SPACE-TIME INTERACTIONS AND INTERREGIONAL GROWTH POLICIES

Sakari T. Jutila and William A. Muraco*

Introduction

A growing interest in the regional aspects of economic development characterizes much of the contemporary planning literature. Unfortunately, full implementation of spatial dynamic processes in the derivation of regional policy is constrained by an incomplete body of theoretical and empirical supporting literature. The extensive spatial diffusion and interaction literature, for example, has not always been adequately linked to the literature of economic development to permit the direct translation of regional development policies into directed geographically based diffusion processes. Concern for this problem was recently noted by Gauthier [10] when he stated that many perceive the relationship between economic development and spatial diffusion as a problem purely of communications. He suggests that a simplistic viewpoint of this type ignores the complex interactions that may result between economic policy and the role of diffusion agents, networks, and regional infrastructures.

The recent research of Hagerstrand and Kuklinski [12], Brown [5], and Brown and Lentnek [6] illustrates the emergence of a linkage between regional policy and diffusion theory. The preceding works are characterized by a shift in emphasis from the study of household adoptions to the evaluation of the actions of innovation propagators and their associated areal strategies. The initial findings of this research suggest that diffusions of economic changes must be examined at both a macro and meso spatial scale, and that the geographic configuration of regional interactions is related to whether the sources for the interactions are of a mononuclear or polynuclear orientation [8]. In addition, the rate and the geographic pattern of spatial interactions may be constrained by the availability of a supporting regional infrastructure. These constraints are most evident in the nature of investment capital and with distance related costs, such as, communications and utilities. The resulting interactions are often complex and deviate from the simplistic assumptions of a pure neighborhood or hierarchical household adoption flow [7].

A second aspect of the present interaction and diffusion literature is found in attempts to link spatial processes with regional systems. For example, the nature of the relationship between the settlement system and the orientation and flow of regional economic development changes has only recently been studied. The work of Berry [1], Pred [19], and Gould and Tornquist [11]

*Professor, Department of Operations Analysis and Associate Professor, Department of Geography, The University of Toledo, respectively.

attempt to define these relationships. This research represents a coalescence of urban systems theory within the context of an economic development transmission system. Initial empirical findings suggest that the hierarchical structure of the urban system provides a functional network through which innovation diffusions and interactions may be projected. Systems of cities in which a complete urban hierarchy is absent appear to inhibit the diffusion of innovation [2, 13]. These findings suggest that the spread of economic change should occur concurrently or be preceded by patterns of urban development. It is evident from these findings that it is through the functional linkages of the urban system that the necessary attractive and propulsive interactions between core areas and related lower order regions are facilitated.

Closely associated with the urban systems research is the operationally based literature of planned growth poles. Implementation of a growth pole strategy to a regional economy introduces a mechanism for both the transmission of economic impulses, as well as, a geographically localized economic stimulus. The literature on growth pole effects suggests that several complex interactions are operating in a regional growth system. The early works of Myrdal [18] and Hirschman [14] show that regional development and interactions patterns reflect geographic imbalances in growth rates and in the attraction of investment capital. The spatial translation of these processes result in uneven and often directionally biased attractive and propulsive interactions over the life cycles of associated regions. Current empirical studies of these processes verify the above dynamics and the stage in the life cycle when each is dominant: Boudeville[4], Friedmann[9], Robock [20], and Rodwin [21]. Stohr [23], for example, identifies five specific types of growth center interactions: (1) growth center locations in undeveloped resource frontier areas; (2) growth center locations in lagging peripheral regions; (3) growth center locations in intermediate zones between core regions; (4) growth center locations on the rural/urban fringe; and (5) growth center locations within the center of older growth cores. The regional interactions resulting from each of these strategies are dynamic and are related to national policy, stage in the regional life cycle, and the general level of economic development.

Objectives of the Study

A current limitation of the growth pole research is its reliance on generally descriptive static models. Exploratory theoretical research for growth pole impacts suggest that dynamic interaction between regions occur in both a temporal and spatial dimension, Isard and Liossatos [15], Jutila [17]. It is the contention of the authors that implementation of regional growth strategies requires a stronger linkage with this urban diffusion and interaction theoretical literature. This necessitates that a comprehensive understanding of functional interactions and their impacts on regional dynamics be established. The objective of the paper is to examine the theoretical aspects of these interactions and to define their economic impacts on the achievement of regional, social and economic growth objectives. In addition, shifts in the dominant interactions and their subsequent impacts over the life cycle of the recipient regions are isolated in the analysis.

Research Format

Two major growth center regional development strategies identified by Stohr, and their related interactions and implications are evaluated in the paper. The first strategy to be examined consists of an example of exploitive and cooperative interactions associated with the placement of a new urban growth center in a developing resource region. The second strategy to be examined is concerned with the interactions and resulting diffusion impacts of locating a growth center in a lagging or depressed peripheral area. The above strategies are studied according to criteria associated with orientation and intensity of investments, resource flow interactions, income differentials and growth rates. These criteria are viewed from a dichotomous locational perspective consisting of a developed, mature national core and its related, less advanced peripheral region.

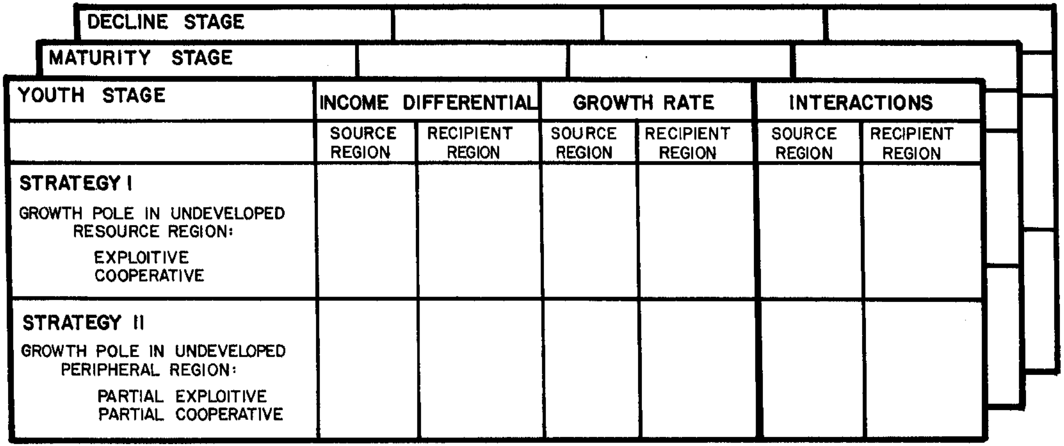
Figure 1 provides a diagrammatic representation of the research problem. It may be observed in the figure that the two strategies are examined in respect to their objectives for the two regions according to three regional life cycle stages: a youthful stage, characterized by growth and development, a mature stage in which the economy is at a steady state, and a declining stage in which the economy and the region's resource base undergoes shrinkage.

Incorporation of a temporal dimension in both strategies permits a more sensitive and comprehensive analysis of the shifts in the spatial dynamics and interactions that occur between the core and peripheral regions. Most researchers view life cycle changes in a regional economy from a historical stage perspective in which a continuum of events leads to expansion or a decline in the resource base Thompson [24], Jacobs [16], Borchert [3], and Siebert [22]. The early stages are generally reflective of an experimental period in which the base of the regional economy is developed. The maturity phase is seen as the fruition of the base and its associated linkages to supporting production and services. Technological shifts, exhaustion of the old resource base, changes in the marketing pattern, and an archaic physical plant most often are responsible for initiating the decline stage of the economy. It is important to emphasize that as each region undergoes these life cycle changes its relationships and interactions with other regions will change. Hence, its functional relationships in respect to investments, savings, resource flows, and income differentials will change with the stage of the life cycle.

It may be noted that the core region in itself may experience a life cycle Thompson [24]. In this case the interactions between the two life cycles and regional policy objectives would introduce additional dynamics into the nature of interactions. For example, Stohr's fifth strategy would be a case in point.' For the present paper, however, life cycle considerations will be limited to the recipient region with the assumption that the core region is in a viable mature and generally static stage of its life cycle.

The Interaction Model

The previous discussion is largely descriptive and fails to identify the ramifications of each policy and strategy on the space time dynamics of regional



RESEARCH FORMAT: STRATEGIES AND LIFE CYCLE

FIGURE I

interactions. In order to evaluate these dynamics a linear interaction model is derived.

A Linear Exponential Growth Model with Dislocations

Let us consider a system of n regions R_i, $i = 1,2,3,\ldots,n$. For each region there is a measure $y_i(\theta)$ of its total social or economic activity (including population, know-how, all relevant resources, etc.) defined as a value per annum flow function of time θ. It is decomposed to the components of final consumption $c_i(\theta)$ (including all consumption of capital, human resources, etc.), investment $i_i(\theta)$ as an activity saved from consumption for the rate of expansion of the social productive pool of resources $P_i(\theta)$, net export flow $e_i(\theta)$, and minus the net imports flow $m_i(\theta)$:

$$(1)\quad y_i(\theta) = c_i(\theta) + i_i(\theta) + e_i(\theta) - m_i(\theta)$$

This equation accounts for the conservation of the above mutually exclusive flows for each and all regions R_i, $i = 1,2,3,\ldots,n$. For these regions there is a respective linear production function relating the pool of its productive resources, $P_i(\theta)$, to its total flow of activity, $y_i(\theta)$ as follows:

$$(2)\quad y_i(\theta) = r_i P_i(\theta)$$

r_i is the real rate of return on the pool of productive assets, $P_i(\theta)$. Now, investment $i_i(\theta)$ by definition is

$$(3)\quad i_i(\theta) = dP_i(\theta)/d\theta = (1/r_i)\ dy_i(\theta)/d\theta$$

Consumption is assumed to be a fixed fraction b_i of $y_i(\theta)$:

$$(4)\quad c_i(\theta) = b_i y_i(\theta)$$

The interregional dynamic interaction model developed here is not a trade model, nor is it necessarily assumed that import-export flows (which now include also migration of people among all other resources) are "balanced". In a contrast, it will be assumed that regions can push, reject or spill over their resources into other regions, or that they can pull, attract or draw resources from other regions. If this is done, the exports from a region R_i into other regions would be positive if R_i is rejecting or pushing away its resources, and these exports would be negative if it was pulling or attracting resources from the other regions. Similarily, imports could be negative if other regions attract from the region R_i or positive if they push their resources into R_i. Let R_{ij} be the coefficient of rejection and A_{ij} the coefficient of attraction for the region R_i. Then the exports from R_i to the other regions are assumed to be of the following linear form:

$$(5)\quad e_i(\theta) = \sum_{\substack{j=1 \\ j\neq i}}^{n} (R_{ij} - A_{ij})\ y_i(\theta)$$

Thus, $e_i(\theta)$ depends solely on the level $y_i(\theta)$ of the activity in the region R_i. Similarily, and analogically, the imports are assumed to be of the form:

$$(6) \quad m_i(\theta) = \sum_{\substack{j=1 \\ j \neq i}}^{n} (R_{ji} - A_{ji})\, y_j(\theta)$$

If now $Y_i(s)$, $C_i(s)$, $I_i(s)$, $E_i(s)$ and $M_i(s)$ are the respective Laplace transforms of $y_i(\theta)$, $c_i(\theta)$, $i_i(\theta)$, $e_i(\theta)$ and $m_i(\theta)$, and if y_{oi} are the initial conditions for the activities of the regions R_i, $i = 1,2,3,\ldots,n$, then one obtains the following system of linear equations:

$$(7) \quad [s - r_i(1 - b_i - \sum_{\substack{j=1 \\ j \neq i}}^{n} (R_{ij} - A_{ij}))]Y_i(s) - r_i[\sum_{\substack{j=1 \\ j \neq i}}^{n} (R_{ji} - A_{ji})Y_j(s)] = y_{oi}$$

$$i = 1,2,3,\ldots,n$$

Dynamic Interactions Between Two Regions

The above model can now be applied to the case of two interacting regions R_1 and R_2. Let us define $A_1 = A_{12} - R_{12}$ and $A_2 = A_{21} - R_{21}$ as the net attractions by the region R_1 and R_2, respectively. It should be noted that if the net attraction is negative, it then represents rejection or push. If it is positive, there is an attraction or pull by the respective region. For two regions the system of equations is simply as follows:

$$(8) \quad \begin{bmatrix} s-r_1(1-b_1+A_1) & r_1 A_2 \\ r_2 A_1 & s-r_2(1-b_2+A_2) \end{bmatrix} \begin{bmatrix} Y_1(s) \\ Y_2(s) \end{bmatrix} = \begin{bmatrix} y_{o1} \\ y_{o2} \end{bmatrix}$$

This sytem of equations is easily solved for $Y_1(s)$ and $Y_2(s)$ whereafter $y_i(\theta)$ and $y_2(\theta)$ are obtained by taking the inverse Laplace transforms of $Y_1(s)$ and $Y_2(s)$, respectively.

Even in terms of this simple linearly exponential growth model it is possible to illustrate five major types of distinct interregional interactions, as shown in Table 1. These five major different types of interactions correspond to five respectively different dynamic processes for the two regions.

Piece-Wise Continuous Interregional Interactions with Impact Dislocations

Societal and economic processes are subject to impacts such as man-made or natural calamities, intentional policy and strategic changes, etc. Such dislocations are assumed here to occur at distinct points in time, possibly changing one or more of the behavioral system parameters r_1, r_2, b_1, b_2, A_1 and A_2. Since we assume such dislocations occur for a sequence of distinct points in time,

TABLE 1: Types of Interregional Interactions

Type of Interaction	Region R_1 as a Donor	Region R_2 as an Acceptor
Symmetric Push-Push	$A_1 = - A, A > 0$	$A_2 = - A, A > 0$
Symmetric Pull-Pull	$A_1 = + A$	$A_2 = + A$
R_1 pushes into R_2	$A_1 = - A$	$A_2 = 0$
R_2 pulls from R_1	$A_1 = 0$	$A_2 = + A$
R_1 pushes, R_2 pulls	$A_1 = - A$	$A_2 = + A$

there will be a piece-wise continuous process over time θ, where the social process for each time segment is linked to the previous and subsequent process by appropriate conservation principle. A catastrophe can incur losses and a windfall can generate gains. For such cases one can introduce an appropriate impulse correction. For the purpose of this presentation such corrections are not needed. Figure 2 illustrates the case of a piece-wise continuous process with the impact dislocations. Now each time segment $\theta_{k+1} - \theta_k$ is called the k^{th} time segment for which a specific set of parameters are assigned representing a stage of history of a process, and then one finds the respective behavioral solutions using Equation 8. Therefore, it is possible, for example, to portray a life-cycle of a region or an urban center. For each time segment one introduces the transformed time variable t such that

$$(9) \quad t = \theta - \theta_k \; ; \quad 0 \leq t \leq \theta_{k+1} - \theta_k$$

For a proper conservation of activity it is also assumed that the final conditions for $y_{ik}(t)$ of the previous time segment k equals to the initial conditions for $y_{ik+1}(t)$ of the subsequent time segment:

$$(10) \quad y_{ik}(\theta_{k+1} - \theta_k) = y_{ik+1}(0)$$

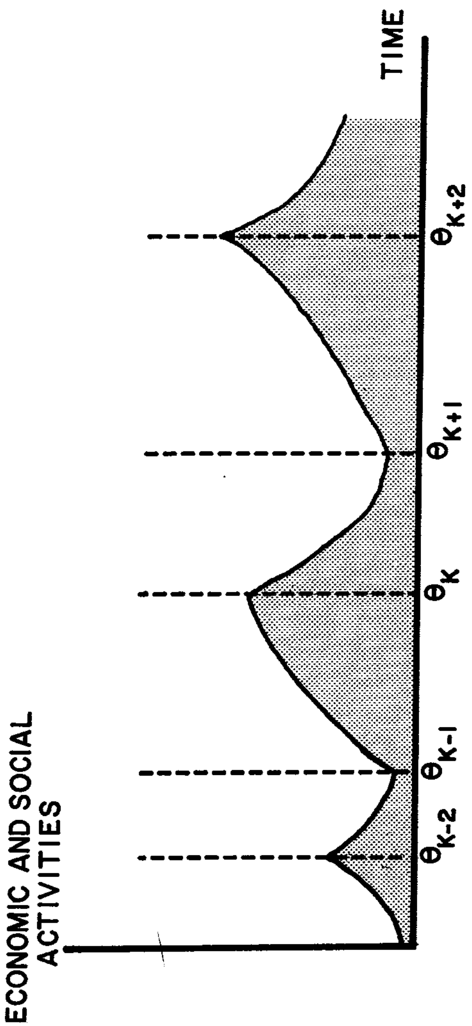
At this point an impulse correction could be added if needed, at the left hand side of Equation 2.

An Illustration of a History of a Region

Figure 3 illustrates a vintage model of a regional life cycle. This is a historic process with generation gaps and changing life styles. For each generation there is a specific interregional interaction at work shaping the overall life cycle of the region. In this case the derivative of $y(\theta)$ is piece-wise continuous. It should be clear now that the piece-wise continuous modeling approach with dislocations does allow an introduction of a historic sequence of institutional and interregional changes.

Space-Time Interactions and Interregional Growth Policies

An interregional growth policy may dictate the overall life cycle characteristics of the particular regions in a system of interacting regions. For such a policy a strategy would be a particularly feasible and realizable sequence of planned dislocations influencing the socio-economic development in the directions called for by the policy. Clearly, there could be numerous (infinitely many) different strategies to achieve the desired end results. Furthermore, the interregional setting may involve gaming between various regions or groups of regions. The gaming strategies can again be defined as sequences of planned dislocations. There can also be random man-made or natural catastrophes which require counteracting planned strategies in order to minimize the detrimental effects of these catastrophes on the welfare of the system of regions. Such counteracting strategies may again be defined in terms of a sequence of dislocations.



A PIECE-WISE CONTINUOUS PROCESS

FIGURE 2

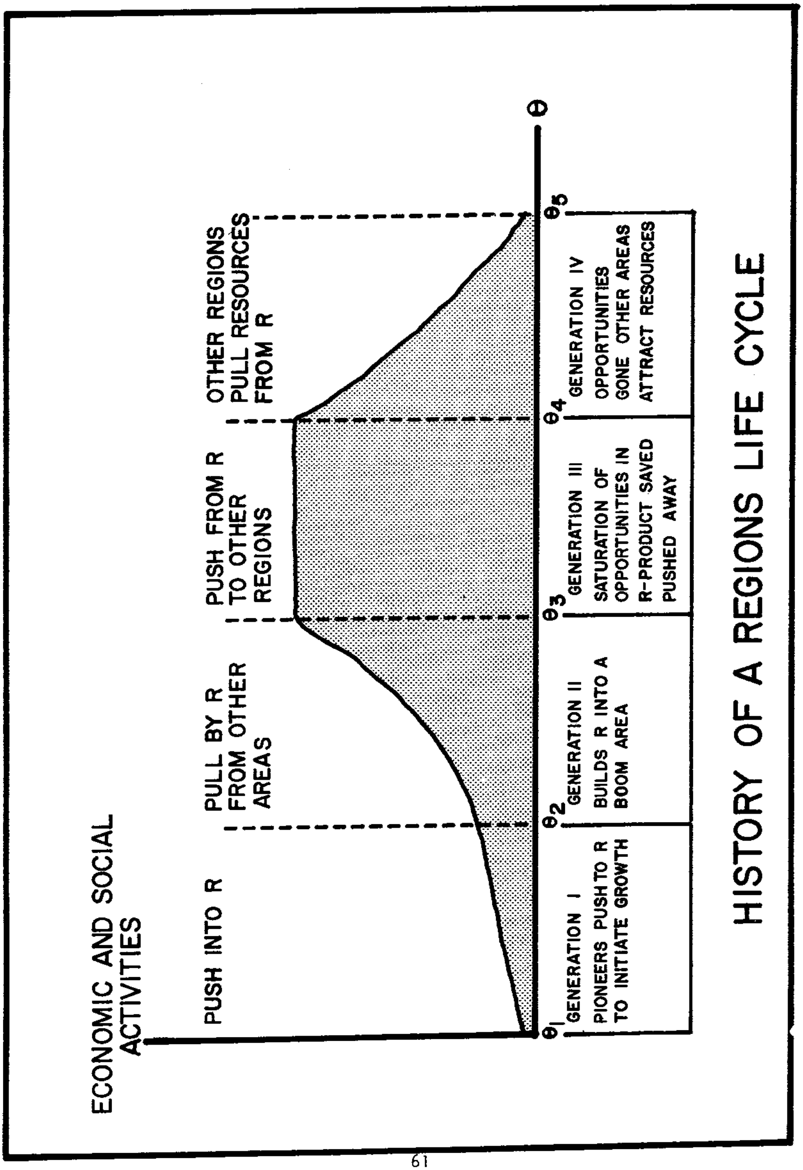

ECONOMIC AND SOCIAL ACTIVITIES
PUSH INTO R
PULL BY R FROM OTHER AREAS
PUSH FROM R TO OTHER REGIONS
OTHER REGIONS PULL RESOURCES FROM R
θ
θ1
θ2
θ3
θ4
θ5
GENERATION I PIONEERS PUSH TO R TO INITIATE GROWTH
GENERATION II BUILDS R INTO A BOOM AREA
GENERATION III SATURATION OF OPPORTUNITIES IN R-PRODUCT SAVED PUSHED AWAY
GENERATION IV OPPORTUNITIES GONE OTHER AREAS ATTRACT RESOURCES
HISTORY OF A REGIONS LIFE CYCLE

FIGURE 3

An Illustration of a Colonial Exploitation

Consider a parent region R_1 and its colonial region R_2. Let the parameters have the following values: $b_1 = b_2 = 0.8$; $r_2 = 2r_1 = 0.4$ per annum. Initially $y_1(0) = 1$ value unit per annum and $y_2(0) = 0$ value units per annum. The high real rate of return r_2 in comparison to r_1 arises from certain natural advantages. Now region R_1 wants to exploit the region R_2.

Segment 1: R_1 pushes resources into R_2 for a period of 25 years with $A_1 = -0.1$ while $A_2 = 0$:

$$\begin{bmatrix} s - 0.2(1-0.8-0.1) & 0 \\ -(0.4)(0.1) & s-0.4(1-0.8) \end{bmatrix} \begin{bmatrix} Y_1(s) \\ Y_2(s) \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

As t runs from 0 to 25 years, we have a solution as shown below:

$$y_1(t) = e^{0.02t} \quad ; \qquad y_2(t) = (2/3)[e^{0.08t} - e^{0.02t}]$$

The final conditions at the end of 25 years are:

$$y_1(25) = 1.6487 \; ; \qquad y_2(25) = 3.8269$$

The policy of R_1 was to initiate a development in R_2 and then benefit from this development. Suppose now that this policy also calls for an equal growth rate for both regions. If this is a policy objective, R_1 can pull just enough product saved from consumption from R_2 in order to make the growth rates equal. So for another 25 years we have time Segment 2:

Segment 2: R_1 pulls from R_2 with $A_1 = +0.13978$ with the initial conditions equal to the final conditions of the previous time segment:

$$\begin{bmatrix} s - 0.2(1-0.8+.13978) & 0 \\ +0.4(.13978) & s-0.4(1-0.8) \end{bmatrix} \begin{bmatrix} Y_1(s) \\ Y_2(s) \end{bmatrix} = \begin{bmatrix} 1.6487 \\ 3.8269 \end{bmatrix}$$

Again $A_2 = 0$. In this case the solutions for the time segment from 25 to 50 years are:

$$y_1(t) = 1.6487 \; e^{0.06796\,t} \; ; \qquad y_2(t) = 3.8269 \; e^{0.06796\,t}$$

Over this segment of time R_1 clearly exploits R_2 resulting in a reduction of the overall economic development of the system of the two regions. If for Segment 2 R_1 would have isolated itself from R_2, i.e., if $A_1 = A_2 = 0$, the solutions would have been as follows:

$$y_1(t) = 1.6487 \; e^{0.04\,t} \; ; \qquad y_2(t) = 3.8269 \; e^{0.08\,t}$$

This would have resulted in a higher total overall growth for the system of two regions, and there would have been no exploitation of R_2 by R_1.

R_1 could exploit R_2 even more severely than in the above equal growth rate case. For Segment 2 it could send its agents into R_2 to push all its savings into R_1, i.e., by letting $A_2 = -(1-b_2)$. In this case the solutions can be shown to be as follows:

$$y_1(t) = 5.4756 \ e^{0.04\ t} - 3.8269; \quad y_2(t) = 3.8269$$

For the overall system of regions this would have been the lowest welfare policy. The parent region would have drawn savings from a relatively high growth region to a relatively low growth region. Yet it represents a solution for a colonial exploiter who maintains a position of a growing relative power over its colony by suppressing the growth of this colony. It is clear that there exist a great number of possible exploitive or more or less cooperative policies for the two regions. In fact, it is possible to introduce a gaming situation between the two regions, where both players manipulate interregional interactions for their selfish gains.

If the growth rates of the two regions are equal, i.e., if $b_1 = b_2 = b$ and $r_1 = r_2 = r$, then the various interactions merely redistribute the overall economic activity between the two regions in respectively different ways over time, while for all the different interactions the sum total of the activities of the two regions remains conserved and the same. A life cycle example will now be given in a parametric form. Assume region R_1 is the parent region and region R_2 is the satellite region. R_1 is assumed to control the interactions by its agents either in R_1 or in R_2 or both. The initial conditions at the beginning of time Segment 1 are: $y_1(0) = 1$, $y_2(0) = 0$. Equation 8 and appropriate Laplace transform techniques are applied for each relevant time segment.

Segment 1. R_1 initiates the development of R_2 by pushing resources into it with $A_1 = -A$, $A_2 = 0$. For this case

$$y_1(t) = e^{(1-b-A)r\ t} \quad ; \qquad y_2(t) = [1 - e^{-Art}]\ e^{(1-b)rt}$$

This goes on for t from 0 to 1/Ar. At this point the final conditions are

$$y_1(1/Ar) = e^{(1/A)(1-b-A)}; \quad y_2(1/Ar) = (1/e)(e-1)e^{(1-b)/A}$$

Segment 2. From $\theta = 1/Ar$ onto $\theta = (1/Ar) + (1/r(1-b))$ or the stage 2 time t from 0 to $1/r(1-b)$ R_1 orders its agents in R_2 to push out of R_2 all product saved from consumption into R_1. Therefore, the activity in R_2 remains constant. In this case $A_1 = 0$ and $A_2 = -(1-b)$ and

$$y_1(t) = [e^{(1-b)/A}][e^{r(1-b)t} - (e-1)/e]$$

$$y_2(t) = (1/e)(e-1)e^{(1-b)/A}$$

Segment 3. At the time $\theta = (1/Ar) + (1/r(1-b))$ R_1 decides to pull out or attract from R_2 its resources into R_1. Now $A_1 = +A$ and $A_2 = 0$. In this case

$$y_1(t) = [e - (e-1)/e]e^{(1-b)/b} e^{r(1-b+A)t}$$

$$y_2(t) = [e - (e - (e-1)/e)e^{Art}]e^{(1-b)/b} e^{(1-b)rt}$$

At the time

$$t_o = (1/Ar) \ln[e^2/(e^2-e+1)]$$

$y_2(t_o)$ becomes zero. This is an endogenous dislocation due to the pull by R_1.

Segment 4: After Segment 3 terminates at $t = t_o$ or $\theta = (1/Ar)+(1/r(1-b)) + t_o$, $y_2(\theta)$ remains zero thereafter, and R_1 will grow for the t of this Segment 4 with the final value of y_1 for Segment 3 as its new Segment 4 initial condition:

$$y_1(t) = [(e^2-e+1)/e][e^2/(e^2-e+1)]^{(1-b+A)/A} e^{(1-b)/A} e^{r(1-b)t}$$

$$y_2(t) = 0$$

This then completes the life cycle of the region R_2 due to the manipulation of R_1. The important thing to note is that at all times the sum total of economic activity Y_T is conserved:

$$y_T(\theta) = y_1(\theta) + y_2(\theta) = e^{r(1-b)\theta}$$

In the sense of total welfare there has been no exploitation. However, from the point of view of a particular region, namely region R_2, there has been, indeed, exploitation by R_1. There has been correspondingly four distinct dislocation effects over the life cycle in the interregional dynamics. So to speak, R_1's strategy on R_2 has been characterized by these four distinct dislocations occurring at the respective points in time.

Cooperative Solutions for Interregional Economic Development

If we adhere to the case where $b_1 = b_2 = b$ and $r_1 = r_2 = r$ for both regions R_1 and R_2, and if R_1 is initially the parent region and R_2 its satellite with the respective initial conditions $y_1(0) = 1$ and $y_2(0) = 0$, then a reasonable criterion for an interregional economic development would be the elimination of regional disparities. In this second example the growth rates are already equal, so that this criterion would be automatically satisfied.

Stage 1: R_1 will push into R_2 to initiate an economic development there:

$$y_1(t) = e^{(1-b-A)r\,t} \quad ; \quad y_2(t) = [1-e^{-Art}]\, e^{(1-b)r\,t}$$

where $A_1 = -A$ and $A_2 = 0$. Now this process goes on until at some time t_o we have $y_1(t_o) = y_2(t_o)$. This condition is satisfied at the time

$$t = t_o = (1/Ar) \ln 2$$

Thereafter the regions R_1 and R_2 can grow either in isolation or with symmetric push-push or symmetric pull-pull interactions in order to keep up the inter-regional parity of economic development. The symmetric push-push or pull-pull conditions are sort of balanced trade conditions which could allow regional specialization in an interregional setting without disparities of levels of activities and growth rates. Clearly, it is possible to discuss several other types of cooperative criteria in multi-regional setting, but the above example will suffice for this presentation. Again, a cooperative strategy can be thought of as a sequence of dislocations in order to achieve common objectives in a desirable direction.

Comments on Piece-Wise Linear Dislocation Modeling

The illustrations used in the previous discussions of a piece-wise continuous dislocation modeling have been kept intentionally at the simplest level of a linearly exponential growth dynamic. This need not be a restriction. It could be utilized equally well in terms of a non-linear dynamics. However, the important point is that the method does bring into the economic modeling explicitly the notion of dislocations which may be either intentional or accidental. The approach introduces to the modeling process an element of catastrophe theory so badly needed in social system modeling. Historic studies do reveal the importance of sequences of social and institutional changes. There is no reason, for example, why the dislocation modeling method could not be applied to dialectic changes of a societal process over a course of history. A purpose of the technique is to get away from the overtly mechanistic notions of the neo-classical economic theory, and to bring in a stronger aspect of an institutional change. Interregional economic dynamics reflect, indeed, an inter-cultural political dynamics.

It should be noted that even the simplest linear dynamics introduced here provides already a rather rich variety of possible interregional interactions not so obvious from the traditional international trade models. In fact there are some indications that an excessive emphasis on a market mechanism at the expense of understanding social, political and cultural interaction forces has already caused serious misunderstanding of interregional social and economic development.

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