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Decision units and their interdependence. The explanations provided by spatial economic theory are ultimately in terms of the economic motivation and behavior of individual decision units and the ways in which their decisions react upon each other.

Hoover and Frank Giarratani 1 Introduction 1. Economic systems are dynamic entities, and the nature and consequences of changes that take place in these systems are of considerable importance. Such change affects the well-being of individuals and ultimately the social and political fabric of community and nation. As social beings, we cannot help but react to the changes we observe. For some people that reaction is quite passive; the economy changes, and they find that their immediate environment is somehow different, forcing adjustment to the new reality. For others, changes in the economic system represent a challenge; they seek to understand the nature of factors that have led to change and may, in light of that knowledge, adjust their own patterns of behavior or attempt to bring about change in the economic, political, and social systems in which they live and work. In this context, regional economics represents a framework within which the spatial character of economic systems may be understood. We seek to identify the factors governing the distribution of economic activity over space and to recognize that as this distribution changes, there will be important consequences for individuals and for communities. Where refers to location in relation to other economic activity; it involves questions of proximity, concentration, dispersion, and similarity or disparity of spatial patterns, and it can be discussed either in broad terms, such as among regions, or microgeographically, in terms of zones, neighborhoods, and sites. Regional economics is a relatively young branch of economics. Its late start exemplifies the regrettable tendency of formal professional disciplines to lose contact with one another and to neglect some important problem areas that require a mixture of approaches. Until fairly recently, traditional economists ignored the where question altogether, finding plenty of problems to occupy them without giving any spatial dimension to their analysis. Traditional geographers, though directly concerned with what is where, lacked any real technique of explanation in terms of human behavior and institutions to supply the why, and resorted to mere description and mapping. Traditional city planners, similarly limited, remained preoccupied with the physical and aesthetic aspects of idealized urban layouts. This unfortunate situation has been corrected to a remarkable extent within the last few decades. The unflagging pioneer work and the intellectual and organizational leadership of Walter Isard since the s played a key role in enlisting support from various disciplines to create this new focus. His domain of "regional science" is extremely broad. This book will follow a less comprehensive approach, using the special interests and capabilities of the economist as a point of departure. The first of these "foundation stones" appears in the simplistic explanations of the location of industries and cities that can still be found in old-style geography books. Wine and movies are made in California because there is plenty of sunshine there; New York and New Orleans are great port cities because each has a natural water-level route to the interior of the country; easily developable waterpower sites located the early mill towns of New England; and so on. In other words, the unequal distribution of climate, minerals, soil, topography, and most other natural features helps to explain the location of many kinds of economic activity. A bit more generally and in the more precise terminology of economic theory, we can identify the complete or partial immobility of land and other productive factors as one essential part of any explanation of what is where. Such immobility lies at the heart of the comparative advantage that various regions enjoy for specialization in production and trade. This is, however, by no means an adequate explanation. What does actually appear as the logical outcome is none of these, but an elaborate and interesting regular pattern somewhat akin to various crystal structures and showing some recognizable similarity to real-world patterns of distribution of cities and towns. We shall have a look at this pattern in Chapter 8. These are the second and third essential foundation stones. Economists have long been aware of the importance of economies of scale, particularly since the days of Adam Smith, and have analyzed them largely in terms of imperfect divisibility of production factors and other goods and services. The economies of spatial concentration in their turn can, as we shall see in Chapter 5 and elsewhere, be traced mainly to economies of scale in specific industries. Finally, goods and services are not freely or instantaneously mobile: Transport and communication cost something in effort and time. These costs limit the extent to which advantages of natural endowment or economies of spatial concentration can be realized. To sum up, an understanding of spatial and regional economic problems can be built on three facts of life: In more technical language, these foundation stones can be identified as 1 imperfect factor mobility, 2 imperfect divisibility, and 3 imperfect mobility of goods and services. They arise, as we shall see, on several different levels. Some are primarily microeconomic, involving the spatial preferences, decisions, and experiences of such units as households or business firms. Others involve the behavior of large groups of people, whole industries, or such areas as cities or regions. To give some idea of the range of questions involved and also the approach that this book takes in developing a conceptual framework to handle them, we shall follow here a sequence corresponding to the successive later chapters. The business firm is, of course, most directly interested in what regional economics may have to say about choosing a profitable location in relation to given markets, sources of materials, labor, services, and other relevant location factors. A nonbusiness unit such as a household, institution, or public facility faces an analogous problem of location choice, though the specific location factors to be considered may be rather different and less subject to evaluation in terms of price and profit. Our survey of regional economics begins in Chapter 2 by taking a microeconomic viewpoint. That is, all locations, conditions, and activities other than the individual unit in question will be taken as given: The importance of transport and communication services in determining locations one of the three foundation stones will become evident in Chapter 2. The relation of distance to the cost of the spatial movement of goods and services, however, is not simple. It depends on such factors as route layouts, scale economies in terminal and carriage operations, the length of the journey, the characteristics of the goods and services transferred, and the technical capabilities of the available transport and communication media. Chapter 3 identifies and explains such relations and will explore their effects on the advantages of different locations. In Chapter 4 , an analysis of pricing decisions and demand in a spatial context is developed. This analysis extends some principles of economics concerning the theory of pricing and output decisions to the spatial dimension. As a result, we shall be able to appreciate more fully the relationship between pricing policies and the market area of a seller. We shall find also that space provides yet another dimension for competition among sellers. Further, this analysis will serve as a basis for understanding the location patterns of whole industries. If an individual firm or other unit has any but the most myopic outlook, it will want to know something about shifts in such patterns. For example, a firm producing oil-drilling or refinery equipment should be interested in the locational shifts in the oil industry and a business firm enjoying favorable access to a market should want to know whether it is likely that more competition will be coming its way. While some of the issues developed in Chapter 4 concern factors that contribute to the dispersion of sellers within an industry, Chapter 5 recognizes the powerful forces that may draw sellers together in space. From an analysis of various types of economies of spatial concentration and a description of empirical evidence bearing on their significance, we shall find that the nature of this foundation stone of location decisions can have important consequences for local areas or regions. Chapter 6 introduces explicit recognition of the fact that activities require space. Space or distance, which is simply space in one dimension plays an interestingly dual role in the location of activities. On the one hand, distance represents cost and inconvenience when there is a need for access for instance, in commuting to work or delivering a product to the market , and transport and communication represent more or less costly ways of surmounting the handicaps to human interaction imposed by distance. But at the same time, every human activity requires space for itself. In intensively developed areas, sheer elbowroom as well as the amenities of privacy are scarce and valuable. In this context, space and distance appear as assets rather than as liabilities. Chapter 6 treats competition for space as a factor helping to determine location patterns and individual choices. In Chapter 6, the location patterns of many industries or other activities are considered as constituents of the land-use pattern of an area, like pieces of a jigsaw puzzle. Many of the real problems with which regional economies deal are in fact posed in terms of land use How is this site or area best used? The insights developed in this chapter are relevant, then, not only for the individual locators but also for those owning land, operating transit or other utility services, or otherwise having a stake in what happens to a given piece of territory. The land-use analysis of Chapter 6 serves also as a basis for understanding the spatial organization of economic activity within urban areas. For this reason, Chapter 7 employs the principles of resource allocation that govern land use and exposes the fundamental spatial structure of urban areas. Consideration is given also to the reasons for and implications of changes in urban spatial structure. This analysis provides a framework for understanding a diverse array of problems faced by city planners and community developers and redevelopers. In Chapter 8 , the focus is broadened once more in order to understand patterns of urbanization within a region: Real-world questions involving this so-called central-place analysis include, for example, trends in city-size distributions. Is the crossroads hamlet or the small town losing its functions and becoming obsolete, or is its place in the spatial order becoming more important? What size city or town is the best location for some specific kind of business or public facility? What services and facilities are available only in middle-sized and larger cities, or only in the largest metropolitan centers? In the planned developed or underdeveloped region, what size distribution and location pattern of cities would be most appropriate? Any principles or insights that can help answer such questions or expose the nature of their complexity are obviously useful to a wide range of individuals. Chapter 9 deals with regions of various types in terms of their structure and functions. In particular, it concerns the internal economic ties or "linkages" among activities and interests that give a region organic entity and make it a useful unit for description, analysis, administration, planning, and policy. After an understanding of the nature of regions is developed in Chapter 9, our attention turns to growth and change and to the usefulness and desirability of locational changes, as distinct from rationalizations of observed behavior or patterns. Chapter 10 deals specifically with people and their personal locational preferences; it is a necessary prelude to the consideration of regional and urban development and policy that follows. Migration is the central topic, since people most clearly express their locational likes and dislikes by moving. Some insight into the factors that determine who moves where, and when, is needed by anyone trying to foresee population changes such as regional and community planners and developers, utility companies, and the like. This insight is even more important in connection with framing public policies aimed at relieving regional or local poverty and unemployment. Chapter 11, building on the concepts of regional structure developed in Chapter 9, concentrates on the process and causes of regional growth and change. Viewing the region as a live organism, we develop a basic understanding of its anatomy and physiology. Chapter 12 proposes appropriate objectives for regional development involving, that is, the definition of regional economic "health". It analyzes the economic ills to which regions are heir pathology and ventures to assess the merits of various kinds of policy to help distressed regions therapeutics. Throughout this text, evidence of the special significance of the "urban" region will be found. Discussions of economies associated with the spatial concentration of activity, land use, and regional development and policy have important urban dimensions. It is fitting, the, that the last chapter of the text, Chapter 13 , focuses on some major present-day urban problems and possible curative or palliative measures. Attention is given to four areas of concern downtown blight, poverty, urban transport, and urban fiscal distress in which spatial economic relationships are particularly important and the relevance of our specialized approach is therefore strong. It is hoped that this discussion has served to create an awareness of some basic factors governing the spatial distribution of economic activity and their importance in a larger setting. The course of study on which we are about to embark will introduce a framework for understanding the mechanisms by which these factors have effect. It holds out the prospect of developing perspective on associated problems and a basis for the analysis of those problems and their consequences. The MIT Press, Gustav Fischer, ; 2nd ed. Yale University Press, Leon Moses, "Spatial Economics: Nourse, Regional Economics New York:

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Location theory describes this kind of analysis when the emphasis is upon alternative locations for specified kinds of activities, such as industry. Regional analysis is concerned with groupings of interrelated economic activities in proximity, within specified areas or types of areas; and the theory of interregional trade refers to the economic relationships between such areas. Decision units and their interdependence. The explanations provided by spatial economic theory are ultimately in terms of the economic motivation and behavior of individual decision units and the ways in which their decisions react upon each other. A decision unit in this context can be, say, a business enterprise, a household, a public institution, or a labor union local. Here, as elsewhere in economic theorizing, simplifying assumptions about motivation are usedâ€"for example, the assumption that a business firm will prefer locations that provide higher rates of return to the investments of its owners, or the assumption that households will prefer locations with higher and more dependable levels of real income. Location theory views a decision unit most often a business establishment or a household as weighing the desirability of alternative locations. From the standpoint of a particular decision unit, with a production function that gives it a limited range of alternative ways of combining inputs and producing outputs, some locations are better than others. Thus, the terms on which out-puts can be disposed of will depend on access to established markets for such outputs; labor and other service inputs of the types required will be available on more favorable terms in some places than in others; land for cultivation or building will be available in different qualities and at different prices in various locations. The process by which the decision unit weighs all these location factors and makes a choice of location and production technology is describable, as first clearly pointed out by Predohl , in terms of marginal substitutions. Such analysis is not peculiar to location economics but is part and parcel of the more general body of economic theory of rational firm and household behavior. The distinctive task of spatial economics is to identify and account for the development of systematic spatial configurations of advantage for economic activities, as they arise out of the interaction of different decision units upon one another in ways strongly conditioned by distance. There is an analogy here to the work of the physicist who identifies systematic spatial patterns of the microstructure of matter e. Some of the more important ways in which decision units interact in a systematic spatial way can be cited. For example, sellers of a product compete for markets; users of a material compete for the source of supply; firms in a labor market compete for labor; economic activities in a city compete for space. Such interrelationships appear as forces of mutual repulsion or dispersion between the competing units. At the same time, when one unit supplies a good or service to another, either or both will have an interest in proximity for the sake of reducing transport cost and inconvenience. And many kinds of production and exchange are subject to important economies of scale, calling for some degree of spatial concentration. Suppliers of complementary products and services find themselves attracted to the same markets, and buyers of jointly produced goods or services find themselves attracted to the same sources. Here we have forces of mutual attraction or agglomeration. Both the repulsive and the attractive forces can apply either as between like decision units e. A general equilibrium theory of spatial economic relations takes cognizance simultaneously of all the important types of spatial interdependence of firms, households, and other decision units. A partial equilibrium theory focuses on just one or a few selected relationships, which can then be explored with greater attention to realistic detail, while other elements are taken as given. Thus, by making the necessary simplifying assumptions, we can focus on, say, the way in which complexes of metals industries locate in response to given market, raw material, and technological situations; the allocations of land in an urban central business district; the patterns of residence adopted by people employed in an industrial area; the development of reciprocal trade between two regions; or the choice of a good site for a new suburban shopping center. The remainder of this article describes some of the various lines of partial equilibrium spatial analysis that have been most extensively developed by economic theorists. In each case the point of departure is the simplest case, in which all but a very few variables are ignored. Some indication is given of the ways in which this type of analysis can gradually approach reality by successive relaxations of the initial simplifying assumptions. It was first set forth by the engineer Wilhelm Launhardt in , further developed by the economist Alfred Weber , and later elaborated by Tord Palander and others [see Weber, Alfred]. All costs and prices are assumed to be constant, irrespective of the scale of output. Under these assumptions, the optimum location is simply the location for which the combined costs of procuring and assembling inputs and delivering outputs is least per unit of output. All these considerations can be weighed as determinants of the type of transport orientation of a specified kind of production; that is, whether production is likely to be optimally located at the market, at a source of material, or at some intermediate point, such as a junction of routes, of modes of transport, or of rate zones. If the various inputs are required in fixed pro-portions, as assumed by Weber and others, the optimum production location will also be the point of minimum total transport costs of inputs and outputs; but as Leon Moses has shown, this need not be the case if the mix of inputs can be varied in response to spatial differences in their relative unit costs. Spatial competition for markets. Relaxing this highly artificial assumption makes it possible to analyze the various ways in which producers compete for markets and the ways in which location patterns are affected by economies of scale and geographic concentration. If the amount of output that a producer can sell in any one market without lowering his price is limited, he is likely to find it advantageous to sell in more than one market, and perhaps in a whole range of markets constituting his market area. Thus, one kind of situation in which producers in different locations interact through competition for markets is that in which each supplies a market area wherein he can deliver the product at a lower price than his competitor can. One branch of spatial economic analysis considers the way in which the size and shape of contiguous market areas are determined for producers whose locations are taken as fixed. The key factors here are 1 the difference between the f. If, for example, one producer must ship at a higher tariff because his product is less compactly packed, more perishable, or shipped in smaller lots than that of his competitor, he will be under an added disadvantage at markets at longer distances, and his market area may be entirely surrounded by that of his rival who ships at a lower tariff. The laws of market areas, first set forth in systematic form by Frank A. Fetter and subsequently elaborated by others, permit useful insights into some of the ways in which the structure of transport costs influences the location of producers in relation to their markets and the extent to which a reduction of either production costs or transport rates may enlarge the market that can be economically served from a given production location. An enterprise facing a choice among locations can use these principles under some circumstances in estimating the relative advantages, in terms of the market area and net sales revenues, of alternative locations. In its most simplified form, market-area theory assumes that market areas are discrete because 1 the products from competing centers are highly interchangeable rather than differentiated, 2 transport costs rise continuously with distance, and 3 the output of a producer sells at a uniform f. This combination of conditions is rather uncommon in practice and is perhaps most closely approached in the case of the sales territories of the several separated branches of a given firm that seeks to minimize total delivery expense. But where different firms are competing for markets and are selling somewhat differentiated products, the market areas of different production centers often overlap to a high degree. To some extent this reflects the fact that transport charges do not always rise continuously with added distance but stay constant over substantial ranges of added length of haul. Full freight absorption means selling at a uniform delivered price to all markets and tends, of course, to produce a very great degree of market-area overlap and cross-hauling of products. Market areas and supply areas. The types of market-area analysis just discussed apply essentially to products that are produced at fewer points than those at which they are consumed or bought. For certain products, howeverâ€"mainly agricultural onesâ€"the characteristic situation is that of widely dispersed producers selling to a relatively small number of consuming or collecting centers. This is the inverse of the characteristic market-area situation. Accordingly, the various simplified and complex types of market-area analysis have their counterparts in the field of supply-area analysis. The most familiar examples of rather discrete supply areas are urban milksheds. The effects of various transport rate patterns and pricing policies of buyers have been worked out, in fairly close analogy to the effects of transport rate patterns and pricing policies of sellers in the market-area analysis discussed above. Many situations in the real world are composite, with a single seller or production point serving several markets while at the same time a market is supplied by several sellers at different locations. This is particularly likely to occur where transport costs of the product in question are small relative to either 1 other considerations of production location, such as labor costs, or 2 qualitative differences between the brands of rival producers. Another classic approach to spatial analysis, pioneered by Thiinen, focuses upon the competition between producers for space on which to operate and upon the role of land rent as the price and allocator of space [see the biography of Thnen]. This line of analysis uniquely points up the dual economic role that space playsâ€"it provides utility as a necessary and generally scarce production input, and it causes disutility by imposing costs of transport or communication to bridge distances. In the simplest case, the choice of location for the producer is assumed to rest on just two factors: The net prices realized for outputs are assumed to depend only on transport costs to a single specified market. All other location factors such as cost of transported inputs or labor are ignored. The factor of access to market thus acts centripetally on producers, while the balancing centrifugal force is the higher rent resulting from competitive bidding for the space nearer the market. Each industry or kind of land use , depending on its technical production characteristics and the transportability of its output, strikes its own compromise between nearness to market and cheap land; and the equilibrium pattern of land uses is envisaged, in the simplest such case, as a systematic series of concentric ring-shaped zones, each devoted to a particular use. In general, his production function will allow considerable substitution between land and other production factors e. There is a maximum rent that the producer can afford to pay to occupy that specified location. A rent gradient or surface rises to a peak at the point of best access to market e. The gradients or surfaces corresponding to different land uses have different heights and slopes. Competition in the real estate market, together with the incentive for owners of land to realize maximum returns, implies that each land use will tend to pre-empt those areas for which its rent surface is the highest one. This theoretical approach is most applicable to situations in which the main factors affecting the choice of location for a variety of competing uses are 1 rents and 2 some other spatial differential that is common to all the principal alternative uses and is related systematically and continuously to distanceâ€"e. In practice, this applies to extensive extractive land uses like agriculture and forestry and on a much more local scale the main classes of urban land use within a city or metropolitan area. With this general type of analysis it is possible to derive useful insights, for planning or prognosis, into the shifts in land-use patterns likely to result from changes in demand for products, technological and transport changes, and land-use controls. Some of the more obvious variations on the simplest case have been developed by Thiinen and succeeding generations of theorists; they include, for example, the existence of cheaper transport along certain routes, variations in the desirability of land other than those due to access to markets, labor cost differentials, economies of scale, multi-crop farming systems and other land-use combinations, trade barriers, and imperfections in the real estate market. Many important and interesting questions of spatial economics relate to the spatial interaction between people and jobs. Labor is an essential input of all productive activi-ties, and variations in the cost and availability of manpower influence the choice of location for many activities. One of the oldest components of the theory of labor cost differentials rests on the proposition that living costs are lower in predominantly agricultural areas, so that a lower money wage in such areas is consistent with the equality of real wages, which is a condition for equilibrium under full labor mobility. In the more advanced countries, however, locally produced foodstuffs account for a smaller part of the consumer budget, and interregional differences in consumer prices within the country are narrower. Moreover, the cost of living as measured by statistical indexes omits some important considerations, such as amenity and style of life, that enter into choice of residence. A second well-established component of the theory explicitly involves demographic behavior fertility, mortality, and migration. Since various economic and social impediments to labor mobility exist, labor tends to be abundant and cheap where natural increase outruns the growth of labor demand. Further insight here calls for evaluation of the complex ways in which fertility and mortality are influenced by income level and the local pattern of economic opportunities, and also for more de-tailed analysis of the determinants of spatial mobility. The selectivity of migration plays a vital role here: Certain important locational effects arise from the fact that since most adults are members of households labor is often a jointly supplied service. Still another principal component of the theory of labor cost differentials involves the factors of size, diversity, and productivity in a labor market. This is mentioned in the next section, in the discussion of local external economies. Among the most important questions to which spatial economic theory is ad-dressed is the degree to which a particular economic activity, or a complex of closely related activities, is concentrated in a small number of locations. Perhaps the simplest basis for spatial concentration is economies of scale for the individual production unit, such as a steel works or oil refinery [see Economies of Scale]. If large units are much more efficient than small ones, one large unit can serve a number of market locations more cheaply than a number of smaller decentralized units can, even though the total delivery cost is greater. Similarly, the economies of concentration in a single large plant can outweigh extra costs of material assembly involved in drawing materials from a larger range of sources of supply. In the case where scale economies and access to markets are the principal locational factors, production units will be larger when markets are more concentrated and when transport is cheap. Some degree of spatial concentration through scale economies underlies the class of situations discussed earlier in regard to spatial competition for markets, in which individual producers sell to many markets and can adopt discriminatory systems of delivered prices. The agglomeration of a single activity by virtue of internal economies of scale, as just described, often has important indirect agglomerative effects by providing external economies to related activi-ties [see External Economies and Diseconomies]. For example, fully equipped commercial testing lab-oratories can operate economically only where they can command a sizable volume of business; and firms using such services can save time and money by locating in a center where such service is available. Similarly, the sheer volume of demand for interregional transport freight and passenger to and from a large metropolitan area provides the basis for much more efficient, varied, and flexible transport services than a smaller center can sup-port; and this advantage in transport service is an attraction to a wide range of transport-using activities. Scale economies within individual units, specialization division of labor among production units , and close contact among units are the elements in an external-economies type of agglomeration. Where there is a large concentration of activities in proximity, more and more particular operations, processes, or services can be undertaken on an efficient scale by separate units that serve other units in the area. In smaller areas, such specialized activities are either absent altogether or have to be provided within the firms that use themâ€”at higher costs, because they are on a relatively smaller-scale basis. To return to the initial example of testing services for industrial products or materials, in a major industrial center various fully equipped and efficient commercial laboratories are available to provide quick service, while in a distant small town the manufacturer needing such testing service has to choose among 1 providing it himself on a small and less efficient scale, 2 having it done at a distance by a commercial facility, with costly delay and inconvenience, or 3 doing without it. From the standpoint of the user of specialized goods and services, there are three advantages of quick access to a large source of supplyâ€”cheapness, variety, and flexibility. First, the specialized producers or providers of services who exist in large agglomerations can provide their goods or services at lower cost because of their own scale economies.

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Since most spatial theories are extensions of economic theories, traditional work in regional science and theoretical geography has been directed toward the same normative, optimizing constructs as have the studies in economics.

Behavioral geographers analyze data on the behavior of individual people, recognizing that individuals vary from each other. A key tenet of behavioral geography holds that models of human activity and interaction can be improved by incorporating more realistic assumptions about human behavior. For example, behavioral geographers agree with other human geographers that distance or related factors such as travel time or effort is an important determinant of human activity, but they maintain that it is subjective rather than objective distance that is typically important. Thus, the disaggregate study of human geography naturally led behavioral researchers to consider what the individual knows or believes about the world as playing an important role in explaining what the individual does or will doâ€”that is, people do what they do because of what they think is true. People evaluate decision alternatives according to their beliefs in order to make behavioral choices in space and place. What people think, in turn, arises from perceptual knowledge acquired via the senses, as organized and interpreted by existing beliefs and schematic knowledge structures and processes. Behavioral geography further maintains that human-environment relations are dynamic and bidirectional: The actions and mental states of individuals cause, and are caused by, physical and social environments, within the context of ongoing and changing interactions. Because of these various interests and beliefs, behavioral geography has inherent interdisciplinary connections, particularly with various subfields of psychology, but also with other behavioral and cognitive disciplines, such as linguistics, anthropology, economics, and artificial intelligence, and environmental disciplines, such as planning, architecture, and urban studies. Given this fundamental interdisciplinarity, much of the literature cited here has been published not only within geography and cartography, but also within psychology, linguistics, computer science, and other fields. General Overviews More than some other fields of geography, the best overviews of behavioral geography may be found in edited books with chapters by different authors or sets of authors. This reflects the relative newness of the subfield, its extremely multidisciplinary nature, and its wide relevance to so many disparate problem areas within geography and cartography. At the same time, it has attracted relatively few scholars few departments specialize in it, for example. There are some valuable books authored by single sets of authors, including Golledge and Stimson , the most authoritative general book on behavioral geography, with the most breadth of coverage; it is the much-expanded second edition of an earlier version by these two authors. Walmsley and Lewis is better suited as a textbook for introductory courses. Finally, some journal articles are useful overviews of at least important parts of behavioral geography. Evans , published in a prominent journal of psychology, is perhaps the best example of this. Cognitive Mapping and Spatial Behavior. Includes chapters by prominent geographers, psychologists, and others. Probably no other single reference in all of behavioral geography is more important. Article from a top journal of research psychology that overviews a major part of behavioral geographyâ€”environmental cognitionâ€”from the multidisciplinary perspective of environmental psychology, the subfield of psychology most closely parallel to behavioral geography. Psychological and Geographical Approaches. Edited collection of great value because it consists of review chapters covering much of the breadth of behavioral geography, written by top scholars. Uniquely contrasts the perspectives of geography and psychology on each major topic it covers. Does one of the best jobs of connecting the behavioral approach to the general field of human geography. More appropriate for graduate courses than undergraduate. Covers mental, behavioral, social, and cultural use of space by individuals and groups. Behavioural Approaches in Human Geography. Like Golledge and Stimson , it provides a broad coverage that connects the behavioral approach to the rest of human geography, but more concisely and at a more basic level. Users without a subscription are not able to see the full content on this page. Please subscribe or login. How to Subscribe Oxford Bibliographies Online is available by subscription and perpetual access to institutions. For more information or to contact an Oxford Sales Representative click here.

Chapter 4 : Spatial Behaviour Research Papers - www.nxgvision.com

A spatial econometric model of harvest location in a reef fishery is presented. â€¢ Spatial dependence and autocorrelation is a major issue in location decisions.

Spatial Economics [An updated version of this article can be found at Spatial Economics in the 2nd edition. Indeed, much commercial activity is concerned with "space bridging," and much entrepreneurship is aimed at cutting the costs of transport and communication. The study of how space distance affects economic behavior is called "spatial" economics. Throughout history, space has often been a hindrance to economic growth. But improvements in transport and communications have been among the main driving forces of economic progress, as Australian economist Colin Clark pointed out. In medieval Europe and China three-quarters of the population never traveled farther than five miles from their birthplaces, and before the advent of book printing, most people knew very little about what happened beyond their narrow horizons. Since then technical and organizational progress has continually reduced the costs of transporting goods and "transporting" ideas communication. Transport and communication have also become user-friendly. Now fax machines, satellite TV, and global computer networks are revolutionizing the world economy yet again. Businesses locate their plants so as to economize on transport and communication costs and reduce the risks of transport disruptions between the locations of their inputs and the locations of their market demand. In the past, firms that depended on heavy inputs, such as steel makers, located near the source of major inputs, such as coal mines. Firms that require intensive and frequent interaction with their customers locate near the demand. Gasoline stations, for example, locate near busy intersections. Transport and communication costs normally give firms a degree of local monopoly. But concern about neighboring competitors entering their market niche tends to keep them from abusing this market power, keeping them in "creative unease" and thus forcing them to control costs and to remain innovative. Falling transport and communication costs threaten such market niches. Producers are now often able to move away from their sources of supply or the neighborhood of their demand. Many firms have become more "footloose. Similarly, the telecommunications revolution has made many service operations footloose. The airline booking clerk one calls on an number from New York, for example, may work in Omaha, and daily accounting services for a business in Chicago may be done by an office at the end of the fax line in Singapore. Businesses combine inputs that are mobile in space, such as know-how and capital, with inputs that cannot be moved at all or only at great cost, such as land or unskilled labor. One immobile factor that must not be forgotten is government. Good government can raise the productivity of the other inputs and make certain locations attractive. Bad governmentâ€”a hostile government or a confusing, complex set of regulations; high taxes; and poor public infrastructuresâ€”can lower productivity and induce the flight of mobile production factors. Producers who are remote from the market can succeed only if they bear the transport cost to the marketplace. But the mobile production factors have to be paid the same return, wherever they are used. In a city or region, real estate rents drop as one moves from the center of activity. In the center, enterprises use a lot of capital to build high rises, saving on high land costs, and only space-saving offices, not large production plants, are located there. Cheap land on the periphery is devoted to land-intensive uses, such as for storage and dumps. If landowners on the periphery were to raise rents, they would soon be out of business. Within a nation, landowners, workers, and the tax collector can reap high "location rents" if they operate in the central areas of economic activity, like Chicago or Los Angeles. There, mobile factors crowd in, so that intensive use is made of land, labor, and public administration, and high incomes are earned. High rental prices for the immobile inputs determine which goods and services are produced and which production methods are used. If, however, the differentials in land, labor, and tax costs between central regions and more remote locations exceed the transport costs from the remote locations to the central markets, producers migrate. That is how industry has spread out from historic centers like New York and Pittsburgh to new industrial regions. World-market prices and product standards are determined there, and the highest incomes are earned. Both mobile and immobile inputs are most productive in these centers. Further away in economic space are the new industrial countries, such as Taiwan, Korea, Malaysia, and Mexico, where the immobile production factors are earning lower returns. And further still, on the periphery of the global economic system, are the underdeveloped countries with very low incomes. The main production factors that tend to be internationally immobile are labor and government, although some countries have also attracted high legal and illegal labor migration. Because they are internationally immobile, labor and governments in noncentral countries that want to join in intensive world trade must absorb the transport-cost disadvantages. What matters in this context is "economic distance," which cannot necessarily be equated with geographic distance. Places with efficient transport connections, like Hong Kong or Singapore, are closer economically to Los Angeles than, say, a town in southern Mexico. Technical, organizational, and social change has reduced global transport and communications costs see table 1. This is now leading to an unprecedented degree of mobility of human, financial, and physical capital, of entrepreneurship, and of entire firms. The owners of these mobile production factors, who wish to supply world markets, are increasingly "shopping around" the world for the labor and the style of government administration that promise them a high rate of return and low risks. Thus, more and more companies are becoming "locational innovators.

Chapter 5 : Spatial Behavior: A Geographic Perspective

Spatial Choice Behavior. The NOAA Fisheries economics program contributes to marine spatial decisions by predicting the values and trade-offs associated with fishery management options that restrict allowable uses in designated areas.

The value of q is within [0, 1], 0 indicates no spatial stratified heterogeneity, 1 indicates perfect spatial stratified heterogeneity. The value of q indicates the percent of the variance of an attribute explained by the stratification. The q follows a noncentral F probability density function. A hand map with different spatial patterns. Spatial interpolation[edit] Spatial interpolation methods estimate the variables at unobserved locations in geographic space based on the values at observed locations. Basic methods include inverse distance weighting: Kriging is a more sophisticated method that interpolates across space according to a spatial lag relationship that has both systematic and random components. This can accommodate a wide range of spatial relationships for the hidden values between observed locations. Kriging provides optimal estimates given the hypothesized lag relationship, and error estimates can be mapped to determine if spatial patterns exist. Local regression and Regression-Kriging Spatial regression methods capture spatial dependency in regression analysis , avoiding statistical problems such as unstable parameters and unreliable significance tests, as well as providing information on spatial relationships among the variables involved. The estimated spatial relationships can be used on spatial and spatio-temporal predictions. Geographically weighted regression GWR is a local version of spatial regression that generates parameters disaggregated by the spatial units of analysis. Spatial stochastic processes, such as Gaussian processes are also increasingly being deployed in spatial regression analysis. Model-based versions of GWR, known as spatially varying coefficient models have been applied to conduct Bayesian inference. Factors can include origin propulsive variables such as the number of commuters in residential areas, destination attractiveness variables such as the amount of office space in employment areas, and proximity relationships between the locations measured in terms such as driving distance or travel time. In addition, the topological, or connective , relationships between areas must be identified, particularly considering the often conflicting relationship between distance and topology; for example, two spatially close neighborhoods may not display any significant interaction if they are separated by a highway. After specifying the functional forms of these relationships, the analyst can estimate model parameters using observed flow data and standard estimation techniques such as ordinary least squares or maximum likelihood. Competing destinations versions of spatial interaction models include the proximity among the destinations or origins in addition to the origin-destination proximity; this captures the effects of destination origin clustering on flows. Computational methods such as artificial neural networks can also estimate spatial interaction relationships among locations and can handle noisy and qualitative data. This characteristic is also shared by urban models such as those based on mathematical programming, flows among economic sectors, or bid-rent theory. An alternative modeling perspective is to represent the system at the highest possible level of disaggregation and study the bottom-up emergence of complex patterns and relationships from behavior and interactions at the individual level. Two fundamentally spatial simulation methods are cellular automata and agent-based modeling. Cellular automata modeling imposes a fixed spatial framework such as grid cells and specifies rules that dictate the state of a cell based on the states of its neighboring cells. As time progresses, spatial patterns emerge as cells change states based on their neighbors; this alters the conditions for future time periods. For example, cells can represent locations in an urban area and their states can be different types of land use. Patterns that can emerge from the simple interactions of local land uses include office districts and urban sprawl. Agent-based modeling uses software entities agents that have purposeful behavior goals and can react, interact and modify their environment while seeking their objectives. Unlike the cells in cellular automata, simulysts can allow agents to be mobile with respect to space. For example, one could model traffic flow and dynamics using agents representing individual vehicles that try to minimize travel time between specified origins and destinations. While pursuing minimal travel times, the agents must avoid collisions with other vehicles also seeking to minimize their travel times. Cellular automata and agent-based modeling are complementary modeling strategies. They can be integrated into a common geographic automata system where some agents are fixed while others are mobile. Initial approaches to CA proposed robust calibration approaches based on stochastic, Monte Carlo methods. The method analyzes the spatial statistics of the geological model, called the training image, and generates realizations of the phenomena that honor those input multiple-point statistics. A recent MPS algorithm used to accomplish this task is the pattern-based method by Honarkhah. This allows the reproduction of the multiple-point statistics, and the complex geometrical features of the training image. Each output of the MPS algorithm is a realization that represents a random field. Together, several realizations may be used to quantify spatial uncertainty. One of the recent methods is presented by Tahmasebi et al. This method is able to quantify the spatial connectivity, variability and uncertainty. Furthermore, the method is not sensitive to any type of data and is able to simulate both categorical and continuous scenarios. CCSIM algorithm is able to be used for any stationary, non-stationary and multivariate systems and it can provide high quality visual appeal model. Geospatial analysis, or just spatial analysis, [33] is an approach to applying statistical analysis and other analytic techniques to data which has a geographical or spatial aspect [34]. Such analysis would typically employ software capable of rendering maps processing spatial data, and applying analytical methods to terrestrial or geographic datasets, including the use of geographic information systems and geomatics. Basic applications[edit] Geospatial analysis, using GIS , was developed for problems in the environmental and life sciences, in particular ecology , geology and epidemiology. It has extended to almost all industries including defense, intelligence, utilities, Natural Resources i. Oil and Gas, Forestry Spatial statistics typically result primarily from observation rather than experimentation. Basic operations[edit] Vector-based GIS is typically related to operations such as map overlay combining two or more maps or map layers according to predefined rules , simple buffering identifying regions of a map within a specified distance of one or more features, such as towns, roads or rivers and similar basic operations. Descriptive statistics, such as cell counts, means, variances, maxima, minima, cumulative values, frequencies and a number of other measures and distance computations are also often included in this generic term spatial analysis. Spatial analysis includes a large variety of statistical techniques descriptive, exploratory , and explanatory statistics that apply to data that vary spatially and which can vary over time. Advanced operations[edit] Geospatial analysis goes beyond 2D and 3D mapping operations and spatial statistics. GIS-based network analysis may be used to address a wide range of practical problems such as route selection and facility location core topics in the field of operations research , and problems involving flows such as those found in hydrology and transportation research. In many instances location problems relate to networks and as such are addressed with tools designed for this purpose, but in others existing networks may have little or no relevance or may be impractical to incorporate within the modeling process. Problems that are not specifically network constrained, such as new road or pipeline routing, regional warehouse location, mobile phone mast positioning or the selection of rural community health care sites, may be effectively analysed at least initially without reference to existing physical networks. Locational analysis "in the plane" is also applicable where suitable network datasets are not available, or are too large or expensive to be utilised, or where the location algorithm is very complex or involves the examination or simulation of a very large number of alternative configurations. Geovisualization â€” the creation and manipulation of images, maps, diagrams, charts, 3D views and their associated tabular datasets. GIS packages increasingly provide a range of such tools, providing static or rotating views, draping images over 2. This latter class of tools is the least developed, reflecting in part the limited range of suitable compatible datasets and the limited set of analytical methods available, although this picture is changing rapidly. All these facilities augment the core tools utilised in spatial analysis throughout the analytical process exploration of data, identification of patterns and relationships, construction of models, and communication of results Mobile Geospatial Computing[edit] Traditionally geospatial computing has been performed primarily on personal computers PCs or servers. Due to the increasing capabilities of mobile devices, however, geospatial computing in mobile devices is a fast-growing trend. In addition to the local processing of geospatial information on mobile devices, another growing trend is cloud-based geospatial computing. In this architecture, data can be collected in the field using mobile devices and then transmitted to cloud-based servers for further processing and ultimate storage. In a similar manner, geospatial information can be made available to connected mobile devices via the cloud, allowing access to vast databases of geospatial information anywhere where a wireless data connection is available. Geographic information science and spatial analysis[edit] Further information: The increasing ability to capture and handle geographic data means that spatial analysis is occurring within increasingly data-rich environments. Geographic data capture systems include remotely sensed imagery, environmental monitoring systems such as intelligent transportation systems, and location-aware technologies such as mobile devices that can report location in near-real time. GIS provide platforms for managing these data, computing spatial relationships such as distance, connectivity and directional relationships between spatial units, and visualizing both the raw data and spatial analytic results within a cartographic context. Content[edit] Spatial location: Transfer positioning information of space objects with the help of space coordinate system. Projection transformation theory is the foundation of spatial object representation. Geovisualization GVis combines scientific visualization with digital cartography to support the exploration and analysis of geographic data and information, including the results of spatial analysis or simulation. GVis leverages the human orientation towards visual information processing in the exploration, analysis and communication of geographic data and information. In contrast with traditional cartography, GVis is typically three- or four-dimensional the latter including time and user-interactive. Geographic knowledge discovery GKD is the human-centered process of applying efficient computational tools for exploring massive spatial databases. GKD includes geographic data mining , but also encompasses related activities such as data selection, data cleaning and pre-processing, and interpretation of results. GVis can also serve a central role in the GKD process. GKD is based on the premise that massive databases contain interesting valid, novel, useful and understandable patterns that standard analytical techniques cannot find. GKD can serve as a hypothesis-generating process for spatial analysis, producing tentative patterns and relationships that should be confirmed using spatial analytical techniques. Spatial decision support systems SDSS take existing spatial data and use a variety of mathematical models to make projections into the future. This allows urban and regional planners to test intervention decisions prior to implementation.

Chapter 6 : Chapter 1-Hoover and Giarratani

Spatial economics is the study of how space (distance) affects economic behavior. The Costs of "Space Bridging" Have Fallen Throughout history, transport costs have hampered specialization, and improvements in transport and communications have been among the main driving forces of economic progress.

Chapter 7 : Spatial Behavior: A Geographic Perspective - Reginald G. Golledge - Google Books

Examining a broad range of questions--from how human beings negotiate the spaces in which they live, work, and play to how firms and institutions, and their spatial behaviors, are affected by processes of economic and societal change--this work presents an overview of research into the spatial behavior of humans and their institutions.

Chapter 8 : Spatial organization - Wikipedia

The company uses spatial analysis to create a digital replica of a city's transportation system and helps cities implement incentives based on behavioral economics that reward commuters for.

Chapter 9 : Can Spatial Analytics Combined with Behavioral Economics Ease Congestion?

1 Executive Summary Many economic and business decisions are affected by geography and location. For example, spatial factors that affect power plant location include resource availability, distance to the grid and key.