the established center of Melbourne and considerably within the outer rim of existing pastoral settlement, is unduly stretching the definition given in the opening paragraph of this essay.^{1/} The Australian frontier, like the Latin American one, is "hollow".

The tendency for Australians to look to their government to provide both development and welfare is a reflection of the nature of the frontier. The "log-cabin-to-riches" legend never played any role in Australia because there was never any foundation for it. From the beginning, social overhead capital had to be provided by public enterprise; the land in the interior could not even be given away. There was no chance of building railroads through private enterprise and land grants, as in the United States. Even water had to be provided by public enterprise.

Colin Clark's indices of man-year productivity, measured in his international units, show productivity in Australia above that of the United States, and also rising more rapidly than in the United States, up to the last decade of the nineteenth century. There was then a marked tapering off of growth in the 1890's, while the growth of the United States was accelerated so that the curves of man-year output crossed.

Still more striking is the apparent stagnation of Australian income after 1925. It was at about this time that the good land was fully occupied, necessitating a structural change in the Australian economy if the growing population was to be absorbed without an actual decline in per capita output and income. Since the Australian industrial base was less favorable than the base for the pastoral industries, the maintenance of early rates of growth proved to be impossible. The structural change in Australia was indeed very rapid, and it is interesting to note that by the middle fifties the proportion of the labor force remaining in agriculture was considerably lower in Australia than in Canada, and about the same as in the United States. During the years 1933 to 1954 the share of the labor force engaged in agriculture dropped from 22 per cent to 13 per cent. There was actually a reduction in the total numbers engaged in agriculture between these years from 588,000 to 498,000.

Australian national income was subject to violent fluctuations between the years 1941 and 1959, the years for which data are available for both the commonwealth and the six Australian states. The fluctuations added up to rapid growth of per capita real income between 1941 and 1950, followed by a decline in per capita.

^{1/} Fred Alexander, Moving Frontiers, Melbourne, Melbourne University Press, 1947, p. 28.

real income during the 1950's. Even the total real income was not much higher in 1959 than it had been at the previous cyclical peak in 1950.

The fluctuations were so violent that it is very difficult to discern any general tendency towards convergence or divergence of income among states over the whole period. The dispersion, measured both by the percentage gap between highest and lowest per capita income among states, or by the standard deviation, fell during the war, rose between 1944 and 1948, fell again between 1948 and 1952, rose to 1954, fell to 1957 and rose again to 1959. On balance it appears that a rising national income in the Australian case is accompanied by a divergence of state incomes and a falling income by convergence, but this relationship does not hold for every period. The percentage gap was somewhat lower in 1959 than in 1941; but the standard deviation was somewhat higher in the latter year. At least we can say that there is no clear trend toward convergence.

It should be noted that the total gap is very much less than in the United States, although it is increasing in absolute terms. The difference in per capita real income between richest and poorest states was A£ 37.3 in 1941 A£ 92.7 in 1959. However the percentage gap between richest and poorest was 28 per cent in 1941 and only 20 per cent in 1959. In the latter year the richest state had a per capita real income less than 6 per cent above the national average; and the poorest state only 15 per cent below the national average.

With so small a range of per capita real incomes among states and with such violent fluctuations the rank order of the states has been subject to frequent change. Thus Victoria went from first to third and back to first again, New South Wales from third to first and back to second, Queensland from fifth to first to third to fifth to sixth to fifth, South Australia from fourth to fifth to third, and Western Australian from second to first to fourth to fifth and back to fourth. Except for 1957, when it was second from the bottom, Tasmania has always been low man on the Australian totem-pole. Every other state but Tasmania has been the richest state in the Commonwealth in at least one year during the two decades covered by the available statistics. However, over the whole period there are two fairly clearly distinguishable groups: Tasmania, Queensland and Western Australia, which have always been the "claimant states," have tended to run consistently below Victoria, New South Wales and South Australia as the relatively prosperous states.

The over-all picture is one of an astonishing degree of stagnation in so young and thinly populated a country. The sharp limit to frontier development and the consequent need for structural change on a limited industrial resource base is no doubt a large part of the explanation. But the lack of frontier spirit, the limitations on private entrepreneurship, and the emphasis on dividing the pie rather than make it grow are surely also significant aspects of the causal relationship involved.

Brazil and Mexico

Brazil, like Australia, has "hollow frontiers". True, much of the infrastructure thus far has been built up by private enterprise, mainly foreign. However, the infrastructure has been limited to what is necessary to service (none too well) the existing centers of population, leaving most of the country empty. One reason for the very emptiness is the difficulty and cost of extending this infrastructure.

Immigration to Brazil was a trickle in comparison to immigration to North America. The opportunities for economic self-advancement were simply not so apparent in Brazil. In North America access to land was relatively easy; but in Brazil the immigrant "found himself face to face with the established tradition of aristocratic landowner and tenant, of master and man."^{1/} The Brazilian frontier, like the Australian one, was a "big men's frontier." It was the fazendeiros who benefited from the sale of sugar or coffee in Brazil and who made the profits from rise in land values.^{2/} Wages paid to the colonos were barely above subsistence level. The initial investment in a sugar or coffee plantation was too large for a small proprietor;^{3/} the colono had little hope of accumulating capital on the required scale. Thus, immigrants to Brazil "sent back discouraging reports which must have poorly compared with stories of the quick wealth to be made in North America."^{4/}

The whole process has left Brazil substantially empty as in Australia and in contrast to the United States.

Brazilian development has seen none of the steady westward push that characterized American economic development in the 19th century, and even in the 20th, where industrialization is concerned. Instead, settlement has made discontinuous jumps to isolated spots on or near the coast. Frontier development in Brazil, as in Australia, has failed to pull population into the center.

TECHNOLOGICAL DUALISM IN BRAZIL

One might even regard Brazil as the classic case of a country divided into two sharply differentiated sectors, a modern sector utilizing capital intensive techniques and achieving high productivity, and a traditional sector utilizing labor intensive techniques and suffering

1/ Preston James , Latin America, New York, 1959, pp. 482.

2/ Cf. Celso Furtado, Formacao Economica do Brazil, Rio de Janeiro 1959, pp.57- 58

3/ According to Furtado, the value of a sugar refinery was £15,000 at the end of the 16th Century. (Ibid) The present equivalent would be several times as high. Investment in slaves must be added to this figures.

4/ Preston James, op.cit., p.482

from low productivity and low income per man-year. The modern sector includes large scale, mechanized commercial agriculture as well as mining, the petroleum industry and large-scale manufacture. The traditional sector consists mainly of small scale agriculture, handicrafts, cottage industry and small industry. Each sector typically has financial, transport, and other services associated with it.

In Brazil, these sharply differentiated sectors are associated with equally sharply differentiated regions. The modern sector consists of the South, the traditional sector of the North and the Northeast. Undeveloped or lagging regions do not matter so much if, as in Australia, few people live in them. But in Brazil about 30% of the population now lives in the Northeast, another 10% in the North. Adding the population employed in the pockets of low productivity within the Southern region, it may be said that about half of the Brazilian population is still engaged in the "traditional" sector. Moreover, the spreads in per capita income between traditional and modern sector are enormous - of the order of 400% - and they are increasing. No such differentials exist in Australia. Indeed, there is no "traditional" sector or region left in Australia. There are a few farmers struggling on sub-marginal land, but the great bulk of the population lives and works in high-productivity industry and agriculture.

The per capita income in the richest of the five major regions in Brazil (the South) is nearly four times as high as it is in the poorest region (the Northeast). Even within regions there are substantial differences in per capita incomes by States. Per capita income in the poorest State is only about 10 per cent of per capita income in the richest one (Sao Paulo). As might be expected, these differences in per capita income reflect differences in the degree of industrialization. In the Southeastern subregion (Minas Gerais, Hapiritu Santo, Rio de Janeiro, Sao Paulo and the old Federal District, now the State of Guanabara) the proportion of the total population living in rural areas was already down to about 52 per cent as early as 1956, when the figure for the country as a whole was 63.8%.

In the Brazilian South per capita income had reached \$400 per year by 1961; in the State of Sao paulo it was higher still. This figure is above that of some European countries normally considered "advanced". Clearly, if the whole country were as highly developed as the South, let alone the Southeast, and the present high current rates of growth still prevailed, there would be little reason to be concerned about Brazilian development problems. But such is far from the case. Poverty and squalor in the shanty towns of Northeastern cities rival that of the poorest Asian cities, and in the rural areas conditions are even worse. The good land with assured rainfall is already suffering from serious overcrowding, with population densities in the coastal areas as high as 300 per square mile-one generation of growth at current rates would create a problem of population pressure in the coastal areas of the Brazilian Northeast worse than now prevails in Java. It is estimated that in order to guarantee a minimum per capita income of even \$100 per year in this area it will be necessary to move 7.5 million people out of it.

Even more distressing is the fact that current rates of growth—even percentage rates, let alone absolute rates — are lower in the Northeast than in the country as a whole. With such enormous difference in the base incomes, it would take decades of faster percentage growth in the poorer districts before the gap in levels of per capita income would begin to close, and more decades before the gap would disappear. But in Brazil this process of diminishing gaps has not even started.

Mexico

The Mexican case is slightly more complicated. In general, one can draw a line across the country just south of the capital city, and say that the developed region lies to the north of the line and the underdeveloped region to the South. However, the geographic split is less clearcut than in Brazil. As may be seen from Tables 4 and 5, Quintano Roo far to the South has a higher level of per capita income, and a higher industrial output per capita, than some of the States farther north. A number of States between those bordering the United States (which, together with the Federal District, are the most highly developed) and Mexico City belong to the middle rather than the upper ranks. Nonetheless, one can safely describe the North as the leading region and the South as the lagging region.

The percentage gap in per capita incomes by States is much the same as in Brazil: in 1960 the richest state had a per capita income nearly twelve times that of the poorest state. If the Mexican States were grouped by major regions, — the six States on the U.S. border, say, and all the States south of Mexico City — the differences in per capita regional incomes would also be of the same order of magnitude as in Brazil.

In one respect the Mexican picture is different from that of Brazil. In terms of percentage rates of change there is a centripetal, rather than a centrifugal tendency in per capita income by States. Between 1940 and 1960 the poor states, as a group had higher rates of growth than the rich states as a group. The richest state of all — Baja California del Norte — actually suffered a decline in per capita output in two decades, while the poorest, Oaxaca, enjoyed an increase of 163 per cent. It might be concluded that Mexico is "over the hump" so far as regional disintegration is concerned. However, the difference between the Brazilian and the Mexican pictures should not be exaggerated. Some rich states still have higher growth rates than some poor states; and because of the enormous difference in the base levels of per capita output, it will in any case be fifty years or so before the gaps between the richer states and the poorer ones begin to narrow.

- IO A. -
Some Theoretical Speculations

My general thesis is that both a high level and a high rate of growth for the national economy as a whole require long run convergence of per capita productivity and income among major regions within the economy. So far as they go, the facts seem to confirm this thesis for the United States. From 1840-1860, there seems to have been a high percentage rate of growth up total output of the national economy, but a rather small increase in per capita income, and a mildly centrifugal tendency among regional incomes. Between 1860 and 1880, the overall rate of economic development was apparently somewhat slower. There was also a more marked divergence of regional income, but the Civil War and the addition of the Rocky, Mountain and Pacific Coast regions at high initial levels of per capita income make this period a somewhat peculiar one. The period from 1880 to 1920 was one of relatively rapid growth, with convergence of income among regions. The decade of the 1920's was one of slow growth in the national economy and mild divergence in per capita income. The decades 1920-1950, taken as a whole, were a period of very rapid growth of the national economy and marked convergence among regions. The decade of the 50's again, was one of relatively slow growth and a mildly centrifugal tendency in regional income.

To simplify the analysis, let us first assume that the economy in question has only two major regions, metropolitan region and a frontier defined in the fashion outlined above. We shall also assume in the first instance that per capita income is initially lower in the less industrialized frontier area than it is in the more industrialized metropolitan area. So far as mere arithmetic is concerned, there are then four possible relationships between the over-all national rate of economic growth and interregional relations: 1./ A high national rate of economic growth, accompanied by divergence of regional income, as a result of a high rate of growth on the frontier accompanied by very high rates of growth in the metropolis. 2./ A low rate of national economic growth accompanied by divergence, resulting from a very low rate of growth on the frontier, and a low rate of growth in the metropolis. 3./ A high national rate of economic growth with convergence of regional incomes, reflecting a very high rate of growth on the frontier and a high rate of growth in the metropolis. 4./ A low national rate of economic growth with convergence of regional incomes, resulting from a low rate of growth on the frontier and a very low rate of growth in the metropolis.

The case where per capita income is initially lower in the "frontier" area (as distinct from marginal productivity of labor or capital moving into the frontier) is probably the typical one; in such cases as the addition of the rocky mountain and the far west regions to the United States at very high initial rates of per capita income, because of a young population concentrated in mining, a relatively short period might ensue in which per capita income was higher on the frontier. In those cases, of course, the models would have to be recast.

Backwash and Spread Effects:

These four cases might be elaborated in terms of the Myrdal concept of "backwash" and "spread" effects. In general, backwash effects occur when the development of the frontier has unfavorable effects on the metropolitan region, (or vice versa) Spread effects occur when the expansion of the frontier region has favorable effects on income, employment, output, etc., in the metropolis (or vice versa) The relationship is probably best expressed in terms of investment. Let I_m represent investment in the metropolitan region, and I_f investment in the frontier area. We may then say that net spread effects from opening the frontier occur if, $\frac{\Delta I_{m,t+n}}{\Delta I_{f,t}} > 0$, and backwash

effects occur on balance if $\frac{\Delta I_{mt+n}}{\Delta I_{ft}} < 0$. Our first case in the above list of four is therefore one in which spread effects of frontier development exceed backwash effects; in the second case, spread effects also outweigh backwash effects on the old region, although growth in both regions is low. In the third and fourth cases, we may assume that backwash effects of frontier development outweigh spread effects in the metropolitan region. There may also be backwash or spread effects from metropolis to frontier: $\frac{\Delta I_{ft+n}}{\Delta I_{mt}} < 0$.

It is clear that the selection of period ("n") is very important in determining the sign of $\frac{\Delta I_{mt+n}}{\Delta I_{ft}}$. In discussing American experience we

have taken three periods of twenty years, one of forty years and two of ten years, representing periods of overall convergence or divergence. The longer periods can be up into shorter cyclical movements, and there is a need for analysis of interregional relationships in the course of the national business cycle.

The "ratchet effect"

One acceptable format for interregional relations in national economic development would be for the development of the frontier to lead initially to "Case one", which might be called the "ratchet effect". High overall national growth would be accompanied by regional divergence, because of spread effects of frontier development in the metropolis, bringing "very high" rates of growth there. The initial growth would then have a reverse spread effect, leading to convergence, as the very high growth of the region has spread effects on the frontier, bringing still higher rates of growth there. The reverse sequence could also lead to continuously high rates of growth in the national economy; that is, initial very high rates of growth in the frontier, accompanied by a high rate of growth in the metropolitan region, and consequent convergence, leading to subsequent divergence as the spread effects of frontier development result in very high rates of growth in the metropolitan region, with only "high" rates of growth on the frontier. Provided this situation is followed by another period in which convergence takes place, with the very high growth in the metropolitan area once again having spread effects in the frontier area, the "ratchet effect" would occur in this sequence also, and high national rates of growth would prevail.

It should be noted that divergence is not in itself evidence that backwash effects in one region outweigh the spread effects. It is possible, for example, that the development of a frontier, with very high rates of growth there, and only high rates of growth in the metropolis, with consequent divergence, might still be accompanied by net spread effects. That is, the level of investment and rate of growth in the metropolis, while lower than in the frontier, may nonetheless be higher than if no frontier development were taking place. We must also repeat the word of caution from our initial chapter. Higher percentage rates of growth in the poorer region will not immediately produce convergence of per capita income if the initial levels of per capita income are very far apart.

Regional Dichotomies

1. It may be well at this point to clarify the various dichotomies suggested among regions.
2. Leading-Lagging - We have been using the terms leading and lagging to refer almost entirely to differences in current rates of growth, usually measured in per capita real income. It may be useful to retain this definition of leading and lagging. However, the current rates of growth do not in themselves indicate the direction of the causal connection. If interregional export multipliers are high, a frontier region, for example, may be a leading region and yet the basic cause of its growth may be the expansion of a metropolitan region and a consequent expansion of the frontier region's export market.

Dependent-independent: We might call a region which is generating net spread effects to others an "independent" region, and one whose growth is largely the result of spread effects from other regions a "dependent" region.

3. It is important to distinguish among types of lagging regions when appraising their significance for national economic development. For example, a region may be "lagging" because its resource base is very poor and its population insignificant, as in the case of the Australia center or the Canadian north. Secondly, a region may be lagging because it is essentially empty, although rich resources exist in it and have simply been undiscovered. Northern Ontario or Labrador might be cases in point. That is, there is a difference between an empty region which has been thoroughly surveyed and explored and is known to be useless at the current level of technology, and one which is simply unknown. Third, there are lagging regions with population densities of the same order of magnitude as for the country as a whole, as in the case of the United States southeast and southwest. Finally, there are "lagging regions" like Java and the coastal areas of the Brazilian state of Pernambuco, with population densities far above the national average, reflecting past population explosions when the now lagging region was a leading one.
4. Frontier-Metropolitan - The frontier is essentially an area where current growth, whether in terms of population or capital accumulation, is associated with the exploitation of recently discovered resources within the region itself. These resources may be agricultural, forest, mineral, energy, or climatic resources. In the metropolitan areas on the other hand employment, increases in employment, and capital accumulation will be associated with the provision of services and the processing, distributing, insuring, transporting and financing of goods based substantially on natural resources outside the region.

5. An old region is one which has reached a certain structure relatively early in time, as compared to other regions in the same country. This structure may be expressed in terms of ratios of population to resources (population densities), ratio of urban to rural population, ratio of industrial employment to agricultural employment, or possibly capital per head.
6. How do "backwash" effects occur? The neo-classical literature has always assumed that "spread effects" of the development of new regions would outweigh backwash effects. (The analysis was applied to international rather than interregional relationships, but the essential nature of the argument is the same in both cases). Thus Marshall maintained that the study of economic development was essentially a branch of the theory of international trade, and Robertson referred to foreign trade as "an engine for growth". Similarly, within a relatively closed economy such as the United States, one might expect that the study of economic development is a branch of the theory of interregional trade, and interregional trade would be the engine for growth. Something of this viewpoint does appear in the study of mature regions by Borts, and also in the writings of Douglass North.

At first blush one would expect that the growth of population and income in a new region would always raise income, employment, and output in the old one. The growth of the market would provide the basis for expanding exports from the older region. It would provide a release from any population pressure, or simple redundancy of the labor supply, through migration to the new region. Finally, frontier development would provide an outlet for investment, maintaining the marginal efficiency of capital at a relatively high level, and maintaining per capita incomes in the old region through transfers of profits, dividends, interest, and rents from the frontier, as in the case of United Kingdom investment abroad during the nineteenth century.

Indeed, one might be inclined to ask how "backwash" effects could occur at all. There seem to be five possible ways in which the development of a new region could lead to backwash effects on the old one. 1./ If resources are discovered in the new region which are essentially the same as in the old one, but more readily available and cheaper to produce, leading to the production of the same products in substantially increased volume, and lowering the price of these products below average cost of producing them in the metropolis. If the old region has no other resources natural or human, with which to develop alternative industries, backwash effects would then occur. The case of the Maritimes provinces in Canada may be one in point. Coal and timber were discovered elsewhere and could be produced at lower cost in other parts of the country, and the ship-building skill, which was another part of the resources base, proved to be unimportant with the shift from wooden sailing ships to iron steamships. 2./ Technological change or a change of taste, combined with movement to a new region, may have a similar effect in displacing the resources or products of the older region. For example, hydro-electric power may, in a new region, replace high cost coal in the old one. Again, if there

is no other resource base, natural or human, on which to rebuild alternative industries the net effect will be a "backwash" one. 3./ If the new region, by virtue of a more rapid rate of growth and higher marginal productivity of skilled workers, leads to the immigration of people with relatively high levels of need-achievement, higher degrees of training and skills, and the like. Such a process is easily observed where ever lagging regions exist, as in the case of the Maritimes provinces in Canada the Brazilian northeast, the Italian south, and the like. 4./ If managerial, technical and scientific skills are imported into the new region from a third one, so that these skills are not produced in either the new or old region, and the proper educational facilities are not provided. This is the case of the foreign "enclave" development in under-developed countries. Investment in the "frontier" of Sumatra in the nineteenth century had only backwash effects on Java, since the high-level, technical, managerial, entrepreneurial and scientific skills were brought in from European countries and the United States. A few people with low-level skills migrated from Java to Sumatra, leaving Java less well supplied with skills than before. 5./ If the flow of capital from the metropolis to the frontier area has such an accelerating effect on the growth of income in the frontier, that the capital flow from metropolis to frontier never succeeds in reducing the gap between returns to investment in the frontier and in the metropolis.

The importance of the time period is again apparent. How short can the period of unfavorable repercussions be and still warrant the use of the term "backwash"? There is a difference between genuine backwash and transition. For example, New England lost much of its boot and shoe, textiles, pulp and paper industries, but now is better off for that, having turned to electronics, carbon black, and other scientifically oriented industries.

Backwash effectives technological dualism: It is also important to distinguish between effects and technological dualism. The latter is essentially a matter of too little investment in the frontier region, relative to the rate of growth of the labor force in the country as a whole, rather than of genuine backwash effects, that is, investment in the modern sector of underdeveloped countries has not actually reduced investment sector; on the contrary, it has probably led to some increase in investment in the traditional sector as well. However, because of the population explosion that accompanied this investment, the absorption of labor into the modern sector was never more than a small fraction of the growth of the total labor force, leading of necessity to increasingly labor-intensive undertakings in the traditional sector and consequent stagnation of per capita income there. It can perhaps be argued that the net effect was one of "backwash" through the process of population explosion. However, it's clear enough that if the same population growth took place without the investment in the modern sector, the traditional sector would be less well off than it is now. In advanced countries like the United States it is not easy to distinguish between the "technological dualism" process - that is, investment in one region which has favorable effects on other regions, but does not create sufficient job opportunities to permit migration in excess of natural population growth from lagging

regions, so that gaps increase - and genuine backwash effects, in the sense that investment in lagging regions is actually lower than it would be if no investment were taking place in the leading regions.

Results of Empirical Study

Since it is not possible to arrive at general theories of regional relationships and national economic development through logical analysis alone, economists have turned to empirical studies to endeavor to isolate some strategic relationships. Given several reasonable hypotheses about the causal relationships, only empirical tests can provide final answers. The field is so new that it can hardly be said that any final answers have yet emerged. However, the studies made to date indicate some important tentative conclusions.

Importance of Movement Out of Agriculture:

Perhaps the most significant conclusion that arises from the empirical studies is that the movement out of agricultural into other occupations is the over-whelmingly important single process in raising per capita productivity and income, both in the country as a whole and in particular regions.

So far as the arithmetic is concerned, there are three possibilities. One region may grow more rapidly than others because a larger proportion of its total production is concentrated in those industries which are growing relatively rapidly in the economy as a whole. This sort of relatively rapid regional growth Perloff, Dunn, et.al., refers to as "the proportionality factor". Secondly, a region may grow more rapidly than others, although its occupational structure and product mix are the same, because the industries are growing more rapidly in that region than elsewhere. Perloff, Dunn, et.al., called this the "differential" factor. Third, a region may grow more rapidly than others because it has a higher rate of structural change, with a more rapid rate of movement from low-growth or low-productivity industries to high-growth or high-productivity industries. Perloff, Dunn, et.al., attached no importance to this third possibility, apparently because for the period 1939-1954 covered by their data they found no strong correlation between regional rates of growth and structural change in the form of a more rapid shift to workers into growth industries. They found that the states with the relatively high proportion of labor in growth industries at the end of their period were in the mature regions with relatively slow growth, such as New England and the Great Lakes region. The same was true for this short period of the increase in employment in growth industries relative to the increase in total manufacturing employment. The states with the relatively high ratio of increase in growth industries to total increase in manufacturing employment were also in the mature regions with relatively slow growth. One cannot but wonder, however, whether this lack of relationship between rate of structural change and overall rate of growth is not an historical accident. The period 1939-1954 was a very special one, and to some degree the regional location of industry was frozen during the earlier part of

this period, consisting as it did of World War II. The figures might merely show that the war effort made use of plant and industrial skills where they were, but shifted them to relatively highly skilled occupations.

It should be remembered - still speaking only of the arithmetic - that a region may grow by getting a larger share of a nationally declining industry. It may also grow by attracting the growth sectors of a nationally declining industry,

One of the pieces of evidence pointing to the importance of the shift from agriculture is that when the causes of convergence are broken down, we find that there has been relatively little convergence of agricultural output per worker, and limited convergence of industrial output per worker, combined with a significant convergence of property income per capita and a dramatic convergence of the ratio of agricultural employment to total employment by states or regions. Thus the convergence is explained primarily by relatively rapid shifts of workers out of agriculture in those states and regions with relatively high rates of growth of per capita income as a whole.

The major conclusion of the Borts and Stein study is that the rate of growth of per capita income in a particular region is very largely a function of the degree of misallocation of resources at the beginning of the period. Essentially, "misallocation" turns out to mean an excessively large proportion of the labor force in small scale, unproductive, unmechanized agriculture. The authors find a marked convergence of the occupational structure, which correlates highly with relative rates of growth in income by states, and they also find that in every year covered by their analysis per capita income by states correlates highly and inversely with the ratio of agricultural employment to total employment. They do not find a significant correlation between the level or rate of growth of per capita income and the occupational structure or product mix within the industrial sector. This particular analysis was undertaken for cyclical periods 1919-29, 1929-37, 1948-53. They found no significant association between the actual rate of growth and a hypothetical rate which would occur if each industry in a state grew at the national rate for the industry, except for the period 1948-1953.

The Climax Economy

The evidence suggests that the United States may be approaching a "climax economy" in which structural change would make no further contribution to economy growth. The United States is a country with a much more clear-cut comparative advantage in agriculture than in industry, and there is a limit beyond which labor cannot be moved out of agriculture without a misallocation of resources. Indeed it may well be that as the now underdeveloped countries industrialize, comparative advantage will dictate an increase in the numbers, if not the percentage, of workers engaged in agriculture. At the very least, a point may be reached in the fairly near

future where the proportion of total output emerging from the agricultural sector will begin to increase again. The rate at which people can be transferred from agriculture to industry would then depend on the pace of labor-saving innovation in agriculture itself, as well as on expansion and technological progress in the industrial sector. It is also clear that there must be some limit to the shift from other sectors into services, we cannot live entirely by taking in each other's washing, and some agricultural and industrial base must be retained.

In a full-fledged climax economy, technological dualism would have completely disappeared and marginal productivity of all resources would have been equalized in all regions. Structural change would have been completed, and so would the "draining of the countryside." Urban growth would tend to be somewhat slower than rural growth, or at least equal to it, since population growth in all sectors and regions would be reduced to the natural rates of growth. Hitherto natural growth rates have been lower in urban than in rural centers, but in the climax economies they would presumably tend to equalize.

In the past, U.S. development consisted first of moving from relatively low to relatively high productivity occupations through geographic movement, without any necessary improvement of skill. Per capita output was higher in Ohio agriculture than in New England, not because the skills were improved but because the soil and climate were better. It may even be that agricultural productivity in the mid-west was higher than the labor productivity in the textile mills of New England, and the level of skill might in some sense have been lower. Later, growth in the United States was largely the result of structural change. The whole process of migration involved not only settling the land, but also resource discovery, industrialization and urbanization. But with some 7 per cent of the labor force in agriculture in a country whose most marked comparative advantage is precisely in that sector, we are about at the bottom of the barrel with respect to this kind of structural change.

It should also be noted that frontier development and resource discovery, which in the past were closely linked to population movement as such, will henceforth be tied largely to technological change. That is, there are few opportunities left for discovery of new resources which are already important in the present product-mix. New discoveries, such as uranium and plutonium, will be a by-product of technological change. Nor do opportunities still exist for moving from poor-resource to rich-resource regions independently of technological change.

In a climax economy, then, further economic growth is dependent upon education, research, technological progress, training, and the like. Our studies of migration in the Southwest suggest that even there - in a region much further from a climax economy than most regions in the United States - little is now served by movement from one place to another except as a by

product of moving from one industrial occupation to another, more productive, industrial occupation, often involving higher levels of skill and additional training. Mobility is simply one aspect of education and training; the "bird dogs" are not temperamentally different from the "kennel dogs," but are simply dogs that have been trained to "point" - to carry further Mr. Wilson's rather malodorous analogy. Failure to "get out of the kennel" reflects lack of "birds," lack of training, or both.

If all this is true, the ARA approach (and most others) to underdeveloped areas are on the wrong track. We are confronted with "depressed people" rather than "depressed areas" and only the retraining aspects of the legislation may be of real significance.

Isolating Independent Regions

There is a tendency in regional studies to relate the growth of the particular region under scrutiny to the growth of the national economy. But since the national economy is an aggregation of its regions, the argument cannot be extended to all regions at once. One could, of course, argue that the growth of the national economy is due to expansion of foreign trade, and each region grows as a consequence of expansion of the national economy. It would be difficult to demonstrate in the American case, however, that foreign trade has been the mainspring of growth in recent decades, consisting as it does of some five per cent of gross national product. In any case, if the growth of the American economy is, for example, the result of expansion in Europe, how do we explain the European expansion? Somewhere or other, the mainspring of economic growth for the world economy must be located.

One might begin by looking for differences in timing and amplitude of growth and fluctuation. If region A reached cyclical turning points before region B in every case, this experience might be regarded as some evidence that A is an "independent" region and B a "dependent" region. However, we could not leap immediately from the data to this conclusion. It is conceivable, for example, that entrepreneurs in region A are more foresighted and more farsighted than those in the rest of the economy, and consequently curtail their investments (or expand it) in anticipation of a downswing or upswing in the economy as a whole. Moreover, if investment in region A is a function of changes in output in region B, we would have to look at the timing of absolute changes in investment and income in region A relative to inflection points in output of region B. If region A always leads in the timing of its fluctuations, for both or either of total output or changes in output in region B and if the amplitude of fluctuations in region A is less, there would be some suggestion that region A is independent, having high spread effects on the rest of the economy. We would still have to grapple with the possibility of superior foresight, however; projections of past growth in demand for iron and steel in the United States economy, for example, might have led to the development of the iron and steel industry in Pennsylvania.

In order to isolate dependent from independent regions, it seems necessary to look at the foreign sector as well. If the expansion of output or investment in the Great Lakes Region during the late 19th century, for example was greater than could be explained by expansion of output in the United States, either because the Great Lakes Region was able to export to the world economy, or to replace imports from the world economy, we would then say that the Great Lakes was an "independent" region. With a high export multiplier the independent region may become a lagging one after some time interval, just because of its high spread effects on the rest of the economy.