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Regional Growth and Development Theory: Summary and Evaluation

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Abstract

Regional growth and development theory has undergone several periods of intense introspection and re-evaluation. After four decades of work in this area, there remains little consensus as to a generally accepted theory. In this paper, a review of the approaches will be provided, beginning with the neoclassical ideas and moving to the set of debates that appear to be of importance at the present time. These focus on the role of linkages and alternative forms of production space. Some new ideas are presented about the role of change in structure and the important role played in innovation diffusion and adoption.

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I. Introduction

Assume that an analyst was faced with the following problem. A nation was divided into n distinct, mutually exclusive and exhaustive regions; data were available for the major aggregates associated with macroeconomic accounting at the national level but, at least initially, the analyst was not provided with information at the regional levels. Drawing on received theory, what could the analyst say about the expected patterns of growth and development at the regional level? Essentially, one is asking the analyst a set of questions:

- how do regions grow?
- why do some grow more quickly than others while others decline?
- will regional growth and eventually measures of regional welfare all converge on the national values or diverge?

While these are eminently reasonable questions, a review of the available literature would suggest that there is little consensus on the process of change and the expected outcomes and that the empirical evidence is often inconclusive or just unavailable.

In the final analysis, the major question of concern revolves around the expectation that levels of welfare among the region, no matter how measured, will either converge on or diverge from the national average. Of course, more recent work in dynamic theory suggests that the patterns themselves (whether of divergence or convergence) may have some cyclical component; these findings cast suspicion on the acceptability of any equilibrium criterion. However, it should also be stated that many of the recent theoretical contributions have yet to be subjected to extensive empirical validation.

One feature that is quite prominent throughout the regional growth and development literature is the heavy intellectual debt owed to macroeconomic growth and development theory, international trade theory and behavioral relationships among macro and micro variables. A distinctive, quintessential regional theory has yet to emerge although reliance on mainstream economics appears to be weakening over time.

In the next section, the tour through the literature will begin with the neoclassical approaches; thereafter, some of the more recent perspectives will be reviewed. The roles of linkages and interaction and the problem of causation will provide the focus for the next section. The question of space will be addressed very briefly before some concluding comments are provided.

II. Neoclassical Theory[1]

The problems stated in the first section present an attractive challenge to the analyst stepped in the neoclassical paradigm. However, as Isard (1956) pointed out so eloquently, the "Anglo-Saxon bias" characterizing the foundations of modern economic theory precluded any direct and easy translation to a real world in which space had dimension and distance represented a real obstacle to overcome. Furthermore, this bias reflected itself in the lack of awareness of some of the important work being undertaken in languages other than English by scholars such as Palender, Predohl, Weber, Von Thunen. In the beginnings of regional theory, most closely associated with the work of Olsen (1971), Borts and Stein (1964) and later with Siebert (1969), real space was transformed into the physical complement of homo economicus. It was rational (i.e., uniform), with no barriers to entry; transportation costs were assumed to be either negligible or a simple function of distance. Factors were able to move between parts of the space, i.e., between regions, freely and without incurring transaction costs. In equilibrium, factor equality would be achieved across space with all factors paid their marginal products.

The neoclassicists begin with a standard production function:

$$Y_r = f_r\,[K,L,t]$$

where Y is gross regional product in region r, and K and L are levels of labor and capital respectively. The final argument is technical progress, an amalgam of effects that combine to improve the efficiency of the stock of resources within the region. Growth in the system is assumed to be full-capacity growth; the interest rate serves as the mechanism to equate investment and savings. Within the national system, regions can grow at different rates (in terms of population and rates of progress). Adjustments take place in the capital/output ratio. Although there is a global equilibrium in the savings/investments relations, there is no restriction that this should occur at the regional level. For example, the higher the region's growth rate, the more likely it will be to import capital. Since capital and labor are assumed to be perfectly mobile, and that each region produces homogeneous outputs, one would expect that capital will flow from high to low wage regions and labor will flow in the opposite direction until factor returns are equal. Hence, the long run effect will be for low wage regions to grow faster; the influx of new capital will raise wages but begin to decrease the marginal product of capital that was initially higher than in the high wage regions. Eventually, convergence will take place.

Criticism of the neo-classical model can be provided from any number of perspectives; perhaps, though, the assumption of perfect mobility of factors (and the implicit assumption of omniscience on the part of those factors--e., they have perfect information) creates the most difficulty. Notion of inertia, lumpiness of capital, the interindustrial and interregional linkages that characterize modern production systems all serve to dampen the transfer of the theory to reality.

The Harrod-Domar model, on the other hand, would predict that with initial differences in regional growth rates, divergence in levels of welfare between regions will occur. The model examines rates of growth in output and capital; the rate of growth for population (and hence, labor) is assumed to be constant. Trade among regions is considered explicitly with the result that steady growth in a single region would alter the interregional flows of labor and capital elsewhere in the system. In this model, a steady-state path of growth would be unlikely; regions with higher propensities to save and lower capital-output ratios will grow faster. Their growth rates will, in turn, attract inmigration and further the growth processes, further enhancing the separation in levels of welfare between regions.

In the context of the known real world, such theories are easy targets for criticism (see for example, Clark et al. 1987); however, as a theory, it does provide important insights into the potential functioning of markets in a world in which physical distance is an important concern. However, the nature of this distance impact--i.e., its embodied characteristics--precludes a simple translation of space into a transport surface in which costs are purely a function of length of travel. The costs of overcoming space involve time as well as real monetary outlays; they are further tempered by the nature and volume of the good being transported (including the possibility that the good might be individuals), the direction travelled, the final distance, and so forth.

Other authors, such as Thirlwall (1974), have argued that regions should be treated no differently than nations. With the exception of some functions (such as the ability to issue currency), they behave very much the same way as nations. Accordingly, Thirlwall argues, many regional problems are really balance of payments problems. If we believe that regions behave in a similar fashion to nations, then we might find Thirlwall's arguments persuasive. Essentially, he argues that in line with national development problems, the problems of regional adjustment stem from an inability to handle balance of payments crises. With no ability to regulate exchange rates through devaluation/revaluation, what options are open to regional governments? In the US--modest taxation policy; industrial incentives (to lower costs of production and thus provide an analogous response to devaluation at the national level), export promotion plans, industrial targeting (usually focused on import substitution). However, it is not clear whether initiatives undertaken by the states have created significant impacts in comparison to the effects generated by the differential, spatial expenditures by the federal government. In particular, the role of defense spending in the 1980s has significantly altered the economic structure and nature of the growth processes in many states.

More Recent Perspectives

The neoclassical theories and the policy prescriptions derived therefrom have been subject to a barrage of criticism. This "assault" might be summarized as coming from structuralist/Marxist perspectives, regional adjustment theorists and, most recently, from those proposing notions of new production spaces. The movement of production away from a system of individually-owned plants producing single products for geographically limited markets to one characterized by multiregional and multinational enterprises has further dampened the enthusiasm for neoclassical vision of regional growth and development. The structuralists (see Massey and Meegan (1982), Holland 1976a,b) focus attention on imbalances in accumulation between factors (labor and capital) and over space (between one region and another or between countries). Exploitation of labor inevitably results in concentration of wealth; it is not entirely clear whether this will always result in spatial concentration, although the empirical evidence used in support of these approaches usually documents the existence of a classic "north-south" problem. It should also be mentioned that the structuralist approaches tend to be as critical of those analysts using models (such as economic base or input-output) as they are of the neoclassical theorists.

Although critical of this body of theory, Clark et al (1986) have suggested that firms (and hence regions) are in a state of continuous adjustment since the environment in which they are operating is constantly, and not necessarily uniformly, changing. The net effect of this is to introduce uncertainty into the calculus of decision-making, thereby creating opportunities for investment and marketing decisions that will turn out to be sub-optimal. While the idea is intuitively appealing, the development of the theory and attendant empirical evidence has lagged behind.

Scott (1988) has recently provided what may be termed a mediated position between the strict tenets of the neoclassical vision of change and the more critical structuralist claims. His suggestion of "flexible production spaces" provides an attractive vehicle for examining the dynamics of change within urban and regional economies. Essentially, he focuses on the fact that firms in the latter part of the twentieth century have a much greater flexibility to (a) choose production processes and (b) choose the location of suppliers. Given the rapidly with which many products move through a product cycle, there is little guarantee any longer that new products will be produced in the same location and with the same set of suppliers. This summary sketch of Scoot's ideas does not provide a complete picture of the approach; however, from the perspective of this paper, it does suggest a number of important dimensions. First, attention on the firm or industry is probably more critical than before, essentially because the dynamics of change within a regions may not be evident from an examination of gross, macro-level statistics. Secondly, the nature of change in one region at one point in time may provide a very imperfect guide to future activities; the flexibility alluded to earlier suggests that firms can search a global market for sites and inputs that will yield higher returns on investment. The ephemeral nature of the nonmetropolitan expansion heralded in the 1970s suggests that rapid movements through the product cycle have the capability of disequilibriating growth patterns. Thirdly, Scott's evidence suggests that even though growth may be occurring in small firms, large firms exact a very important role in setting demand for products and providing many important inputs. If anything, in the last twenty years, the nature of interdependence in the economy has increased rather than decreased. This has been accomplished through extensive vertical disintegration; in some cases, the linked firms in the production chain have been scattered throughout the globe. In other cases, strong agglomeration economies, such as those associated with the just-in-time production system, have created industrial complexes within regions.

Recent work by regional analysts, such as Dendrinos and Mullaly (1981) and Dendrinos and Haag (1984), especially in the application of nonlinear urban dynamics suggests that some of the processes identified by Scott (1988) could be conceived within a different paradigm. For example, drawing upon chaos theory, one might consider regions as "strange attractors" in an economic sense, around which and through which gyrate a complex of interdependent flows within the social accounting production space. While the aggregate effect of different inputs into the system (defense contracts, export demands, new firms creation) may yield similar changes in the levels of key variables, the paths through which these changes move will be different, generating differences in distributions across space and sectors.

What is not clear from these new perspectives is the issue of regional convergence or divergence; since most of the analyses have been short run in nature, it may be premature to expect commitments to the longer-term outlook for regions within a national economy. The changing nature of production creates options for once lagging regions to grow more rapidly; whether they will or not still depends on many classical factors of location decision-making. In the next section, some of these more traditional approaches will be examined.

Linkages, Interaction, Causation

Regional analysts have long had an interest in the role of linkages: the early statement on location theory were very much concerned with the ability of firms to assemble inputs, produce and market goods within a cost-minimizing or profit-maximizing environment. This interest has manifested itself in the construction of regional models that focus on the essential interdependence of activities within regional economies.

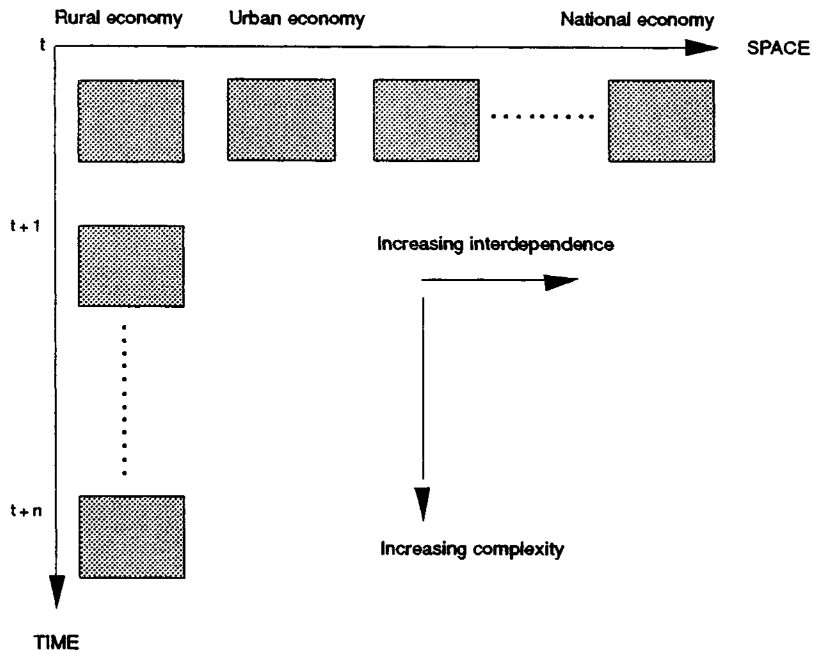
Perhaps the best known theory that focuses on linkages was proposed by Perroux (1955); his notion of "poles de croissance" or growth poles captured the essential interdependence within economic systems. Economies were assumed to grow as a result of the propulsive forces created by key sectors--sectors with strong backward and forward linkages. These linkages generated impulses throughout the economy, creating industrial demand and, through payments of wages and salaries, consumption demand. A parallel concept, the growth center, may be thought of as the spatial analog to the growth pole idea. Growth centers were regions/metropolitan areas in which there was assumed to exist a strong degree of interaction among sectors. Hence, the multiplier and accelerator effects of classical growth models were assumed to be concentrated in space. Closely allied with these ideas are the circular and cumulative causation theories of Myrdal (1957) and the work of Rasmussen

(1952) and Hirschman (1958). Myrdal envisioned growth as a self-perpetuating mechanism whereby additions to output generate attractions for more investment and so forth. Pred translated this idea into a theory of metropolitan growth; Thompson (1965) introduced the notion of a ratchet effect, a level of size that assured continued growth within a region or urban economy. Hirschman and Rasmussen both provided important ideas about the role of key sectors within economies. However, the empirical evaluation of these concepts has provided the source of a great deal of debate (see Hewings, 1982) much of which has centered on the problems of consistent identification of key sectors and the associated issue of whether such key sectors identified from input-output models of the economy produced in the past provide accurate guidance for development potential.

Taken as a whole, these contributions have been important essentially because they have focused on the structure of the economy. In terms of convergence/divergence, there would appear to be suggestions that regions would tend to diverge, the divergence emanating from the properties of the cumulative causation that attracted growth in the first place. In the 1960s and 1970s, there was a great deal of interest in promotion regional development based on the creation of growth centers; however, many policy-makers felt that the process was akin to ordination--one simply anointed a regional economy as a growth center and waited for growth to occur. Needless to say, most of the results were disappointing! This is not to suggest that linkages are unimportant, but rather that the process of creation of linkage patterns is very complex and not subject to the mere waving of a magic wand.

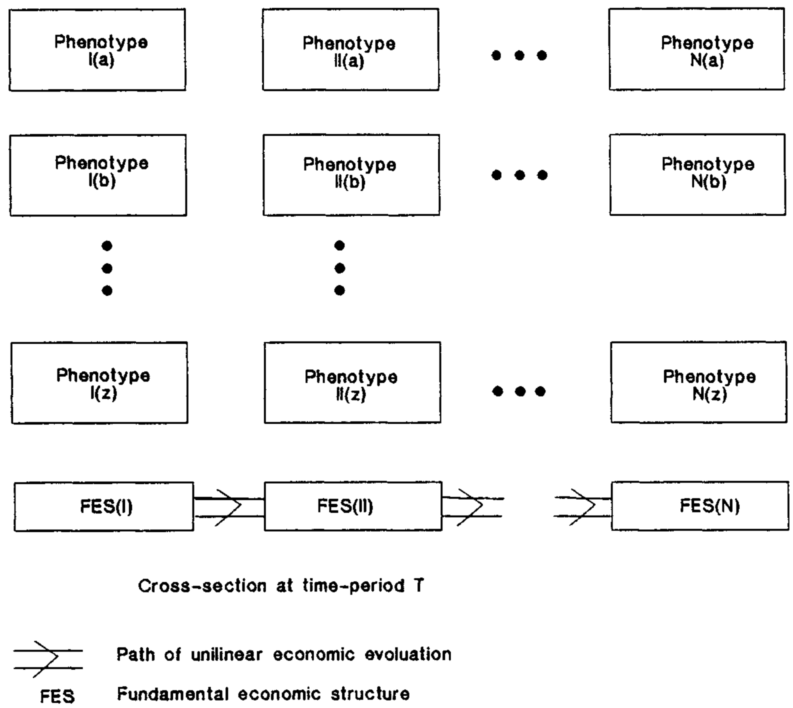
There has been a great deal of interest in trying to understand the dynamics of change within urban and regional economies in terms of the evolution of a set of linkages among the components of the economy. The various models, such as economic base, input-output and econometric, that have been developed at the regional level place heavy emphasis on a system that is demand driven and generates total impacts that are some multiple of the initial changes. The specification of this multiplier effect has been the source of considerable debate in the literature (see Hewings and Jensen, 1986; Richardson, 1985, Bolton, 1985 for reviews). Only a few authors have attempted to examine the nature of this interaction in terms of the stage of development characterizing the regional economy. Figure 1 provides a schematic space-time representation of the set of economies within a nation. What can we say about the expected paths of development through which these economies might be expected to pass? How will this movement be associated with the changing nature of interactions among industries, consumers, governments and other institutions? Can we expect some logical progression in the nature of the structure of the economy as we move from small, rural economies to those describing large, complex metropolitan/industrial systems? How will the nature of these economies, at different stages, vary over time?

Figure 1
Space-time representation of structure of economies



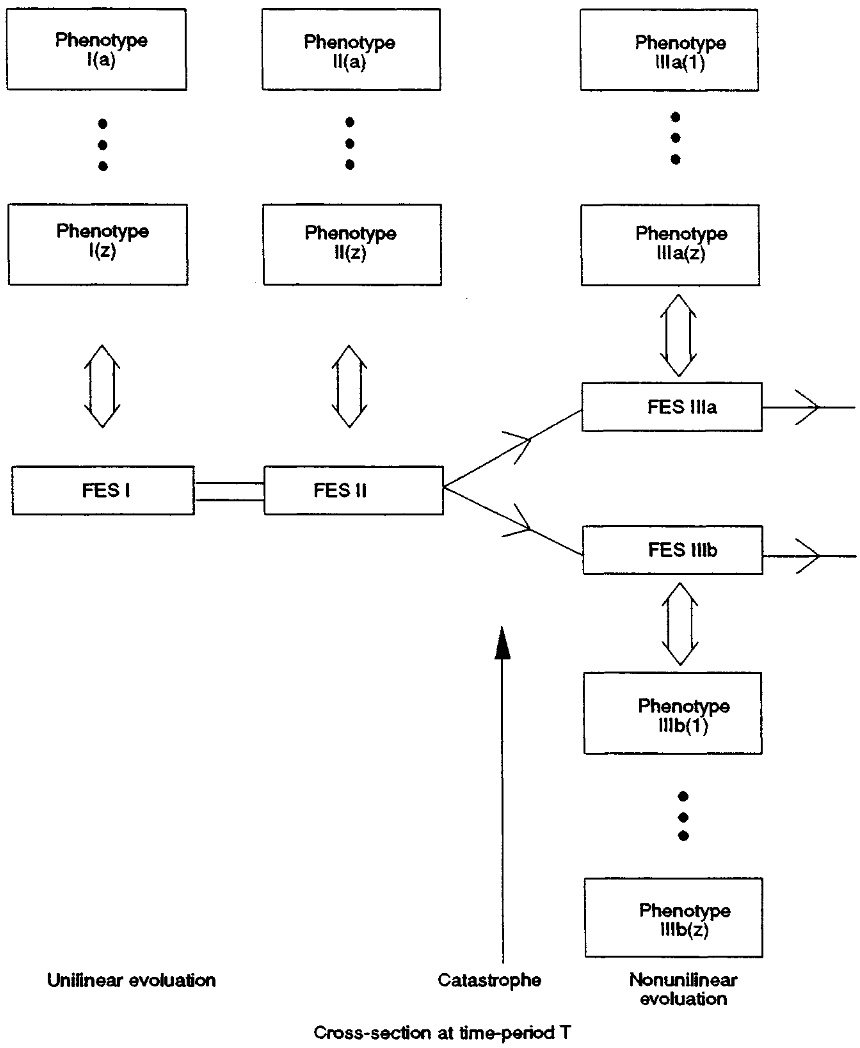
The received literature in regional analysis provides very little help in answering these questions; as shown on Figure 1, we are able to offer comments to the effect that increasing complexity and increasing connectedness are associated with movements across space and over time. However, there is a dearth of empirical evidence and the accumulated information is not enough to offer any comments as to the nature of change. Jensen et al. (1987) offer a hypothesis that the evolution might be unilinear and be characterized by the path shown in Figure 2. However, recent work in urban dynamics and catastrophe theory suggests that the evolutionary process is likely to be nonlinear with substantial discontinuities created by sharp changes in the external environment (i.e., oil shocks) or the introduction of radical new innovations in product and production process.

Figure 2
Unilinear evolution, fundamental economic structures and economies



Thompson (1965) offered a vision of regional growth and development that stressed the changing nature of linkages within the regional system. As the economy evolved, he suggested that the threshold levels where local demand would be feasible created discontinuities in development that would witness the process of import substitution of inputs formally purchased outside the region. Agglomeration economies and the ever-expanding local market would provide additional opportunities for new firms to locate in the region or for existing firms to expand. Thompson also stressed the key role played by induced income--the effects of spending from wages and salaries generated by export sales--even to the extent of suggesting that the economy may be in a position to begin exporting services originally located in the region to serve the local market. In fact, as Beyers (1989) has shown, the export of services from regions in some parts of the US is now as important and as extensive as the exports of manufactured goods. Figure 3 provides a version of the expected development path of a region in terms of structural complexity; the

Figure 3
Nonunilinear evolution, fundamental economic structures and economies

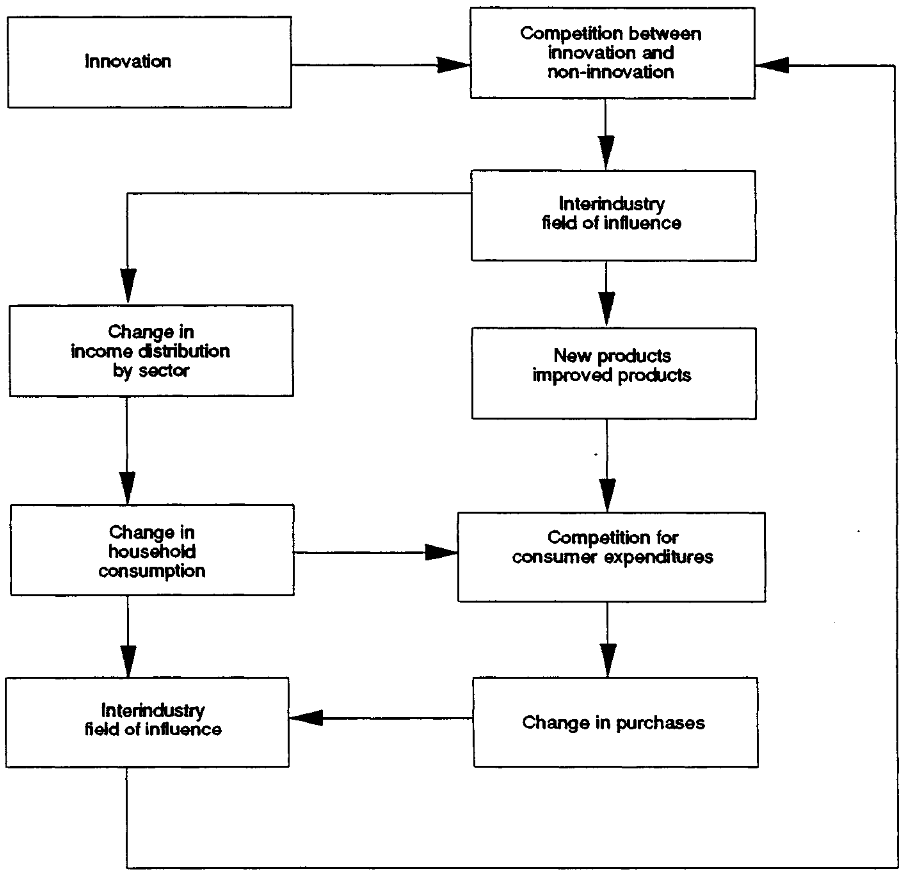


suggestion here is that the process is logistic with long periods of low and high levels of complexity and a relatively shorter period during which the region moves from the low to the high level. Recent work by Okazaki (1989) in Japan has introduced the notion of "hollowing out," a process of decreasing complexity in the structure of a regional economy. The processes of vertical disintegration noted by Scott (1988) may be considered to be a case in point wherein the production spaces of firms/industries expand beyond the confines of a single region's economy. Do these processes enhance or retard the convergence of regional welfare levels?

It is clear that, apart from the abortive attempt to generate artificial growth centers, the role of linkages and linkage development continues to play a key role in growth and development processes at the regional level. However, the major differences between the 1980s and earlier decades is the enhanced role of service activity and institutions. The earlier economic models of regional economies were very much dominated by the demand (= export) lead economic development theories derived from international trade theory. Exports were assumed to comprise mainly goods produced by manufacturing plants within the region; the service activity that existed was assumed to be supporting the functioning of the manufacturing exports. Little attention was paid to monetary flows and "invisibles"; to be fair, some authors, such as Blumenfeld (1955), suggested that the economic base theorists had got it all wrong--it was the nonbasic sector that provided the attraction for new firms and thus the basis for growth and development.

In attempting to assess the state of current thinking, several points emerge. First, the simplistic categorization of economies as manufacturing, service or resources based is probably misleading. Regions should be characterized by the nature and strengths of their internal and external interactions; as economies evolve, it is changes in this part of the system that are likely to create the major impacts. In a sense, one is arguing that the processes described by Scott are really processes of organization of production with the linkage pattern potentially undergoing substantial spatial shifts as new products and processes are introduced. Secondly, it is not clear whether regions can influence the nature of these changes through policies; as Glickman and Woodward (1989) have argued, there is some general suspicion about the zero-sum nature of industrial incentives programs, especially those offered to foreign firms interested in locating in the US. On the other hand, it is clear that regions do function as systems of interacting firms and that the more of this activity that can be encouraged to locate within the boundaries, ceteris paribus, the better off the regional economy will be in terms of income, employment, and other measures of welfare.

Figure 4
Innovation and the income-expenditure-industry system



However, there is one dimension of change that appears prominently in the regional science literature but rarely in the context of regional growth and development theory. The theory of innovation diffusion and adoption has provided substantial insights in the nature of change associated with the introduction of new products and the manner in which those products have been adopted by consumers or other firms. Rarely has this literature examined the indirect and induced effects of innovation diffusion (see Hewings et al. 1989). Figure 4 suggests a way in which the innovation process might be captured within the context of some of the formal models of regional economies (such as an input-output or econometric model). Figure 5 provides some speculation on the nature of changes of individual parameters and Figure 6 provides some possible ways in which change might be manifested within a set of interacting industries. The suggestion is made that innovation spread and its impact on changes in structure provide a useful explanatory mechanism for understanding the changing complexity of economies.

Figure 5
Qualitative description of redistributional dynamics (diagram numbers refer to text classifications)

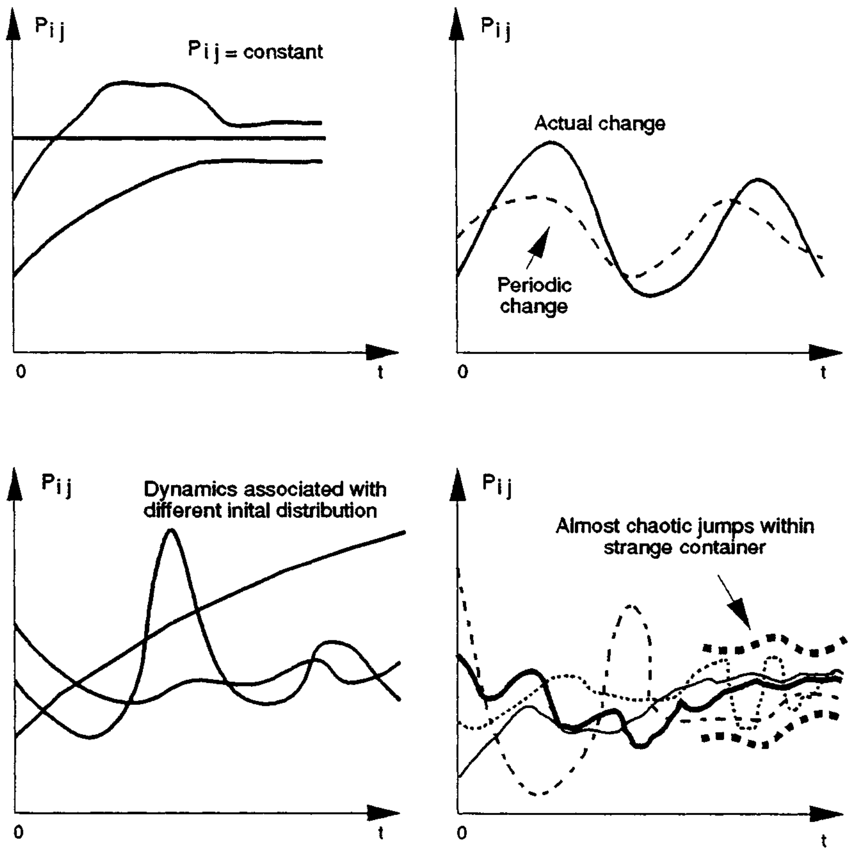
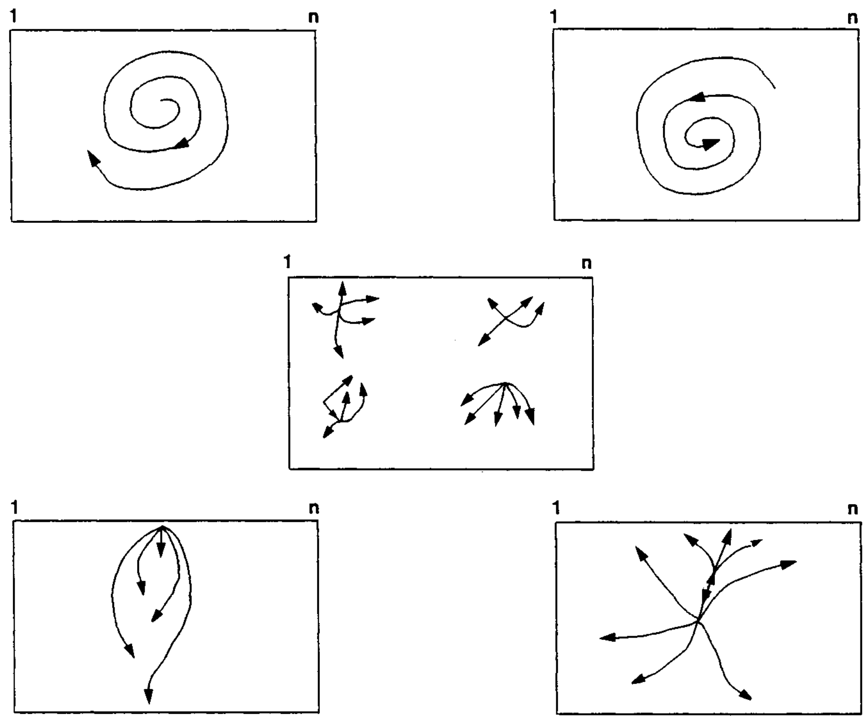


Figure 6
Types of diffusion of change in an input-output modelling framework



Does Space Matter?

Warntz (1967) in a provocative address to the Regional Science Association discussed the tyranny of space and its relationship to time. Many scholars remain skeptical about the importance of space in conditioning the growth and development paths of regional economies. Arguments are proposed to the effect that new developments in air travel and telecommunications have produced a "shrunken" world. Firms are now free to locate in a wider variety of locations than was the case two or three decades ago; in essence, to use Weber's (1929) distinctions, have more factor inputs become ubiquitous and therefor ceased to provide constraints on location? As with any generalization, there are whole truths and partial truths. There is no doubt that firms do have potentially greater locational flexibility than ever before; however, as the ubiquity of some resources increases and factor costs tend to equalize, greater attention is therefore transferred to those factor inputs whose prices still vary substantially over space. The most important would appear to be labor and the cost of capital. Small differences in labor costs can translate into substantial differences in unit costs and, with large production runs, into important differences in profit margins.

Barnes and Sheppard (1984) have recently begun to explore the application of Sraffa's (1973) ideas of switching and reswitching in a spatial context. In their vision, product, process and location are linked in a complex of decision-making with little expectation that new product demands will necessarily follow the same process of production in the same geographical locations.

The recent developments within the Chicago SMSA, especially firm migration to the suburbs, have created new problems for firms wishing to employ labor at the lower end of the skill spectrum. The processes here are suggestive of the findings of Amos (1988); he updated some of Williamson's (1965, 1977) work which lead to the hypothesis of an inverted 'u' shaped process of development by suggesting that macro-level convergences (such as that observed at the census region level in the United States) may be accompanied by increasing intra-regional disparities. When viewed at the metropolitan scale, this suggestion of divergence in access to jobs, income levels and welfare generally, would appear to be characteristic of a large number of metropolitan complexes.

Concluding Comments

The major work in regional growth and development theory was articulated in a world that was strictly hierarchical. Decisions were assumed to take place at the international level, then the national level and finally filter down to the regional and sub-regional levels. Accordingly, the view of development was essentially top-down. In recent years, two major developments appear to have created a need to challenge some of these ideas. The first finds regions and nations (other than the one in which the region is located) interacting and developing trade relationships directly. The second, and potentially more pervasive, is the development of major groupings of nations into economic communities such as the European Community, the US-Canada Free Trade Agreement, ASEAN and so forth.

What are the implications for regional development? In the United States, several states have begun to develop what is de facto a foreign trade policy; this has been manifested in the establishment of trading missions in several countries in Europe and Asia in an attempt to lure investment capital with the major goal of job creation. While Glickman and Woodward (1989) have been very critical of such "foreign smokestack chasing," the pressures for all states to enter the race has been intense, especially in the Midwest. The incentives packages offered to many of the firms have raised justifiable concerns about the wisdom of such actions, measured in terms of traditional cost-benefit appraisal criteria.[2]

The second development, multination trading alliances, is not new; however, what characterizes the present developments is the degree to which individual autonomy will be surrendered in some critical areas (like monetary policy). In the post 1992 European Community, the nature of regional development policy will be different; it is not clear whether similar criteria will be applied across all regions or whether there will be some attempt to differentially assist areas whose development indices are way out of line with the country in which they are located if not in terms of the EC as a whole. In North America, the much vaunted US-Canada FTA has begun to take shape. Initial estimates of the impacts suggest that in the US the benefits from Free Trade are likely to be small, even negligible. A more interesting question is the degree to which the FTA will hurt or help specific sectors and regions, especially in the Midwest and Northeast--the major US-Canada trading partners.

Scholars outside US, have been puzzled by the absence of a coordinated regional development policy. The role of the individual states has been much stronger than comparable roles for regions in other countries. The one arm of the federal government that was specifically involved with regional development, the Economic Development Administration, has been ineffective with continual threats for its elimination by successive Republican administrations. Changes in the pace of development over the next two decades are likely to reveal new spatial development configurations. The major concern in the Midwest will be the degree to which the optimism generated in the last half dozen years will be translated into a foundation for growth well into the next century. More generally, few scholars seem to be prepared to offer suggestions as to the likely paths of development in the next fifty years in terms of regional convergence or divergence. The changes of the last two decades have created some concern about venturing too far out on a limb with forecasts of such complex patterns of development.

Footnotes

[1]This section draws heavily on Richardson (1969, 1973); Borts and Stein (1964), Siebert (1969)

[2]In many cases, a cost-benefit analysis has not been undertaken but assertions have been made about the stream of benefits being positive. A great deal hinges on (1) number of indirect jobs created (which often depends on exchange rates (2) length of time firm stays in state and (3) degree to which the firm meets targets. The Volkswagen plant in New Scranton, Pennsylvania failed on all three counts (see Van Meter, 1989)

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