A SURVEY OF AGRICULTURAL ECONOMICS LITERATURE
VOLUME 3

Economics of Welfare,
Rural Development,
and Natural Resources
in Agriculture,
1940s to 1970s

LEE R. MARTIN,
editor

Published by the University of Minnesota Press, Minneapolis, for the American Agricultural Economics Association
The Bases for Regional Growth: A Review

Clark Edwards
Senior Economist
Economics, Statistics, and Cooperatives Service
U.S. Department of Agriculture

Economic activity varies over time and place. Temporal and spatial changes in population, income, and employment have been explained in a number of ways. This review describes five principles, or theories, that have been variously considered in the literature of economics as a basis for regional growth. They are: increasing resource availabilities, advancing technology, expanding markets, conquering geographic space, and building institutions. Not all growth theories can be classified into one and only one of the above categories; but many growth authors rely heavily on only one basis, even when several are considered.

A considerable portion of the literature on economic growth does not refer to any of these bases. The "stages of growth" literature, for example, describes variations in the growth history of regions in an interesting and useful way but generally fails to explain how a society progresses from one stage to the next. When a growth author depends on none of the analytical bases for growth, we may classify that contribution as descriptive rather than analytical.

Some authors discuss several, or possibly all, of the five bases for growth. Such discussions may emphasize the interrelatedness or interdependence among the bases. One must analyze the whole system rather than focus on a single basis to understand growth. When an author considers two or more of the five analytical bases equally important, we may classify that contribution as a "systems approach."
This review is organized around seven points: descriptive statements, the five theoretical bases, and the systems approach. Ideas about economic growth that are found in the literature are classified by the reviewer into these seven categories. The emphasis for selection of material is on a sample of post-World War II literature, although probes deeper into history are occasionally made. The point of view is largely that of regional growth, and of rural development in the United States. But probes into the literature of national growth, international trade and payments, developing countries, and urban economies are occasionally made. No effort is made in what follows to synthesize the findings or to formulate a comprehensive growth theory. Hilhorst [1967, p. 9] echoed a number of authors when he said that "no such theory exists." Bruton [1960, p. 239] concurred:

There is no body of thought or set of principles that may be confidently called "the modern theory of economic growth." Current and recent literature abound with seminal ideas, revealing insights, penetrating bits and pieces of analysis, loose ends, and unrealistic assumptions.

Descriptive Statements

A notable and useful share of regional growth literature has reference to no analytical basis for growth whatsoever. The literature instead relies on descriptive statements. Examples include the stages-of-growth concept, the spatial diffusion process, and shift-share analysis. Also included are econometric models which may appear to be analytic but which turn out to be descriptive, at least insofar as the treatment of growth is concerned.

Stages of Growth

One of the most common descriptive approaches to regional growth embraces the notion that an economy passes sequentially from a primitive toward an advanced stage. This view has been around a long time. The Abbé de Saint-Pierre outlined his view of the stages of growth in 1773 (Bury [1920, p. 135]). The Abbé argued that the classical Greek legend about regress from the original golden age down through successive ages of silver, bronze, and iron is reversed. Saint-Simon reflected the Abbé's idea when he said, "The golden age, which blind tradition has hitherto placed in the past, is before us." The Abbé saw, instead of the traditional regress, progressive stages, starting with a savage stage of iron. In this he agreed with Bodin's interpretation of two centuries earlier. The bronze age, according to the Abbé, brought social order and a beginning of technology. The silver age was the age in which the Abbé found himself. The golden age of wise government, peace,
and happiness was seen to be approaching. The phrase "golden age" has survived in modern economic growth jargon. It refers, as the Abbé intended, to a future state, one which is growing in a dynamic and desirable equilibrium.

The Abbé's views are interesting not only as an early example of the modern view of stages of growth but also as a representation of the beginnings of the modern idea that the economic and social situation has improved over the past, is now improving, and will continue to improve. Modern considerations of economic growth have roots in this eighteenth-century idea of progress which, in turn, has roots in certain classical Greek writings (Edelstein [1967]; Nisbet [1980]). The idea of progress is reflected in the writings of the classical economists from Anne Robert Turgot and Adam Smith to John Stuart Mill but is almost lost in the literature of the late nineteenth century when marginality invaded economics. Myrdal [1972, p. 182] noted that concern for growth came into prominence again during the second quarter of the present century.

Ely [1889] is representative of those who kept the idea of stages of growth alive during the invasion of marginalism. He looked at stages over the grand sweep of time—from a prehistoric economy to the modern industrial stage. When man learns to kindle fires, eat meat, and live in political communities, said Ely, he moves from the prehistoric economy to the hunting and fishing economy, in which nature continues to be the principal factor of production. When hunting tribes begin to domesticate animals, Ely continued, they usually enter the pastoral stage, and man gains partial control over nature. When man learns agriculture, he gains a greater variety of food and establishes village communities. Hand-labor skills improve man's control over nature and bring him to the trades and commerce stage. This leads to the industrial stage in which the great civilized nations of the earth are now living—according to Ely, the highest stage yet attained by economic life.

Ely's view of the stages of growth grew out of the German historical school of economics. The important writers in the school, which includes List [1966 (1885)], Hildebrand [1922 (1864)], and Bücher [1901], agreed on the importance of promoting industrialization in Germany but disagreed over the precise order of stages that lead to the desired end. Ely's version does not emphasize the importance of the rise of intermediate markets or the credit economy, which are prominent in the stages of earlier writers, but these concepts received increased attention in subsequent versions such as those of A. Weber [1929 (1909)] and Clark [1940]. Weber [chap. 14] believed the stage of economic development is indicated by the relative proportions of primary, secondary, and tertiary industries in an economy as well as the proportions of primary and secondary institutions. Clark retained Weber's classification but showed less interest in his institutional classification.
The ideas of Weber and Clark were incorporated into Ely's scheme by Hoover and Fisher [1949]. They considered their sequence of development stages to be supported by a well-accepted body of theory. Versions similar to that of Hoover and Fisher are relatively commonplace in the literature of agricultural economics. Their first stage is an undeveloped, agricultural, subsistence economy with the regional distribution of economic activity dependent on the distribution of natural resources. Village industries are built on the agricultural base during the second stage; the people engage in trade with other regions, and they develop some industry and occupational specialization. In Hoover and Fisher's third stage, there is a heightening of economic activity through agricultural development and increased trade. In the fourth stage, people turn from primary activities related to agriculture to secondary ones related to manufacturing. The earlier manufacturing stages are based on agricultural products, later ones on intensive use of mineral resources. The final stage is characterized by specialization in tertiary industries for domestic use and exports such as transportation, communication, education, maintenance, and financial service.

Mill [1904 (1843)] is among those who sought to turn the stages concept into a theory in the sense that since one stage follows another in time or space, the relationship is causal and the sequence will be repeated (Teggart [1929, p. 331], Pollard [1968, p. 35]). For Mill, the problem is to "find laws according to which any state of society produces the state which succeeds it" ([1904, (1843), p. 595]; see Van Doren [1967, p. 45]). Mill [1909 (1848), pp. 9-21] presented a sequence in which the early stages, up through a developing agriculture, are much like those of his successors. For the later stages he provided alternative futures which vary accordingly as the agricultural surplus is appropriated by government, or by those he called lords of the soil, or is kept and used by those who produce it. Insofar as the causes that lead from one stage to the next "are moral or psychological, dependent on institutions and social relations, or are the principles of human nature, their investigation belongs not to physical but to moral and social science, and is the object of what is called Political Economy" [1909 (1848), p. 21].

The popularity of the stages-of-growth idea in the post-World War II literature was stimulated by Rostow's [1960] assertion that a country or a region moves from a traditional economic structure through a transitional stage to a take-off stage, wherein a particular sharp stimulus to growth can be identified. Rostow compared his stages to Marx's stages of feudalism, bourgeois capitalism, socialism, and communism (see G. M. Meier [1964, p. 23]). Kuznets [1966, p. 19] countered Rostow by maintaining that there is no take-off; rather, there is a gradual acceleration from one stage of development
to the next, measured by an increase in both population and per capita product.

Rostow argued that Kuznets was looking at annual changes in broad aggregates (such as Gross National Product) over time, whereas he (Rostow) was looking at detailed subsectors in which new technologies are absorbed and from which these spreading effects are generated. But the more Rostow talked about modern growth being rooted in the progressive diffusion of new and efficient technologies [1960 (1971, 2nd ed., p. xii)], the less he was discussing identifiable stages and the more he was classing himself among the proponents of technology as the basis for growth, to be discussed below. Rostow's take-off stage has some of the characteristics of Kuznets's "epochal innovation."

M. D. Thomas [1964, 1969] is among the recent authors who consider the stages-of-growth concept as a theoretical framework. However, for Thomas, the driving mechanism is "the strategic variable income elasticity of demand" [1964, p. 424]. Thomas's interpretation, therefore, identifies expanding markets as the basis for growth. Rostow, Thomas, and others have not succeeded in reaching Mill's goal of turning the stages concept into a theory.

Ranis [1965, p. 13] said of the stages-of-growth concept:

. . . there have been a few bold attempts to move directly from an interpretation of the past to a general theory of growth and stagnation in our contemporary world. Such premature attempts to 'explain everything' in the Marxian tradition have, however, usually culminated in Rostow-type stages theories in which conceptual rigor is conspicuously lacking and the field is all too often conceded to intuition and judgement in the grand manner. While this sort of an approach may well render a service by providing insights, focusing attention and stimulating others to a more analytical inquiry, it also does us a disservice by its perennially enticing facility, its failure to discriminate between model and extra-model considerations and its consequent inability to isolate the key behavioristic hypotheses.

North [1955] and Ruttan [1965] represent those who are impatient with growth-stage theories because they can only describe, they fail to explain. Ruttan found that the growth-stage approach "substitutes a search for economic doctrine in the form of historical generalizations for the development of analytical power" [1965, p. 31].

Most stages-of-growth authors imply that growth has an ultimate purpose, or is directed toward a definite end. The concern is more with where we are going—with the golden age—than with where we are coming from. The strength of the idea of stages of growth lies in its descriptive power. It helps us envision alternative ways of doing things. The weakness lies in its analytic
sterility; there is no explanation of why certain things occur within a stage or of how a region is to proceed from one stage to the next.

Diffusion

The stages-of-growth concept is usually applied to growth in a given place over time. Another term is needed to discuss the diffusion of growth over space. The need for including spatial as well as temporal considerations in growth theory was emphasized by Lösch [1940, p. 508] when he said, "if everything occurred at the same time, there would be no development. If everything existed in the same place, there could be no particularity." The analytic importance of spatial considerations in growth theory will be treated in a later section; notice is taken here of the extensive descriptive literature on the spatial diffusion of growth. Some of this literature transforms the temporal stages-of-growth framework into a cross-sectional framework. Emphasis in diffusion studies is generally on transference of information rather than on flows of people, goods, or capital. The latter are examined with different frameworks, to be discussed later. Transference of information is not the same as creation of information. Schmookler's [1966, p. 2] distinction between innovation and imitation is useful in this context. Innovation as a basis for growth is discussed in a later section; imitation by one's neighbors results in diffusion.

A means of combining the stages-of-growth concept temporally and spatially is exhibited in some diffusion studies (H. C. Bos [1965], L. A. Brown [1968], Taaffe, [1970]). Hagerstrand [1968] treated diffusion as a communication process and as a probabilistic process. He gave many examples of the diffusion of agricultural innovation. References to cross-sectional stages of development are frequently encountered in comparisons of underdeveloped nations with developed nations. Differences in the level of development are sometimes referred to as the "North-South" problem (Williamson [1965, p. 3], Batra and Scully [1972]). The North-to-South orientation of the regional economist is comparable to the East-to-West orientation historians have taken toward growth and progress. Hirschman [1958, pp. 183-201] examined the diffusion of progress away from the area of early development. He identified forces leading to progress in the South as a "trickle down" effect of earlier progress in the North. He also identified forces resulting in polarization and a widening difference between levels of development in the two regions.

Spatial diffusion studies are of two kinds. One describes the geographic spreading of stages of development from a center to contiguous adopting areas. Within an industry, agriculture for example, large variations in productivity can be observed among firms. Knowledge is diffused over space from
leading farmers to their neighbors. The other kind is hierarchical diffusion from major central cities to other places which are lower in the hierarchy of central place but which, in general, are not spatially contiguous. Some evidence suggests that hierarchical diffusion is more important near the upper end of the urban hierarchy, whereas spatial diffusion is more important through the middle and lower end (Hagerstrand [1968], L. A. Brown [1968]).

Diffusion of economic activity over space depends on interactions among people and on resistance to interactions (i.e., conservatism). The probability of interactions may be explained in part by functional relationships but, as Hagerstrand and others have pointed out, it is also explained by spatial nearness. Studies by Dodd [1953] and others found that the diffusion process corresponds closely to a logistics curve. Griliches [1957] examined inter-state adoption of hybrid corn and found that the rate of diffusion depends on the profitability of adoption. In many diffusion applications, the concern is with relatively short-run phenomena, such as spatial diffusion of adoption of a new technology (L. A. Brown [1968]). Siebert [1969] suggested that institutional arrangements such as patent laws affect the rate of diffusion of private innovations differently from public, government supported research. Beckman [1970] demonstrated that diffusion of innovations, price levels, economic activity, and even people (migration) are similar processes.

Diffusion authors tend to treat the subject descriptively: what geographic path does the process follow, how long does it take, what equation best describes the process, and what variables tend to shift the equation? To the extent that some authors pursue the theory of diffusion and its contribution to regional growth, the diffusion literature contributes to two other sections of this review: advancing technology and conquering space.

Shift-Share

The shift-share technique describes a region's growth in terms of its share of national growth, a shift due to the local mix of industries, and a shift due to unique regional factors. The regional shift can be interpreted to identify regions that made an elastic response to national growth or to identify growth that is considered independent of national trends. However, Buck [1970] suggested that the regional shift may reflect aggregation bias in defining industries, incorrect classifications, and other errors and unexplained residuals. The shift-share concept is related to the view described by Isard [1960, p. 545] that a region "develops because the nation of which it is a part, develops" (see also Schmid [1969]).

Creamer [1943] was apparently the first to apply the "shift" technique for organizing data to describe economic growth. Fuchs [1959, 1962]
examined shifts among states in the location of manufacturing from 1929 to 1954. Perloff, Dunn, Lampard, and Muth [1960] used the shift-share concept with illuminating, descriptive insight into long-term national and regional growth processes (see also Perloff and Dodds [1963]). Ashby [1964, 1965] applied it to usefully exploit detailed employment data to describe county growth patterns.

Floyd [1973], Paraskevopoulos [1974], Kuehn [1974], and others used the shift-share technique as a basis for economic projections. Such projections rely on the assumption that past regional shares and shifts will hold in the future. Paraskevopoulos [1971] found the shares and shifts sufficiently stable to support such studies, whereas H. J. Brown [1969, 1971] and Kuehn [1974] concluded that they were too unstable over time.

The shift-share technique is considered by some users to be analytic. Este­ban-Marquillas [1972, p. 249] found that the success of the shift-share tech­nique “has probably been due to the fact that the statistical information re­quired is very elementary and the analytical possibilities that it offers are quite large.” Chalmers and Beckhelm [1976] showed that shift-share’s analyt­ic results are consistent with industrial location theory.

The notion that the shift-share computations can provide analytical insight or reliable projections was questioned by Houston [1967, p. 578] who said, “the measure is an identity with no behavioral implications.” This idea was repeated by Bishop and Simpson [1972], Curtis [1972], Herzog and Olsen [1977], Jansma [1975], Stilwell [1970], and others. The dissatisfaction with shift-share is sometimes mild. Schreiner and Warner chose not to use it because of “difficulties of presentation and ambiguities of interpretation” [1970, p. 153]. Other times the attack gets emotional. Richardson called it, “a harmless pastime for small boys with pocket calculators” [1978a, p. 202; 1979, p. 202] and elsewhere added “but in fact it can be far from harmless if used for policy (mis)guidance” [1978b, p. 18].

The shift-share technique appears to be useful as a descriptive way to sort out historical information. However, Emerson, Ramanathan, and Ramm [1975] showed that other descriptive techniques, such as covariance analysis, can be substituted for it.

Descriptive Models

Many comprehensive regional growth models are descriptive frameworks that avoid the question of causation altogether. Such models tend to rely instead on projections of historical rates and shares, on assumptions of exo­genous growth, and on assumptions of target growth levels. Such studies sometimes seek answers to questions about the consequences of growth, but
— the basis for classification here — they assume answers to questions about the attainment of growth.

Shares of national projections of growth by industry form the basis for regional growth in a study of the New York Metropolitan Region (Berman, Chinitz, and Hoover [1961], Vernon [1960]). Historical regional shares, measured by a shift-share description of basic industries, are used to distribute among regions national projections of population, income, and employment for the U.S. Water Resources Council [1974].

Assumptions about exogenous growth in demand underlie the fifty-year projections of 29 sectors for investment, government spending, net trade balances, and defense expenditures in an Ohio River Basin study (A. D. Little [1964]). The California Development Model (Dyckman [1964]) relies on projections of exogenous exports as a basis for growth, as does the sophisticated simulation of the Susquehanna River Basin (Hamilton et al. [1969]). An exogenous bill of projected final demands is used to drive the multi-regional, input-output model at Harvard (Polenske [1970]).

Growth targets are assumed which would reduce net outmigration to zero in an analysis of growth in the Upper Midwest Economic Study (Henderson and Krueger [1965]). Four planning goals relating to income distribution, population, external balance of payments, and government budgets form the basis for growth for the Oahu, Hawaii Planning Model (Artie [1965]). A linear programming analysis of growth in South Central Kentucky is based on population and income per capita targets set for a ten-year planning period (Spiegelman et al. [1965], Spiegelman [1966a]). A linear programming analysis of rural community development in Northeast Iowa abstracts from the regional growth process by holding population and consumption per capita constant; the model maximizes the accumulation of capital (Patrick and Heady [1974]).

Each of the above comprehensive models of regional growth fails to incorporate an analytic basis for growth. They serve as examples of descriptive frameworks with respect to their explanation of growth processes notwithstanding their relative complexity and their reliance on extensive data, systems of equations, and automatic data processing.

**Increasing Resource Availabilities**

The quantity of resources available to a region is considered the basis of growth by a number of economists — more outputs will be forthcoming if more inputs are made available. This idea is firmly embedded in the classical and neoclassical economic literature. A modern application of the idea is:
regional variations in growth are explained through regional variations in the availability of land, labor, and capital.

In an earlier review of our subject, Leven [1965] identified three theories of growth: an aggregate demand theory, a productivity theory, and a factor market imperfection theory. Leven's productivity theory depends on increasing resource availabilities. This growth theory, which regards improved income per capita as the end-in-view, follows the classical economic thought that productivity rises according to the law of variable proportions through accumulated investment in private capital, human capital, and social overhead capital. Leven did not explicitly include advancing technology as a basis for improvement in productivity in this review (although he did so elsewhere [1964]; Needleman [1968, p. 80]). Leven also called his productivity theory an equity theory.

A review by Goldstein and Moses [1973] reduced various theories of growth to two categories: demand-dominated and supply-dominated. This dichotomy appears to be quite popular among economists. The supply-dominated theory is a descendant of the classical economic growth model which explains gains in output as a consequence of increases in quantities of resources available. It may say, for example, that regional growth is limited by growth of the local labor supply. Hence this includes Leven's equity theory.

Hilhorst [1967] synthesized regional development theory into two bases for growth: from outside the region and from inside. His "inside" category included the local availability of natural resources as one of several factors affecting regional growth.

Linear programming models of regional growth, such as those cited by Spiegelman [1962] and Meyer [1963], and other optimization models, like those described by Schmid [1969], are supply-dominated in the sense that the objective function is constrained by limits on available resources. That is, as added resources become available, higher points on the objective function may be attained. Such models implicitly assume that resource availability is the basis for regional growth. Spiegelman [1962], in his review of regional techniques, regarded linear programming as an advancement of the Leontief [1941] input-output system because it incorporates flexibility and a choice mechanism. Meyer [1963] judged mathematical programming (linear programming) to have a great potential as a regional theory to the extent that economic rationality in fact occurs, and to the extent that the massive data requirements of the model can be satisfied. Meyer treated programming as a growth theory; Spiegelman treated it as a technique.

A number of growth authors explicitly consider availabilities of all types of resources. Additions of land, labor, and capital are what Kindleberger
[1958] called "the ingredients" of economic development. He considered all resources equally important, and he distinguished these ingredients from "the process" which involves institutions, technology, and scale (see also Parsons [1964] and Poole [1970]).

Haberler ([1957]; Morgan, Betz, and Choudhry [1963, p. 233]) put it this way: "Industrial advance is usually limited by a lack of capital, . . . entrepreneurship, . . . labor and not by the insufficient size of the market." Myint [1964] critically surveyed the leading post-World War II policies of economic development and tried to show that they frequently are extensions of the Keynesian theoretical approach—an approach Myint found inappropriate to the underdeveloped countries. He brought to bear on these modern ideas some of the relevant parts of the classical and neoclassical approach. "When all has been said and done we cannot ultimately afford to ignore the problem of choice, for, beyond a certain point, different lines of economic development activity compete for the available scarce resources" [1964, p. 166]. As we shall see below, many authors emphasize the importance of only one resource, not all, as the key to growth. Some emphasize capital, some land, and yet others, labor.

Capital

If there is a single basis for growth more popular in the literature of economics than any other, surely it is the accumulation of capital. This tradition can be traced to some of the English classical economists, whose theories and policy prescriptions centered on economic growth. A modern interpretation of the basic importance of capital in economic growth is: "Capital theory is the economics of time" (Dorfman [1969, p. 817]). The main thesis of Dorfman's paper is that optimal control theory is formally identical with capital theory.

In the discussion that follows, private capital is distinguished from public capital, and flows of goods and services are distinguished from flows of funds.

PRIVATE CAPITAL

The usual view is that private capital is saved for accumulation out of current production; the rate of accumulation depends on the ability of an economy to produce and to create or save a surplus of production above current consumption needs (Cavin et al. [1963]). The mercantilists of the Middle Ages viewed foreign trade as the source of a surplus and argued for government-protected trade monopolies to promote growth (Hoselitz [1960, p. 4]). The Physiocrats in eighteenth-century France saw agriculture as the source of an economic surplus and, therefore, as the basis for growth (Hoselitz [1960, p. 4]). This agricultural view is still popular: "England and
Western Europe were able to initiate the industrial revolution because an agricultural revolution had already provided a domestic food surplus which sufficed to feed a growing industrial-urban population" (Nicholls [1962, p. 1]). “Throughout the process of [Japan's] industrialization, agriculture has been a major source of resources for the nonfarm economy. . . . Japan was able to finance industrialization by mobilizing agricultural surpluses” (Hayami and Yamada [1968, p. 135]).

A. Smith [1910 (1776)] characterized the physiocratic concept as “the surplus produce of the land” [p. 634]. He saw the surplus as arising not only from land but from the annual produce of labor, land, and capital stock [pp. 52, 578, 777]. Ricardo [1911 (1817)] regarded labor as the source of surplus. Marx [1906 (1867)] agreed with Ricardo, but he went on to argue for communism as an institution that promoted equitable distribution and optimal growth. Marx suggested that capitalists did not always accumulate capital by virtuously foregoing immediate consumption; sometimes they stole their surplus from other tribes or nations by war and plunder. And Marx added that extensive reinvestment of profits may be a basis for decay rather than growth because large profits lead to large investments which would result in overproduction, falling prices, depression, and the eventual collapse of capitalism.

Modern western economists look to profits as a measure of the surplus, and to free market institutions and private interest to maximize profits, distribute them to alternative uses, and achieve optimal growth. The possibility that capital accumulation may begin with a chance event which produces windfall profits was developed by Bensusan-Butt [1960]. He built a model in which capital begins to accumulate as a result of a surplus produced by an unusually good harvest. W. A. Lewis ([1954]; Morgan, Betz, and Choudhry [1963, p. 221]) emphasized that: “the key to the process [of economic expansion] is the use which is made of the capitalist surplus.”

The optimal rate of saving and investment was examined by means of a theoretical and mathematical model by Ramsey [1928]. He determined an optimal rule for growth which maximizes a social welfare function. The rule runs as follows: “The rate of saving multiplied by the marginal utility of money should always be equal to the amount by which the total rate of enjoyment of utility falls short of the maximum possible rate of enjoyment” [1928, p. 543]. Much of the subsequent literature on optimal growth, according to Sen [1970, p. 475], draws heavily on Ramsey’s contributions.

Investment of accumulated capital is the key to the warranted rate of growth in the Harrod [1939, 1948] and Domar [1946, 1947, 1948, 1957] theories. Domar was concerned whether the warranted rate of growth, based on capital accumulation, is in balance with the natural rate of growth, the
latter being defined by expansion in the labor force. Both the warranted and 
the natural rates of growth are rooted in classical growth theories based on 
expanding resource availabilities.

Bruton [1955] observed that models like those of Harrod and Domar, and 
the savings-investment analysis of Keynes, narrowed the boundaries of the 
problem more rigorously in developed countries. In the analysis of under­
developed countries, Bruton continued, "the problem is usually very generally 
defined, rigor is frequently completely absent, and the variables considered 
ievitably spill over into areas which economists have long treated as beyond 
the scope of the discipline" ([1955]; Agarwala and Singh [1958, p. 219]). 
Bruton modified the Harrod-Domar model to adapt it to the situation of a 
representative underdeveloped country.

Solow [1956] improved on the Harrod-Domar model by showing that 
whereas the natural growth rate depends on population growth and techno­
logical improvement, the level of well-being measured by consumption per 
capita depends on the rate of investment. The importance of invested savings 
in the growth process was emphasized by Kahn [1959]: "If two golden ages 
differed only in respect of thrift, the one with the higher thrift was the pre­
ferable one . . . even though the extra thrift was entirely at the expense of the 
wage earners" (Sen [1970, p. 156]). Phelps [1961] gave an entertaining 
but serious picture of what a "Solovian" economy would be like when it 
reached the golden age. "A golden age is defined," according to Swan [1964], 
"as a state of affairs in which every economic variable is changing at a con­
stant exponential rate" (Sen [1970, p. 205]). The golden age is to com­
parative dynamics what the stationary state is to comparative statics.

Sen [1965] objected that the Solow model "leaves out all the problems 
about the expected rate of growth, all questions about what Joan Robinson 
calls the 'animal spirits' of the entrepreneurs" (Sen [1970, p. 227]). Keynes 
[1936, p. 161] had already made the same point about animal spirits (see 
[1965] introduced into the neoclassical model some Keynesian ideas in the 
form of an independent investment function based on expectations.

The basic determinant of development was seen by Hirschman [1958, p. 
177] to be "the ability to invest." Hirschman discussed many other factors 
influencing development, ranging from determination to grow, and the per­
ception of what needs to be done, to interregional transmission of growth. 
However, he funneled all these effects through the investment process.

"A rise in the rate of growth in underdeveloped areas," according to Leon­
tief [1963], "would demand an increased volume of productive investment" 
[1963; 1966, p. 200]. He said that the additional capital could be created 
from internal saving or from abroad, and presented a dynamic system that
described the magnitude of the capital transfer required from the developed areas of the world to meet growth targets for the underdeveloped areas.

Romans [1965, p. 3] noted that "from colonial times to the present day, statesmen and economists have assumed inter-regional capital movements to be a major variable affecting the economic growth and welfare of regions in the United States." Romans found the magnitude of capital flows among states and regions to be sizeable and regarded them as an important determinant of differences among regional growth rates.

Borts [1968b] used a regional growth model in which capital is accumulated as a consequence of net exports. Thus, for Borts, a favorable balance of trade leads to economic growth through accumulation of capital. This neoclassical interpretation of net exports as a means of increasing resource availabilities is in contrast to other theories, to be discussed later, which hold that a favorable balance of trade is considered to induce growth by expanding aggregate demand.

Mera [1968] devised a neoclassical, multiregion, multisector model of equilibrium growth which assumes fixed land for each region, exogenously determined growth in the labor force, and endogenous capital accumulation. Domanski [1973] discussed a capital accumulation growth model for a system of regions.

PUBLIC CAPITAL

There is a chicken and egg argument in the literature as to whether public or private capital should come first in an economic development strategy. Hirschman [19658] argued that the important thing is to keep the two kinds of capital out of balance with one another as an inducement to invest—balanced growth was seen by Hirschman to be not only impossible but also undesirable. Hirschman appeared to favor a relative scarcity of public capital. Others have argued strongly that public capital in the form of schools, roads, hospitals, sewer and water, and industrial parks needs to come first, as an inducement to private investment.

Cumberland [1971, chap. 3] gave an interesting account of the importance of planned public capital investments in the early development of the United States. The basic problem in the then new nation, he said, was how to gain control over its vast resources and organize them into an efficient economy. The highest priority in economic development was assigned to the rapid establishment of improved transportation and communication within and among states. The rationale for building a network of nationally planned roads and canals was that proposed programs involved investments which were too large for private capital to finance but which would allow for regional specialization and division of labor; it would employ otherwise idle
resources and lead to economic development. Hence capital accumulation for public investment is seen as a prerequisite to conquering space.

Definition of the term "social capital" varies among authors. Willis and Engel [1973, p. 15] defined it broadly to be the totality of resources available to a region. This includes the natural resource endowment, publicly and privately owned capital goods, and the people—numbers, concentration, and skills—in addition to the usually implied public capital or infrastructure such as schools and hospitals. Herbert [1970] said of public capital outlays, "we no longer leave it up to each individual to sustain his own and his family's existence as best he can. Instead, we now accept it as a national responsibility and obligation to improve and to enrich his existence through public investment and the expenditure of public wealth" [1970, p. 98].

Chenery ([1962] ; Needleman [1968, p. 198]) discussed an attempt of the Italian government to carry out in Southern Italy "the theoretically attractive procedure of developing external economies by a massive dose of public works while leaving the direct investment in commodity production to private individuals." Chenery found that the program as carried out in Southern Italy was not very effective (Needleman [1968, pp. 230-231]).

A parallel between the roles of public and private capital in neoclassical growth models is illustrated in a regional model by Sakashita and Kamoike [1974]. The optimal tax rate for accumulating public capital is symmetrical to the private saving rate for accumulating private capital.

Illes [1973] further weakened the distinction between private and public capital by suggesting that over longer planning periods, public investments in infrastructures are not fixed, but are flexible, and that infrastructures can be completely rebuilt and relocated. Some studies of public investments did not inquire into the bases for growth but addressed themselves to the marginal impact of increments of public programs on development (Barnard et al. [1969], Bokeman [1974], Hartley and Patton [1973]).

FLOW OF FUNDS

Financial flows are not the same as real flows of goods and services. "In the literature of regional growth," observed Hooker [1970, p. 1], "one finds little about the effect that the structure of the financial community has on the growth of a region." Although a concern for the flow of funds as a basis for regional growth may have arrived late, McGee [1970a, p. 1] noted that "the importance of financial institutions in the economic growth process is beginning to be recognized in the [regional] growth literature."

Whereas regional growth literature has only recently begun to reflect concern for the role of money, there is a long and extensive literature on the role of money in national and international growth. This national growth
literature is of two kinds: one argues that money does not really matter, either because it is just another commodity and has no role different from that of any commodity, or because it is just a veil over the economy with no effect on real flows. The other maintains that money does matter; it is not just another commodity, and a change in the quantity of money can change real flows.

National Flows. In the classical and neoclassical literature, money is frequently defined simply as another commodity. Any commodity can function as a numeraire to facilitate exchange, serve as a unit of account, and act as a store of value. If money is wheat or tobacco or gold, which can be produced and consumed the same as any other commodity, then accumulation of wealth in the form of money is, in principle, the same as accumulation of plant, equipment, or inventory. The equilibrium growth path responds to accumulation of money and wealth just as it does to accumulation of other commodities as reviewed above. Money, according to this view, does not play a unique role.

The equation of exchange states that the supply of money times its velocity equals the quantity of transactions times price. The classical interpretation is that, with velocity constant, real growth is neutral with respect to the money supply. The money supply determines the price level, and prices act as a veil covering real flows. The real flows, however, are not permanently changed by a change in the money supply. Jones [1975, p. 228] concluded from his review of neoclassical growth models that "it can reasonably be argued that monetary phenomena should not obtrude into models of the long run."

Keynes [1936, p. 32] told how Ricardo [1911 (1817)] had muffled certain of Malthus's [1951, 1820] ideas affecting growth, and how these ideas could only live on furtively, below the surface, in what Keynes called the "underworlds" of Marx [1906 (1867)] and others. The ideas are found in Marx's monetary theory. Marx accepts the classical view of money as a commodity and applies the equation of exchange. But he differs from the classical approach to monetary theory in his recognition of several functions of money and in his attention to the role of hoarding. Hoarding affects the velocity of money as well as the quantity of money in circulation. He says if a commodity is exchanged for money and this money is exchanged quickly for another commodity, Say's Law that supply creates its own demand holds and the classical explanation of growth applies. However, if money is hoarded, Say's Law is contravened and, as had been suggested by Malthus, aggregate demand is insufficient to clear the market of aggregate supply. Not only does hoarding reduce price, says Marx, it also reduces the size of the market. Dishoarding can expand aggregate demand and cause economic growth.
Keynes extended the ideas of Malthus and Marx by distinguishing saving (out of income) from investment (in goods and services). In his view, it may happen that some savings out of income are not invested in goods and services. In Keynes's theory of interest, savings can be held for liquidity or used for speculation in securities in a series of transactions based on liquidity preference and prospects for financial gain. This is portfolio management, not creation of new capital goods. The impact of money on growth is through the interaction of the rate of interest with the inducement to invest in plant, equipment, and materials. Money used for transactions may be neutral for growth, as suggested by classical theory, but money held for liquidity purposes can affect real growth, as suggested by Marx. In the Keynesian interpretation, money no longer needs to be regarded as a commodity. It can be debt, for example, and still have consequences for real flows. The money supply can increase by means of increased debt independently of the supply of numeraire commodities like gold or silver.

Money as debt, and the importance of the intermediation function of financial institutions, is widely recognized as a basis for national and international growth. Gurley and Shaw [1955, p. 515] were convinced that "economic development is associated with debt issue." They examined reciprocal relationships between real and financial growth.

Tobin and others modified the definition of money and inquired into whether growth is neutral to a change in the money supply. Tobin [1955, 1965] accepted the Keynesian criticism of neoclassical growth models and showed that saving can be rationalized when rates of return are too unattractive to invest if there are alternative stores of values, such as government debt. He incorporated this extension into the neoclassical framework. Shane [1974] further extended the framework by introducing a financial market trading in securities.

Tobin [1955] said the money supply is exogenously determined and can be varied only by government budget surpluses or deficits. People are willing to hold money (government debt) as an alternative to real wealth. Tobin's liquidity preference function reflects real wealth, the purchasing power of money wealth, and the rate of return on real wealth. The rate of return on money is fixed by the government at zero. If asset owners desire to exchange real wealth for money, prices will fall. Portfolio balance in equilibrium results in price deflation if an economy grows with a fixed money supply. Inflation follows from too rapid monetary expansion. An increase in money is financed by debt which takes the form of an income transfer. Such an increase raises prices. It also increases consumption relative to saving, reduces capital accumulation, reduces the rate of return to capital, increases holdings of liquid wealth, and slows the rate of economic growth; according to Tobin, money matters.
H. G. Johnson [1967] considered the consequences of money coming from "outside" the economy, as by printing and distributing currency. He found that this kind of money is not neutral—monetary policy influences the characteristics of the economy's growth path if savings depend on considerations other than simply the rate of return on investment. This is because the rate of return on money is fixed at zero. Liquid wealth is held with a view to price changes. A change in the money supply influences prices which, in turn, influence the desire to hold liquid wealth. This affects the rate of return to capital and thereby influences the rate of economic growth. Johnson also examined the role of "inside money" which depends on debt and which offers interest equal to the rate of return on investment. He concluded that "in that case the cost of holding money rather than material capital would be equal to the social cost of creating it, and money would be neutral with respect to economic growth" (H. G. Johnson [1967]; Sen [1970, p. 270]).

Levhari and Patinkin [1968] extended the idea of money as a commodity by including money as a productive factor in an aggregate production function. From this function, they could calculate the marginal productivity of money and the marginal rate of substitution of money for commodities. In their Tobinesque growth model (see Harkness [1972]), money affects price through the equation of exchange. Portfolio management balances the productivity of capital against the productivity of money adjusted for the effect of money on price levels. Money, constantly produced by the government, can be introduced through transfer payments at a rate that will sustain steady growth and stable price. V. K. Smith [1979a] defended money as a factor of production in the production function of an individual firm. Davidson [1978] said this theory violates certain tenets of microeconomic theory. Inclusion of money in the aggregate—or in a firm's production function—is not supported by the theory of the firm. The production function for a single firm incorporates flows of real goods and services; it does not include money (cash or credit) as a productive commodity. The usual microeconomic interpretation is that money is used in the firm to make productive services available, and limited access to cash or credit can limit the size of firms. Davidson concluded, "to develop a concept of 'money as a factor input' can only lead to further confusion" [1979, p. 282].

Wallich [1951, p. 15] noted that "one of the factors that is likely to mold the development process, and in turn is likely to be considerably influenced by it, is the monetary mechanism that links the underdeveloped countries with the rest of the world." Shane [1972a, p. 3] concluded, "Financial markets, by providing an intermediary function between savers and investors, play a fundamental role in the economic development process."

Regional Flows. The scant literature on the role of money in subnational
growth focuses on the regional impact of national monetary activity as well as on regional monetary activity. A nationally expanding money supply may induce national economic growth, but the inducement varies among subnational regions. "If money contributes . . . to fluctuations in national activity levels," said Beare [1976, p. 57], "then it must also contribute to fluctuations in the activity levels of different regions of a national economy, although perhaps by differing amounts." Fishkind [1977], McPheters [1976], Miller [1978], Ruffin [1968], and Scott [1955] each found regional variations in the impact of national monetary policy.

Miller [1978, p. 28] discovered that three kinds of national monetary activity have empirically important consequences for disparate regional monetary conditions: Federal Reserve holding of government securities, interregional commercial and private transactions, and interregional Treasury transactions.

Some of the regional variations in response to national monetary policy can be traced to regional variations in resource availabilities, technological advance, markets for regional products, spatial relationships, and nonfinancial institutions. These aspects are discussed in other sections of this review. In the following paragraphs, the focus turns toward regional variations in financial institutions and on whether the availability of cash, demand deposits, and credit, as influenced by local financial institutions, is a basis for regional economic growth.

Straszheim [1971] found that national capital markets exhibit regional compartmentalization. Roberts and Fishkind concurred and discovered evidence of "capital market imperfections across regions" [1979, p. 26]. Scott [1955] disagreed and believed that many of the vestiges of regional compartmentalization in the capital market have been destroyed through institutional change. Straszheim [1971] said, "Much of the story lies on the lending side" [p. 223] and found that "regional variation in credit availability is probably considerable" [p. 226]. Straszheim considered regional compartmentalization a limit to national growth because of restrictions on the mobility of capital flows. However, he suggested that other factors, such as resource availabilities, technological advances, and public investment, may be far more important: "Compared to these variables, regional capital market differences appear slight" [p. 239]. He emphasized technological advance as the basis for growth, not resource availability. Straszheim did not examine the positive value of compartmentalization to a region, but Shane [1972a] suggested that there is some. For example, rural areas have been net creditors to urban ones. Therefore, when the protective barriers are removed and the intermediary function is made more efficient, Shane found that savings may be drawn even more rapidly from rural banks for use in support of urban growth. Compartmentalization
would, according to this view, have resulted in relatively more rural economic growth. Bowsher, Daane, and Einzig [1958] supported this view; they discovered that rural areas tend to lose funds to local financial centers which, in turn, lose funds to major money market centers. This flow abets urban growth and retards rural growth.

Straszheim [1971, p. 224] pointed out that regional credit markets meet different needs than do national markets. Government is a heavy borrower in national markets, but government borrowing causes relatively little regional variation in supplies of credit. Household borrowing for consumer credit, on the other hand, is mostly in and for local markets. Extensive household credit leaves less local credit available for other local uses. Straszheim placed business and agricultural credit in the middle of the national-local continuum, with agricultural credit relatively more regional and business credit more national. Straszheim's thesis about regional markets being different from national markets is helpful. But his categories need further examination. For examples: national and international businesses were not distinguished by Straszheim from local ones; county and local governments were not distinguished from the federal government; and the extent to which credit cards put consumers into a national money market was not considered.

McGee [1970a, p. 1] asserted that "commercial banks are unquestionably the most important type of financial institution in the process of economic growth." According to him, this is because banks command more resources than all other financial institutions combined. Commercial banks perform two functions in the regional economy which are discussed by McGee [1970a, p. 151]. First, commercial banks are financial intermediaries between those who save and those who invest. There are regional variations in the propensity to save and in the inducement to invest. Investments need not occur in the same regions where income is saved. The second is the payments function. Banks provide liquidity. They facilitate local transactions as well as interregional balances of payment. The efficiency with which they perform the payments function affects the local velocity of money. A third function needs to be added: The loan activity of banks creates and destroys demand deposits and thereby influences the quantity of money based on debt.

McGee [1970b] suggested that regional variations in the velocity of money may be important in regional growth. In a study of Lexington, Kentucky, he found that growth was not accompanied by an increase in bank deposits (money) per dollar of income. He suggested that velocity increased as a consequence of more efficient intermediaries.

Hooker [1970] described some regional variations in commercial banking characteristics. He compared small, rural banks with large, urban ones.
Smaller banks place a higher premium on liquidity, hold more bonds relative to loans, and give evidence of greater aversion to risk [p. 13]. He said that some threshold in community size needs to be passed before a bank will meet its community responsibilities efficiently [p. 19]. He placed the threshold at 200,000 or more people for unit banks and at 75,000 or more for branch banks. Hooker concluded that "country bankers are not growth-oriented" [pp. 26-27]. Shaffer [1978] asserted "that commercial banks do play a vital role in a community's economic growth." He found that certain rural banks immobilize community funds by maintaining a relatively liquid position; in so doing, they divert funds from local job- and income-producing activities. Regional variations in the influence of national monetary policy on growth occur in part because of regional variations in the characteristics of local financial institutions.

Small unit banks in depressed areas tend to have local monopolies. A study of local unit banks in depressed counties of the Ozarks found these banks to be "unduly conservative and not sufficiently aggressive—operating under semi-monopoly conditions, they tended to reinforce the status quo" (Surveys and Research Corp. [1968, p. 131]). Straszheim [1971, p. 220] and Hooker [1970, pp. 17-19] also mentioned the importance of local monopoly in regional banking. Hooker added that branch banking as an alternative to unit banking helps overcome the local monopoly problem of small banks in depressed areas.

The phrase "monetary policy" has meaning at the national level because the central bank and the Treasury influence the quantity of money. It is not so clear what the regional counterpart to national monetary policy is because we do not have subnational money supplies. Perhaps local monetary policy is concerned with regional variations in the availability of credit, in the regional effectiveness of the intermediary function which moves financial saving into real investment, and in the efficiency of performing the payments function. Local monetary policy is to be distinguished from local effects of beyond-local actions such as national monetary policy, federal loans and grants to local users, and national sources of private capital (say by a national firm) for investment in a local establishment.

McGee [1970a] reviewed the reasons why financial flows can be considered a cause as well as an effect of regional economic growth. He concluded that there is a "reciprocal relationship between banking and the real sector" [p. 19]. Shane [1972b] treated financial flows as permissive rather than casual. Hooker [1970] implied that if financial flows are not a basis for regional growth, they are at least able to limit growth: "For a region struggling to catch up it appears that the present banking structure acts more like a brake than an accelerator" [p. 14].
Land

The classical view was that the supply of land and other natural resources is fixed and that as population increases and capital accumulates, the law of diminishing returns—what Mill [1909 (1848), p. 702] called "that fundamental law of production from the soil"—points to the availability of land as the limit to growth. Turner [1893, 1920] considered the opposite view that growth in the United States to 1880 was largely based on the elastic availability of cheap land on the frontier. North and Thomas [1973] also found an unsettled frontier as a basis for growth in their analysis of Northern Europe during the Middle Ages. The modern view, now that these frontiers are closed, lies between these extremes: land as space may be perfectly inelastic, but increased services from land and other natural resources can be made available through applications of capital, such as for irrigation, drainage, or clearing. When additions of labor and capital to scarce land exhibit diminishing returns, conservation and improvement of land offer an escape from potential stagnation. The English agricultural revolution of the eighteenth and nineteenth centuries averted stagnation and supported growth by increased crop and livestock production through the use of manure and lime and through various soil conservation practices.

Enock [1913] maintained that the world's economic problems call for the adaptation of natural resources and national potential to the life of the community. He saw the congestion of the population in towns, the desertion of the countryside, the high cost of living, low wages, unemployment, and related economic phenomena as intimately connected with the conservation and development of natural resources. Friedmann [1975, p. 792] reflected on Enock's era when he noted, "Until the late 1950's, most people understood regional planning to mean the purposeful development of a region's natural resources."

Perloff and Wingo [1961] related regional natural resources to what they called "the geography of national economic expansion." Resource endowment was defined broadly to include the "resources that count," given the demand for final products and given the organization and technology of production. They found that the resources that count change from one region to another and from one stage of economic growth to another. They traced the role of deepwater ports and agricultural hinterlands in the early agricultural period; of minerals during industrial expansion; and of amenities of climate, land, coastline, and water during the "services" era. The meaning of the term "amenities" is not precise and may refer simply to "pleasant living conditions" (Ullman [1954, p. 119]).

According to Perloff and Wingo [1961], resource endowment acts on growth through a combination of both external and internal influences which
can determine self-reinforcing and self-sustaining regional growth. Resource endowment is seen as the critical determinant of the comparative advantage of a region and, therefore, as the key to explaining variations in regional economic growth.

The view that natural resources are the key to explaining growth followed two tracks in the post-World War II literature: a pessimistic one based on Malthus's [1914 (1798)] concern that population is limited by the capacity to produce food; and an optimistic one that diminishing returns are important but can be sidestepped by means of science and innovation. A third position taken in the literature is one of silence: the role of natural resources which had, since Ricardo [1911 (1817)], dominated much of economic thought, has been deemphasized—even to the point that since World War II several books purporting to cover the field of economic development have been published which fail to recognize the role of land or of natural resources in their tables of contents.

Barnett and Morse [1963, p. 3] took up the Malthusian theme. They were concerned with the increasing scarcity of natural resources in a world that is “inescapably subject to a law of diminishing returns.” Scoville [1971, p. 8] summed it up this way: “A favorable ratio of population to resources permits more rapid increases in income per person and increased ability to save and invest. Rapid technological progress may enable a growing population to escape the consequences of diminishing returns, but it does not eliminate the eventual deterioration in quality of life through over-crowding.”

Kneese et al. [1971] are among those who are concerned that short-run growth tactics based on these ideas are “raising the spectre of a new Malthusianism” [p. 118]. The specter became highly visible when Meadows et al. [1972] published results of a model suggesting that the natural limits to growth will bring economic progress to a crashing halt within the next century. Further evidence that growth can be limited or reversed when natural resources are depleted is illustrated in an analysis by Ekholm et al. [1976] of the impact of declining groundwater and of petroleum resource on a regional economy.

Hu [1978] examined the effects of the depletion of exhaustible resources. He found that growth in each sector of a two-sector model, and the dynamic path of the relative prices, depend on the initial stocks of capital and exhaustible resources, as well as on the relative intensities with which the sectors use exhaustible resources.

“In recent years,” according to V. K. Smith [1979b, p. xi], “a renewed interest has emerged in the availability of natural resources for continued well-being and economic growth.” Several authors of papers in the collection edited by Smith reflect the view that persistent growth is an atypical and not necessarily desirable state of civilization.
Schultz [1961, p. 2] represents an optimistic view that the diminution to growth—"to which diminution it is impossible at present to set any limits," according to Mill [1909 (1848), p. 703]—will continue to be overcome by progress in other sectors of the economy. Schultz [1961, p. 2] proposed "to think of economic growth as a particular type of dynamic disequilibrium, during which the economy is absorbing various subsets of superior resources." Schultz [p. 8] asserted that the role of land in economic growth is no longer nearly as important as it appeared to Ricardo [1911, (1817)] and his contemporaries because of the "introduction of new and superior resources" which are effective substitutes for natural resources. Consequently, during the 1960s, some growth authors focused attention on what are called high-payoff inputs. Growth is seen to depend on expanding the supply of those reproducible inputs which promise high productivity; attention is drawn away from concern for growth stemming from conservation and improvement of exhaustible inputs.

Jansma [1975b, pp. 5-13] reviewed some of the literature on the role of natural resources in economic growth and found the following view reflected: "An adequate resource base is important in the earlier stages of development. . . . The evidence . . . is less impressive [for] developed economies" [p. 12]. Cox et al. [1971] supported Jansma's conclusion. They discovered that projects for the development of water resources had no significant impact on economic growth.

Kindleberger [1958] anticipated the divergence of views on the matter. He ended his discussion of the role of land in economic growth as follows:

We conclude that it is difficult to define land unambiguously, and as distinct from capital on the one hand and technology on the other; that it is relatively unimportant for a developed country that has abundant capital to alter the character and capacity of its existing land, and human drive and creativeness to substitute for the niggardliness of nature; but that, other things equal, more and more varied land is better than less and less varied; that land is particularly important to underdeveloped countries with their paucity of capital and innovational skill; and that to ask the question, whether small differences in land, or small differences in social structure, are more significant in boosting or halting economic development, is to outrun the capacity of the discipline for answering questions. Many of us have opinions; no one knows. [pp. 33-34].

Labor

Labor availability is considered by some authors as the basis for economic growth. The labor force and its productivity are affected by changes in popu-
lation, migration, willingness to participate in the labor force, and investment in human capital.

**POPULATION**

Growth in population was seen by A. Smith [1910 (1776), p. vii] as a stimulant to the wealth of nations because a larger population means more workers and, therefore, more output per year. Smith added that growth depends on increased participation of the population in the work force and on increased output per worker through specialization. On the other hand, others are concerned with the depressing Malthusian effect on income per capita that is likely to result from an increase in population. Viner put the case strongly [1952, p. 147]: “Population increase hovers like a menacing dark cloud over all poor countries.”

Schumpeter [1947b, p. 149] noted that “sometimes an increase in population actually has no other effect than that predicted by classical theory—a fall in per capita real income; but at other times it may have an energizing effect that induces new development with the result that income rises.” Note that Schumpeter interpreted the classical theory to be the opposite of that stated by Smith and the modern theory to be the opposite of that expressed by Viner and others today. Hirschman [1958] and W. A. Lewis [1955, p. 299] discussed both sides of the issue. Hirschman commented on the importance of the reaction mechanism that is set up when it is seen that population growth may depress average real income. The reaction leads to improved performance of the administrative, political, and cultural processes.

Thus there are two views about the role of population growth in economic growth: one says that more people add to the incentive to consume as well as to the capacity to produce and thus enhance growth; the other says that more people may simply mean more mouths to feed and a reduced level of living on a per capita basis.

**MIGRATION**

In regional economics, consideration of migration tends to override the effects of change in the rate of natural population increase (Rogers [1968]). Lowry [1966] is one of several to develop the economic “push-pull” hypothesis of migration (Rogers [1968, p. 74]). According to this hypothesis, the net number of migrants from one region to another is explained by relative unemployment, income per capita, size of labor markets, and distance. Some of the factors, such as low income at home, push migrants into the stream; others, like high income elsewhere, pull migrants into the stream.

Beale [1969] found an asymmetry in migration patterns owing to differences between regional push-pull effects and personal mobility effects. Mobile
people may be pushed from regions of limited opportunity and pulled to those of expanding opportunity. But mobile people also move both in and out of economically favored regions. The push-pull hypothesis fails to explain why so many people leave favored regions. Beale suggested that flows among favored regions depend more on characteristics of people than on characteristics of regions. Hence, for areas with net outmigration, migration flows are explained by regional factors that push people out; but for areas with net immigration, the large flows in and out are explained by characteristics of people (see Kriesberg and Vining [1978]).

The literature on rural development published through the 1960s shows concern that the push effect of limited opportunity in some rural areas led to a heavy stream of migration, since World War II, of rural persons to urban places where expectations were not realized, thus adding to urban problems. Observations since 1970 suggest a change in the trend—the resurgence of economic growth in rural areas has been accompanied by a net flow of population from metropolitan areas to nonmetropolitan areas (Beale [1975]).

The question has been studied whether jobs follow people, or people follow jobs. The common view is reflected in the Lowry [1966] hypothesis that people follow jobs: create new jobs and inmigration will follow. The minority view, that jobs follow people, was argued by Borts and Stein [1964a; 1964b]: stimulate inmigration and new jobs will follow. Muth found evidence to support both hypotheses and concluded that, like the chicken and the egg, “migration and employment growth each affect and are affected by each other” [1971, p. 2]. Steinnes [1978] employed a relatively new statistical test of an operational definition of causality which, in his view, supported the Borts and Stein “jobs follow people” causality. “It follows,” said Steinnes, “that other things (e.g., quality of life) besides employment growth should be investigated as the means of affecting migration” [p. 225].

With migration, as with population growth, we find two views: one says that immigration adds to the size of market as well as the capacity to produce and thus leads to economic growth; the other says that immigration is a burden adding to congestion and to welfare rolls.

LABOR FORCE

“The proportion of the population which is ‘gainfully occupied’ or ‘economically active’ in the census sense,” according to W. A. Lewis [1955, p. 330], “is determined partly by the age structure, and partly by the extent of women’s employment.” Compared with the urban labor force, the labor force in slower-growing rural areas tends to have fewer people in prime working age categories, less education and skills training, and possibly less cultural adjustment to the forty-hour work week (R. Marshall [1974]). Inasmuch as people
of working age tend to be those most likely to migrate, outmigration has left rural areas with a disproportionate share of dependent-age persons. The consequent reduced rate of participation in the labor force is seen as a limit to growth. Net immigration to rural areas during the 1970s may have changed the degree of dependency in rural areas and may have increased prospects for further growth as a consequence of increased participation of the population in the labor force.

Recent advances in economic activity in rural areas appear to be associated with an increased participation of rural women in the labor force. The occupational mix of rural women has been restructured more than has that for rural men: "It appears that rural women have been moving out of households into offices . . . out of fields into factories" (Hathaway et al. [1968, p. 149]).

HUMAN CAPITAL

In addition to considerations of the quantity of population and labor force available as a basis for growth, there is a large body of literature concerning quality. Kunkel [1970] saw human development and human behavior as the basis for social change and economic growth. Slower-growing regions are frequently associated in the literature with a labor force that: displays relatively lower levels of education than in faster-growing regions; tends to be employed in industries where labor use is intensive relative to capital; is relatively less skilled; and receives lower wages. The resurgence of growth in rural areas of the United States since 1970 raises questions about the universal validity of such generalizations.

Schultz [1968, p. 1113] saw "a strong connection between the investment in human capital and the secular rise in the economic value of man." He observed that the ownership of land is declining as a source of economic leverage, and so is the ownership of physical capital relative to that of human capital. In fact, "Much of the increase in output," said Schultz [1956, p. 762], "cannot be explained by additional inputs of the conventional types." Heady [1958, p. 393] tried to show that Schultz had simply encountered an index number problem and that technical change within conventional categories can explain growth in output. Had Schultz been drawn into this argument twenty-six years earlier, he might have agreed with Heady. Schultz [1932] examined the law of diminishing returns in view of progress in agricultural production. He recognized that the distinction between changes in people and changes in technology may be qualitative and not subject to any quantitative measurement. He concluded: "This increased productivity cannot be accounted for by a greater expenditure of capital per unit of crop production; certainly the farmers of today have not advanced enough in skill
and expertness over their fathers to make possible this greater productivity. It would seem that the rise stands mainly as a measure of the technological advancements in farming and of those broad progressive influences arising from greater specialization of the interrelated community as a whole. It is essentially a tribute to the favorable changes in the state of the arts” [1932, pp. 647, 648]. However, a later and wiser Schultz [1958, p. 924] focused attention on inputs that tend to be neglected in usual accounting procedures. His response to Heady was: “It is the underspecifications of human and physical capital components that contribute to the improvements in the quality of human effort and of physical capital” [1958, p. 932]. Eisenmenger [1967] demonstrated the important and increasing role of the quality of human resources in the growth of the New England economy from 1970 to 1964.

**Advancing Technology**

“The gods did not reveal to men all things from the beginning,” according to a fragment written some two and a half millennia ago by Xenophanes, “but men through their own search find in the course of time that which is better.” Edelstein [1967] quoted this fragment and considered it to be the first recorded statement that man’s discovery of new ways of doing things is the basis for progress.

Advancement through science and innovation is probably the most widely held idea of the basis for growth outside the field of economics; that is, among historians, philosophers, scientists, anthropologists, and others. For example, Perry [1914, p. 136] described science “pushing rapidly into the as yet unknown, and converting it first into knowledge, then into invention, and finally into civilization.” Pederson, a geographer, considered “information accessibility and innovation . . . the main factor of production” [1975, p. 201].

Among economists, advancing technology is probably held second to the idea of accumulation of capital, discussed above, as a basis for growth. Mill [1909 (1848), pp. 696, 697] considered the “growth of man’s power over nature” to be the progressive feature of civilized nations which “first excites attention”; it results in a “vast multiplication and long succession of contrivances for economizing labor and increasing its produce.”

In his review of the process of regional change, Stabler [1968] saw three bases for growth. One is the well-developed body of location theory; another, international trade theory. His third is technological progress. A region will experience an increase in the volume of activity, said Stabler, if technological improvements are made in production.

Ayres [1944, p. 177] reviewed the arguments about whether institutions such as business enterprises, democracy, and Puritanism induced technological
advance or whether technology induced institutional change. Ayres's book condemned price theory, and it elaborated on institutionalist theoretical alternatives. Even so, Ayres found institutions permissive rather than causal, and he concluded that advancing technology is the basis for progress.

"Economic progress in advanced and densely populated nations must result mainly from technical innovation," according to Heady [1952, p. 795]. Heady recognized that resource availabilities are also a basis for growth when he said, "Discovery [of new resource areas and deposits], innovation, and capital accumulation remain in the main foundations of progress for democratic and peace-loving communities" [1952, p. 794]. Heady realized that the benefits of technology may be mixed. For regions, he said, "Technological change is one of the forces which may cause economic decay in one region while other regions bloom and prosper" [p. 794]. And for individual industries, he remarked, "The aggregate effect [may] be one of the rejection rather than the attraction of resources" [p. 803]. But for the economy as a whole: "All innovations are likely to expand economic progress regardless of the industry to which they apply" [p. 804].

Discoveries in science and technology determine the possible paths for economic development, according to R. L. Meier [1956], and clarify the choice for possible futures. He characterized his book as "an experiment in judging the effects of progress in science upon the development of prospects for the world" [1956 (1966, p. vi)]. Meier [1961] extended his discussion to focus on information theory. Information, or "know how," must circulate prior to utilization. "Increases in the flow of information may serve as a predictor of economic growth" [p. 101].

Most classical growth models are based either on the assumption of fixed production coefficients or on the assumption of substitutability between factors. Johansen [1959] showed that neither of these formulations is best for analyzing the role of technical change in the growth process. He presented a hypothesis that is a compromise between these extremes: capital already installed continues to require constant amounts of labor throughout its life span, whereas increments of new capital can be accompanied by varying increments of labor. He said this formulation is "particularly appropriate in studying the introduction of new techniques" [1959, p. 157].

Cairncross [1962] recognized that the basis for growth may shift over time: "Whatever may have been true of the past," he said ([1962] ; G. M. Meier [1964, p. 106]), "it is now technological innovation—the introduction of new and cheaper ways of doing things—that dominates economic progress."

Kaldor and Mirrlees [1962] captured the feeling of many growth authors in the compelling phrase: "technical progress . . . is the main engine of
economic growth” ([1962]; Sen [1970, p. 362]). Conlisk [1967, p. 199] echoed, “technical change is the main engine of growth.” And again, from Yamaguchi and Binswanger [1975, p. 269], reference was made to “the role of agricultural technical change as a powerful engine of growth.”

Hayami and Yamada discussed the need to mobilize surpluses with which to finance economic development and said, “It is through technological progress that the surpluses have been generated.” [1968, p. 135].

Macy, Bednar, and Roberts found that “there has been a growing tendency on the part of regional organizations to promote science and technology as a means of stimulating economic growth” [1967, p. 12]. They noted that technology does not always have positive impacts on regional growth. They gave as an example an agricultural advance that results in a decline in regional employment opportunities.

Leven dwelt on this theme. He concluded that the regional adjustment required to assimilate technological advance in agriculture must be “more towards capital mobility and away from population mobility” [1959, p. 225].

Leven’s comprehensive views of the bases for growth are treated elsewhere in this review. In one of his articles he said, “The driving force behind economic growth is productivity” ([1964]; Needleman [1968, p. 80]). This quote appears to place him squarely in the camp of those growth authors who hold that advancing technology is the basis for growth. However, he broadened the view by going on to explain that such increased productivity could stem from increases in the stock of physical capital, increases in human capital, resource discovery, invention, or a change in tastes.

Most authors concerned with technical progress take new technology as exogenous and examine the impacts of technical change on growth. Conlisk [1967, p. 199] said, “this exogeneity assumption begs one of the fundamental questions involved in explaining growth.” His paper analyzed a neoclassical model which has a modified labor growth equation and which allows for endogenous technical change. Binswanger, Ruttan et al. [1978] are among those who have inquired into induced innovation wherein endogenous economic forces, such as relative prices, induce technological (as well as institutional) change which, in turn, determines the growth path. This approach regards technological changes as instrumental in the growth process, but not as basic.

Not all authors regard technological advance as progress; Ricardo [1911 (1817), chap. 31] had certain reservations, and others, such as Ellul [1970], Mishan [1967], Sorel [1969 (1908)], and Weiskopf [1971], saw in it regress. As one group of authors put it, “prosperity has brought anxiety to the Western World” (Tinbergen [1976, p. 14]). Inge was concerned that, in our efforts to dominate the planet,
we have devastated the loveliness of the world; we have exterminated several species more beautiful and less vicious than ourselves; we have enslaved the rest of the animal creation, and have treated our distant cousins in fur and feathers so badly that beyond doubt, if they were able to formulate a religion, they would depict the Devil in human form [1920, pp. 13, 14].

Inge quoted Samuel Butler's observation that the vast series of inventions that have made our life so complex began with man's "wish to live beyond his income" [p. 12].

Aggregation

A distinction is found in the literature between technological advance as an aggregative, abstract concept and as a disaggregative adoption of specific concrete changes in the way we do things. Solow [1957] provides an example of the aggregative approach; he found that output grew 1.5 percent per year during 1907-49 owing to technological advance. Swanson [1964] noted four factors that account for shifts in the aggregate measure of technical advance: changes in the institutional structure, economies of scale, changing capacity of the labor force, and knowledge.

Kuznets [1966, p. 491] asserted,

Modern economic growth is distinguished by the fact that the rise in per capita product was due primarily to improvements in quality, not quantity, of inputs—essentially to a greater efficiency or output per single unit of input, traceable to increases in knowledge and better institutional arrangements for its utilization.

Kuznets and Rostow both tended to think of institutional arrangements when they considered innovation. Rostow [1953, p. 257] said, for example, "the middle class, in a sense, was the most important of the economic innovations of modern times." We will talk more about institutions in a subsequent section of this review. Kuznets's [1966, p. 501] main emphasis was on the aggregative effects of "the material achievements of modern technology underlying economic growth." He looked at these achievements by economic sector and presented an interesting discussion on the role of agricultural technology in economic growth. Kuznets associated sweeping structural change with what he called "epochal innovation." His definition of an epoch was couched in stages-of-growth terms. The innovation that distinguishes the modern epoch, now some 200 years old, is the extended application of science to problems of economic production.

Batra and Scully [1972] used a regional model for which national labor and capital levels are fixed, consumption is induced, and growth depends entirely on aggregate technical progress. Technology in such models appears as a
creeping statistical abstraction that has been infiltrating the production function in the past and which is likely to continue to do so in the future.

Schumpeter [1939, vol. 1, p. 233] denounced "the curse of aggregative thinking." Rostow [1960 (1971, 2nd ed.), p. xii] supposed, "We all agree that modern growth is rooted in the progressive diffusion of new technologies on an efficient basis," and found that this can only be understood by studying movements in specific sectors and subsectors within which new technologies are actually observed. Rostow [1960 (1971, 2nd ed.), p. 13] was also concerned about economists' excessive reliance on highly aggregated and, particularly, single-product models to explain growth. Rostow argued for a flexible, disaggregated theory.

Growth, Development, or Progress

Schumpeter [1911 (1961), p. 68] was reacting against the neoclassical equilibrium theory, and its emphasis on increasing resource availabilities as the basis for growth, when he introduced the idea that "development consists primarily in employing existing resources in a different way, in doing new things with them." These new things have to arise within the economy by their own initiative, rather than be forced on the economy from without, to qualify for Schumpeter as economic development.

Schumpeter [1911 (1961), p. 63] was careful to distinguish development from growth: "Nor will the mere growth of the economy, as shown by the growth of population and wealth, be designated here as a process of development." Growth is understood in some fields to mean the unfolding of qualities contained in a primal seed, as the acorn grows into an oak. Among economists, growth has come to mean more of everything in (at least approximately) constant proportions. Growth can follow from increasing resource availabilities, but development depends on finding new ways of doing things through technological advances, according to Schumpeter ([1935; Haberler [1944, pp. 6-7]). Creative destruction, he said elsewhere [1942, chap. 7], is replacing the old with the new and better.

Myrdal [1972, p. 189] made a distinction similar to Schumpeter's between growth and development. Many authors treat the terms growth and development as synonymous, not only with each other but also with the term progress. Gould [1972, pp. 3-4] explained why the English language makes it difficult to maintain a distinction between these concepts. Those who reserve a special meaning for the term progress usually point to a change in values and to a judgment that things not only are changed but are somehow better (Van Doreen [1967], Nisbet [1980]).
Division of Labor

Technical advance is often associated with specialization and with the division of labor. Ever since A. Smith [1910 (1776), p. 60] made this association in his discussion of division of labor in a pin factory, a debate has flourished to resolve whether the division of labor contributes to growth and, therefore, to progress, or, as argued by Marx [1906 (1867)], to dehumanization of the worker and, therefore, to regress. Actually, Smith shared Marx's concern and noted that “in the progress of the division of labor . . . the man whose whole life is spent performing a few simple operations . . . generally becomes as stupid and ignorant as it is possible for a human creature to become” [1910 (1776), p. 734].

A third view, that of Plato, is seldom found in the current literature. Plato held that the value of division of labor is in its contribution to justice and to happiness because it allows each person to do that which he does best.

Science or Technique

Among those who regard technical advance as the basis for growth, we can distinguish those who emphasize empirical inventions or discovery of specific techniques from those who emphasize advances in concepts and ways of looking at things. It is a question of whether science precedes invention or succeeds it.

Mill [1909 (1848), p. 1] cast a vote for invention: “In every department of human affairs, Practice long precedes Science.” Schumpeter ([1935]; Haberler [1944, p. 10]) saw a connection between invention and innovation, but attached considerable economic importance to innovations “as distinguished from ‘invention’ or experimentation which are quite another matter and do not in themselves exert any influence on business life at all.” Pollard [1968, p. 28] agreed and cast his vote for the engineers, traders, and adventurers. He asserted, “Science owed more to Columbus than he owed to the scientists.”

Hicks [1969, p. 145], on the other hand, cast a vote for science. Siegel [1960] agreed that science comes first but noted the importance of entrepreneurship in the realization of opportunities. Bronowski [1974] was concerned with a few insights that were springboards to specific techniques. For example, he dwelt at length on the idea of molding clay into a rectangular brick, instead of a round pot, in the ascent of man. The pot was nothing but a pot, however beautiful, but, once the brick was conceptualized, man could build almost anything.

Kuhn [1971] suggested that which of the two is causal depends upon the
stage of growth. He noted that science and technology were separate enterprises, at least since the separation of classical Greek sciences from Roman technology, until about 100 years ago. He saw technology as the source of progress during the industrial revolution. "The emergence of science as a prime mover in socioeconomic development" was a sudden and recent phenomenon.

Expanding Markets

Expansion in the markets for the products of a region has been considered a basis for growth at least since Mandeville made the observation that "luxury employed a million of the poor, and odious pride a million more" [1970 (1724), p. 68]. He went on to explain that "the greater variety there was of wants, the larger the number of individuals might find their private interest in laboring for the good of others." During the mercantile period—when England sought to expand its treasure through foreign trade (Hoselitz [1960, pp. 3-54])—various unsystematic references gave support to the idea of expanding markets. Ortes [1804 (1774)], an Italian contemporary of A. Smith [1910 (1776)], systematically examined consumption as the limit to growth (Schumpeter [1954, p. 178]). Malthus [1951 (1820)] brought these fragmentary views into focus. He considered expanding markets as the basis of growth, and he said, "The greatest of all difficulties in converting uncivilized and thinly peopled countries into civilized and populous ones, is to inspire them with the wants best calculated to excite their exertions in the production of wealth" [p. 403].

Keynes [1936] revived these ideas during the 1930s. A representative post-World War II statement on the importance of expanding markets which reflects the Keynesian view is found in a report by the U.S. Advisory Commission on Intergovernmental Relations: "The ability of a community to grow depends upon its success in attracting additional spending within its confines—whether this be personal consumption, business investment, or government outlays" [1968, p. 37].

In an earlier review of regional growth literature, Spiegelman [1962] classified analytical tools, or methods for regional analysis, into four broad types: location theory, multiplier analysis, input-output analysis, and linear programming. Meyer's [1963] survey of regional economics used the same four rubrics to classify the theoretical foundations of regional analysis. Spiegelman and Meyer each gave excellent reviews of empirical and theoretical literature before 1960. Both provided lengthy and interesting citations, showing surprisingly little duplication. The main difference between the two reviewers was that Spiegelman regarded the four categories as empirical tools of analysis and he looked for theories that require these tools, whereas Meyer regarded the
categories as theories and discussed their empirical usefulness. Both chroniclers pointed to three bases for growth: increasing resource availabilities, expanding markets, and conquering space. Their discussions of expanding markets were in terms of multiplier analysis and of input-output analysis.

Multiplier or base theory was seen as a readily available empirical device both by Spiegelman and by Meyer. This theory explains growth as a function of autonomous spending, such as for exports. Meyer traced this theory back to Hoyt [1937, 1941]. Input-output analysis was seen by both chroniclers as a sophisticated extension of base multiplier theory where multipliers of demand for an exogenous bill of goods are examined for their impacts on interlinked industries and occupations. Input-output demands much more in the way of detailed regional accounts than does base theory. Meyer traced the method to Leontief [1941].

One of Leven’s [1965] three categories used to discuss alternative growth theories is an aggregate demand theory, which includes the multiplier and input-output theories. He said the end-in-view of such a theory is to make aggregate income as large as possible. This is seen to be in the interest of businessmen and politicians. This theory suggests policies of enlarging a region’s share of the market, creating new products, and exploiting existing opportunities first, as policies to promote growth in lagging areas.

In a review of strategies, models, and economic theories of development, Berry [1967] regarded location and the multiplier as bases of growth. In his multiplier theory, he distinguished classical trade theory from modern theory: classical trade theory explains spatial differences in wealth in terms of specialization based on comparative advantage; modern multiplier theory explains movements of capital and entrepreneurs into unsettled regions in terms of the market for the region’s main export or staple.

Hilhorst’s [1967] synthesis of regional development theory began with two bases for regional growth: from outside the region, and from inside. Tweeten and Brinkman [1976, p. 74] called these the “external combustion theory” and the “internal combustion theory” (see also Tweeten [1968, p. 14], Tweeten [1972, p. 8]). Hilhorst’s “outside” bases include demand through interregional trade, resource availability as influenced by migration of the labor force, and space as affected by transport and communication systems. His “inside” bases include internal demand, availability of natural resources, space as affected by central place, and sociopolitical institutions. Expanding markets are seen to play a growth-inducing role on both sides of Hilhorst’s dichotomy.

In their survey of urban economics, Goldstein and Moses [1973] reduced the various theories of economic growth to demand- and supply-dominated theories; they explicitly included multiplier theory and central place theory.
as bases for growth in their demand-dominated category. Their multiplier theory included the input-output theories cited by Spiegelman and Meyer, and the aggregate demand theory of Leven.

The market-oriented approaches are consistent with the Keynesian view that income and employment are determined by aggregate demand. Four types of growth theories that emphasize expanding markets for local products as a basis for regional growth emerge: (1) Specializing regions exchange in order to gain from comparative advantage. (2) Exports determine the economic base of a region and, consequently, the level of residentiary activity. (3) The level of aggregate demand for local consumption, investment, and government determines the aggregate level of business activity. And (4) demand arising from specific industries within a region drive the regional economy. This classification provides a convenient organization for the remainder of this section, but certain points of interest will be found to cut across, rather than be contained in, these categories. For example, each of these four types of market demand involves a distinction made by Hildreth, as he presented a paper by Hildreth and Schaller [1972], between inducing community development from outside, as with a skyhook, versus that community pulling itself up with its own bootstrap.

Comparative Advantage

The idea that nations or regions can mutually gain through exchange was discussed by A. Smith [1910 (1776)] and further developed by Ricardo [1911 (1817), chap. 7] and Mill [1909 (1848), pp. 574-606]. Heckscher [1950 (1919)] and Ohlin [1967 (1933)] extended the concept to allow for consideration of resource availability and technology. Heckscher and Ohlin, who tended to treat regions as abstract points without geographic features or a location in space, showed that exchange is a basis for regional growth. They demonstrated that this conclusion follows from the principle of comparative advantage, which is based not only on markets but also on each region’s internal economic structure. Two trading regions can produce a greater total economic product than if there was no trade.

The gains from trade were considered by Enke [1963, p. 456] to stem from three sources: the short-run welfare gains from exchange of final products, the longer-run inducements to change each nation’s industry mix and purchasing power, and the change in productivity provided through exchange of intermediate rather than final products.

"The general arguments in favor of trade among nations are so strong," added Enke [1963, p. 455], "that the burden of proof is always upon those who would restrict it." Viner [1952, p. 146] concurred: "The opportunities open to an underdeveloped country in foreign trade are certain to be a vital
factor in determining the rate at which it can make economic progress." And, in a like vein, from Haberler (1959; Morgan, Betz, and Choudhry 1963, p. 242): "International trade has made a tremendous contribution to the development of less developed countries in the 19th and 20th centuries and can be expected to make an equally big contribution in the future, if it is allowed to proceed freely." Estle (1967), Greytak (1975), and Klassen (1973) each found empirical support for the Heckscher-Ohlin trade model.

But not all traders are convinced, and restraint of trade continues despite the exhortations of economists. Some empirical studies failed to confirm the trade hypothesis. For example, Moroney and Walker (1966) discovered that the Heckscher-Ohlin trade model did not hold for the Southern United States. The orthodox position in favor of the theory was recapitulated by Viner (1952) and that of its critics in Myrdal (1956). Myint (1958; Morgan, Betz, and Choudhry 1963, p. 256) thus summarized the controversy:

The critics start with the intention of showing that the "nineteenth century pattern" of international trade, whereby the underdeveloped countries export raw materials and import manufactured goods, has been unfavorable to the development of those countries. But instead of trying to show this directly, they concentrate their attacks on the "classical theory," which they believe to be responsible for the unfavorable pattern of trade. The orthodox economists then come to the defense of the classical theory by reiterating the principle of comparative costs which they claim to be applicable both to the developed and the underdeveloped countries. After this, the controversy shifts from the primary question whether or not the nineteenth-century pattern of international trade, as a historical reality, has been unfavorable to the underdeveloped countries to the different question whether or not the theoretical model assumed in the comparative-costs analysis is applicable to these countries. Both sides then tend to conduct their argument as though the two questions were the same and to identify the "classical theory" with the comparative-costs theory.

Hirschman (1958, chap. 10) included trade in his analysis of interregional and international transmission of economic growth. He found that trade among regions within a nation has many of the economic implications that trade among nations has. But he also discovered differences, and he raised new questions about the role of interregional trade in the growth process. He alluded to the unsettling thought that some subnational regions might be better off if they were sovereign political units, partly because this would provide a mechanism for protectionist movements and for implementation of reactions to balance of payments difficulties. Free trade among regions may result in a greater total product, as neoclassical theory holds, but it may also
in an inequitable and, therefore, unacceptable distribution of income among trading regions.

Exports

The economic base of a community consists of those activities which provide the basic employment and income on which the rest of the local economy depends. An economic base study identifies the basic sources of employment and income and provides an understanding of the source and the level of all employment and income in a community (Tiebout [1962, p. 9]).

The goods and services which the community sells outside its boundaries are considered exports. Exports include all sales made outside the community, not just trade with foreign nations. The remaining goods and services go to the local market. Local is defined to mean the geographic region being studied.

Implicit in this division of markets is the cause and effect relationship. Export markets are considered the prime mover of the local economy. If employment serving this market rises or falls, employment serving the local market is presumed to move in the same direction. When the factory (export) closes, retail merchants (local) feel the impact as laid-off factory workers have less to spend. Because of the prime mover role export employment is considered as 'basic.' Employment which serves the local market is considered adaptive and is titled 'non-basic.' (Tiebout [1962, p. 13]).

In its simplest form, base theory appears naive: all kinds of industries and occupations are reduced to two categories, basic and non-basic (Bendavid [1972, chap. 6]); and the level of total economic activity is fully explained by the size of the market for the region's main export or staple (Hultman [1967]). Hultman surveyed several models relating exports to economic growth. Leven [1966, p. 80] cautioned that we must beware of making naive applications of base theory; for example, he suggested that export markets are needed before local industries can expand and specialize sufficiently to take advantage of economies of scale.

The idea of export of a region's staple product as a basis for growth seems to have gotten its start from Mackintosh [1923, 1953], who sought to explain the prosperity of Canadian colonies, and from Innis [1927], who studied the Canadian fur trade. In the hands of capable believers, such as North [1955] and Watkins [1963], base theory has much power. North's aim was to dethrone the stages-of-growth concept which had dominated as a theory of regional economic growth. Empirically, North believed the espoused stages bear little resemblance to the actual development of regions. Starting with Innis's [1927] study of the fur trade in Canada, North developed the
position that expansion of an exportable commodity reflects a comparative advantage in production and transport which enables the region to compete with other regions. Ramifications through the region, in the long run, result in the export base shaping the whole character of the region's economy. North's subsequent probing in detail of the reasons for growth, decline, and change in a region's export base introduced economic analyses of markets, resource availability, technology, and location. North [1959] emphasized the role of agriculture and other extractive industries in determining "a region's ability to become integrated into the larger markets of the world through exports." His objective was to replace the descriptive stages of growth with a dynamic, theoretical basis.

Tiebout [1956] objected to North's interpretation and held that the concept of the export base is merely one aspect of a general theory of short-run economic growth. He tried to save the stages-of-growth theory on the grounds that the theory is not necessarily wrong but simply may not apply in some cases. He argued that the base might induce growth in certain isolated cases but that, in general, the importance of the export base is a function of internal factor costs, which in turn depend on the stage of growth of the region's residentiary activities. Furthermore, the export base is a function of the absolute size of a region. Small regions might be highly dependent on exports, but large ones need not be; for the whole world, there are no exports.

To the extent that base theory helped topple the stages-of-growth concept and introduce new approaches to growth analysis, it served a useful purpose. And it focused attention on external demand for local products as a basis for growth.

"At the theoretical level," said Tiebout [1960, p. 75], "some efforts have been directed at an integration of base theory with more general theory, either foreign trade multiplier or input-output models." Caves [1965] demonstrated the association of base theory with the foreign trade multiplier and said that base theory as understood by Innis [1927] and North [1955] belongs to the same family as the "vent for surplus" theory proposed by Myint [1958]. Myint's version was an application of international trade theory to the particular situation of underdeveloped countries with large indigenous populations.

Braschler [1973] considered a number of alternative explanations for regional growth and concluded from a study of rural Missouri counties for 1950-70 that export base theory appears to provide an empirically valid explanatory model.

"Supporters of export base theory have," according to Richardson [1969a, p. 54], "recognized that regions may grow as a result of influences other than export expansion: central government spending in the region, in-migration
caused by non-economic forces; import-substitution in local industries; and increased efficiency in local supplying industries. But in general they regard investment in local industries as being induced by an expansion in income received from outside the region."

In the extreme simplification from foreign trade theory to base theory, the viewpoint of the exporter becomes paramount, that of the importer, suppressed. The idea of mutual advantage through trade is abandoned; base theorists adopt a one-sided view of regional growth in which a region seeks its own advantage through increased exports or reduced imports. To the extent that base theory is valid, it can serve as a defense for protectionism by justifying limits to imports and subsidies to exports.

On the other hand, base theory can be viewed as a simplification of Keynesian aggregate demand theory and of input-output models, to be discussed in the next section. However, in most interpretations, the importance of internal sources of autonomous demand—what Hilhorst [1967] called the "inside" basis of growth—is suppressed. Base theory treats all internal demand as if it were induced and all external demand (export) as if it were autonomous.

The credibility of base theory has sometimes been limited by naive applications in which local employment is arbitrarily divided into basic and residential, multipliers are empirically determined, and prospects for growth are based solely on prospects for expanding the market for staples. Empirical estimates of base multipliers from such applications tend to display disconcerting variations over time and space; this raises questions about their utility.

Greenhut [1966] argued that the unfortunate and widespread belief that export base is extremely important has helped promote the abandonment of classical economic principles. Greenhut found the internal structure of a region important in economic development theory and called for what he termed "a return to the classics."

Aggregate Demand

Keynes [1936] revived the idea of Ortes [1804 (1774)], Malthus [1951 (1820)], Marx [1906 (1867)], and others that aggregate demand is a basis for economic growth. He distinguished autonomous from induced demand. The level of autonomous demand can be determined independently of the level of aggregate economic activity; the level of induced demand is a function of autonomous demand. Autonomous demand could be internal to the economy, as with government spending or business investment, or it could be external, as with exports abroad. Autonomous aggregate demand was seen by Keynes as the basis for growth in an economy with idle resources and excess capacity.
Keynes argued that a redistribution of income toward a class of consumers with a relatively higher marginal propensity to consume would stimulate growth. Other studies, such as one by Hartman [1966], looked on income distribution as a result of growth rather than a cause.

Hartman and Seckler [1967] inquired, "Can a region lift itself by its own bootstraps?" Their conclusion that a region can do so was based on a Keynesian model of aggregate demand. They began with a regional accounts equation which expresses gross regional product as the sum of consumption, investment, government expenditures, and net exports. This model has a skyhook in the sense that local income is a multiple of exports. It also has a bootstrap in the sense that income responds to autonomous increases in local demand for investment and government expenditures. Their approach is illustrative of the class of theories that see expansion in local demand for goods and services as a source of growth. For example, Doeksen and Schreiner [1972, 1974] simulated growth in the Oklahoma economy based on exogenous projections of final demands. Ghali [1973] tested the relative roles of investment (the bootstrap) and exports (the skyhook) for Hawaii over the period 1953-69; he found that internal investment explained most of the variation in growth in income and employment and that "the growth of exports is not a necessary condition for regional growth." Holloway said of his model: "Final demand drives the system over time" [1974, p. 172]. The models used by Doeksen and Schreiner, Hartman and Seckler, Holloway, and Ghali are not constrained by resource availabilities.

Input-output models are frequently incorporated in multiproduct analyses of growth. (See, for example, Isard and Schooler [1959].) A vector of final demands for local or for export use is specified. This vector may be regarded as a generalization of the scalar exogenous demand of base theory (Romanoff [1974]) or of Keynesian aggregate demand theory. The vector of exogenous demand implies, through multiplier analysis, a vector of industry requirements. The level of industry requirements grows as the bill of final goods grows; the industry mix changes as the composition of the bill of final goods changes. Ordinarily, growth in such models is not considered to be constrained by resource availabilities, although multipliers for employment and other factors of production can be computed when resource requirements are known for each industry (Doeksen and Schreiner [1972]).

Keynes was chiefly concerned with short-run problems of unemployment. He asserted that at full employment, his general theory is the same as the special case of neoclassical equilibrium theory. He demonstrated that short-run growth, to the limits of capacity, of a partly idle economy may depend on expanding demand. But long-run growth depends on expanding capacity, as explained by neoclassical theory (W. A. Lewis [1954]). Hickman [1965]
took the growth path of potential output as given in conformance with the neoclassical view of growth and then demonstrated the key role that the demand by business firms for investment in plant and equipment plays in keeping actual growth close to the path of potential growth. Kindleberger expressed his view, of whether demand is sufficient for growth or necessary, this way: "Like kisses and diamonds in the indifference curves of young ladies, [demand] is nice, but elastic supply is an economy's best friend" [1965, p. 248].

Borts [1968a, p. 133] emphasized that "over long periods of time, it appears that the demand hypothesis does not play a role in explaining regional economic growth"; he continued, "supply factors appeared to have been very important in explaining regional growth differentials." For expanding markets to assume a critical role as a basis for long-run growth, the classical idea that supply creates its own demand must be replaced. The alternatives are that demand creates its own supply, or that supply and demand are mutually interactive and simultaneously determined. This was discussed by Kregel, who compared the Keynesian with the neoclassical view of growth and concluded, "Neoclassical theory is simply devoid of a theory of investment" [1971, p. 197].

The use of the Keynesian definition of aggregate demand in a model may give it the appearance of a Keynesian model but need not necessarily make that model Keynesian. For example, Borts and Stein [1964a] built their model around the Keynesian definition of aggregate demand, but constrained their model with a production function and resource availabilities. They saw regional growth responding to three types of change: increases in the supplies of capital and labor; technological change; and increases in economic efficiency through regional reallocation of resources. Aggregate demand does not determine growth in this formulation. The Borts-Stein model is therefore an example of a classical, not a Keynesian model, despite appearances.

Leading Industries

In discussing the limitations of single-product growth models, J. Robinson [1971, p. xii] said, "Output consists of a single homogeneous physical substance, say butter, which can be consumed or used as a means of production." Hahn ([1965]; also Hahn and Matthews [1964]) provided a two-sector model, with a consumption good and an investment good, which grows in response to invested savings. Chakravarty [1969, p. 112] warned that models introducing multiple goods, which are treated as perfect substitutes, do not raise any new points in principle. He argued that a more realistic approach is to consider outputs that are not shiftable.

Models considering two goods abound in the literature. For many such
models, one good is destined for consumption, the other for capital accumulation. Rate of growth in such models is usually explained in terms of savings, investment, and capital accumulation. Such models were discussed above in the section on expanding resource availabilities.

Another popular version of the two-good model is the dual model. The dual model is an early version of multisector analysis which seeks to relate a traditional, lagging sector, such as agriculture, with a growing, modern sector, according to Ruttan [1968, p. 10]. W. A. Lewis [1955] developed a dynamic approach to dualism. Ranis and Fei [1961] argued that many underdeveloped countries meet conditions that would allow them to contribute workers and surplus production from agriculture to the modern sector. Jorgenson [1961] emphasized the importance of technological changes in the traditional sector before it could sustain continued growth in the modern sector through transfer of capital and labor. Mellor [1967] stressed the complexity of interaction between the traditional and modern sector.

Two sectors are seldom a sufficient framework within which to analyze growth. Paauw [1970] extended it to three: agriculture, industry, and the foreign sector. Models with four or more sectors may be needed to sort out the complexity of interactions. A closed growth model emphasizing sectors of interest to agricultural economists might include: traditional or low-income agriculture, advancing or commercial agriculture, rural nonfarm industries, and modern urban industries.

Further extensions lead to disaggregation by industry. Leontief's [1941] input-output model provides a simple way to incorporate industry detail in demand-driven models. Von Neumann [1945-46 (1937)] proposed a formal and fully explicit model of disaggregated growth; an exposition of his capital accumulation model and its impact on subsequent economic theory is in Koopmans ([1964]; see also Vanek [1968]).

Green saw "the very essence of economic development as change in socioeconomic structure" [1965, p. 208]. He reviewed several analytical methods for determining growth potentials in terms of changes in socioeconomic structure and found what he called "dominant sectors" significantly influencing growth. He defined dominant sectors as those having the greatest total influence on income and welfare. He concluded, "For development analysis, we want to determine the dominant activities of an area, their growth characteristics, and their influence on other activities" [1965, p. 216].

In some multisector models, growth in aggregate economic activity is spurred by demand originating in a single sector. This sector may, itself, be spurred by any of the several bases for growth discussed in this review. For example, in some models, availability of either labor or capital in a specific sector is introduced as a stimulant to a leading industry. Rostow [1975]
referred to new technology and a stage of increasing returns to explain a leading industry. Base theory suggests that a single export industry can spur the entire regional economy.

An early application of this idea of leading industries was consciously made to fluctuations in the business cycles by Robertson [1915]. Schumpeter ([1935]; Haberler [1944, p. 11]) found it "possible to associate historically every business cycle with a distinct industry, or a few industries, which led in it and, as it were, applied the torch to what after becomes a flare-up covering a much wider surface." Schumpeter ([1935]; Haberler [1944, p. 8]) was also aware of the implications of leading industries on the location of industry and agriculture, and on agglomeration. Lead industries have impacts not only through a multiplier but also through an accelerator.

Perroux [1955] applied the idea that some industries are driving forces to problems of regional growth. He emphasized short-run effects of advances in technology in his examination of lead firms and propulsive industries, according to M. D. Thomas [1975], who extended Perroux's ideas to include the long run. Vining [1945, 1946a, 1946b] wrote a series of articles in which he distinguished "carrier" industries from "passive" industries. He found that these carrier industries explain regional variations in the business cycle.

Agriculture is sometimes pointed to as the driving industry for long-run growth (Cavin et al. [1963], Gould [1972, chap. 2], Nicholls [1962, 1963]). Cavin et al. [1963, p. ii] listed the following contributions of agriculture to the economic growth of a country: "The release of workers to industry; lowering of food costs relative to income; an expanding market for industrial goods; large earnings from exports of farm products; sustained output during economic depressions; the meeting of wartime demands for food and fiber; and assistance to the economic development of other countries." W. A. Lewis [1955, p. 173] found that it is not profitable to develop the manufacturing sector of an economy unless the agricultural sector is growing to support it. Enke [1963, pp. 547-52] argued that technical advance in agriculture supports and induces industrialization. "Before anything else," according to Papi [1965, p. 75], "the living conditions of the people must be improved . . . economic development should therefore begin with raising the production of foodstuffs, agricultural raw materials, clothing, and housing, and should then lead up to producing industrial equipment." Hayami [1972], from the Japanese experience of the past century, suggested that "the food production potential . . . can contribute to capital accumulation and industrial development."

The importance of agriculture in growth depends, according to Johnston and Mellor [1961], on the stage of economic growth. They found that agriculture plays a dominant role in the economy of a developing country:
much of a nation's land and labor are engaged in agriculture, and (2) as the country grows, there is a secular decline in the importance of agriculture. Johnston and Mellor concluded that in developing economies there must be a "net flow of capital and other resources from agriculture to the industrial sector" [p. 590].

North [1959, p. 943] reflected an alternative view about the role of agriculture as a leading industry when he noted that there seems to be general agreement among many economists that "agriculture contributes little to economic growth." Fox [1969, p. 96] said, "increased efficiency of agricultural production is one element, but only one, in the development process." He added [p. 95] that "during the development process, such dualism as may exist initially is resolved into monism." E. A. J. Johnson [1970, p. 25] concluded, "It was by domestic urban progress . . . that agriculture was reciprocally stimulated."

BALANCED GROWTH

Hirschman [1958], Myrdal [1957], and Perroux [1955] are among those who argue that growth is inherently not balanced. Some things necessarily change prior to others and in different proportions from others. Some early versions of the doctrine of balanced growth paid close attention to the size of the market for local products. It was believed that investment in modern, efficient methods of large-scale production in individual industries might not be warranted because of the limited market for the output of one such industry in an otherwise undeveloped region. Balanced investment in a mix of industries overcame the difficulty in two ways: through agglomeration efficiencies based on interactions of diverse industries—making economies that were external to a single industry internal to the region as a whole; and by expanding the domestic market for the region's own diverse products. This doctrine was foreshadowed in an article by Young [1928] and set forth clearly by Rosenstein-Rodan [1943]. Fleming [1955] shifted the focus for the analysis of balanced growth from demand and market considerations to those of supply and resource availabilities.

Scitovsky [1959] enumerated the classical and modern arguments both for balanced and for unbalanced growth. He defined an economy as balanced if the pattern of output conforms to the pattern of utilization. In an unbalanced economy, he said, a balanced pattern of availabilities can always be secured by foreign trade. Scitovsky pointed out that unbalanced economies with free trade can grow faster but that balanced economies are more self-sustaining and less vulnerable. He concluded that:

What emerges from these considerations is an argument in favor of large size. In a large economy, mere geographical extent and diversity of
climates and natural resources automatically assure some degree of self-sufficiency and balance while allowing plenty of scope for concentrated growth on a regional or functional basis [1959, p. 216].

Georgescu-Roegen [1960, p. 10] said that most Western social scientists share "the economist's disapproval of small scale production." Schumacher [1973] countered with several arguments in favor of small size.

It is possible, according to Nath [1962], that much of the controversy between advocates of balanced and unbalanced growth is due to different uncertainty discounts or allowances for the possible effects of economic development policies.

Proponents of unbalanced growth frequently point to something other than markets as the basis for growth—for example, Scitovsky [1959] emphasized the importance of technology and economies of scale. But these proponents recognize the importance of markets, especially beyond local markets, for allowing a locally unbalanced growth situation to be sustained. Rostow [1960 (2nd ed. 1971), p. 15] is among those who mention the importance of markets as a cause of unbalanced growth through differences in price or income elasticities of demand. An industry with a high income elasticity will grow faster than one with a low elasticity as income per capita rises. In a disguised way, this elasticity concept underlies the descriptions of relative growth among industries in shift-share analysis. Uzawa's [1961] analysis of a two-sector model led him to conclude that an imbalance such that the consumption-goods sector is more capital-intensive than the investment-goods sector is required for stable equilibrium expansion. Engerman [1965] reviewed several theories that explain unbalanced, disparate regional impacts. Alonso [1968, p. 2] suggested that we may prefer to maintain imbalances. He found it conceivable that "the path of fastest economic growth may imply sharp geographic inequalities, concentrating wealth and power in a few advanced centers and condemning backward areas to lengthy periods of poverty."

These views are in direct opposition to theories that assume balanced equilibrium growth, such as that of Hicks [1965]. W. A. Lewis summed up his own position in support of balanced growth thus:

All sectors of the economy should grow simultaneously, so as to keep a proper balance between industry and agriculture, and between production for home consumption and production for export. Though this is rather an obvious conclusion, it conforms neither to current practice nor to current recommendation. There is, for example, a whole school of 'liberal' economists in the industrial countries who urge upon the agricultural countries, usually in lofty moral tones, that they should
concentrate upon agriculture and do nothing to advance their industry. The same school also extols the virtues of exporting and is horrified by programmes which might have the effect of reducing dependence on foreign trade. The follies of this school have their match in Marxist and nationalist dogmas, according to which the road to economic progress lies through concentration on industrialization. In the heat of the passions aroused by these controversies it seems almost cowardly to take the line that the truth is that all sectors should be expanded simultaneously, but the logic of this proposition is as unassailable as its simplicity [1955, p. 283].

Conquering Space

Economic location theory tends to live a life of its own. Geographical space has not been considered an important dimension of economic space in much of economic theory. But the importance of space has never been totally ignored: A. Smith [1910 (1776)] and Ricardo [1911 (1817)] recognized the role of spatial location in rent theory; Smith devoted a good deal of attention to differences between town and country; and von Thunen [1966 (1826)] developed his seminal approach to the location of economic activity more than a century and a half ago.

Even so, it was fair for Siebert [1969, p. 1] to say that "traditional theory has long ignored this spatial aspect of economic behavior." Jutila [1972, p. 95] added, "an economic model should be subject to an extension by exogenous introductions of such dimensions as space, distance, and location." Isard and Liossatos [1979, p. 9] were referring to the omission of spatial considerations when they observed "that there exists a major gap [which] pertains to development theory, growth theory, evolutionary theory, theories of transition and change (cyclical and secular), and in general, dynamic social theory."

Location theory has not been an integral part of economic growth theory even for authors who sometimes write about regional location and other times write about growth. The authors accomplish this as follows: when writing about space, they tend to use a static, timeless framework; when writing about growth, they tend to treat regions as spaceless points. Regional growth theories treating regions as spaceless points are discussed in other sections of this review. This section is concerned with regions in space, and in particular with the role of space in economic growth.

Implications for growth of various spatial characteristics, when noted in the literature, often are seen to operate through one of the other mechanisms discussed in this paper. For example, a change in the density of population may be seen to relate to economic growth of a region through entering a new
stage of growth, accumulating human resources, diffusing new technology and allowing for specialization, expanding the market for local products, or inducing new institutional arrangements. Yet the importance of spatial relationships as a separate and distinct growth factor is documented, and some growth authors treat spatial relationships as the key to growth.


Lande [1977] classified regional development models into two general categories: the neoclassical model and the growth poles/growth centers model. Neoclassical models predict an economic system tending toward equilibrium. Growth poles/growth centers models, Lande said, are used to argue that agglomeration economies at certain locations in space are likely to offset neoclassical tendencies and lead to disequilibrium.

Early efforts to include locational information in economic analyses were largely descriptive. For example, H. C. Taylor [1911] included the geographical method in his list of five methods used in agricultural economics research. His geographical method was to arrange on maps large quantities of data collected by the census and by market reporting agencies. This method is still much in use today.

Modern spatial economics is mostly a post-World War II phenomenon (Gilmore [1960, pp. 7-8]). Efforts to include locational information in economic analyses emphasize the functional interaction between geographic space and variables in "economic space." Location theory usually focuses on certain attributes of space such as location of resources, markets, and transportation systems to explain where economic activity locates. Two books by Isard [1956, 1960] are of paramount importance in clarifying these ideas.

Some regional growth studies are based on models by which it can be implied that spatial considerations are the sole source of growth. For example, a model used by Lathrop and Hamberg [1965] to assess impacts of transportation policy on the spatial distribution of economic activity views growth as depending on the availability of land relative to an urban center and the density of economic activity.

Siebert [1969, p. ix] pointed out that "growth occurs in space; it is influ-
enced by the spatial structure and it has a feedback upon the economic landscape." Efforts to study these feedbacks have sometimes suffered for want of a consistent theoretical approach. Kerr and Williamson [1970, p. 6] noted that "regional economists have borrowed theories, principles, and analytical tools from general economics and adapted them for their own specific purposes."

Cumberland [1971, p. 1] related subregional growth to national growth: "Disaggregation of national experience by space is as essential as disaggregation by time and by industry in advancing understanding of the phenomenon involved." That is, the parts are explained in terms of the whole.

Others turn the logic around and explain the whole in terms of its parts. Richardson [1974, p. 2] explained the bottom-up mechanism involved in relating geographic space to economic space: "Growth rates vary with location over time because the relative strength of agglomeration and dispersion factors alters over space and intertemporally." Jutila [1973] illustrated how to introduce specific spatial structure or order into a conventional macroeconomic developmental model.

Friedmann and Alonso [1975, p. xv] emphasized the policy implications of spatial considerations: "The decision about how much of a given resource to allocate to a specific function must ultimately involve the question of where this allocation is to take effect, if only because its contribution to national economic growth will tend to vary greatly with location."

Only recently has much progress been made in integrating spatial theory with static economics; integration with growth economics remains incomplete (Isard and Liossatos [1973, 1979]). Richardson's (1973) growth model incorporated elements of the neoclassical equilibrium framework and of the spatial effects of diffusion, agglomeration, and cumulative causation. Richardson explained why the attempt at integration is likely to remain incomplete: the neoclassical growth model has certain implications which conflict with spatially explicit formulations of the growth process. His objections to the neoclassical theories were:

- their reliance on the price mechanism as a spatial allocator of resources;
- emphasis of marginal adjustments, whereas spatial functions are discontinuous and locational changes usually mean inertia (no change) or a long-distance jump; the neglect, or at best trivial treatment, of space (e.g., spatial diffusion theory);
- the assumption that growth can be constructively analyzed, even at the abstract level, in terms of an aggregate production function and a homogeneous capital stock; a predilection for, if not exclusive emphasis on, equilibrium solutions; a greater facility with deterministic rather than probabilistic models; and the policy inference that regional inequalities can be satisfactorily dealt with by
reducing market imperfections and by adjusting the price system via taxes and subsidies rather than by infrastructure strategies and comprehensive regional planning [1974, pp. 5, 6].

However, Borts [1974] believed of Richardson [1973] that "what started out as an attack on neoclassical growth models winds up as an interesting, potentially testable, and useful synthesis of locational variables which might strengthen the neoclassical approach" [1974, p. 546]. Borts noted that Richardson's [1973] model presented at the end of his book embraced "precisely those neoclassical relations spurned at the beginning" [p. 546]. Von Boventer commented that Richardson's main thesis was "fully correct—that the significance of neoclassical adjustment mechanisms has, on the whole, been overrated and that cumulative processes and agglomeration factors should be given much more attention than has been the case in the past" [1975, p. 2].

Spatial studies may take the microscopic view of where an added firm will locate, given that everything else is in place, or they may take the macroscopic view of the spatial pattern of location of all economic activity. Analysis of the location of individual firms, households, or projects points to one of the unique contributions of regional economics: the importance of spatial relationships in economics. Analysis of spatial patterns formed by many firms and households points to another unique contribution: the concept of a region as a unit of analysis.

Individual Location

The theory of location of an individual firm generally assumes a profit-maximizing firm with perfect knowledge in a free market (Alonso [1964]). Most firms are found to be responsive to some specific locational influence: Those with relatively high transportation costs locate to minimize such costs, and those with high labor costs are labor-oriented. Some firms have multiple orientation, and the profit-maximizing location is based on marginal trade-offs between, say, labor costs and transportation costs. Some firms have no particular locational orientation and are called footloose.

The general effect of transportation costs is to concentrate industries; a new plant tends to locate near existing ones owing to orientation toward resources, markets, junctions, transshipment points, or median locations. Avoidance of high rent and the hope for establishing a local monopoly are examples of dispersive locational forces causing new plants to decentralize and locate away from existing plants.

A. Weber [1929 (1909)] examined the least-cost location of a firm with respect to regional variation in the cost of labor and transportation. E. M. Hoover [1948] extended the analysis to include other factors and characterized the location of firms relative to inputs or markets with respect to whether
the product is weight-increasing or weight-decreasing in the transformation from raw materials to final product. Until fairly recently, location theory laid an exaggerated emphasis on the role of transportation costs, according to E. M. Hoover [1971 (2nd ed. 1975), p. 23].

Isard [1956] integrated the spatial dimension into the conventional theory of the firm. Later extensions showed that serious errors can be made in firm analysis by ignoring nonspatial factors just as errors had been made earlier by ignoring spatial ones. Lefeber [1958] demonstrated how these considerations enter into a linear programming analysis, except that his model failed to make final product prices endogenous. Greenhut [1963] summed it up by observing that long-run competitive equilibrium in the space economy simply requires that marginal cost equal marginal revenue, and average cost equal price, in spatial as well as nonspatial dimensions.

Efforts to integrate spatial with nonspatial economics of the firm have shown that the problem is not as simple as it first appeared. For example, equilibrium models are hard to build because the relationship of information to distance makes it difficult to assume perfect knowledge and because recognition of spatial monopoly makes it difficult to assume perfect competition. However, these efforts have shown that it is important to take geographic space into account when analyzing the economic behavior of firms and households.

Relaxation of assumptions about the goal (Boulding [1950, chaps. 1 and 2], Isard [1956, p. 221]), about knowledge (Webber [1972]), and about the market structure (Greenhut [1963]) lead to useful variations. To illustrate the importance of a change in the assumption about goals, consider that the point of view in firm location is usually taken as that of the firm manager who stands to profit from the decision. When the point of view of society is taken instead, a different location pattern is likely to emerge: the profit-maximizing location of a plant may not be the optimal site from the point of view of access to jobs by residents of a slower-growing region.

Uncertainty about spatial relationships spurs the concentration of plant location, possibly at a faster rate than would be socially optimal under conditions of perfect knowledge. Webber [1972] drew upon game models, probability models, and hypothetical simulations in his discussion of the relations between space and uncertainty. Firm managers’ uncertainty about markets, sources of supply, and levels of productivity, said Webber, tends to send them to the obvious, or safe, location—the center of the market. This may not be an optimal location given complete knowledge. Uncertainty can raise distance costs, increase inventories, reduce the size of plants, and increase external economies of scale. Innovation has a higher probability of occurrence in a concentrated area; and diffusion processes, or learning curves, may result in accelerated
growth in concentrated areas relative to remote, sparsely populated areas. Thus, uncertainty-space relationships tend to increase the concentration of plant location beyond the optimal degree. Reduction of uncertainty through communication and planning may lead to a less concentrated, more rural-oriented society.

Economic and social characteristics of a region affect the likelihood that economic activity will locate there. Spiegelman [1968] regressed the growth during 1947-58 of 53 manufacturing industries in 506 multicounty areas of the United States on 75 local explanatory economic and social characteristics. He found, for example, that the industry manufacturing upholstered wood household furniture (SIC-2512) grew the fastest in areas with a small proportion of prosperous farms, a large proportion of lower-income farms, and low building construction costs.

Struyk [1967, 1969] examined how regional variations in tax structure affect growth. He is one of the few who have argued that "there is an inverse relationship between growth and degree of taxation." Hady [1969] is representative of the more popular view that there is little relationship between regional growth and the local tax structure. Kaldor [1965] made the point that higher taxes on the one hand destroy incentives to locate firms, but on the other hand can be spent in a way that will enhance available resources and promote growth.

Some studies show that spatial function is not always the main determinant of geographic location. Apparently nonspatial considerations determine the location of some firms. Julius [1972] found that more than half of Iowa's manufacturing employment was in industries that had little or no attachment either to local nonlabor resources or to local markets. These industries obtained most of their supplies from beyond Iowa's borders and sold most of their output beyond the borders.

The decision to locate a plant in a region affects the prospects for further growth there. The relationship of individual plant location to economic growth theory is usually seen through multiplier analysis. If a locality has, or creates by policy, economic conditions that attract firms, then the locality will grow, not only by the direct attraction of more firms but also by the indirect multiplier effect on related jobs and income. Such multipliers might be termed factor multipliers to distinguish them from product multipliers discussed earlier in this review in the section on base theory; the spur to growth here is considered to be on the supply side rather than on the demand side. Application of location theory as a basis for growth has concentrated on industrial plant location because of the assumed "growth generating nature of manufacturing" cited in a report by Management & Economics Research, Inc. [1967, p. 1].

The impact on a local economy of locating a new plant there is seen to be
quite variable. Sometimes there is a strong, positive multiplier [McElveen, 1970], sometimes a small one [Jordan, 1967]; sometimes the long-run impact is negative [C. B. Garrison, 1970]. When a new plant fails, it can leave a region with more unemployment than there was before the plant moved in [Crecink, 1970]. Some of the variation in multipliers has been explained by type of industry, by scale of industry, and by location of a plant relative to a regional trade center (Bender [1975], Bender and Coltrane [1974]).

Regional Patterns

The subject of this review is bases for regional growth, yet in much of the literature there seems to be confusion about what it is that grows—that is, "What is a region?" Three general approaches to regionalization are reviewed below. Then attention is turned to empirical applications of one of these approaches—functional economic areas. Finally, some of the literature on relationships of functional economic areas to economic growth is reviewed.

APPROACHES TO REGIONALIZATION

Three general approaches to regionalization include: political, homogeneous, and economic function (Boudeville [1966]).

Political Units. The political units frequently used to assess regional growth in the United States are states, counties, and municipalities. There are some references to interjurisdictional units composed of several counties or of several states, and a number of references to communities. Gilbertson [1917, p. 171], after tracing the history of counties, noted, "the counties were derived originally for communities in a state of nature—few people widely scattered, all but oblivious to the existence or need of government." He argued that the cities were becoming functional units which saw the need for local government and which usurped some of the functions of county government. But counties tended to defend themselves against the city at some point short of annihilation, so we have both types of government operating, often with duplication, at the local level. Gilbertson [p. 152] cited the New York Times as proposing in 1915 to abolish existing boundaries of the 61 New York counties and substitute 8 administrative districts. Gilbertson traced why these consolidation efforts, however logical they may be, generally fail [p. 152]. In fact, history was moving in the opposite direction; a 62nd county, the Bronx, was created out of New York county in 1914.

For political convenience, a multicounty structure sometimes has been superimposed on the county structure. Multicounty coalitions are usually for special purposes, such as coping with interjurisdictional matters related to health, transportation, water, air, or natural resources. The multicounty structure for political, administrative purposes which comes closest to blanketing
the entire United States is promulgated by the U.S. Office of Management and Budget [1969] through its circular A-95.

A report by the U.S. Department of Agriculture [1973] recommended a regional approach to rural development "which would allow local input in the determination of priorities, yet assure that decisions and funds were all being used toward national goals" [p. 23]. Multistate regional centers were proposed as well as substate multicounty regions. The report said, "one of the most promising approaches is substate districts required by OMB Circular A-95. These districts were established for planning, review, coordination, and evaluation of Federal and federally assisted programs and projects" [p. 25]. Multicounty regions designed for political convenience are often used for planning and implementing economic development programs which draw on federal and state, as well as local, assistance.

A report by the National Academy of Sciences [1969, pp. 48-49] raised the issue of whether it pays to analyze anything but a political region for which some representative body is in charge. The report pointed out that "in most cases a region is not identified with a specified political unit or governmental body." It suggested that isolating policies to promote regional growth in such cases "may be a futile intellectual exercise."

During the 1960s, the secretary of commerce was authorized to designate, with the concurrence of the states involved, multistate regions sharing problems of economic distress or lag that extend beyond the capability of any one state to solve (U.S. Advisory Commission on Intergovernmental Relations [1968]). These designations helped overcome difficulties resulting from the fact that "the region does not have a formal legal place in political system" (U.S. Advisory Commission on Intergovernmental Relations [1972, p. 1]). Under this program, multistate regions were delineated for Appalachia, the Ozarks, New England, the Four Corners, the Coastal Plains, and the Upper Great Lakes (U.S. Statutes [1965a, 1965b]). These regional development commissions have proved to be meaningful organizations for coping with interjurisdictional problems that transcend state lines while planning and implementing programs for economic development. However, each multistate region was defined in isolation rather than in relation to economic patterns of the United States as a whole, so the geographic area of the U.S. remains unevenly covered by this scheme despite recent new delineations. Hansen [1972] found that the regional delineation tended to exclude from the regions the nearby urban places that could be expected to help contribute to the solution of the region's economic problems.

Regionalization covering all areas of the United States are important both for multistate districts and for multicounty districts. In addition, a planetary view points to the arbitrariness of national boundaries in the world economy.
Certain cities, such as Tokyo, New York, Moscow, Peking, London, and Paris, function as "world cities," whereas other large cities tend to be important in a subplanetary regional context. J. A. C. Brown [1969] suggested 14 multinational regions for the world economy.

**Homogeneous Units.** Odum and Moore [1938] provide an early example of mapping the country into homogeneous regions. They delineated six multi-state regions "approximating the largest available degree of homogeneity measured by the largest number of indices available for the largest possible number of purposes" (quoted in Raper and Taylor [1949, p. 332]). Later, Odum expressed dissatisfaction with using state boundaries for delineating "societal regions" (Raper and Taylor [1949, p. 332]).

Mangus [1940] used county boundaries to delineate 264 rural cultural subregions with homogeneous economic and social structure which he combined into 34 rural cultural regions. Woofter [1940] superimposed rural industrial activity on Mangus's map and renamed the 34 regions to carry more of a cultural and less of a geographic connotation. Colby, Marschner, and Haggerty used 235 "livelihood areas," which did not follow county boundaries, as units of area analysis (U.S. National Resources Planning Board [1943]). These were combined into 34 regions approximating those by Mangus.

Raper and Taylor [1949, p. 339] explained the value of homogeneous locality units in social science. Lively and Gregory believed that their 16 rural social areas in Missouri, which were distinguished according to homogeneity of culture, should be useful "in the administrative analysis of rural social problems" [1939, p. 1].

Another purpose for these several regional delineations was to use them to promote national growth:

The economy of the United States is so complex and our understanding of it is so inadequate that we find difficulty in viewing or comprehending it in its entirety. Under such circumstances, the part of wisdom is to study the local economy of each section of the country. This areal approach is in harmony with the fact that the strength of the nation in peace as in war lies in the effective utilization of all of its resources of men and material (U.S. National Resources Planning Board [1943, p. 40]).

Bogue and Beale [1961] subdivided the United States into clusters that are as homogeneous in their general livelihood and socioeconomic characteristics as it was possible to make them on a practical basis and yet be able to obtain statistics for each unit of area. This was accomplished by grouping similar counties. The economic areas are delineated on the hypothesis that
regional variations in population, income, and employment could be explained by variations in socioeconomic characteristics. The result is 507 State Economic Areas (SEA) covering the entire land area of the 48 contiguous states. The purpose for these state economic areas is different from the various purposes cited for some of the earlier homogeneous area delineations. In this case, the idea is to provide a descriptively useful way to summarize county data collected by the U.S. Census.

Homogeneous units have proved convenient for descriptive purposes; like things are grouped and unlike things are separated. However, homogeneous units lack the political and administrative cohesion found important for political units reviewed above. They also lack the regional unity of spatial economic interdependence found important for functional units reviewed below.

**Functional Units.** An alternative approach to regionalization delineates areas on the basis of functional economic relationships. Von Thünen [1966, (1826)] had in mind a central place with agricultural hinterlands and was concerned with the spatial pattern of the whole system. A. Weber [1929 (1909)] emphasized the importance of agglomeration economies in plant location. Many subsequent studies of agglomeration have been concerned with spatial concentration of firms in a single industry. But the concept is probably more important for its focus on the economics of spatial nearness of apparently unrelated industries. Isard, Schooler, and Vietorisz [1959] extended the agglomerative concept and developed the idea of "industrial complex analysis" which focuses on flows of goods and services among different industries within a region. Consideration of agglomeration turns attention beyond the microlevel view of a single plant to the macrolevel outcome of decisions not only by many firms and households but also by local institutions and group actions.

Galpin [1915] studied the emergence of rural communities in the preautomobile era. He delineated 12 trade centers in Walworth County, Wisconsin, which were in stable adjustment to horse-and-wagon transportation. Galpin found it difficult, if not impossible, to avoid the conclusion that the trade zone about one of these rather complete agricultural civic centers forms the boundary of an actual, if not legal, community. Galpin conceptualized a system of communities formed of a trade center and a circular hinterland consisting of approximately fifty square miles. A system of such communities on a featureless plain would consist of a series of circles, whose outer edges overlapped, around trade centers which were equidistant from one another.

The agricultural hinterland around Louisville, Kentucky, was examined by Arnold and Montgomery [1918]. They found empirical support for von Thünen's idea that distance from the city has an important influence on the type of farming. Truck crops and potatoes were dominant enterprises. This
The bases for regional growth was shown to be, to a large extent, a function of the access of truck farmers to city sources of manure. Field crops like corn, wheat, hay, hogs, and cattle become more important as distance from the city increases. Dairying also becomes more important as distance from the city increases. As a consequence of this land use pattern, as well as competition near the city for nonfarm uses of land, the value of land per acre was shown by Arnold and Montgomery to decrease as distance from the central place increases.

Kolb and Brunner [1933, p. 552] noted that time was changing Galpin's areas:

While farmer and villager have united in the building of a larger community, the contacts of both with the city have increased both directly and indirectly. Naturally, therefore, as one observes the pattern of life in concentric zones around the city the old differences between urban and rural begin to fade.

McKenzie [1933, p. 443] added, "Smaller communities within a wide radius of every urban center have lost much of their former isolation, provincialism, and independence."

Christaller [1966 (1933)] was unaware of Galpin's [1915] work when he introduced central place theory, which incorporated the idea that the growth of a city depends on its specialization in various functions and on the demand of the region it serves for central city services. Christaller saw these regions as composed of central places and hinterlands; the economic fortunes of a region depend on the interplay among its parts. His analysis of dynamic processes was mainly in terms of comparative statics, but Christaller did pay some attention to continuous growth and to technical change.

Lösch [1940] studied spatial relationships under assumptions of noncompetitive markets and extended the analysis to problems of general location patterns and to the network of economic regions. He presented a single geometric basis for unifying spatial arrangements which Christaller had considered as independent. The honeycomb pattern of regular hexagons considered by Christaller and Lösch as a possible geographical configuration of functional economic areas would have been the pattern resulting from Galpin's framework, had Galpin drawn straight lines in his Figure 10 to divide the overlapping segments of his circular trade areas equally. Soap bubbles clustered on a plane between two nearly touching plates of glass can be seen to assume the same efficient, natural, hexagonal structure.

Lösch examined economic forces influencing the varied pattern of economic landscapes and showed how the hierarchy of markets is modified by consideration of administrative areas and of regional variations in cultural factors, such as homogeneity of production or consumption patterns. Spiegelman
[1962] believed that Lösch's work failed to precipitate the anticipated revolution in regional analysis; Meyer [1963] hailed the work as having given location theory an identity.

These considerations of firm location and agglomeration suggest regionalization as a basis for growth. In central place theory, the center and its hinterland are seen as complementary. The center provides goods and services to residents of the hinterland and offers jobs, shopping, and cultural attractions to commuters or migrants from the hinterland. The hinterland, on the other hand, produces rural-oriented goods, like food, textiles, minerals, and timber products, and it furnishes workers to fill central-place jobs. It may supply residential and recreational sites for central city residents. It may also provide sites for decentralization of central-place activities. For example, it may offer a low-rent site to a manufacturing firm that is dependent on the central place for transportation and financial services.

The impact of change in the central place on economic activity in the hinterlands may be positive or negative. Miron [1975] reviewed the spread and backwash hypotheses. The spread hypothesis, he said, asserts that areas near the center expand when the center expands; the backwash hypothesis asserts that such areas decline instead. Miron described a spatial equilibrium model which incorporates both hypotheses. He explained the spread effect by increased demand and the backwash effect by changes in technology which result in substitution of more central city resources for fewer hinterland resources [1975, pp. 151, 152].

For a central place to be formed, some threshold in demand for its services must be reached. Downs [1967] called it a "critical mass." Demand increases as the hinterland becomes more densely populated, grows larger, increases income per capita, reduces transportation costs, or experiences a change in tastes.

The threshold is much lower for some industries than for others. Until an industry's threshold has been reached through regional growth, that industry will not locate in the region. This fact is used in central place theory to explain hierarchy of central place, where both smaller villages and larger cities provide goods and services with lower thresholds, but where only the larger cities provide specialized functions which have higher thresholds. Thus, a small village will have a gas station to serve residents of the village and of its hinterland. A nearby town will also have a gas station for its residents, but, in addition, will have a supermarket that serves both the town, the village, and the hinterlands. Further, a nearby city will have supermarkets and gas stations to serve its residents plus, perhaps, a financial center that serves not only the city but also the town, the village, and the hinterlands.

The conclusion of the regional economist is that functional economic
areas, each composed of a central place and its hinterland, are appropriate units of analysis. Homogeneous units are proposed because they have descriptive value, but functional units have also been found to be descriptively useful. However, if the functional units lack political and administrative unity, they may prove less useful than political units for policy-oriented analysis.

Empirical Delineation of Functional Economic Areas

The theories of Von Thünen, A. Weber, Galpin, Christaller, Lösch, and others suggest that for purposes of growth analysis, the geography of a nation can be subdivided into a number of small areas, each with a central place and a hinterland. Since 1961, Fox has written a number of papers on the concept of functional economic areas (Fox and Kumar [1966, p. 13]). In his work, Fox has sought a practical approximation to the theoretical idea (Fox and Kumar [1965]). He delineated hinterlands within commuting distance of their central place. Fox ([1967b]; Leven [1967, pp. 163-72]) pointed out that counties may have functioned as units when they were formed in the last century, with the county seat within commuting distance by horse and buggy for most residents. However, of a nine county area functioning as an economic unit in Iowa, he said to those who seek to analyze it as if it were nine separate areas: "What the people have put together, let not the politicians and the administrators put asunder" (Fox and Kumar [1966, p. 22]). Fox recommended that the functional economic area concept should be used explicitly for analysis and for implementing the type of economic development programs that rely heavily on local initiative and local recognition of mutual interest (Fox and Kumar [1966, p. 55]).

Berry et al. [1968] analyzed 1960 commuting patterns to establish commuting fields around central cities. Using these patterns, they estimated boundaries for functional economic areas. Berry found that 87 percent of the population of the United States lived within the commuting fields of cities exceeding 50,000 in population. Another 9 percent of the population lived within the commuting fields of cities greater than 25,000 in population. He delineated 305 commuting areas containing 96 percent of the population. The remaining 4 percent lived outside functional economic areas as defined by Berry.

Rand McNally [1980] regularly publishes a trading area map which divides the 50 states into 494 Basic Trading Areas. The boundaries of these areas follow county lines and are based on studies of physiography, population, newspaper circulation, economic activity, highway facilities, railroad services, suburban transportation, and subjective field reports from sales analysts. The Rand McNally areas approximate functional economic areas and have the advantage over the Berry estimates of blanketing the entire land area of the United States.
The U.S. Department of Commerce, Bureau of Economic Analysis [1977] delineated the 50 states into 183 multicounty areas which they call BEA economic areas (see U.S. Department of Commerce, Regional Analysis Division [1975]). Three basic guidelines were used in this delineation: to include all counties; to have regions large enough so that estimates of income and other economic and social attributes would have statistical reliability; and to conform to functional economic area logic to the extent that limited time and research budgets permitted. Snead [1976] described the BEA areas and discussed a number of their important analytical and operational properties. He illustrated the suitability of using this regionalization in implementing federal programs. These areas are useful units of analysis for many subnational problems, but the areas are relatively large in terms of trading and commuting patterns.

A statistical analysis indicates that the Rand-McNally areas, BEA areas, and an additional delineation known as Basic Economic Research Areas (BERA), which was worked out by USDA economists, are about equivalent to one another in the sense that correlations, regressions, and factor analyses tend to give about the same results. The statistical properties of the three functional economic areas are different from those of the homogeneous State Economic Areas delineated by Bogue and Beale [1961], and different from those of political areas like counties and states. Their statistical properties are similar, however, to those of the substate planning districts delineated by governors of the various states. This suggests that it is feasible to delineate regions that are both functional and political.

Analysis of United States commuting and trade patterns suggests that the nation is probably composed of some 500 functional economic areas which are relatively closed with respect to trading and commuting and which include central places and hinterlands. Fox ([1967b]; Leven, Legler, and Shapiro [1970, p. 138]) said that they

form areas of very strong common interest with regard to economic development policy. Larger areas would include too many subsets among which economic transactions would either be nonexistent or very remote. Smaller areas would produce a situation with too many issues where the communities of interest would straddle regional borders.

These functional economic areas fit into a hierarchy in which some are fairly rural and can be considered, themselves, as a hinterland to some of the relatively more urban-oriented multicounty areas which provide central city services to residents beyond commuting distance. About one-half of the 500 functional economic areas of the U.S. contains one or more cities larger than 50,000 persons and the other half is relatively rural.
Growth Centers

Central places perform their centralized functions whether or not they are growing, yet the terms central place and growth center are frequently used as if they were synonymous. The concept of central place is defined through the ideas reviewed above. The concept of a growth center is not so clearly defined in the literature. Some authors apparently use the term to mean any urban place that grew during some recent period. For example, Hansen said, "Growth centers are SMSAs in which population growth from 1960 to 1970 was more rapid than in SMSAs as a whole" [1972, p. 509]. This overlooks the facts that some urban places which grew may not have been central places, and some urban places which did not grow may have been performing satisfactorily their central place functions. Darwent [1969] cleared up much confusion about the terms "growth pole" and "growth center" (see Richardson [1978c, p. 28]). Bird [1971] implied that growth centers which are also central places of functional economic areas have a key role to play in national economic growth, and he mentioned that national programs are weakened when centers are designated in response to political pressures, community pride, and other considerations.

Some authors appeared to associate growth centers with size. Thompson [1965] pointed out that during the 1950s, all the SMSAs with over 500,000 persons gained in population. Only two SMSAs between 250,000 and 500,000 lost population. Considerations of why this might have happened led Thompson to conclude that irreversible growth may be attained once a threshold size is passed. It was two decades later before census data demonstrated the doubtfulness of this conclusion. Other studies suggest that there are diminishing returns (or increasing costs) once some threshold has been reached and that there is an optimal city size (Tolley, Graves, and Gardner [1979]).

Multiplier theory is often brought to bear on the relationship of space to growth by way of the "growth center" concept. "The underlying idea of growth center theory," according to Richardson [1978, p. 28], "is that the spatial concentration of economic activity in an urban center of an under-developed region will raise the economic performance of the region as a whole."

Programs of the U.S. Economic Development Administration (EDA) have concentrated on locating firms in the central places of areas with low income or high unemployment on the theory that: "accelerating the creation of employment opportunities in or near such centers was believed the most effective and timely approach to providing jobs for residents of neighboring depressed areas" (U.S. Department of Commerce, EDA [1972a, p. 10]). Berry [1972, p. 9] elaborated the EDA view: "The task of regional policy is seen as one of strengthening key urban centers that can bring growth to the
peripheries and the pockets of isolation beyond." Research is needed, he con­tinued, to identify "potential growth centers capable of exerting uplifting spread effects on their hinterlands." The EDA approach to growth centers be­came popularly known as the "trickle-down" theory.

The U.S. Department of Commerce, EDA [1972a, p. 78] concluded from seven years of operating these programs that they were "successful in locating jobs, generating income, and stimulating the development process in econom­ically depressed areas." Cameron [1970, chap. 3] listed several theoretical reasons why growth-center policies for regional development have merit; he added several practical reasons why growth center policies might fail.

Statistical evidence that the assumed multipliers might not always work has been compiled. Milkman et al. [1972, chap. 8] analyzed a number of EDA growth-center projects which had been justified on the basis that pur­posively accelerated growth in the center would benefit the entire redevelop­ment area. In the growth centers evaluated, there was almost no impact on the redevelopment areas or their residents [p. 209]. The multiplier was close to zero; little "trickle down" effect was noticed. W. C. Lewis and Prescott [1972] found that 86 labor market areas were relatively stable regions that would likely respond better to uniform and direct development policies than to in­direct multipliers through growth centers. In a study of 85 smaller SMSAs and their hinterlands, Stewart and Benson [1973] discovered that population growth in the hinterland was positively correlated with growth in the center during the 1960s but that per capita income was negatively correlated. Their general conclusion was that linkages between the smaller SMSA and its hinter­land are very weak [p. 439].

E. M. Hoover [1967] concluded that "the multiplier effect through local purchases does not seem to furnish any real rationale for the strategy of con­centrating stimuli in growth centers. Indeed, it would seem just as reasonable to invoke this effect in advocating that growth ought to be initiated in the hinterland . . . to create income and employment in the central place" [pp. iv, 32, 33].

The history of the U.S. Department of Agriculture's evolvement of rural development programs was traced by Sundquist and Davis [1969]. They ex­plained how the department's rural development activity began as a program for low income farmers and, as a consequence of the logic of the problem ad­ressed, was expanded to include the rural, nonfarm sector of the economy.

The U.S. Department of Agriculture reversed the multiplier logic of EDA and encouraged plant location in rural areas outside the central place:

The basic theory underlying these . . . efforts is that rural industry can bring about sufficient economic growth to resolve problems of un­employment, underemployment, and low income . . . the growth
center concept should not be overemphasized . . . modern communication and transportation . . . make decentralized development entirely practical (Weitzell [1969, p. 6]).

Berry [1972] characterized this as “the hot-house industrialization of rural areas.” In contrast to the EDA growth center approach, the USDA approach seems to imply that beneficial effects would “trickle up” from the hinterland to the center. No such beneficial effects have been substantiated, as a general rule. Many of the plants that were placed in locations remote from access to central city services succeeded, but many others failed. Success or failure of plants located under these programs probably was due to other factors than either the “trickle down” or “trickle up” process.

E. A. J. Johnson [1970, p. 217] pointed out that even if short-run gains from government programs are greater in the growth center than elsewhere, we should be cautious about concentrating development programs in such centers because “short-run wisdom may be long-run folly” in that spatial income disparities may widen further.

The implication is that an explanation of how to conquer space will likely never be arrived at by reducing spatial theory to simple multiplier relationships. The problems of communication and transportation over space and their contributions to growth are proving to be more complicated than that.

Urban and Rural Growth

Some regional growth authors see urban economic activity as the basis for growth whereas others see the rural areas, and the agricultural subsector in particular, as the basis. Since the terms rural and urban have geographic connotations, these authors imply spatial variations in the sources of growth. Georgescu-Roegen [1960, p. 8] said “the interests of the town conflict with those of the countryside.”

Most of the literature on central place and agglomerative relationships is written from the urban, not the rural point of view according to Spiegelman [1966a, p. 1]. For example, Friedmann and Miller [1965], in developing their concept of an urban field that extends far beyond existing metropolitan cores, supported the idea of expansion of urban life into the rural regions that “intervene among metropolitan regions” [p. 313]. This intermetropolitan periphery was likened to “a devil’s mirror, much of it has developed a socioeconomic profile that perversely reflects the very opposite of metropolitan virility” [p. 313].

Berry [1973] found that metropolitan markets trade with each other and, when threshold conditions are reached, develop a self-regenerative growth pattern. He asserted that growth in the periphery, or hinterlands, is related to capturing a share of downward-filtering industries which grow slowly and yield
lower returns. This led Berry to a view of rural-urban differences in which “the basic regional distinction is, therefore, that between self-regenerative metropolitan America, and the hand-me-down intermetropolitan periphery, condemned to progress characterized at best by lagged emulation and second-hand growth” [p. 10].

N. M. Hansen [1970] also reflects an urban point of view; he explicitly rejected a rural point of view. In reviewing the report of the President’s National Advisory Commission on Rural Poverty [1967], The People Left Behind, Hansen found it to be concerned with the places, not the people, left behind [p. 238]. He saw no need for government programs to attract industry to the countryside, either from an efficiency or an equity standpoint. However, he did find that federal investment for education, health, and migration of rural people benefit both rural and urban areas. Hansen would concentrate federal expenditures for economic development in cities of at least 250,000 persons. He found that such programs are best based on what he called intermediate-sized cities, ranging in size from 250,000 to 750,000 persons, because it would be easier to accelerate their growth than it would be to accelerate growth in a lagging region. Berry [1972] explained the rationale: it is not generally feasible to base a national strategy on the industrialization of rural areas; our largest metropolitan areas are already too big, and emphasis on growth in intermediate-sized places provides an alternative to rural poverty other than the metropolitan ghetto. Only about 50 of the functional economic areas in the United States contain a city of more than 250,000 persons. Ten of the 50 have cities greater than 750,000. Consequently, Hansen’s proposal would concentrate Federal funds for growth programs in about 40 of the 500 functional economic areas of the nation. Richardson summarized the urban point of view when he concluded, “cities then become the engine of regional growth” [1979, p. 154].

Redfield and Singer [1954] challenged the view that there is a one-way flow from urban to rural areas. They traced vital interaction and feedback between the two sectors in their discussion of the cultural role of cities. E. A. J. Johnson [1970, p. vii] warned that, despite the greatness of our cities, we ought not to be blinded to their limitations: “Metropolitan centers are both creative and parasitic, elegant and squalid, majestic and pathetic.” “If these [rural] communities did not exist,” according to Yasseen and Fulton [1970, p. 3], “they would have to be invented. They are absolutely essential for the needs of our expanding and decentralizing industry.”

Disenchantment with European policies that treated only the largest cities as growth centers was discussed by Sundquist [1975]. He found evidence of “a gradual shift in emphasis from the larger to the smaller centers” [p. 27]. Richardson was speaking of developing countries when he said of rural-orient-
ed growth centers: "The traditional view is to interpret their role as 'parasitic,' draining the rural hinterland of resources. . . . However, from another perspective their location in rural areas could be viewed as a potential advantage, provided that policymakers can capitalize on this important locational advantage" [1978c, p. 135].

The distinction between rural and urban is more than geographic. The literature abounds with distinctions that are physical, economic, political, social, cultural, and religious. Heilbroner [1963] had such distinctions in mind when he spoke of "intellectual and ideological boundaries" in addition to geographic boundaries between countries and regions. But there are others who feel that these distinctions are becoming blurred. Leven [1978] noted the abrupt demographic changes of the past decade and the spatial dispersion of large, polycentric metropolitan areas. From this he concluded (echoing Kolb and Brunner [1933]) that "the distinction between metropolitan and nonmetropolitan —may lose, finally, any real definition" [1978, p. 110].

Agricultural economists tend to take an agricultural point of view toward the geographic source of growth. Some of this literature was reviewed above in the discussion of leading industries as a source of expanding markets. Mosher [1969] illustrates a broader rural point of view toward central place theory and spatial relationships as a basis for growth in his framework for a progressive rural structure to serve a modern agriculture.

The importance of urban centers to agricultural growth was noted by Schultz [1953, chap. 9], who proposed an industrial-urban development hypothesis. He emphasized the spatial element in the development of the agricultural sector and pointed out that "the process of economic growth does not necessarily occur in the same way, at the same time, or at the same rate in different locations." Schultz noted that demand for agricultural products is inelastic, which tends to limit agricultural growth as the economy grows. He discussed the importance of resource availabilities and, in particular, of participation in the labor force. He called attention to resource productivity and emphasized the importance of education and the quality of labor in that productivity. He noted institutional relationships and emphasized markets that lead to factor-price equalization. Schultz's hypothesis was that all these factors tend to work better near the urban center of a location matrix and work less well around the periphery (Bryant [1966], Bryant and O'Connor [1968], Tang [1958]). Vining [1959] detected what he termed a "lack of clarity" owing to "the ambiguity of certain concepts" in the Schultzian analysis and seeks to clarify it.

Most of the rural economy in the United States is a nonfarm economy. Rural growth is not equivalent to agricultural growth. In fact, technical progress in agriculture can release redundant agricultural labor into the nearby
nonfarm rural economy and have a depressing rather than a stimulating effect. A growing commercial agriculture may have closer economic ties with the highly developed urban economy, where it sells products and purchases inputs, than with the spatially contiguous rural nonfarm economy. An interesting discussion of growth in the nonfarm rural economy by E. A. J. Johnson [1970, p. 138] recognized the role of central place in rural growth and traced the contributions of Galpin [1915], Kolb and Brunner [1933], Kolb [1959], and Sanderson [1932].

As the national economy grows, each of its functional economic areas can be expected to grow (or decline) differently. Regional variations in natural features, such as availability of natural resources and amenities, and the presence of coasts, lakes, rivers, mountains, or plains are enough to guarantee that. In addition, a number of economic forces are at work differentiating areas even when natural features are equal. Some of these forces are cohesive and lead to formation of central places and to urban-oriented functional economic areas. These cohesive forces include transportation costs, risk avoidance, economies of scale, externalities, and agglomerative efficiencies. Other forces are dispersive and lead to formation of hinterlands to central places and to rural-oriented functional economic areas. These dispersive forces include access to scattered resources or markets, access to amenities, avoidance of high rent, diminishing returns, and personal preferences.

Rural and urban growth are not independent; one basis for growth of a rural area may be access to central city services (Jansma [1972, p. 16]). A rural point of view would provide economic opportunity and cultural and other services within commuting distance of every resident of the nation and not skip over certain areas simply because they are sparsely populated. National policy is needed which is related not only to the distribution of people but also to the distribution of economic opportunity and the availability of central city services. Rural residents in urban-oriented areas have commuting access to metropolitan centers for markets, shopping, nonfarm employment, and cultural attractions. Rural residents of rural-oriented areas have access to central places that are different in character. The character of these smaller central places influences the prospects for growth of the rural-oriented areas.

**Building Institutions**

People are goal-oriented animals. They may seek to reach goals as individuals or as members of a group (Reeder [1963]). Much of economic theory is based on simplifying assumptions concerning behavior of individual heads of households or firms wherein goals are reached, and conflicts among individuals are resolved impersonally, through the marketplace. Friedman and Friedman compared voting by consumers in the marketplace with voting at the
ballot box: "The ballot box produces conformity without unanimity; the market place, unanimity without conformity" [1980, p. 66]. Tinbergen and Bos expressed the neoclassical conclusion that relative price changes influence growth rates but that "the nature of development is not so very different in times of a rising price level and in times of a falling price level" [1962, p. 12].

The marketplace assumptions have proved fruitful. Yet they preclude the economist's opportunity to review and analyze many important institutions. Group behavior depends on arrangements for cooperative achievement of mutual goals and for resolving conflicts. A group of individuals organized to attain a goal has sometimes been defined as an institution. The form of institutional arrangement chosen can affect the growth of the economy.

Explicit reference to purposive institution building is less common in the literature than it once was. An example of what can be involved is provided in the Report of the Country Life Commission:

We must picture to ourselves a new rural social structure, developed from the strong resident forces of the open country; and then we must set at work all the agencies that will tend to bring this about. The entire people need to be roused to this avenue of usefulness. Most of the new leaders must be farmers who can find not only a satisfying business career on the farm, but who will throw themselves into the service of upbuilding the community. A new race of teachers is also to appear in the country. A new rural clergy is to be trained. These leaders will see the great underlying problem of country life, and together they will work, each in his own field, for the one goal of a new and permanent rural civilization. Upon the development of this distinctively rural civilization rests ultimately our ability, by methods of farming requiring the highest intelligence, to continue to feed and clothe the hungry nations; to supply the city and metropolis with fresh blood, clean bodies, and clear brains that can endure the strain of modern urban life; and to preserve a race of men in the open country that, in the future as in the past, will be the stay and strength of the nation in time of war and its guiding and controlling spirit in time of peace (U.S. Congress [1909, pp. 19-20]).

Many kinds of institutions are discussed in the growth literature. Tinbergen [1976, p. 5] made the distinction that:

institutions are organizations in either the concrete or abstract sense. Examples of concrete institutions are ministries and their respective parts, trade unions, and political parties. Examples of abstract institutions include markets and other customary or spontaneous ways of behavior.

Booth [1964] reviewed the state of knowledge about economic growth in
the context of optimizing institutions. He distinguished two types of theorizing about growth: empirical and analytical. Empirical growth studies deal directly with backwardness and regional disparities. Analytical growth studies concentrate on growth in advanced economies. The analytical studies are characterized as Classical, Neoclassical, and Keynesian. Booth found that institutions can easily become barriers to growth since they are static and are usually invented to fit a given environment. He concluded: “Institutions can be stimulants, but as growth proceeds, they usually become barriers. Unless institutions are mortal, or at least malleable, they cannot be optimal for economic progress” [1964, p. 16].

Leven [1965] discussed what he called the factor market imperfection theory. This theory supposes that firms and regions maximize profits. Its proponents look to regional variations in factor market prices caused by institutional market rigidities as symptoms that a reallocation of resources among regions would increase efficiency. Nicholls, for example, attributed wide regional differences in rates of industrial development to his belief “(1) that the factor and product markets are relatively more efficient in those counties which have enjoyed considerable industrial-urban development and (2) that fundamental impediments to equilibrating factor movements exist” [1960, p. 135].

Some growth authors use the phrase “market failure” to describe the persistent lack of market equilibrium, including the consequences for limits to growth. Others focus on institutional barriers to exchange among regions including licensing, unionization, zoning, taxing, and various legal regulations. Policies to promote growth in lagging regions under Leven’s market imperfection theory include removal of immobilities, institutional barriers, and market imperfections so that factor prices and quantities can reach equilibrium. If regions lose labor, capital, or income under these policies, it is because such regions, states the theory, are inefficient and their contributions are not needed in the whole system. Leven also called this the efficiency theory. It grows jointly out of consideration of location theory, reviewed by Spiegelman [1962], Meyer [1963], and Berry [1967], and of classical economic thought, but it embraces an additional concept as a basis for growth: the importance of institutional arrangements.

Schmid [1969], in his earlier review of our subject, merged location theory with export or staple theory, and he replaced the linear programming theories cited by Spiegelman [1962] and Meyer [1963] with various other optimizing frameworks. Leven’s [1965] efficiency theory took the form under Schmid of fixed asset theory. Regional variations in economic activity were explained by Schmid in terms of lack of incentive to redistribute resources for increased efficiency among regions when salvage values for fixed
assets in depressed regions are low relative to marginal value products. Nourse [1968, p. 207] explained fixed asset theory in terms of institutional rigidities in factor markets:

The reason why migration of labor and capital may not continue until wages and return on capital are equalized [among regions] is that investment in migration is not profitable. For older workers and for job changes requiring a change of residence the present value of net returns will probably not be sufficient to cover the cost of migration.

Schmid emphasized the importance of institutional arrangements as a basis for growth, a basis alluded to by Leven. Schmid pointed out that location takes place in an institutional framework. Rents received by landowners depend partly on productivity of land and on location, but partly, also, on zoning and tax laws. Regional variations in the growth in income, employment, and population are explained in part by variations in institutional arrangements.

Schmid extended this to include a dimension not explicitly discussed above: the theory of public goods. This touches on Leven’s reference in his equity theory to social overhead capital but it is not the same thing. Leven’s efficiency theory assumes private goods that move from one region to another at the discretion of an individual entrepreneur, given a set of well-functioning market institutions. Schmid’s public goods theory adds that group decisions through institutional arrangements are required to produce public goods which are consumed jointly. A regional settlement pattern is given as an example of a public good.

Jansma et al., in their review of conceptual frameworks used in rural development studies, concluded, “The institutional framework within which the process of community decision-making operates to solve local problems is an important variable in the success of rural development efforts (see p. 309 of this volume).

The emphasis on institution building in the growth literature is mostly a post-World War II phenomenon. Reference to the importance of institutions in economic growth in pre-World War II literature is uneven; other bases for growth, particularly increasing resource availabilities and advancing technology, received far more attention. References are there, however, and institutions are considered of paramount importance by some growth authors.

A. Smith [1910 (1776), p. 95] referred to the limit to growth set by the “laws and institutions” of a country. He emphasized the importance of “order and good government” [pp. 379, 385, 388] and noted that the capitalistic institutions promoted technological advance:

The greater the number of laborers, the more they naturally divide
themselves into different classes and subdivisions of employment. More heads are occupied in inventing the most proper machinery for executing the work of each, and it is, therefore, more likely to be invented [p. 86].

Mill [1909 (1848), pp. 697, 698] listed several institutional changes which he considered to be characteristic of economic progress: a continual increase of the security of person and property; adoption by the people of the qualities "industry" and "frugality"; an improvement in the business capacities of humankind; and the capacity for cooperation. Later [p. 945] he added "that originality of mind and individuality of character are the only source of any real progress."

Marx [1906 (1867)] also noted the interplay between technological advance and institutional change. He was concerned with the unprecedented increase in productivity under capitalism, and he concluded that the capitalist institution provided strong incentives for technological advance.

Toynbee [1956 (1884), p. 58] agreed with Smith and Marx and went a step further. He saw the essence of the industrial revolution not as a technological advance but as an institutional change in which competition was substituted for the medieval regulations that had previously controlled the production and distribution of wealth. Toynbee [1956 (1884), p. 59] observed that it was three-quarters of a century from the time that A. Smith [1910 (1776)] argued for industrial freedom until Mill [1909 (1848)] recognized that competition alone is not a satisfactory basis for society. Mill's [1909 (1848)] closing chapter lists several reasons why institutional intervention is needed to correct the social ills caused by the marketplace.

The importance of institutions was consistently recognized by followers of the German Historical School and by isolated individuals outside the mainstream of Western academic economics, such as George [1879]. A. Marshall [1949 (1890), p. 249] admitted that institutions may be changed rapidly but warned that if they are to endure, they must not be changed very much faster than man changes. Marshall's view may help explain why his followers have been willing to assume away the importance of institutional change in short-run analysis.

Authors who view economic growth over a span of history, like Gould [1972], Hicks [1969], North and Thomas [1973], and M. Weber [1927], tend to pay far more attention to the role of institutional change than those taking a short-term view. Possibly this is because, whereas the impact of institutions on growth is sizeable, the pace of change in institutions is relatively slow and cumulative and, therefore, the impact appears negligible over shorter time periods.

Veblen [1899] characterized classical economic theory as pre-Darwinian
and focused on the economic institutions about which classical theory says little. His followers were institutionalists who shared his contempt for theory. The result was divisive and we are still struggling to remerge institutional considerations into the received body of economic theory.

Whitehead [1925, p. 96] sought to merge institutionalism and theory, not divide them. He saw the institutionalization of scientific method as the source of progress: "The great invention of the nineteenth century was the invention of the method of invention."

The wisdom of deleting considerations of nonmarket institutions from the mainstream of neoclassical economic theory was seriously questioned by Keynes [1936]. He pointed out that the theory did not accord with empirical observations, and he alluded to the importance of purposive government intervention. In contrast to the earlier view that institutional change can be ignored in the short run, the short-run solution was seen by Keynes to require institutional change; long-run perpetuation of the problem would accompany continued avoidance of institutional change. Regarding market institutions, Keynes's main objection to classical theory was the presumption of perfectly competitive markets. He began with the general assumption of imperfect markets as the general case, instead, and considered perfect markets as a special case.

Since World War II, a number of authors has cited institutional change as a basis for growth (e.g., Polanyi [1944, p. 119]). Planning is one of the means used to influence the direction an economy takes. It can modify the outcome relative to what free market institutions would have done. Friedmann ([1956]; Friedmann and Alonzo [1964, p. 497]) was concerned that "American planning practice, and not only the practice but the idea of planning itself, has always been in sharp contrast to the approach popular in Europe and elsewhere."

Meyer [1956], whose thesis was that technological advance is the basis for growth, seemed to imply that new discoveries in science and technology are most needed in institution building. He said he was

profoundly convinced that the search for principles of organization—whether they be of organic substance, mind, machine, language, or of institutional arrangements—is the most fundamental, and the most liberating task of our generation. The fundamental search for world development lies in that direction [1956 (2nd ed. 1966), p. vii].

Baran [1957, p. 3] observed that, contrary to the neoclassical view of institutions, "Economic development has always meant a far-reaching transformation of society's economic, social, and political structure of the dominant organization of production, distribution, and consumption." The interrelations among the several elements affecting growth were seen by Kindleberger
[1958] to be many and complex. And yet it appears, he said, "that the social factor is in many ways the strategic element" [p. 312]. Georgescu-Roegen [1960, p. 3] concluded that "what characterizes an economic system are its institutions, not the technology it uses." Heilbroner [1963, p. 10] expressed the same idea: "The process which we call economic development is . . . a process through which the social, political, and economic institutions of the future are being shaped."

Brewster [1967] said, "political development is a necessary precondition of economic development, and not the other way around." Sometimes the needed political development is slow in coming. The need for central controls, planning, and purposive institution building has been recognized, according to Bird [1969, p. 158], yet not fully adopted. The needed political developments are not only domestic. On an international basis, "governments are increasingly thinking in terms of regional development policies rather than in terms of aid to depressed areas" (Organization for Economic Cooperation and Development [1970, p. 23]).

North and Thomas [1973, p. 1] found that "efficient organization is the key to growth" (see also Davis and North [1971]). They defined efficient organization as the establishment of institutional arrangements and property rights that create an incentive to channel individual economic effort into activities that bring the private rate of return close to the social rate of return. North and Thomas were well aware of the other bases for growth considered in this review, and mentioned them explicitly. For example, in discussing economic change in the western world during the Middle Ages, they consigned the stages theory of history "to the intellectual rubbish heap" [1973, pp. 25-26]. They defined spatial relationships and identified the North-South divergence. They discussed demand and external stimuli from trade and suggested internal factors may have been more important than external ones. They considered technological change, through which animal, water, and wind power allowed inputs to be combined more efficiently. And they emphasized the importance of growth in population and increased labor force, and the availability of virgin lands in the wilderness. But North and Thomas did not see these several factors as ultimate bases for growth. They asserted, "The industrial revolution was not the source of modern economic growth" [1973, p. 157]. They returned to the proposition put forward by Toynbee [1956 (1884)] that institutional change is the key. They discussed institutional change involved in the delivery of public goods, such as justice and protection; growth of the money economy; transactions; specialization; and, particularly, institutions related to private property rights. North and Thomas discussed economic forces that stimulated growth of certain institutions,
conflicts related to institutional formation, and the impact on various regions of Europe of different institutional patterns.

Olson [1976, p. 25] made a strong argument that certain kinds of institutions tend to develop in democratic countries with freedom of organization which, through monopoly power and political clout, are likely to lower the rate of economic growth. That is, growth can become impaired by what Olson called "institutional arthritis."

Purposive Institution Building

A number of references suggest that appropriate economic institutions do not necessarily evolve naturally, with the assistance of the invisible, guiding hand. Boulding said somewhere that the trouble with the guiding hand is that it does not have a head. Reviewed below are several situations, discussed in the literature, in which purposive institution building may be required to modify economic forces in order to produce desired results: (1) A competitive equilibrium situation may be held to be inequitable, that is, society is dissatisfied with the status quo. (2) The economy may not be converging on an equilibrium, but may be observed, in fact, to be diverging. (3) Monopoly power may override competitive forces. (4) Uncertainty, or imperfect knowledge, may interfere with competitive choice. (5) Market failure may arise for public goods that are not distributable by the same institutions that distribute private goods. And, (6) conflicts related to disagreement on goals and on distributive justice among individuals may not be resolved by market forces. Each of these situations, alone or in combination with others, can give rise to the need for institution building in order to direct economic growth in a socially preferred direction.

COMPETITIVE EQUILIBRIUM

Neoclassical microeconomics analyzes allocation of scarce resources among alternative ends by heads of households and firms. In that theory, institutional arrangements required to organize firms and households to obtain social goals of equity and efficiency rely on an impersonal, free market price system. In a perfectly competitive economy producing private goods under perfect knowledge, an equilibrium will be reached in which conflicts are resolved in the marketplace and maximum efficiency and equity will be attained (Samuelson [1952]). Institutional arrangements are assumed to evolve as needed to absorb increased demand, accumulate resources, innovate, and conquer space as firms and families take appropriate actions to reach their individual goals in a growing economy. As McCracken [1963, p. 29] put it: "Businesses are probing for new and better ways to use resources more productively—
urged by the lure of profits ahead and the spur of competition from the rear.”

This view implies that people need concentrate only on private firm and household goals; the free market will automatically organize firms and households into an efficient, equitable system which will impersonally attain social goals. Growth is considered to be induced by competitive equilibration to changing demands, resource availability, technology, or spatial relationships. The free market institution would keep resources fully employed, according to this theory, and, therefore, “create the conditions for rapid economic progress” (Myrdal [1956, p. 338]). Myrdal continued, “The doctrine of the perfect market represented, as we know, something more than a theoretical tool for economic analysis, namely a valuation of how society ought to operate” [p. 338].

However, suppose that the neoclassical economic equilibrium was attained and then found unsatisfactory to the residents of an area? Persons in an economy experiencing a persistently high level of unemployment or high incidence of poverty may come to the realization that the status quo is not satisfactory. Leaders in such an economy may seek to build institutions whose purposes are to describe the problem, explain the situation, and prescribe corrective policies. In the simplest case, the assumption can be made that the invisible, guiding hand will respond to purposively introduced, corrective policy instruments and move the economy toward a preferred equilibrium. When this approach works, a minimal degree of intervention into the market system is required. This is the approach, for example, of Keynesian macroeconomists. When society finds the neoclassical general equilibrium unacceptable, fiscal and monetary policies are implemented and the economy is expected to adjust to such purposive intervention by moving toward full employment and stable prices. Federal regulation of irrigation water and 160-acre size limits on farms are examples of other kinds of institutional constraints to which the economy is expected to adjust. From Mill [1909 (1848)] on, the theory of the free market economy was always presented with a major reservation that corrections would have to be applied by taxation and other interferences with the price mechanism (Myrdal [1956, p. 338]).

Before institutions can reallocate resources among alternative ends, “ends must be graded” (Neale [1964, pp. 107-108]; see also Ayres [1944], Emerson, [1966]). North [1955] went a step further to say that the value judgments associated with economic growth influence the choice of means as well as of ends. “By no econometric trick . . . can a value premise be generated by pure reasoning or inferred from facts other than people’s actual valuation” (Myrdal [1956, p. 337]). “We cannot escape this world of values” (Talbot and Youngberg [1972, p. D-14]). “No meaningful analysis of any of these [economic development] subjects can proceed without relying on some
explicit or implicit value judgments" (Nath [1968, p. 220]). It is not "possible to advocate proposals for change from a position of value neutrality" (Tinbergen [1976, p. 2]).

An understanding of the importance of grading ends, and of the prospect of choosing one from among several alternative futures, is fairly recent in the growth literature. Earlier, going back as far as the eighteenth-century roots of the modern idea of progress, ends were considered given to society. Our task than was to achieve predestined ends, not to debate alternatives.

Hirschman [1958, p. 8] observed that when people in underdeveloped regions identify goals for economic development, and organize institutions to reach them, they are bound to follow a less spontaneous and more deliberate institution-building process than was required in the regions or countries where economic development first occurred. Hirschman raised the question whether economic development depends solely on the ability and determination of a nation or a region and its citizens to organize themselves for development. He concluded that determination is not enough after all and appeared to be saying that the institutions are necessary but not sufficient. Nicholls [1972, p. 737] seemed to imply sufficiency when he said that in the United States the South made much progress over the past few decades because it "chose progress over tradition."

Economists tend to take utility functions as given. On the other hand, advertisers on Madison Avenue assume that utility functions can be modified and that to do so influences the outcome of economic activity. Institutions that pass culture from one generation to the next, and which assist in the formulation and modification of goals, can influence economic growth. Progress through changes in values and goals can modify utility functions and thereby shift demand functions for final products. The effects of changes in values are reflected in changes in markets, which were reviewed above. Plato expressed a similar idea when he said that what is honored in a country will be cultivated there. This has been looked upon as Say’s Law in reverse: Demand creates its own supply.

If an economic system fails to function according to the principles of welfare and distributive justice described by perfectly competitive neoclassical equilibrium theory, several group processes may need to be considered before optimal growth can be achieved (Reeder [1963]). People need to consider values, attitudes, and goals, and have opinions about what ought to be. These considerations go beyond the domain of economics. As Paarlberg [1973, p. 22] put it: “The development process is more than just economic; it is also social, political and esthetic.” If the institutions required to bring about these changes do not evolve, people will need to engage in purposive institution building in order to identify and reach for the desired outcome.
DIVERGENT GROWTH

Economic growth is understood by some to be a self-reinforcing, diverging process in which the rich continue to get richer, and the poor, poorer (Adelman and Morris [1973], Adelman and Robinson [1978], Tinbergen [1976]). Myrdal [1957] identified what he called the principle of circular and cumulative causation as a cause of inequity: "The social system is by itself not moving toward any balance between forces. . . . A change does not call forth countervailing forces but, instead, supports changes . . . and tends to gather speed at an increasing rate" [p. 13]. Myrdal suggested that rest in such a social system can be achieved by policy interference. Boulding [1968, p. 24] agreed with Myrdal that failure of the system to converge implies a potentially explosive situation. Not that equilibrium is necessarily good either, or even possible, in the view of these authors. Boulding [1974, p. 29] asserted that "equilibrium is a figment of the human imagination." "The preoccupation with equilibrium growth may be particularly misleading in regional analysis," according to Richardson [1969b, p. 321], "because the transmission of impulses across regional boundaries is likely to result in disequilibrating forces . . . if only because regions lack the instruments for corrective action." Richardson [1973] believed that convergence models fail to recognize spatial factors affecting growth. Lande and Gordon [1977] tested Richardson's hypothesis by incorporating spatial considerations in a neoclassical growth model and found that place preference and agglomerative factors contribute to divergence. A neoclassical model capable of exhibiting divergent growth was developed by Alao [1977]. Purposive institution building is required to intervene continuously in order to guide or redirect various strands of the economy toward a socially acceptable economic situation.

There are both theoretical and empirical reasons why many commentators tend to see growth as an equilibrating, converging process in which undesired income disparities are eliminated. Myrdal [1957, pp. 144-147] described the theoretical reinforcements of this belief. He counted "to the credit of the equilibrium notion that it represents a convenient means to comprehend and demonstrate in a simple fashion the universal interdependence among all the factors in the economic system, and also that it constitutes an almost indispensable logical step in many economic arguments" [p. 144]. However, Myrdal said we have retained in our equilibrium theory, "a teleological significance above the simple and technical purpose of being a chosen theoretical tool useful for the analysis of social reality" [p. 144]. Myrdal referred to the positive value connotation attached to equilibrium and the negative one to disequilibrium. He found that the popular bias that the economy is moving toward a stable equilibrium has its basis in various predilections of economic theory which he identified as "the idea of inter-
est harmony, the anti-state or anti-organization inclination, and the free trade presumption" [p. 147].

Petrulis [1971] indicated that, in addition to a conceptual or theoretical bias, there is a statistical or empirical bias which helps perpetuate the equilibrium notion. He found that different statistical measures applied to the same data lead to conflicting conclusions about convergence of regional incomes. He gave an example of two regions that appear to be converging when their growth is measured by percentage gain per year but which, according to the same data, appear to be diverging in terms of the absolute differences. Empirical evidence that growth processes can diverge as well as converge is given in Williamson [1965], and in Gilbert and Goodman [1976].

It is often held that all members of an economy benefit from general economic growth. In particular, it is held that poverty is ameliorated by growth. Greenfield [1976] reviewed several optimistic and several pessimistic authors on this subject. Greenfield's regression analysis led him to support the conventional view that "economic growth was important in reducing poverty in nonmetropolitan areas." Beck [1977] countered that general economic growth does not necessarily trickle down to help the poor in a region. He found Greenfield's results ambiguous because growth might be accompanied by immigration resulting in an apparent reduction in the incidence of poverty, but with no necessary improvement for those in poverty. Growth paths for two groups in an economy may diverge unless institutions are built to change the growth pattern.

MONOPOLY

The evolvement of antitrust legislation during the latter part of the nineteenth century is symptomatic of dissatisfaction with the invisible guiding hand. The old saw about the "invisible handshake" implies duopoly instead of perfect competition. Purposive institutions were built to counter monopoly forces when the judgment was made that free market competitive forces were not dominant. When monopoly is seen as the force retarding growth and leading to inequities, it may be attacked by government regulation or by private actions such as those of unions. C. B. Hoover [1954, p. 14] commented on the mixture in the U.S. economy of competitive elements, monopolistic elements, and government intervention, in his discussion of institutions and economic change.

The growth literature is ambivalent about the role of monopoly as a basis for regional growth. Sometimes a monopolistic firm is regarded as the cause of depressed wages and low levels of employment in a region. Excess profits result in a maldistribution of income. And the efficiencies associated with long-run competitive equilibrium are foregone. At other times, the location of
a single large plant is sought for the community because of its potential as a source of growth. Large-scale firms can afford to do research and, perhaps more important, afford to develop the results of research. An indigenous monopoly has the power to protect a region from infiltration by outside firms. If there is a local shortage of entrepreneurial skills, monopolies use the available skills efficiently. Economies of scale may lead to more efficiency from a monopoly than from perfect competition. And the excess profits of monopoly provide the savings from which investments for further growth are made.

Keynes [1936] viewed monopoly power as a limit to growth and to full employment. Monopoly of business against the consumer, and bilateral monopoly between business and labor, were seen by Keynes to influence prices and quantities, not perfectly competitive supply and demand. “It is, then, the assumption of equality between the demand price of output as a whole and its supply price which is to be regarded as the classical theory’s ‘axiom of parallels’ ” [p. 21]. Keynes saw an analogy between Euclid’s axiom of parallels and the classical axiom of perfect competition, which caused him to say, “The classical theorists resemble Euclidean geometers in a non-Euclidean world” [p. 16].

Schumpeter [1942 (1947a), chaps. 7 and 8] argued in favor of monopoly as a basis for growth. He viewed capitalism as an evolutionary process. The fundamental impulse that sets and keeps the capitalist engines in motion is the creative destruction by monopolies and large firms of old ways of doing things in order to introduce new consumer goods, new methods of production or transportation, new markets, and new forms of industrial organization.

W. A. Lewis [1955] saw some value in the contribution to growth that monopoly can make. But he was more cautious than Schumpeter:

In sum, it is clear that the relationship between monopoly and economic growth does not lend itself to simple conclusions. We may perhaps say that monopoly is more likely to emerge, and more likely to be helpful, in the earlier than in the later stages of economic growth. At the same time, monopoly is dangerous at any stage [p. 101].

Regarding the assumption of competitive market institutions in so much of economic analysis, Greenhut ([1964]; Karaska and Bramhall [1969, p. 340]) observed that “by its very nature, space involved monopolistic elements.” The market form of organization in a region implies various institutions, evolved or purposively built, which influence regional growth. W. A. Lewis [1955, p. 101] called it a “sound instinct that causes men everywhere to distrust monopoly, and to seek to restrict its powers.” If monopoly, not perfect competition, describes the market structure, then equilibrium theory suggests
that purposive institution building is necessary to correct for social imbalances resulting from monopoly power.

UNCERTAINTY

"It is the very nature of economic growth that nobody knows what is going to happen," observed W. A. Lewis [1955, p. 285]. He added that the process of growth is "reaching out into the dark" [p. 289]. This idea is in conflict with the conventional assumption of perfect knowledge on the part of firms and households in the neoclassical theory of free market institutional evolvement. In his discussion of long-term expectations, Keynes [1936, p. 148] said the state of confidence is a matter to which practical men pay close attention but which economists have not analyzed carefully.

Schmid [1969] saw a relationship between institutions and uncertainty. He stated a need for research on how institutions might perform a hedging function differently. It is imperfect knowledge that creates the need for institutions for research, education, and extension. Business people depend on market news. Insurance companies sell a service designed to cope with uncertainty. Arrow associated uncertainty with institution building and suggested that sometimes nonmarket institutions fill gaps created by market failures which were caused by inequality of information among economic agents [1974, pp. 36-37]. Webber [1972] described how uncertainty has an impact on the spatial relationships of growth. He found that "instability and growth are negatively associated, and instability is positively associated with distance" [p. 221]. The result is that uncertainty slows the growth rate and concentrates most economic activity in a few relatively crowded places. Institutions coping with uncertainty modify regional growth patterns.

PUBLIC GOODS

The demand and supply of public goods frequently exhibit market failures which call for institution building. Neoclassical economics explains price-quantity behavior of private goods, and, when certain conditions are met, a competitive market may evolve to organize firms and households. Horvath [1971, p. 740] described the extent to which the rural economies' "contacts with the rest of the world do not go through the exchange process." Consider two persons at a lunch counter. The food each orders is a private good, the prices and quantities of which can be explained by neoclassical equilibrium theory. However, a selection on the jukebox by either person is consumed by both; it is a public good. When one person plays the jukebox, the other has to listen. The second person gets a "free ride" if the selection is pleasing and feels put upon if it is not. The rules for describing and explaining economic behavior are different for public goods than they are for private goods.
The institutions required to deliver public goods, such as jukebox selections, swim clubs, hospitals, roads, symphony orchestras, and the armed forces, need not evolve as market institutions for private goods do; they must be built purposively if they are to function smoothly.

Interjurisdictional conflicts between city and county governments, and among county governments in a multicounty commuting and trading area, are symptomatic of the institutional breakdown associated with market failure in delivering public goods related to health, education, and community facilities to various regions in the United States and in limiting prospects for regional economic growth.

CONFLICT

"Conflict is an activity that is found almost everywhere," said Boulding [1968, p. 1]. The invisible, guiding hand does not deny conflict, but, rather, assumes that harmony will be attained in the marketplace. Of course, not all conflict is resolved in the market; added institutions may be needed to cope with conflict (Isard et al. [1969, p. 230]). The institutional view recognizes conflict, not harmony, as fundamental. There are two views about the role of conflict in economic growth. Conflict can be a driving force for growth because it induces people to take sides and work hard for what they consider right; and it can be a limiting force because the energies of people are scattered among objectives that are never attained. Boulding examined the concept of an optimum degree of conflict, a concept which "relieves us from the illusion that conflict is either good or bad in itself" [1962, p. 305].

Some conflicts are not likely to be resolved by free market equilibrium forces. Hence we must look not upon equilibrium models which explain harmony, but upon institutional arrangements created to harness the energies of and to resolve conflict. Failure of the institutional arrangements to deal constructively with conflict limits regional growth.

"Conflict may be defined as a situation of competition in which the parties are aware of the incompatibility of potential future positions and in which each party wishes to occupy a position that is incompatible with the wishes of the other" (Boulding [1968, p. 5]). The importance of understanding conflict in economic analysis was emphasized by Brewster [1959, p. 1169]: "The heart of any serious policy problem is a conflict of deep-seated value judgments."

Resolution of conflict has consequences for regional growth [Robock, 1966]. Regional planning seeks to deal with such conflict and to recommend growth strategies. However, the notion of planning was not well received in the United States during the early post-World War II period which followed two decades of active federal intervention to deal with depression and war.
Neale [1964, p. 115] cited how goals of acquiring and exercising power came into conflict in India with goals that would lead to economic growth. Ladd [1969] noted how parochial goals came into conflict in Connecticut with cosmopolitan goals that would lead to economic growth. Okano [1969] discussed conflicts that arise between existing residents of a region and newcomers, and conflicts between declining and growing regions. Strong [1975] outlined conflict between landowners along the banks of the Upper East Branch of Brandywine Creek, who stood to gain from economic development through a rise in land values, and residents of eight nearby townships, who preferred the status quo.

Some growth authors assume conflict is a short-run problem. Conflict was considered "more apparent than real" by Mesarovic and Pestel [1974], because "in the long run ... cooperation is the only sensible and most beneficial path for all participants" [p. 97].

The role of government institutions in resolving conflict and promoting growth is not always clear. W. A. Lewis [1955, pp. 80-81] pointed out that an authoritarian government can form a cohesive society which can develop more effectively than an individualistic society. He said, "the cohesive, authoritarian group will have superior growth if the chief knows better than the individuals the measures which growth requires" [p. 81]. However, he added that authoritarian governments are not likely to "have the interests of the common people primarily at heart." He suggested that the institutions required to resolve conflicts fairly are more likely to be present in advanced societies than in backward ones. Adelman and Morris [1973, p. 20] found that increases in political participation in developing countries do not predictably change the socioeconomic situation. Lieberman [1977] uncovered evidence to support the thesis that political ideology had little to do with the type and rate of economic growth experienced by six mixed economies in Europe.

We have reviewed a number of reasons why purposive institution building may be required to resolve problems and to promote desired economic growth: when residents are dissatisfied with the status quo; when sectors diverge rather than equilibrate; when monopoly results in higher prices, lower incomes, and reduced economic opportunity; when there is limited information; when public goods are involved; or, when there are conflicting purposes. These various sources of institutional failure as a limit to regional growth are typically treated singly by the various authors in the literature, but slower growing or depressed regions may be suffering from several sources of institutional breakdown simultaneously.

Parsons [1964, p. 81] noted that institutions are the procedural or social aspects of an economic system. From that view, we may say that sometimes
the procedural aspect, rather than a substantive aspect, of a regional economy becomes the bottleneck to growth. In such cases, institution building is seen as the basis for growth.

**Systems Approach**

Five analytic bases for growth and a descriptive approach have been reviewed. Each has been singled out by different growth authors as the basic, or most important, consideration. When an author mentions two or more bases, one is frequently stated explicitly to be more basic than the others. This review has attempted to describe what has been found in the growth literature without evaluating which might be most important. After reviewing these bases, a natural next step is to consider them all relevant, and to explore theories that incorporate them in a holistic approach.

In an earlier review of our subject, Hilhorst [1967] argued that the several facets of regional development fail to add up to a proper theory. He emphasized the need for interdisciplinary conceptualization and argued the need for a synthesis of the several facets into a comprehensive theory. In so doing, he joined the trend of a number of recent authors who have called for a systems approach in explaining regional growth.

The systems approach is a method which some researchers—perhaps too readily—adopt as an intellectual habit. Lovejoy [1936, p. 10] warned of this habit as "the organismic or flower-in-the-crannied-wall motive, the habit of assuming that, where you have a complex of one or another kind, no element in that complex can be understood, or can, indeed, be what it is apart from its relations to all the other components of the system to which it belongs." Leven [1963] said that "even though we know that everything depends on everything else . . . thinking about area growth . . . in that manner gives most of us a headache, so we abstract from the total world around us and look at smaller pieces" [p. 23].

Proponents of the systems approach emphasize the relationship among co-dependent parts within a whole. This point of view has gained wide acclaim recently because its emphasis on synthesis into a meaningful whole appears to overcome some of the difficulties remaining after analysis has fragmented a problem into many parts. As Lovejoy [1936] implied, the systems approach is not new. Cournot [1963 (1838), p. 108] observed that "for a complete and rigorous solution of the problems relative to some parts of the economic system, it [is] indispensable to take the entire system into consideration." "In political economy," according to Malthus [1951 (1820), p. 477], "the desire to simplify has occasioned an unwillingness to acknowledge the operation of more causes than one." Samuelson [1947, pp. 7-10] pointed
out, “To designate this environment completely would require specification of the whole universe. . . . The fruitfulness of any theory will hinge on the degree to which factors relevant to the particular investigation at hand are brought into sharp focus.” Tweeten [1974] noted that systems planning is as old as problem solving itself.

Several studies of economic growth have examined many sectors of a region, looked at many resources, and shown concern for interaction among variables [Milliman, 1971]. One might think that a review of such studies would reveal the systems approach in action and display the relative importance of the several bases of economic growth. Although some of the economic analysis of growth based on the systems approach is proving worthwhile, much of it appears to promise more than it can deliver. There seems to be a disparity between what systems authors say is required and what research practitioners do.

Comparative Significance of Two or More Bases

An analysis of increasing resource availabilities compared with advancing technology as the basis for growth in the U.S. economy was conducted by Jorgenson and Griliches [1967, p. 249]. They took the position that “if quantities of output and input are measured accurately, growth in output is largely explained by growth in total input.” They found first that, when using conventional measures of input and output, only 52 percent of the growth in output during 1945-65 is explained by growth in input. But when the aggregation errors were eliminated and correction made for changes in rate of utilization of labor and capital stock, they found that growth in input explains 97 percent of the growth in output, leaving little residual to be explained by a change in technology. This was in direct opposition to earlier estimates of Solow [1957] and Massell [1960] that around 90 percent of the increase in output is due to technological change.

Denison [1969] argued that some of the Jorgenson-Griliches adjustments were theoretically unsound, particularly the adjustment for utilization of capital and land. Denison [1974] estimated that about 53 percent of the growth in U.S. output can be explained by growth in inputs for the period 1929-69. This leaves 47 percent to be explained by other factors, like the quality of the human factor or technological advance.

Several studies have tested the hypothesis that two or more of the five bases for growth examined in this review are statistically significant. Hammill and Bryant [1970] used regression analysis to isolate factors that influence county or multicounty area income. Age, migration, and natural resource endowment indicate the importance of resource availabilities. Education, farm
size, and nonfarm industry mix indicate the importance of technology. And industrial growth and urbanity indicate the importance of space and the access to markets.

Adelman and Morris [1973] used factor analysis to weight a number of factors affecting national growth, including industrialization, agricultural productivity, overhead capital, investment, and political and economic institutions. An important finding of the Adelman and Morris study was that gains in growth are not highly associated with gains in equity. Bryant, Bawden, and Saupe [1980], in their review of the economics of rural poverty, cited studies that agree with the conclusion of Adelman and Morris about the lack of relation of national growth to equity, and others that disagree. Bryant et al. uncovered considerable evidence in the literature that regional or area pockets of poverty are strongly affected by local economic growth.

Debertin and Huie [1974] found that resource availability, aggregate demand, and spatial relationships contributed to growth in Indiana. Retail sales grew fastest in higher income communities where demand was stronger. Incomes grew more rapidly in smaller towns. Employment in manufacturing grew fastest in lower income communities; but population grew relatively faster in areas located on interstate highways.

Denison [1974] took an accounting approach to measure growth in the United States. Humphries [1976] used regression techniques as an alternative to growth accounting. Denison's measures of growth determinants do not fit neatly into the five analytical categories of bases for growth reviewed here, but his general comments about interpreting growth determinants do cover all five categories. The length accorded below to Denison in this review—a review characterized by so many one-line commentaries—is justified by your reviewer on the grounds that Denison's effort provides an opportunity to pause in the narration long enough to get a feel for the empirical importance of the various proposed bases for growth. Expansion of resource availability is estimated to be the leading determinant of national growth when we attempt to apply Denison's measures to our five categories. Advancing technology is seen to be a close second.

RESOURCE AVAILABILITIES

Changes in the availability of resources account for 43.9 percent of U.S. national growth during 1948-69, according to Denison. Of this, 23.1 percent is associated with increased employment and 20.8 percent with increased capital. Land availability contributes nothing in Denison's accounting framework because the total land area of the nation did not change and changes in land quality or land use are not accounted for. Denison did not consider the contribution of availability of petroleum, coal, and other natural resources.
TECHNOLOGY

Advances in technology account for 41.3 percent of the growth during 1948-69, according to Denison. Most of this (30.9 percent) is attributed to an increase in technological and managerial knowledge. The latter expressly includes managerial and organizational techniques in a broad sense. As such, it appears to include some of what was termed in this review an institutional basis for growth. Denison measured the contribution of technology to growth as a residual after all other effects were removed. Consequently, it might include many contributions other than advances in technology. Denison was careful to label this residual term "advances in knowledge and not elsewhere classified." Education contributes about 10.6 percent of the total growth.

MARKETS

Two measures devised by Denison are related to demand. They had a negligible, slightly negative effect during 1948-69. One, intensity of demand, is associated with the business cycle; variation of nonlabor earnings in corporations is the chief ingredient of this measure. The other market-related measure in Denison's account is occupied housing. Other measures of demand discussed as bases for growth in this review were not explicitly measured in Denison's accounts. The influence of other market inducements to growth which he failed to consider was, doubtless, latent in Denison's residuals.

SPATIAL RELATIONSHIPS

Denison explicitly discussed the importance of local, regional, and national markets as a determinant of growth. He said, "larger regional and local markets permit greater geographic specialization and less transporting of products," [p. 71]. Denison saw this influence reflected in economies of scale as the economy grows and experiences increasing returns. Hence, he called the measure "economies of scale," but he interpreted it as the impact of geographic specialization and transport. This measure accounts for 10.9 percent of the growth, according to Denison's estimate.

INSTITUTIONAL ARRANGEMENTS

Denison sought to account for the contribution of two market institutions which allocate resources among alternative uses. One transfers workers from farm to nonfarm employment; the other transfers the nonfarm, self-employed to other nonfarm employment. Denison saw both these shifts as movement from an inefficient underemployed use of labor to a higher use. He found that these institutional impacts accounted for 8.8 percent of the growth during 1948-69.

Work stoppages due to labor disputes represent an additional institutional
influence measured by Denison. Fluctuations from year to year were minor, so there was no contribution to growth from this source for the 1948-69 period.

Denison's categories do not fit neatly into our categories, but there is enough correspondence to hazard the following opinion: The five theoretical bases for growth each contributed something to growth during the post-World War II period. Accumulation of resources (mostly labor and capital) may have been the major contributor. New technology appears to be a strong determinant, even though Denison's residual estimate may be an overstatement reflecting understatement of the contribution of other bases. Demand, space, and institutions were not so clearly measured by Denison and, although their contributions to growth were positive, they did not appear to be as important as resources and technology. Were a more deliberate accounting of these three bases attempted, each would likely show a positive contribution, yet rank well below resources and technology in empirical importance.

Analytical Models with Two or More Bases

Several economic models rely on at least two analytical bases for growth and may therefore be classified as efforts toward a systems approach. Empirical applications of systems analysis to economic growth are apparently more common abroad than in the United States. Many of the applications are to underdeveloped countries; a summary of balanced regional and sectoral growth models used in one developed economy is found in Andersson and Jungen [1971].

All the models discussed below incorporate endogenously increasing resource availabilities as a basis for growth. Each incorporates, as well, either expanding markets or increasing productivity; some include both. It was rare to find explicit inclusion of spatial relationships or institutional arrangements.

The section below includes only one or two examples of each combination of bases this reviewer found in the literature. This section of the review, consequently, is brief and illustrative. It does not systematically canvass the empirical literature. However, this is not to imply that what appears below is only the tip of an iceberg—there is no iceberg. That is to say, only a small proportion of the empirical analyses of the growth process are modeled in a way that can compare the importance of several bases of growth.

Examination of these models suggests that perhaps there is good reason for not treating all possible bases for growth evenly in a single model: a model designed to examine explicitly certain bases might, in its very design, preclude examination of others. For example, a perfectly competitive equilibrium model designed to examine the roles of resource availabilities and advancing technology might be incompatible with a monopolistic model designed to
examine the roles of expanding markets or conquering space. A model designed to find the efficient means to work toward given community ends might be incompatible with a model to explain cyclical processes of birth, growth, decay, death, and rebirth. And a cyclical model might be incompatible with a model designed to examine the one-way, unpredictable unfolding of the institutional processes.

Relatively few systematic long-run growth models are found in the literature compared to the number of short-run price and quantity equilibrium models. Perhaps this is because the long-run problem is more difficult to conceptualize. Furthermore, the long-run growth problem involves more non-measurable factors that must be accounted for, factors like regional changes in the quality of life and in institutional arrangements, which are not amenable to modeling methods.

Resource availabilities and advancing technology are the bases for growth in a model of the Dominican Republic (Billingsley and Nowell [1971]). The resources considered are population and capital. These are the two bases emphasized in the classical framework; numerous examples of models relying on this combination can be found.

Resource availabilities and expanding demand are the bases for growth in a simulation by Holland and Gillespie [1963] of an underdeveloped economy. The emphasis is on capital accumulation, but the model incorporates other resource availabilities such as minerals and population, and it responds to changes in aggregate demand. An increase in demand accelerated growth in output when the economy was not at capacity and induced inflation otherwise. A model of growth in Mexico (Goreux and Manne [1973]) incorporates the same two bases. The objective function in the Mexican multisector model of the macroeconomy maximized per capita consumption. Growth in that model depends on endogenous capital accumulation, exogenous labor supplies, and expanding opportunities to create foreign exchange. Models relying on both resources and markets as bases are comparatively rare; they present a conceptual difficulty of reconciling the classical with the Keynesian view.

Expanding markets, availability of resources, and advancing technology are bases for growth in models by Borts [1960; 1968b]; by Maki, Suttor, and Barnard [1966]; and by Golladay and Sandoval [1972]. Borts [1968b] assumed a single sector economy whose growth is explained by 15 equations. Resource availability depends on growth in the number of persons employed. Advance in technology increases the productivity of both labor and capital. Demand for exports is the source of net factor income on which accumulation of capital depends. Borts [1960] found demand for exports more important than resource availability or advancing technology in explaining regional variations in U.S. growth. Maki, Suttor, and Barnard [1966] simulated
changes in the income and product accounts for a regional economy wherein growth depends on increasing resource availabilities, increasing productivity, and expanding beyond local markets. Their model is quite sensitive to export markets as a source of growth when there is idle labor and capital. They found that increasing productivity of labor destroys job opportunities and reduces the aggregate level of income.

Golladay and Sandoval [1972] used a dynamic programming model which is sensitive to changes in demand, supply, and technology as sources of growth in New Mexico. They discovered that growth of the New Mexico economy is limited primarily by lack of effective demand for locally produced goods and relative scarcity of labor. They found expanding export markets to be a promising source of growth. And they examined strategies for adapting to the depressants on the economy, such as a loss of demand by defense industries and a decline in the availability of natural resources. Models relying on these three bases exhaust the easily measurable bases discussed in this review. Incorporating measures of space and institutions presents modeling problems beyond those of measures of resources, techniques, and markets.

Availability of resources, advancing technology, and spatial relationships are bases for growth in a model by D. M. Smith [1974], who added interregional flows of labor and capital to a standard, neoclassical growth model. Smith examined state economic growth in the United States and found that inclusion of spatial considerations improved the explanatory power of the neoclassical model.

The roles of resources, technology, and markets in the growth process are explicit in a systems dynamics model by N. B. Forrester [1972] of a 250-year cycle of national economic development. Institutional arrangements such as resource regulation, investment incentives, and population controls are shown in this study to be easily incorporated into the model. Spatial considerations are not modeled; when the phrase "migration of labor" is used it means movement in economic space, not geographic space.

Institutional arrangements and spatial relationships are considered in a model of the Nigerian economy (Byerlee and Halter [1974], Halter, Hayenga, and Manetsch [1970]); however, the stress is on resource availabilities as a basis for growth. Impacts of changes in technology on the pattern of growth are studied. Expanding markets for local products are not explicitly considered as an endogenous basis for growth. Spatial relationships are incorporated in the sense that this is a multiregional model; each region is represented as a point in space. Institutional arrangements relate to policies which change economic structures and prices. This model of a developing economy emphasizes agriculture which has "been the major source of past economic growth" (Halter, Hayenga, and Manetsch [1970, p. 225]). The nonfarm population is
endogenous and depends on agriculture, but nonfarm income is exogenous. A recent and more complex version of this model is applied to the Korean economy (Rossmiller [1978]).

Treyz, Friedlander, and Stevens [1977] reported on a regional policy simulation model which combines neoclassical ideas about equilibrium in the factor markets with macroeconomic concepts of base theory and input-output in the product markets. Technology can be changed exogenously; endogenous adjustments of resource allocation to factor price are considered. The labor supply is linked to wages and migration. Classical location theory provides comparative cost analysis among regions. Institutional changes examined are those associated with tax policies.

Obermiller et al. [1975] and White et al. [1975] reported on a development model which computes competitive equilibrium annually among varying resource constraints for land, labor, and capital, demand relationships for domestic and export use, and economic structure. People are located in space accordingly as they are farm, rural nonfarm, or urban residents; they migrate in response to endogenous incentives. Institutional considerations include attention to market structure and to the delivery of public goods such as education, health, and research.

The review of analytic systems models of growth illustrates that each of the five analytic bases for growth is amenable to modeling. A number of models contain several bases; few contain all. These models were not designed to test the relative importance of alternative bases for growth. Further, it is impossible to draw reliable comparisons from these models because the importance of a particular basis in a given model is more likely to reflect bias in conceptualization of the model than actual importance of the basis. Hence no conclusion about relative importance is drawn here. One can, instead, draw conclusions about the relative frequency: expanding resource availabilities is almost always included; advancing technology and expanding markets are frequently included; and conquering space and building institutions are seldom included.

**Conclusion**

This review of selected post-World War II growth literature took a descriptive approach to its subject of bases for regional growth. That is, bases for growth were reviewed as they were found in the literature rather than as theorems deduced from a comprehensive theory. What it is that grows varied from one author to the next. Some treated spaceless economic systems and others economies with specific geographic locations. Some focused on economies that were open with respect to trade and others closed. Some were concerned
with urban systems and some rural. Some dealt with less developed countries and some with more developed. Despite the disparate views, some clear threads emerged from which to weave a theory of economic growth.

Some of the literature described historical growth over time and space without reference to analytical bases which could be considered causal. Five analytical bases for regional growth were found. These were associated with increasing resource availabilities, advancing technology, expanding markets, conquering space, and building institutions. A synthesis of two or more bases for growth into an explanation of regional change was considered a systems approach in this review.

Descriptive Statements

A number of descriptive studies were found which discuss, measure, forecast, and project economic growth without incorporating any of the five analytic bases. Such studies do not explain or analyze growth processes. Rather, they describe past or projected changes over time or space. When such methods are used to describe alternative futures, they assume answers to questions about how a region grows rather than seek answers.

Policy implications of these descriptive methods lie in their efficacy for providing policy makers with a sense of the economic history of a region and of the implications if recent trends continue. These methods help define the nature and extent of regional growth problems. The limitation of these methods is that they do not explain why the problems persist or how policies can be formed in order to intervene to redirect the growth process toward social goals.

Increasing Resource Availabilities

Neoclassical economic theory emphasizes increasing resource availabilities, particularly capital, as a basis for growth. Other resources, including land, labor, and human capital, receive emphasis from certain growth authors. This basis is almost always incorporated in empirical models that draw upon two or more bases, and is regarded with high relative frequency as the sole source of growth in both empirical and theoretical studies. Expanding resource availability appears to be particularly important as a basis for sustaining long-run growth. Empirical models and statistical tests of determinants of growth tend to justify the emphasis economists extend to this basis.

The policy implication of neoclassical growth theory is: to make a region grow, provide it with more resources. Aid to developing countries, and programs to promote growth in depressed areas, frequently emphasize capital as the key resource. For example, the model implicit in the U.S. Statutes [1972], Rural Development Act of 1972, is: outmigration would be stopped,
or even reversed, if more jobs were created; jobs are created if output is increased; output is increased if plant and equipment are expanded; plant and equipment are expanded if more capital is made available. Therefore, the program depends on loans and grants to stimulate public and private investment as a means of stopping outmigration or reversing the direction of population flow. Tax incentives and low interest guaranteed loans to plants locating in depressed areas are further examples of capital accumulation policies that reflect neoclassical principles of expanding resource availabilities as a basis for growth.

Advancing Technology

The emphasis of growth authors who are not economists is on technology and science as a basis for growth. This basis is also popular in the economic literature and probably ranks second to resource availabilities in emphasis given by economists. Empirical models and statistical tests of determinants of growth tend to support the emphasis placed on increasing resource productivity as a basis.

The policy implication of advancing technology as a basis for regional growth was illustrated during the past decade by extensive public and private efforts in the United States to invest in research and development, modernize plants in depressed areas, provide on-the-job training, reduce underemployment, and increase productivity. Technical assistance to plant managers increases productivity of resources. These policy efforts were abetted by federal programs to provide orientation, counseling, education, skill training, and other services to help qualify individuals for jobs.

Expanding Markets

Expanding local markets as well as markets for regional exports has been considered by many observers as the basis for regional growth. Classical theories of free trade and Keynesian theories of aggregate demand both use this approach. Increasing the demand for a region’s product as a basis for growth appears to be more important for short-run growth analysis than for the long run, unless the market change is rooted in a fundamental change in societal values. In the long run, if demand outruns supply, then supply, not demand, will limit growth. Demand is explicitly incorporated in a number of analytical models. In some of these studies, demand appears to be more important than the other bases; in others, less. The difference seems to be explained not by real fluctuations in the bases for growth but by fluctuations in the decisions of various researchers with respect to the specific model formulation and to measures of demand.

The policy implication of market expansion as a basis for growth is
illustrated by federal programs to increase or maintain exports abroad, and to limit imports. Many commodities benefiting from these programs are produced in rural areas. Increased government purchases or reduced taxes are frequently justified, at least in part, by their contribution to aggregate demand and to national growth. Government is a big spender; the geographic distribution of government expenditures has important consequences for regional variations in national growth. Programs for regional product promotion in the United States tend to be operated at the state or local level. Most regional programs for market expansion are operated by private firms and organizations rather than by the public sector.

Conquering Space

The emphasis of many regional economists is on spatial relationships as a basis for growth. This basis was virtually overlooked in the economic literature before World War II. Since then the literature on the subject has been extensive, yet the ideas concerning spatial relationships have not been fully incorporated into growth theory. Treatments of growth among alternative regions, with each region treated as a spatial point, are more common than treatments of physical space within a region, its effect on location of economic activity, and thereby its effect on regional growth. That is, many studies analyze changes in the population, income, and employment of a region, but they fail to produce maps showing where within each region these changes take place. Researchers who consider this basis important tend to formulate empirical models and measures which exclude other bases and thereby bias the results in favor of spatial analysis. On the other hand, empirical models and measures designed without spatial relationships in view tend to incorporate conceptual biases which ensure that space will appear to have no influence on growth.

The policy implications of conquering space as a basis for regional growth include the heavy emphasis on federal programs to enhance transportation. These programs have had considerable impact on regional variations in growth in the United States. Interstate highways have frequently been cited as an example, but other spatial programs relate to air, rail, and water transportation. Highway development policies have been associated with the rapid suburbanization of major cities and with concurrent depopulation of both the central cities and the more distant countryside. Spatial considerations have led to regionalization of a number of federal programs. The regional distribution of population and of access to central city services has become important in several federal programs. Information programs have been found to spur growth and at the same time to reduce geographic concentration.
Building Institutions

The emphasis of the post-World War II generation of institutionally oriented economists is on the importance of organized group action toward accepted goals as a basis for growth. As with studies of spatial relations, there is a tendency for empirical measures and studies that find institutional arrangements important to be conceptualized in a manner that emphasizes this result. Those which are conceptually designed without tests of institutions as an objective tend to play down or omit explicit examination of the role of institutional change in economic growth.

Situations in which purposive institution building may be required to achieve desired economic development include those involving dissatisfaction with the current economic situation and outlook, diverging economic trends, monopoly, uncertainty, market failure, and conflict.

Policy implications for institution building as a basis for regional growth may be classed into two groups: those that facilitate the other bases for growth discussed above and those that serve vital economic functions independently of the other bases for growth. Examples in the former category include financial institutions to expand resource availability, manpower training institutions to advance productivity, news services to expand markets, and zoning regulations to control the conquest of space.

Examples in the latter category include institutions for regional planning, identification of local leadership, and establishment and valuation of local ends. These institutions promote multicounty organizations and employ local coordinators to work with lay leaders in establishing priority needs and carrying out plans for community development. There is an emphasis on institution building to provide for the delivery of public goods, such as health and education services, to depressed areas.

Systems Approach

A number of books and a few articles were found which explicitly referred to all five analytic bases for growth. When this occurred, there was a tendency for the authors to emphasize one basis as the key to growth, with the other four playing relatively less important roles in the resulting growth process. Different authors emphasized different bases.

Empirical studies that incorporated two or more bases on an equal footing were treated in this review as steps toward a systems approach. In all studies examined with two or more explicit bases, expanding resource availability was always included as one of them. Collectively, the various systems approaches reviewed included all five bases; individually, there were fewer
studies found with three bases than with two, and fewer with four than with three. Empirical studies explicitly including all five were rare.

This reviewer suspects that as the five analytic bases for growth continue to be incorporated in theoretical and empirical studies in a fashion which treats all with equal potential for explaining growth, it will be found that all five interact simultaneously in the growth process and that no single one will prove to be the exclusive basis for growth. If this conclusion is correct, it has implications for national and regional growth policy. One can go too far in seeking to explain everything in terms of everything else and find that the all-inclusive system explains nothing. But, at the other extreme, policies based on the assumption that a single one of the five factors is the sole basis for growth are doomed to failure because efforts to reach one specific target are likely to be accompanied by backsliding with respect to other, neglected targets. Growth policies need to be capable of moving on many fronts at once. And they need to be responsive to adjustments as they are applied in one time and place or another, accordingly as one basis for growth or another presents itself as the bottleneck.

References


THE BASES FOR REGIONAL GROWTH


Berrill, K. E., ed. [1964]. Economic Development with Special Reference to East Asia. New York: St. Martin’s Press.


The Bases for Regional Growth


Hoover, R. W., Jr. [1970]. *The Effect of the Financial Community’s Structure on the Commercial Bank’s Role as a Financier of Regional Growth.* University of Texas, Center for Economic Development.


Janssen, L. L., and P. H. Gessaman [1975]. *Businessmen's Funding Sources, Use of Credit, and Assessment of Credit System Adequacy in Two Regions of Rural Nebraska.* University of Nebraska, Department of Agricultural Economics, Report No. 65.


Kolb, J. H., and E. de S. Brunner [1933]. "Rural Life." In Recent Social Trends in the
THE BASES FOR REGIONAL GROWTH


CLARK EDWARDS


Milliman, J. W. [1971]. "Large Scale Models for Forecasting Regional Economic


—— [1959]. "Agriculture in Regional Economic Growth." J. Farm Econ. 41:943-951.
——— [1974]. “Patterns of Regional Economic Growth.” Regional and Urban Econ. 4:77-105.


President’s National Advisory Commission on Rural Poverty [1967]. The People Left Behind. Washington.


—— [1968]. *Growth Stage Theories, Dual Economy Models, and Agricultural Development Policy*. J. S. McLean Visiting Professor Lecture, University of Guelph, Department of Agricultural Economics.


--- [1972b]. The Role of Capital and Credit Markets in Regional Development: Problems and Issues. University of Minnesota, Department of Agricultural Economics, Staff Paper P72-27.


Taylor, H. C. [1911]. *The Place of Economics in Agricultural Education and Research.* University of Wisconsin, Agricultural Experiment Station, Research Bulletin No. 16.


Tweeden, L. G. [1968]. *Rural Poverty: Incidences, Causes, and Cures.* Oklahoma State University, Department of Agricultural Economics, Processed Series P.590R.


U.S. National Resources Planning Board [1942]. *Industrial Location and National Resources.*


THE BASES FOR REGIONAL GROWTH


[1946a]. "Location of Industry and Regional Patterns of Business Cycle Behavior." Econometrica 14:37-68.


The authors wish to acknowledge with deep appreciation the assistance of a number of reviewers—including Walt Butcher (Washington State), James MacMillan (University of Manitoba), Wilbur Maki (University of Minnesota), and Alan Bird (USDA). Special thanks to Irving Hoch (Resources for the Future) for his very detailed review and his many excellent suggestions and to Lee Martin (University of Minnesota) for his contribution to the conceptualization of the paper as well as his painstaking editorial work. Their critical comments were immensely useful in the development of various drafts of the manuscript. The authors also wish to express their appreciation to Roger Beck, formerly Research Assistant at The Pennsylvania State University and currently Assistant Professor of Agricultural Economics at Rutgers University, for his assistance in this endeavor. Responsibility for decisions made on the specific topics to be discussed, as well as any errors in judgment and facts, remains with the authors.

This review was authorized for publication as paper number 4618 in the journal series of The Pennsylvania Agricultural Experiment Station.

J. D. J.
H. B. G.
J. P. M.
R. H. W.