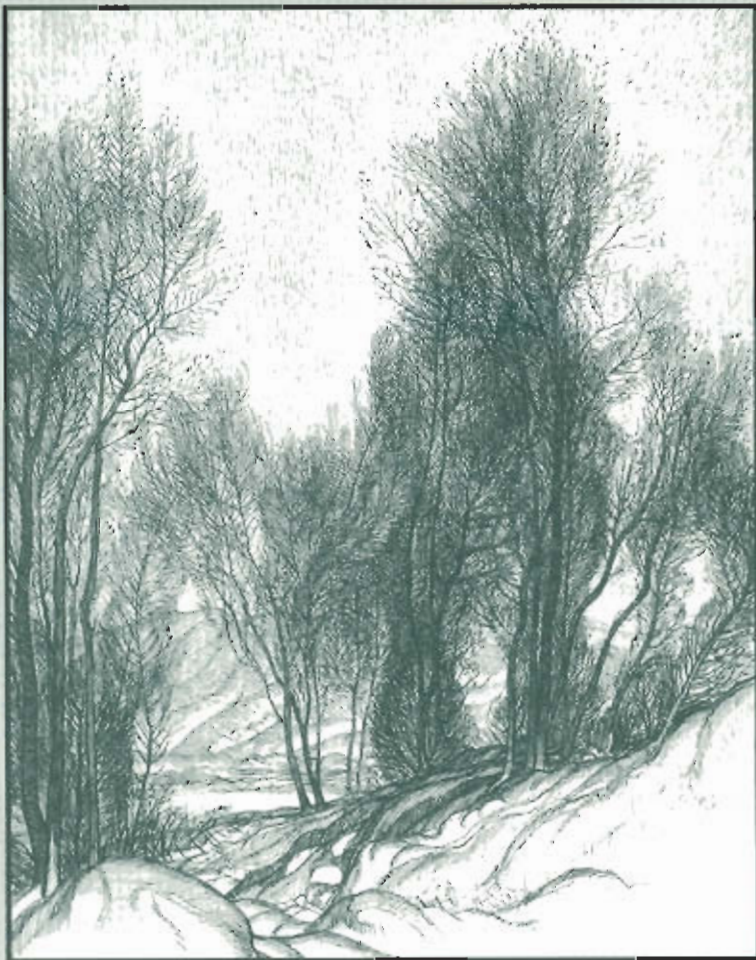


# Conceptual Foundations of Economic Research in Rural Studies

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## INTRODUCTION

**D**uring the past decade, economic and social research on rural areas has been given new energy and impetus by the introduction of new conceptual developments. Two are of particular importance: the concept of social capital, as developed by Coleman and others, and the new economic geography, as articulated by Krugman.

Variously challenged, appropriated, and expanded by economists and rural sociologists, these frameworks have generated a great deal of intellectual excitement among rural social scientists. At the 1998 ASSA meetings, Castle and others used the social capital concept to develop the idea of a rural capital stock. With this framework it is possible to discuss four components of rural capital: man-made, natural, human, and social. Such a concept connects an area to its past, it places a limit on what can be accomplished in the present, and it provides a connection to the future.

The essence of rurality pertains directly to the density of human population and, as a result, distance and space become of crucial importance. The new economic geography provides a different way of viewing familiar phenomena. In particular, it calls attention to the key role of the cost of distance in determining rural economic development. This is especially important as technical change continues to reduce transportation costs both into and out of rural places. Hite (1997) and Kilkenny (1998), for examples, began to push for a serious examination of the new economic geography and both outlined frameworks that could be used to examine the implications of decreasing transportation costs on the future of rural areas.

The papers in this collection grew out of an organized symposium at the 1998 meetings of the American Agricultural Economics Association: "Conceptual Foundations of Economic Research in Rural Studies." The symposium was organized to provide a forum for discussion of the new frameworks of rural capital and economic geography, to expand their boundaries, and to stimulate additional economic research on rural areas. In these papers, agricultural economists who have been in the forefront, challenging and developing these frameworks as they apply to the study of rural places, provide a review and assessment of the concepts and suggest the kind of work that will be needed to bring the ideas to their full potential in understanding and guiding rural economic change.

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## ECONOMICS OF RURAL AREAS: RURAL CAPITAL, CAPITAL IMMOBILITY, AND PATH DEPENDENCE

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These remarks are in the nature of a sequel to an earlier paper with discussions presented at the winter meetings of the American Economic Association and the American Agricultural Economics Association held in Chicago, January 1998. (Castle; also see discussions by Oakerson, Kraybill, Salamon, and Summers and Brown). In that paper it was concluded that rural capital stock is an important concept in rural decision making and in defining the field of rural studies. This conclusion is based on the factual proposition that rural people, under our system of government, have been accorded a degree of autonomy in the management of their affairs. This, in turn, rests on the normative judgment that some degree of autonomy is desirable. In that paper, four forms of capital—natural, man-made, human and social—were assumed to constitute the total stock of rural capital. The paper defined each component, and special attention was given to social capital.

How is this autonomy, of whatever magnitude, to be exercised? What will be its concerns? We believe that the management of the total stock of rural capital is of fundamental importance in this respect. It is this stock that will place a limit on what can be accomplished in the present, and its management in the present will affect the future. Thus, in a very fundamental way, those group decisions accorded to rural people will be concerned with the creation, management, and maintenance of various forms of rural capital.

Clearly, both public and private rights are held in varying proportions in the various capital forms, yet all privately held capital exists in an institutional context reflecting public or group considerations. It is those group decisions which affect the rural capital stock in some way that constitutes the essence of rural studies.

### Group decision making and the rural capital stock

Rural capital stock is of immense public importance both in rural areas and for the nation as a whole. It can be conceived as comprising some of the major elements of what is called *res publica*, the Latin root of republic, referring to the "public good" or "common wealth" of a community. In the founding generation of Americans, *res publica* was an important concept, one that supplied the good sought by the applied science of government and politics. Empirically, one can think of *res publica* as comprising the full set of things shared in common—the "commons" writ large. This set is much larger than usually imagined, including not only Samuelsonian or Musgravian pure

public goods, but also common-pool and flow or fugitive resources such as water and wildlife, land (i.e., the availability of land as a resource over time), public facilities such as roads, the technology that supplies the various forms of man-made capital, relationships of trust and reciprocity among community members (social capital), and facilities for the intergenerational transmission of knowledge—schools, libraries, and churches—that underlie the formation of human capital and, to a considerable extent, social capital as well.

Rural capital management and governance, therefore, is intimately tied up with public decision-making. Two basic types of decisions are important: investment and maintenance. It is important to distinguish the two, even though they cannot always be separated or ought always to be separated organizationally. Investment problems are well known: they involve making a large initial outlay in order to reap a flow of benefits over time. Periodic reinvestment is required. Maintenance problems are different: maintenance requires a series of small inputs over time, each one of which makes a negligible contribution to the capital stock, but that cumulatively extend its life, often greatly.

Each component of rural capital stock presents a somewhat different problem of decision-making, with various public-policy implications. Man-made capital in the form of technology, as we all know, requires maintenance. Natural capital presents mainly a maintenance problem—careful use—except for major replenishment projects, such as restoring the population of wolves. Human capital is both an investment and a maintenance problem, but public attention is usually focused on investment aspects. Once established, social capital is mainly a maintenance problem, a matter of reciprocating; but efforts to establish social capital where little exists may require large initial investments of time and effort and depend on public policy (Gurwitt).

The decision-making puzzle is how to recognize (1) when collective decisions are necessary or appropriate (as opposed to decisions by individuals, firms, or households) and (2) on what scale collective decisions should be made. Each component of rural capital requires a somewhat different mix of public and private decision-making. Investments in technology frequently require, or at least benefit from, collective action, while the maintenance of farm equipment, for example, is best left to individual farms. The scale on which collective action should occur is also a question of substantial importance. At issue in both questions are the incentives created to manage the capital stock appropriately.

Aristotle remarked, "...that which is common to the *greatest* number has the least care bestowed upon it" (emphasis added). Aristotle states his observation as a paradox: those things with the greatest number of hands to care for them paradoxically receive the least care. Much of 20th century social science has been preoccupied in effect with explaining Aristotle's paradox in terms of the incentives involved in collective action. Aristotle's generalization (which undoubtedly has exceptions) carries with it two important implications:

- Responsibility for the full set of things shared in common should be divided, as far as is feasible, into small community packages. The nature of things, of course, imposes limits on how far this can be done, implying multiple, overlying jurisdictions.

- Institutional arrangements for the governance of the full set of things shared in common should be constituted so as to compensate for Aristotle's observation. This implies that small-scale, local governments should be designed quite differently from government on a larger scale, so as to take full advantage of the greater care bestowed by small communities.

If we add to Aristotle's observation the fact of diversity, that the rural capital stock is not homogeneous, but exhibits great variety from place to place, this puts an additional premium on the importance of local collective action able to take account of the diverse character of things shared in common.

Capabilities for local collective action that make use of third-party enforcement of obligations do not just happen; they are institutionally created in the context of the general political system. A major theme of a political science of rural areas should be concerned with the opportunities available for local collective action to address diverse problems of investment and maintenance regarding the four components of rural capital stock. The relevant types and forms of collective action exhibit a considerable range. Included are ground-water management districts; drainage districts; irrigation districts; watershed management institutions; school districts; library districts; road maintenance districts; soil conservation districts; wildlife habitat management regimes; state forests; and so forth. Governmental arrangements are usually complemented by voluntary associations that in the aggregate make up the rural civil society.

To the extent that rural America is different from metropolitan America, "ruralness" should be taken into account when dividing responsibility for *res publica*. To the extent that rural America exhibits diversity from one rural place to another, diverse rural areas need multiple opportunities for local collective action—a one-size-fits-all national rural policy won't do. This begins to make a strong case for rural local autonomy. However, we need to understand that the purpose of autonomy, in Aristotle's terms, is responsibility—care of the commons. The formation of a local government (or local arrangement for collective action) indicates a willingness to take responsibility for the local commons.

Frequently—and more than likely, increasingly—multiple, overlapping communities have somewhat different interests in the same commons—especially with respect to the natural-capital component of the rural capital stock. If local interest is entirely compatible with the interests of others, responsibility can be safely assigned locally. Rural communities become stewards of the nation's natural resources. Others outside the immediate community can enhance local care of the commons by buying into the local endeavor through intergovernmental grants—especially for supporting investment aspects. When local interests and the interests of others conflict, some sort of bargain or accommodation has to be reached that allows both sets of interests to be satisfied to some degree. Rural people should not be required to enter into such discussions from a disadvantaged position, though they are almost always outnumbered in state legislatures and the Congress, where the necessary bargains usually get worked out. The political bargain can, however, take the form of an institutional arrangement that allows various interests to be represented in a continuing process of governing and managing a common-pool resource or facility. Multi-organizational or inter-

agency arrangements for managing resources can bring a variety of interests to bear on collective decisions.

Finally, we need to remember that the human capability to care for *res publica* is cultural—that is, it builds on the efforts of previous generations and thus depends on intergenerational transmission. The ideas and system of ideas on which efforts of human coordination depend are of special relevance here. Social capital, in particular, depends on norms of reciprocity that cannot be reinvented from scratch with each new generation. In this sense, rural studies is itself a cultural project, an effort to build knowledge that can be transmitted from one generation to the next, and thus contribute over the long term to the viability of rural societies.

### **Capital immobility and path dependence**

Practical people concerned about the welfare of rural places are well aware that past investment decisions affect current choices. There are numerous accounts of firms engaging in an economic activity in rural areas, and thereby affecting the rural capital stock in a significant way. A new economic activity may attract additional workers to an area. This may require investment in the infrastructure of the community in the forms of roads, schools, and health services. Private sector investment also increases capital both directly within the new industry, as well as indirectly in related economic activities. The natural environment may also be changed, sometimes through disinvestment rather than investment. In addition, group processes may be affected as they respond to different needs and opportunities within the community.

Conditions may change so that a rural area that once was attractive may no longer be so. The firm may leave and the economic activity it was engaged in may cease, but many of the investments may remain, with the result that the rural place is different than it was before the firm located there originally. The investments and disinvestments made by the firm will define a different set of opportunities than would exist had the firm not located there in the first place. In such a circumstance the past investment has placed the rural area on a different trajectory or path than it would have been on otherwise. This path dependence has been the concern of many writers on rural development topics.

Path dependence stemming from immobile capital provides a justification for including rural capital as an important part of rural studies. The rural capital concept provides a framework for judging the long-term consequences of different investments. Will the resulting trajectories be degenerative or progressive? Economists have powerful tools to bring to bear on such questions if they are applied in realistic institutional settings.

The rural capital concept directs attention to the relationship among the various forms of capital. Coleman noted that social capital usually arises as a by-product of particular endeavors or activities. As a result, it probably will be more productive in terms of its original purpose or mission in the presence of original endeavors or activities than it will be in their absence. Nevertheless, social capital arises because of mutual trust and an expectation of reciprocity, and these attributes may come to have value independent of the activities or endeavors which gave rise to them in the first place. Traditional industries may be favored even though they would no longer be chosen if starting from scratch; a premium is placed on related activities and



endeavors consistent with existing forms of social capital. In other words, different economic endeavors will have varying degrees of compatibility with existing forms of social capital. Such circumstances have clear implications with respect to path dependence and capital immobility.

Recent developments near Garden City, Kansas can illustrate these considerations. Location there of the value added activities of cattle feeding, slaughtering, and meat packing has resulted in many non traditional economic activities. People with different ethnic origins moved into the area. It soon became apparent, at least to some community leaders, that the traditional social capital forms were not adapted to the new economic order. These people set out to create different forms of social capital in the community and especially in the schools. Presumably they worked to establish a certain level of mutual trust among the newcomers as well as between the newcomers and the old-timers. (The newcomers were not of a single ethnic origin.) Explicit attention was directed to modifying traditional forms of social capital to make them consistent with the new economic endeavors. These new social capital arrangements may well have shifted development trajectories. (Gurwitt)

The conditions in Garden City, Kansas provide an example of the identification and subsequent removal of a limiting factor in economic development, specifically a particular form of social capital. Yet all of the consequences of such a development cannot be known at present. The successful launching of a new form of economic activity will necessarily require additional investment in all of the major capital forms. The natural environment will be modified, additional forms of man-made capital will come into existence, the human capital mix will change and, as noted, different social capital forms will be created. The community needs to be concerned as to the nature of the new trajectory that will be created.

The value-added activities that have been created there are clearly dependent on livestock production in that region and economic conditions may not always favor livestock production. If there should be a decline, the Garden City area will be faced with decisions as to how best to use the new forms of capital which have been created. Economic principles can guide such decisions. So long as the productivity of an asset exceeds its salvage value, it will be economic to employ it in some way. There are, of course, complications in practice in following such a principle, especially for human and social capital.

When different ethnic groups come into an area for a significant period of time some typically remain, even though the attraction which brought them there in the first place no longer exists. Whether they can become integrated into the economic and social fabric of the community will depend both on economic opportunity and social integration.

If economic opportunity can be created, they may be able to remain in the area on a progressive social trajectory provided some degree of social integration has occurred. If economic opportunity in the area does not exist, or cannot be created, out migration may be required. If this is necessary, human capital investments that improve adaptability in other circumstances may yield great dividends.

The advantage of the total rural capital concept is that it requires that future consequences be considered. It encourages consideration of the type of trajectory that will result from particular economic development activities. It

asks whether resulting trajectories are likely to be progressive or degenerative for rural places.

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## RURAL DEVELOPMENT, THE THUNEN PARADIGM AND THE DEATH OF DISTANCE: DOES SPACE STILL MATTER?

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*This paper is a follow-up to one published in a recent issue of the Review of Agricultural Economics [Hite, 1997] in which the Thunen model is suggested as a basic conceptual paradigm for rural development analysis. It is assumed that readers of this paper have either read the earlier one or have ready access to it. Except for a brief summary, that paper will not be reargued here. Instead, the Thunen paradigm will be tested for its robustness as a tool for explaining observed empirical evidence of -rural economic phenomena.*

**A**n earlier paper, published in the *Review of Agricultural Economics*, emphasized rural economic activity as something that takes place in space. In fact, since rural is a geographic term, space is seen as critical to the nature of those activities that are somehow "rural," and simply cannot be ignored. The fundamental theoretical model of space shared by both economists and geographers is the Thunen model, and hence, the Thunen model seems a logical paradigm for analysis of rural economic development. Even in its very simple form, the model can yield deductions about the nature of remote economies that replicate the common empirical traits of economies in remote places in the real world.

Until recently, the Thunen model had limited appeal as a paradigm for rural development because of its stringent and unrealistic assumptions of isolation and a homogeneous plain. Krugman (1998) notes that formal models that accounted for space were just too complicated for even the most gifted mathematical economists. However, the mathematics of economics has evolved and the calculating powers of computers have expanded. A new body of literature, in what is called the "New Economic Geography," allows rigorous analysis of more complicated and realistic situations. That work is well illustrated by Kilkenny's paper in this publication. This new economic geography may not produce detailed prescriptions for rural development policy, or for economic agents operating in rural places, but it is already demonstrating capabilities to spin off potentially testable hypotheses regarding strategies for overcoming the disadvantage of remoteness in an era when transport costs are falling and agglomerate economies are powerful.

The Thunen model does not provide the only paradigm rural development analysts need. Space is important, but so is capital of many types, including what Castle and Oakerson call "social capital." But space cannot be ignored in any serious rural development theory. Location matters, and for rural areas, location is always relative to the spatial centers of economic activities manifested in places like Thunen's central city. Space matters, and we have to deal with it.

Critics might argue that the decline in transport and communications costs means that space matters much less today than it did in the past. In fact, Cairncross has published a book entitled *The Death of Distance* (1997). If distance is indeed dying as a real barrier to economic processes, perhaps it makes little sense to emphasize distance and location in our economic models. It is debatable, however, whether distance is in fact dying, although Cairncross is undoubtedly right that the impact of distance upon economic activities is changing dramatically. If that is so, the significance of these changes (there are more than one) for rural and remote places cannot be understood without economic models that account for distance.

### **Broad trends and Schumpeterian development in space**

#### **Declining transport costs**

Schumpeter makes a well-known distinction between economic growth and economic development. The former is associated with realizing an existing potential general equilibrium, the latter with innovations that destroy old equilibria and create new potentials for general equilibrium. Among the types of innovations mentioned specifically by Schumpeter are reductions in the cost of moving goods across space. So if distance is dying because of a reduction in transport and communications cost, the spatial patterns associated with old equilibria are vulnerable to significant rearrangement.

My search for a long index series for transport costs generally has been fruitless. The rather detailed series begins only in 1989, however, it might be useful to note what they show. The cost of moving farm goods by railway has increased at an annual average compounded rate of 5.3 percent during the period 1989-97. The cost of moving goods by foreign deep-sea transport has increased at an average annual rate of 0.7 percent, by deep-sea domestic transport at an average annual rate of 2.3 percent, by air at an average annual rate of 1.0 percent, and by motor freight at an annual average rate of 0.8 percent. During this period, the average annual rate of increase in the GNP deflator was 3.0 percent. So, excepting the cost of moving agricultural products by rail, the unit cost of moving goods generally has been falling relative to other costs.

Ward and Hite (1998) cite some other numbers that show significant declines in the cost of air transport, telephone calls, and information processing in the period 1930-90. Hence, the relative decline in transport costs is apparently part of a longer-run trend of general decline in the costs of overcoming space. The trend is not new, but it may be accelerating. The consequences of such a reduction in friction of space for rural areas are generally deducible from a rather simple Thunen model.

Declining transport costs mean that the area within the market range of Thunen's central city expands. Sophomore economics students are supposed to know that the degree of labor specialization is limited by the extent of the market. Declining transport costs set in motion a train of events that increase specialization. If there is any immobility of factors, the process can, for a time, produce places with a sub-optimal combination of factors to exploit the new conditions. A great deal of spatial readjustment of labor and capital may be required to realize the potential gains that declining transport costs can produce. That process of readjustment is not instantaneous.

Consider the supply side effects. A decline in transport costs increases the geographic area over which a consumer, or a producer, at given place may draw supplies. If we assume the traditional homogeneous plain of the Thunen model, the new area being added has the potential to be just as productive per unit of space as the area already in that supply or market area. If supply is very price elastic and demand very price inelastic, the reduction in transport costs can substantially reduce rents for lands located near centers of demand as it increases those at the periphery of the Thunen plain. Hence, a decline in transport costs threatens existing producers in areas adjacent to centers of consumption who were able to operate profitably in a time of higher transport costs. The economic bases of counties adjacent to metro areas, for instance, might expect some erosion from a decline in transport costs, especially if those bases involve the production of commodities or generic products under pressure from new supplies originating in newly opened peripheral areas.

Opportunities to develop a new economic base are likely to exist in these adjacent counties, but movement to exploit those new opportunities will be hampered by asset fixity in both human and physical capital. Adjustment may take a while, and mean difficult economic times even in the less remote areas.

On the consumer side, a decline in transport costs reduces the cost of living in the most common type of consumer center, the city. The cost of living in remote areas may be reduced as well. However, if consumers in remote areas are forced to shop in highly concentrated local markets (a not unlikely situation), the lower prices may be available only by commuting to a city to shop, and while the costs of such commuting are declining, they still are positive.

Under realistic assumptions, the favorable effects on consumers of declining transport costs are apt to be proportionally greater in cities than in most remote places (except for those at the extreme periphery that are added to the economy by the spatial expansion of the market), which should have the further effect of providing enhanced incentives for rural-to-urban migration. In the end, the only unambiguous winners may well be urban land owners who stand to realize higher rents for city property. People in remote areas may benefit from reductions in transport costs, but are apt to lack the market power to obtain more than a relatively small share of the gains that such lower transport costs make possible.

Lower transport costs are bound to disrupt spatial patterns that developed in a time of higher transport costs. Rural economic actors, even those in areas relatively near metropolitan centers, will have to adjust and innovate. Some of those old patterns, especially if they have been nourished in long-standing habit and fixed capital investments, are not shaken off instantly. During the adjustment process, the allocation of resources will be sub-optimal for new conditions. The places that adjust quickly and smoothly will make greater economic gains relative to those that are slow to adjust. Rural places that are unable to adjust quickly to new market signals will suffer a general decline in income and a loss of population.

### **The telecommunications revolution**

The second set of innovations disrupting spatial patterns is rooted in what is often called the telecommunications revolution. In the present con-

text, that term is used to refer to the movement from analog to digital telecommunications and associated innovations involving the high-speed movement across space of large quantities of data, at relatively low costs, often using orbiting satellites.

At first glance, the telecommunications revolution seems to have the potential to make distance irrelevant with regard to movements of information packages. Yet so long as access to telecommunications networks depends upon a physical, ground-based infrastructure, distance continues to matter. How it matters, however, depends upon the technology, and the direction of future technological developments. Based on existing technology, the following picture seems to emerge.

Malecki and Bousch (1998) point out that digital technology has not altered the basic architecture of our telephone system. For the final connection to users, we remain largely dependent upon the existing architecture of that system. Even the use of cellular phones require being in relatively short range of a system of physical infrastructure. The ability of the telephone system to provide access to an integrated services digital network (ISDN), i.e., one benchmark standard of state-of-the-art telecommunications access, depends upon the presence nearby of a sophisticated and costly switch. Investment theory suggests these switches will be installed first where they produce the highest rates of return, that is, in places where there is a high volume of use per switch. In other words, we should expect that such switches will be put in place first in major urban centers.

Ergan presents a chart that shows how the cost of providing broadband telecommunications access rises exponentially as population density declines. Malecki and Bousch show how the required switches tend to be located in, or adjacent to, major urban centers and highway corridors in Tennessee. Of course, the development of a wireless substitute for the high speed movement of digital signals could alter the way the spatial impact of the telecommunications revolution plays out. Still, as the system seems to be developing, it tends to resemble a network of spatially-fixed nodes that, on the whole, is not favorable to economic activity in remote places.

Such a negative assessment deserves some qualifications. In reality, the landscape is not a homogeneous Thunen plain, but a Ricardian space with local differences in resource endowment. Remote places with high endowments, whether in the form of commodity resources like petroleum and ores, or of amenity resources like beaches, mountains, mild climates, etc. have the potential to acquire sufficient density to make investment in digital switches economically attractive. If we accept the "new growth theory" (Romer, 1988), such places, even though remote from major consumer centers, could reach a take-off stage, as is the case with some beach resorts and retirement colonies in my state of South Carolina. In so doing, these areas become a node in the telecommunications network, and attract the type of economic activity documented by Nelson and Beyers (1998) and Salant, Carey and Dillman (1997).

### **Empirical evidence and the Thunen paradigm**

#### **Remote from what?**

Attempts to extend the Thunen model for use in interpreting contemporary events are faced with a major weakness. Thunen simply ducks the first

fundamental question: what caused a city to arise on his plain? The Thunen city is there by assumption, and since there is only one city, remoteness is merely distance from that city relative to transport costs. Fujita and Krugman (1995) show that Thunen's monocentric economy is only a special case. We live in a polycentric economy, a world of many urban centers of different sizes, functions, and forms because agglomerate economies are different for different types of economic processes and activities. We also live in a Ricardian world where each point in space has a unique set of resource endowments. When we try to make use of the Thunen model as a paradigm for rural development analysis, we discover that the meaning of remoteness in our world is not as clear and simple as in Thunen's special abstract world.

A precise measurement of Thunen remoteness would allow one to determine definitively whether forces are moving positively or negatively relative to the economic conditions and opportunities in any given place. Yet there is no obvious theoretical base for fashioning such a definitive measurement, and in lieu thereof, empirical research has tended to resort to some form of ad hoc spatial potential models. Harris (1954) and Webb, et al (1996) calculated potentials specified to measure cumulative distance from production activities; Alonso (1973) calculated population potentials based on centers of consumption. The results from these efforts have been encouraging with regard to adopting a potential model approach to the Thunen paradigm, but the question, "Remote from what?" continues to trouble anyone trying to make sense of contemporary evidence within a Thunen paradigm.

The best answer today seems to be remoteness from urban mass. There is a tantalizing bit of evidence in a still unpublished paper by Nissan and Carter (1998) showing a strong inverse linkage between the ratios of metro/nonmetro per capita income and nonmetro/total state population in a given state. In other words, it seems that for a relatively long time nonmetro per capita incomes have been, and continue to be, higher in states with large concentrations of metro populations. Remoteness from centers of consumption seems to be negatively correlated with per capita income, at least at the rather gross level of state data. Nissan and Carter find very little difference in the income distribution within metro and nonmetro areas. But distance from larger metro centers does not seem to favor a place's per capita income.

Another supporting piece of empirical evidence can be found in a recently published study by Gale (1998). The geographic manufacturing wage differential does not favor nonmetro areas, yet Gale finds very little difference in wage rates in manufacturing between rural and metro counties when they are adjusted for differences in occupation mix. Gale finds the unfavorable differential is primarily because manufacturing processes in nonmetro places are different from those of urban centers and use a different mix of occupations weighted heavily toward those that command relatively low wages, even in cities. It is not altogether clear that remoteness from cities is the only vector we need to concern ourselves with in rural economic analysis, but there seems to be empirical evidence to suggest we dare not ignore the most fundamental characteristic of rurality—being remote from cities and things urban.

### **Population turnaround**

Throughout the 1980s, rural population was declining in the United States, and that seemed consistent with the general analysis presented

above. Yet Fuguitt and Beale (1996) have published information documenting a turnaround in rural population in the United States in the 1990s. Can this observed turnaround be reconciled with the conclusions drawn out of the Thunen model?

Fuguitt and Beale present their material in the context of discussions among rural sociologists regarding some suggestion of a spatial "deconcentration...favoring nonmetro over metro areas...brought about by innovations in transportation and communications costs and changes in social and economic organization" (p. 157). It is not altogether clear that these innovations would favor the remote parts of the Thunen plain, so the argument for deconcentration generally must rest on theory yet to be explained. A persistent growth of population in rural and remote places would be a serious challenge to a Thunen paradigm of rural development.

On closer look, however, the Fuguitt and Beale analysis poses less of a problem for Thunenesque interpretation than it might seem. Fuguitt and Beale found that the net out migration from rural areas in the 1980s had been reversed in the early 1990s in almost all types of nonmetro counties. They concluded, however, that "The recent increase in net migration for nonmetro counties was found to be primarily due to a decline in outmigration whereas earlier work showed that the 1970s turnaround was more due to increased movement into nonmetro areas" (p. 170). They go on to suggest the turnaround of the 1990s "...could be based more on a lack of attractive alternative opportunities in metropolitan areas than an improved economic circumstance in nonmetro areas..."(p.170).

My colleague, Bill Ward and I have argued that the Thunen model implies a spatial aspect of asset fixity (Ward and Hite, 1996), and there is some tentative empirical evidence to support such a notion (Webb, et al, 1996.). Our argument goes basically like this: (1) The salvage value of an asset depends upon its existing location relative to the location of both potential buyers and of the places where it can be employed in its next highest use; (2) Space thus is an argument in any model of salvage values; (3) Asset fixity occurs when use value at any given location exceeds the salvage value of that asset at that same location; (4) Unless use value and salvage value vary in unison across space, there will be a spatial pattern to asset fixity. We go on to argue that, under a plausible set of assumptions, asset fixity is likely to increase with remoteness from expanding centers of economic activity.

If asset fixity increases with remoteness, one might expect that outmigration from places in disequilibrium would be slowest in the most remote places. Gale's work shows that the occupational mix in rural manufacturing is heavily weighted by the presence of a set of skills that command no appreciably higher wages in urban centers. If the salvage value of their human capital, net moving costs and presumably higher residential rents, is no higher in urban centers than in remote places, it makes so sense to outmigrate. Moreover, the market for residential real estate in remote and declining places is unlikely to favor out-migration by those who own immobile real estate. So one might well expect that there would be greater inflow of population to nonmetro areas than outflow in the early stages of a Schumpeterian change.

Not altogether surprisingly, Nissan's and Carter's data show that the ratio of nonmetro to metro per capita income in the United States has been declining for twenty years. That implies there is too much labor relative to



capital in nonmetro regions. The long term prospects must be for a decline in the population of remote places if (and an important "if") people must of necessity reside at their source of income. If a substantial part of the population can realize their required income without concern for where they establish residence, then it is possible that certain remote places with high amenity endowments will attract population, even as such places become more remote on usual vectors of economic distance. The demographics of an aging population with a source of income not tied to a particular place opens up the possibility for population growth in high-amenity areas. Fuguitt and Beale show that immigration to such counties remained positive even during the 1980s, when the net flow was from nonmetro to metro counties.

This new kind of economic base interests Salant and her associates in Washington State. Their work shows that many of the new residents in rural areas are not retired persons, but so-called "High Flyers" and "Lone Eagles," new kinds of workers and entrepreneurs who see the telecommunications revolution as a way to free themselves of life in congested cities. Nelson and Beyers (1998) find that almost half of the personal income of residents of the rural West is proprietor's income, transfer payments, or dividends, royalties and rents. Population growth in rural places, therefore, need not necessarily mean a growth in local economic opportunities, at least not in the short run.

The net immigration of the 1990s to farm dependent counties reported by Fuguitt and Beale is a bit of a head scratcher. Since many of the farm dependent counties are not places with the kind of local terrain associated with high natural amenities, they would not be thought to be attractive to large numbers of retirees. Professor Glen Pulver reminds me, however, that the sons and daughters of the plains often have a great affection for such landscapes, and undoubtedly, there are many such sons and daughters who will wish to return to farm dependent counties when they are eligible for retirement income. Is it possible that the increased immigration to farm dependent counties is a "Pulver effect?"\*

Which brings us back to the earlier discussion of the telecommunications revolution. If amenities can attract population to remote places, the possibility exists that the population density in some of these places will reach the minimum threshold needed to attract private sector investment in digital switches and related telecommunications infrastructure. When that happens, these places will have an opportunity to diversify their economic bases beyond those activities solely tied to amenities, and perhaps realize a form of economic take-off with long run significance.

### **Land prices, development, and the local farm economy**

If one impact of declining transport costs has been to expand the spatial influence of cities, non-agricultural variables become important influences on local land prices further and further from urban centers. It does not matter that some of the higher land prices may result from overly exuberant speculation. Not only can higher land prices increase the net worth of farmland owners, they also increase the opportunity costs of agricultural production. These increased opportunity costs are especially important for producers of stable commodities trading in global markets. Thus, rural development activities that push local land prices above the highest use value

\* If the "Pulver effect" can be documented, Patricia Salant will be able to add "prairie dogs" to "lone eagles" and "high flyers" as types of immigrants to rural and remote places.

for agricultural production, eventually are likely to have a negative influence on local commodity production.

Our work (Hite, Terrill and Lu, 1998), to be published by the Southern Rural Development Center, shows that a combination of urban sprawl, retirement development, and an increase in the demand for second homes has driven rural land prices in Virginia, the Carolinas, and Georgia to such levels that profitable production of traditional major agricultural commodities (cotton, corn, soybeans, wheat) is feasible only in relatively small remote enclaves. The impact is less pronounced in states like Mississippi, Kentucky and Tennessee, but even in these states, urbanization is pushing agricultural commodity production to remote places of the rich alluvial soils along the Mississippi River.

These results are what we would expect using a Thunen paradigm. There are reasons to expect that growing urban centers will open niches for a market garden agriculture in areas immediately adjacent to the city, and my calculations show that such agriculture will produce rents sufficient to compete with many near-urban uses of land (Hite, 1998). When factors exogenous to agriculture are introduced into the local land market, however, there are adverse consequences for agricultural commodity production. It may be difficult for many remote places to supplement a traditional economic base of agricultural commodity production with non-agricultural economic activities without undermining the cost structure of local agriculture, especially if that agriculture produces for markets at a distance. This conflict and change in land use at the rural/urban fringe, threatens the long term stability of commodity production that competes with producers in areas lacking such stress is absent.

Taken to the extreme, this line of reasoning might suggest commodity agricultural production will be confined to highly specialized areas where land prices are not influenced by anything other than use values from that production. Because the labor requirements for much of such agriculture today are not high, those places will have very low population densities. These specialized agricultural parts of the hinterland are likely to be remote from everything, where population density is positively correlated with the rate of return. Barring some breakthrough in cost-effective technology to extend service to sparsely-populated areas, farm families may continue to be isolated from advanced telecommunications networks unless there are subsidies of some form.

### **Summary and assessment**

Space still matters, even in the face of declining transport and communications costs. What some see as the death of distance is, in fact, a crumpling, bending and spindling of space that has profound implications for economic geography. Even if space were dying, we cannot understand the economic significance of its death for rural places without a paradigm that accounts for economic space. Rural economic development is fundamentally a problem in economic geography. Rural development research and policy requires a geographic paradigm that provides an analytical framework that not only accounts for space, but puts space at the center of the analysis.

When one looks in the literature for a geographic paradigm of economic activity, all roads lead to Thunen. There are models other than the very simple one laid out by Thunen, but all of those models adopt as a starting

place the basic paradigm of a city, or system of cities, on a homogenous plain with positive costs in overcoming distance. As a structure within which to fit empirical facts like the pieces of a jigsaw puzzle, the Thunen paradigm seems to have considerable utility.

There may well be pieces of empirical evidence that are irreconcilable with the Thunen paradigm. The empirical research cited here, admittedly, interested me because it seemed to suggest new insights into a Thunenesque economic system undergoing Schumpeterian development. My method of analysis is hardly mathematically rigorous. Still, the Thunen paradigm gives rural economic development researchers opportunities to test refutable hypotheses in such a way that the sum of all the hypotheses testing will be greater than its parts. In so doing, we can see the possibility of moving toward some coherent story of how rural economies perform and change.

Testing those hypotheses will almost certainly require technical sophistication in the use of the "New Economic Geography." Undoubtedly, many of the ways that space and other economic factors interact are subtle and discoverable only with rigorous mathematical models. Professor Kilkenny is showing the way we might begin to make such discoveries. There is plenty of opportunity for a new generation of rural development economists to join her in shaping a solid theoretical foundation for rural development that need not suffer intellectually when compared to the other subject matter fields of agricultural economics. As our models for testing theoretical hypotheses become more powerful, we will also improve our capabilities for making scientifically sound practical policy and strategy recommendations.

If my use of the Thunen model to interpret events is at all right, such practical work is critically needed to inform policies for sustaining economically viable communities and households in places remote from urban concentrations. Some remote places will find ways to nourish entrepreneurship, innovate, and adapt to new opportunities and overcome the disadvantages of remoteness. Some will have amenity resource endowments that can be turned into economic capital. The new economic geography shows that there are multiple spatial equilibria, and small changes in a single variable can produce different outcomes. Nothing is foreordained.

Declining transport costs in the face of significant scale economies tend to favor cities more than remote places. Some sort of positive policy action will be necessary to avoid a net movement of economic advantage toward urban centers (perhaps not the biggest urban centers, but urban centers of some sort), with the consequence of either growing poverty in remote places, or general out-tigration of population. Even if we had agreement that policy should attempt to redress this balance back toward rural areas, we currently do not know enough to give advice regarding concrete programs and measures with confidence that they would work. Rural development specialists can do little more than utter generalities as recommendations. Our scientific understanding is too thin to allow us to be very specific in responding to community leaders, and thus our responses are often seen as less than useful.

Space is changing, and there is no realistic possibility we will ever be able to make sense of rural development unless we have models that account for space. Perhaps few would reject space altogether. But if rural development economists accept the importance of space, we either have to go to the Thunen paradigm and elaborate upon it, or invent a new one that in-

corporates space. The latter may prove a necessity. Facts may arise that simply cannot be reconciled with the Thunen paradigm regardless of how we crumple, bend, or spindle space. Analytically more useful paradigms may be uncovered that still account for space. All that would be progress over the isolated case-study approach that marked the work of my generation of rural development economists.

There is some urgency here. The economic survival of many communities in the hinterland may depend upon economic science being able to inform the strategies of economic actors in remote places. Good science aimed at building and testing theories of rural development accrues to the benefit of the rural people and rural communities that are the traditional focus of our work as agricultural economists. What can be seen as a professional duty of rural development economists in the land grant system also has the potential to be intellectually exciting and scientifically significant work.

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# NEW ECONOMIC GEOGRAPHY FOR LOW DENSITY PLACES: INSIGHTS FROM KALDOR AND LANCASTER

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This symposium has touched on rural capital in all its varieties and on the usefulness of understanding land allocation. Castle and Oakerson pointed out that rural capital has "important time and space specificities," i.e., it varies widely. A point made by Jim Hite is that Von Thunen's nineteenth century model of rural land use remains useful and applicable to day. The model, however, takes the location of urban agglomerations of population and industry as *exogenously* predetermined. The evolution of the new economic geography explains positive feedback and local growth as being driven by *preferences for variety*, and how the locations of urban agglomerations are *endogenously* determined.

Most new economic geography models, however, are suitable only for modeling *urban*, rather than rural, economic development.<sup>1</sup> Nevertheless, students of rural development should not dwell on the pessimistic implications that low density places dependent on immobile natural resource industries can *never* grow. New economic geography models that operationalize Kaldor's (1935) and Lancaster's (1979) critiques of monopolistic competition are suitable for modeling and do predict how rural economic development might be obtained.

## Fundamentals of economic geography

Broadly, *economic geography* is the study of what happens where. Why do firms and people tend to concentrate in a few locations (cities) rather than spread out evenly across the countryside? How can we rationalize the clustering of similar firms in the same place? What explains the number and variety of economic activities in a region? Why aren't both small and large firms in the same industry equally competitive? What are the economic development prospects for remote, low density (i.e., rural) places? The answers to these questions depend on the trade offs between scale (fixed costs and externalities) and the cost of distance (transport costs).

We have to start with a historical overview of economic geography, because for a while, modern economists actually forgot some of the most relevant fundamentals. Economists of my generation often ignore the fixed costs of being in business. But fixed, or sunk, costs are the most obvious bases of economies of scale. In contrast, those of us who mastered neoclassical microeconomics since the 1970s were taught to think of all inputs as variable (in the long run, anyway!), with technology specified by Cobb-

<sup>1</sup> See Kilkenny (1998b) for a detailed explanation of why most new economic geography models are incapable of simulating rural development.

Douglas production functions. In that constant-returns-to-scale (CRS) world, average and marginal costs are equal; so "marginal cost pricing" is sufficient to sustain firms in long-run industry equilibrium. Many of us never even tried to reconcile the strictly linear Cobb-Douglas cost functions with the intuitively appealing (and, much more realistic) U-shaped cost curves that (still) abound in our undergraduate textbooks.

In any event, as long as scale has no economic payoff, we expected to see large and small firms co-existing in the same industry. We also expected population and economic activity to be widely dispersed. And we couldn't explain the existence of urban agglomerations within the CRS paradigm. Those of us interested in regional development should simply quit dwelling on the CRS, Cobb-Douglas, paradigm.

Between David Ricardo's first publications in the 1800s and the 1970s, however, economists (especially those interested in the location of economic activity) paid a lot of attention to the fact that industries are subject to increasing returns to scale. The larger the fixed costs, the larger the range in output levels over which average costs decline. This suggests a puzzle: why aren't all goods provided by single, very large firms, capturing the most benefits for society from these scale economies? This puzzle was easy to solve: transport costs from a single location could easily outweigh the costs of opening other plants to serve the markets farther away. Thus, given a dispersed agricultural population and technology with minimum efficient scale (the level of output at which all economies of scale are exploited and average costs of production are lowest) there is a socially optimal number of firms dispersed across space that minimize both fixed and transport costs paid by society.<sup>2</sup> This model also rationalizes the dispersion of economic activity; and it still cannot explain urban agglomerations.

That's because one can't explain all urban agglomerations within the paradigm of purely internal increasing returns to scale.<sup>3</sup> The widely observed *clustering* of industries in one location can only be rationalized on the basis of *external* increasing returns to scale. Economists used to pay a lot of attention to those. Adam Smith noted that "the division of labor is limited by the extent of the market" (Stigler, 1951). In this case, as an industry's market increases, the opportunities to achieve economies of scale in intermediate input supplies, increase. Even if the industry in question is subject to CRS, average costs of production can decline as the intermediate input suppliers achieve *their* minimum efficient scales. Marshall (1890) argued that matching firms and workers is more efficient (lower cost) the larger the labor pool in the location. Most recently, Rivera-Batiz and Romer (1991) argue that technology transfer (knowledge) is subject to spatial decay; implying that productivity growth rates can be highest in the locations that already do the most of it. This is one basis for what is now called *endogenous growth*. The existence of external scale economies rationalizes urban agglomeration.

How do industries subject to internal and external scale economies achieve an equilibrium size? Obviously, the available supply of necessary factors of production, and the effective demand for the industry's product,

<sup>2</sup> See Kilkenny and Thisse (1999) for an in-depth survey of geographic firm location theory.

<sup>3</sup> If there were only internal returns to scale, such as in transshipment activity, to minimize the costs to society, only a few ideal port locations would be chosen. Labor would concentrate there. And, those sites would grow as other industries moved near to minimize their transport costs to the markets. But this engine of growth cannot explain the growth of non-port cities.

will define the level of output of the industry. These factors will also determine the market price, but this market price will not equal the *marginal* cost of production. It must cover the *average* cost of production, which is everywhere higher than marginal costs of production throughout the relevant range of output. The full price also reflects transport costs, borne either by the producer who ships or by the consumer who shops.

### Insights from Kaldor

In his seminal work of the 1930s, Chamberlin formalized an explanation for the observed multiplicity of similar firms in a single economy with his model of *monopolistic competition* (Chamberlin, 1962). In his model, each firm in an industry produces one variety of the good (monopolistic). Pricing is such that revenues are only sufficient to cover average costs at any time, because there are no barriers to entry (competition). People prefer to consume as many varieties as possible, so there will be demand for each firm's product. Chamberlin was not trying to explain the clustering of similar firms in a single location, however, so he reasonably posited that the number of firms in the industry would be so large that the entry of a single firm would have a negligible effect on the residual demand, and thus the prices, consumers would pay for the products of all the other firms in the industry. This is the *infra marginality* assumption. In Chamberlin's world, competition between firms within an industry is *non-localized*.

In contrast to Chamberlin's assumption of *infra marginality* is Hotelling's model of "stability in competition" (Hotelling, 1929). Hotelling described the locational choices of firms in an industry in which all firms are rival in the sense that each captures the market closer to them. The analysis is relevant in explaining the locations of firms supplying "shipping" or "shopping" goods. "Shipping" goods are those for which the producer bears the cost of transport (e.g. agricultural produce; manufactures). "Shopping" goods are those for which the consumer bears the cost of transport (e.g. personal services, retail goods). In either case, space and the density between and among firms and consumers, play an important role. These are important considerations for rural areas, which are *remote* and *low density* places. The full price of a shipping good includes production plus transport costs, which rise with the distance between the point of supply and the location of the consumer. The full price of a shopping good rises the lower the density of the suppliers, and the fewer the locally available varieties. Rural customers in low-density areas incur higher search costs for shopping goods, and may pay higher prices for shipping goods, too.

Hotelling argued that (any type of) firms will concentrate in the center of the market (i.e., in the central place (see Mulligan, 1984) or the urban core of a Composite Economic Area (BEA, 1996)). With respect to shopping goods, they will divide the market equally, and price at their marginal cost of production (Hotelling abstracts from fixed costs). Hotelling's result (reformulated correctly by d'Aspremont, Gabszewicz and Thisse, 1979) is known as the *Principle of Minimum Differentiation*. That firms in a duopoly fail to be able to raise their prices above marginal costs is known as *Bertrands' Paradox* (see Tirole, 1988). The point, however, is that suppliers of undifferentiated products cannot afford to extract anything other than competitive prices; and they cannot afford to locate farther from the bulk of the market than their rivals do.



Alternatively, Kaldor (1935) argued that competition is *localized*. Not all firms are rivals (as in Hotelling), nor are all firms *infra marginal* (as in Chamberlin). Kaldor noted that the number of firms supported in any one location is too low for *infra marginality* to be a valid assumption. Furthermore, a new entrant can affect sales of other firms in the neighborhood. He also argued that new entrants cannot affect the sales of more remote firms (Targetti and Thirlwall, 1989). The analysis of firm location in the context of Kaldor's market structure, however, requires the use of the tools of *non-cooperative game theory*, at best. In the least, the local market price must be endogenous to the entrance of a new firm, which means the price-location problem does not have a closed-form solution, and must be solved using computable general equilibrium (CGE) techniques (Kilkenny, 1998a).

Unfortunately, neither technique was sufficiently developed to apply to economic problems until the late 1980s, so that economists could not operationalize Kaldor's localized competition model. Rather, Chamberlin's theory of monopolistic competition was widely applied, as formalized by Dixit and Stiglitz (1977), to explain macroeconomic geography. In macroeconomic geography, the relevant regions are entire countries. Venables (1975), for example, applied Dixit-Stiglitz's monopolistic competition model to explain international specialization and trade as arising from increasing returns to scale. A country with a relatively larger number of firms in an industry, producing a wider variety, can be more competitive in international markets. This breakthrough helped explain the high volume of trade between similarly endowed and similarly productive countries. Neither Ricardo's model of comparative advantage based on relative productivity, nor the Heckscher-Ohlin-Samuelson factor proportions model could rationalize those most significant trade flows in the world.

Krugman (1981) popularized application of the Dixit-Stiglitz version of Chamberlinian, non-localized, monopolistic competition to topics in international economics. Meanwhile, urban systems modelers applied the Dixit-Stiglitz version of monopolistic competition to explain urban agglomeration (Abdel-Rahman, 1988; Fujita, 1988). The urban systems modelers used the concept that product differentiation (distance in characteristics space) is analogous to distance in physical space. By supplying slightly different products, firms insulate themselves from their competition in the same way that transport costs insulate one competitor from the next (see Anderson, de Palma, and Thisse, 1992). The more homogenous the varieties, the stronger the local competition, and the lower market prices, profits, and thus firm numbers in the location. The more heterogeneous, the higher the prices, the more firms.

### **New economic geography**

A 'later treatment' of the urban systems application of Chamberlinian monopolistic competition to explain urban concentration and specialization (Quigley, 1998) was also presented by Krugman (1991). Krugman's intuitively appealing explanations and broadly applicable stylization significantly popularized regional economics. Basically, Krugman did for regional science what he had done a decade earlier for international economics: he popularized the use of Chamberlinian (Dixit-Stiglitz) monopolistic competition market structure assumptions to close models of regional eco-

conomic systems. He called one the "New Trade Theory," and the other "New Economic Geography" (Krugman, 1996).

The prototypical new economic geography model has just two regions; two industries or goods (food and manufactures), and two primary factors of production (farmers and workers). Manufacturing is subject to internal increasing returns to scale. Marginal-cost pricing is incompatible with long-run equilibrium, since a price equal to marginal cost would cover average costs only at zero output. Thus, a monopolistically competitive market structure is assumed. Each firm produces a differentiated product, and each consumer demands a positive quantity of every variety. Firms do not need to disperse across space to serve the same markets profitably, but they do incur delivery costs to serve consumers in the other region. The degree of product differentiation is represented by the parametric elasticity of substitution ( $\alpha$ ) characterizing consumer preferences.

Each household consumes some agricultural product,  $F$ , and a bundle of manufactures,  $M$ , to maximize satisfaction according to a Cobb-Douglas utility function:

$$(1) \quad U = M^\mu F^{1-\mu}$$

where  $\mu$  also measures the budget share on manufactures. The manufactures are a constant elasticity of substitution (CES) aggregate of the varieties produced by  $n$  firms ( $i=1, \dots, n$ ):

$$(2) \quad M = [\sum_i m_i^\rho]^{1/\rho}$$

where the CES exponent  $r = 1 - (1/\sigma)$ . Abstracting from any technological differences, all manufacturing firms will have the same optimal scale, so that (2) simplifies to:

$$(3) \quad M = n^{1/\rho} m$$

Consumer utility (1) is thus increasing in the number of firms or varieties:

$$(4) \quad U = n^{\mu/\rho} m^\mu F^{1-\mu} \quad \partial U / \partial n > 0$$

Analysis of the consumer expenditure minimization problem concerning manufactures consumption reveals that  $s$  is also the price elasticity of demand. Facing this elasticity of demand, industrial firms maximize profits by equating marginal revenue to marginal cost:

$$(5) \quad P \cdot [1 - (1/\sigma)] = W$$

(variety and region subscripts dropped for ease of exposition) so that the profit-maximizing delivered (and mill) price to local markets is a parametric markup ( $1/\rho$ ) over the local wage. Within each region each industrial firm charges the same delivered price to local residents. The optimal delivered price would be lower the more substitutable products are (the larger is  $\rho$ , and  $\sigma$ ). The optimal delivered price is higher if preferences for variety or the degree of differentiation is higher (lower  $\rho$  and  $\sigma$ ), or the higher local wages. To compete with another region's suppliers, therefore, producers must either pay lower wages or *differentiate* their product more.

The *new economic geography* models highlight that a preference for variety is a basis for increasing returns to scale. The higher the preference for variety, the higher the price premium, and the larger the external economies of scale for producers of luxury goods in the region. The more producers will locate in the region, the more workers, the wider the variety produced, and the higher the real utility of the population there. Lancaster (1979, page 54) showed that economies of scale ( $\theta$ ), expressed as the inverse elasticity of cost (percentage change in cost with respect to percentage increase in quantity)

are an inverse function of the elasticity of substitution between inside (differentiated) and outside (homogeneous) goods ( $\sigma$ ). Taking the ratio of average cost (AC) to marginal (MC) cost:

$$(6) \quad \theta = AC/MC = W\sigma/W(\sigma-1) = \sigma/(\sigma-1)$$

In long run equilibrium, the market price (shown in 5) will equal average cost. The local wage is the marginal cost. In general, the production process is homogeneous of degree  $\theta$ , which is inversely related to  $\sigma$ . Almost all *new economic geography* models include this demand-side engine of agglomeration economies of scale.

Note also that since the local labor supply constrains the size of the industry, the higher the preference for variety (smaller  $\sigma$ ), the more numerous and smaller the firms will be. In fact, the external scale economies far outweigh the internal returns to scale, so in 'new economic geography' models, the optimal firm size can be as small as a proprietorship (single employee). Thus, there is no particular reason why rural industry, if differentiated from the urban competition, couldn't profit from the same preference for variety. (Think of French wine or cheese industries.) The problem with the existing new economic geography models, however, is that goods are not *qualitatively* differentiated according to their origin of production. Isserman (1996) critiques the new economic geography model as 'oversimplifying both urban and rural places:'

"Rural areas, however, produce food, natural resources, and other goods and services that are tied to place-specific attributes. Many of these goods cannot be produced in cities. Leaving these goods out of the model becomes a problem when drawing conclusions about the effects of trade on urbanization..." (Isserman, page 39)

Most Krugman-style modelers also assume mill-pricing, which implies that both prices and firm size are parametric (Krugman, 1993, 1996; Fujita and Krugman, 1995; Calmette and Le Pottier, 1995; Walz, 1996). Only real wages are endogenous; and, to close their systems, other modelers assume that the price level is unaffected by the entry or exit of a firm (*infra marginality*). As discussed above, the *infra marginality* assumption seems most egregious for modeling new business openings in remote, low density places. In sympathy with Kaldor's localized competition critique, in my 1998(a) paper I assumed uniform delivered pricing and endogenized market prices and firm size. Firm profits depend explicitly on the spatial distribution of the population. I did not invoke *infra marginality* to close my system, but solved it as a fixed point problem (a true general equilibrium system). With that system I show the existence of stable equilibria in which all regions are occupied in various densities. Krugman-style models only have one stable equilibrium: full concentration in some region.

A recent paper by Helpman (1998) also shows that with the proper assumptions, concentration is not the only stable equilibrium. Helpman shows that all regions are occupied when "housing" (the outside or homogeneous good) has the largest budget share, and people have sufficiently low preferences for variety. I found that all regions are occupied even if the share on the outside good ("food") is low.

### Insights from Lancaster

If there is no feedback from the opening of a new firm in the 'hinterland,' then our models can only simulate urban concentration. If there is

feedback, we can simulate the entire range of relative population densities observed in the real world. What pattern is optimal? There is no single socially desirable spatial allocation. Desirable patterns vary with community preferences. The Tiebout Hypothesis (Tiebout, 1956) is that people choose their desired mix of public or non market goods by migrating, where the spatial configuration of the community is, in effect, one of those non market goods. The work of Kelvin Lancaster may help us model remote, low density populations more effectively.

In 1979, Lancaster made an "informal guess" about how the distribution of population (location in geographic space) may arise from the distribution of preferences (location in characteristics space):

"...the degree of preference variation over the population may vary from one society to another. This degree of variation is itself an important economic parameter, as is shown in the economic simplifications that would result from a total lack of variation. It might be expected that societies with a large degree of ethnic and cultural homogeneity (Scandinavian countries, for example) would have less variation than societies with more diverse populations (like the United States or the Soviet Union), but this is merely an informal guess."

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Lancaster's exploration of the equity and efficiency problems of modern economies was based on three key elements: variety among individual preferences, variety among products, and economies of scale. In contrast with Chamberlin (1962), who did not attempt to quantify qualitative differences between products, Lancaster says that differences between products can be decomposed into differences in measurable *characteristics* (such as the degree of sweetness of cider). Consumers derive utility from the characteristics. As such, the product demand is derived from consumer demand for characteristics. Lancaster classifies products of common characteristics as being in a *group*, and further specifies that consumer utility is separable between the characteristics of the group and those *outside* the group. Finally, Lancaster assumes that goods in the same group are also similarly produced. He modeled production by displaying constant marginal and declining average cost (never lower than marginal cost due to a fixed cost). Lancaster also assumed the most competitive market structure compatible with the afore mentioned economies of scale: monopolistic competition.

Lancaster pointed out that fewer different products (but possibly many plants) and smaller market areas are to be expected when agglomeration scale economies are low. If preferences are such that no variety is desired in the consumption of necessities, but it is desired for luxuries, the opportunities to exploit agglomeration economies will rise as income increases. This happens over time. Population accretes and capital is accumulated. This growth may support the positive feedback we saw above; as Lancaster says:

"an increase in population will (1) increase the degree of product differentiation if the range of diversity is unchanged and the degree of economies of scale varies with output, but have no effect if it is constant, (2) increase the number of goods (and the degree of product differentiation in that sense) if the range of diversity is increased, and (3) lower the per capita resources required for a given level of welfare per capita, whether or not the degree of economies of scale varies with output." (1979, page 79)

## Conclusion

The problem with some rural areas in the USA may be that communities do not differ one from the next. Rural places in the corn belt, for example, are not only sparsely settled, they are also homogeneous: soy and corn fields as far as the eye can see; no architectural variety; and the same franchise fast food/gas shops in all the towns. In the old days, high transport costs justified the proliferation of fixed costs, and insulated one rural place from the next. Now that people can travel across the state within hours, only a few rural places offering homogeneous services and amenities, are needed. Rural places compete with each other in the classic Hotelling sense.

A preference for variety, however, can motivate customers and residents to 'go the extra mile.' All new economic geography models highlight the fact that if consumers value diversity, those who supply it can capture supra-normal profits. Thus, rural areas that offer desirable, unique, or distinctive products or natural resource amenities can capitalize on the premium prices they are able to charge for their fare. If rural citizens and rural tourists, however, actually prefer crowded places and homogeneous products, consolidation is the only hope for survival of a few, relatively accessible, rural towns. Workforces in such towns face the prospect of competing with workers in other countries on the basis of lower wages. They can work in large factories (which capture internal economies of scale), and they mass-produce items in the final (homogeneous) stage of their product cycles. They may also face cyclical redundancy problems, as the old products become obsolete.

All 'new economic geography' papers also show that regional development in the context of agglomeration economies depends on raising real rural wages. Higher real wages attract population and thus support cumulatively causal growth. My own 'new economic geography' work has shown that a market-deepening policy may be an effective rural development strategy. In general, a higher real wage for rural people can be obtained in four ways: higher nominal rural wages, lower rural prices, subsidies, or more positive rural externalities. Unfortunately, high nominal rural wages and low rural prices would repel firms. Our models also show that government subsidies cannot substitute for the positive production externalities (external to firms but internal to an industry) of urban agglomeration in rural places. As should be expected, subsidies ultimately go the owners of the relatively fixed factor of production: urban land. That leaves externalities. One way to raise real wages in rural areas without repelling firms or raising urban land rents is to improve the quality of rural life. Increasing the array of amenities enjoyed by rural people may be a more effective strategy than attempting to alter private incentives facing businesses.

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