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Crossing the Next Meridian: The Economics of Rural-Urban Interdependence, Institutions, and Income Distribution in the American West

Bruce A. Weber

This article explores and develops three ideas: (a) that the aridity of western North America and its attendant characteristics have fundamentally shaped the work of western agricultural economists and encouraged some distinctive western contributions to the study of economics; (b) that in order to understand economic relationships that are critical to rural western economic development, economists need to move beyond the standard equilibrium economic models and explore some emerging models of spatial development and institutional change in which the concept of "increasing returns" plays a key role; and (c) that the West provides a fine laboratory for testing these frameworks.

Key words: income distribution, institutional change, rural-urban interdependence, spatial development

Introduction

Wallace Stegner, the dean of western writers, identifies the West as "two long chains of mountain ranges with deserts and semi-deserts in their rain shadow" (p. 46). Although there are different ideas about where the "American West" begins and ends, most writers on the West, like Stegner, focus on the contiguous region west of the 100th meridian.¹

In this article, I explore and develop three ideas: (a) that the aridity of western North America and its attendant characteristics have fundamentally shaped the work of western agricultural economists and encouraged some distinctive western contributions to the study of economics; (b) that in our attempts to understand economic relationships that are critical to rural western economic development, we need to move beyond our standard equilibrium economic models and explore some emerging models of spatial development and institutional change in which the concept of "increasing returns" plays

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¹This includes the 17 contiguous western states. Alaska and Hawaii are often handled as special cases because of their unique geography and socioeconomic histories. Much of what is said about the West in the U.S. would also apply to the Canadian West—the four westernmost Canadian provinces.

a key role; and (c) that, given the urban concentrations and sparseness of settlement, the high geographic mobility of people and capital in the western United States, the dominant and contested federal presence, and the region's natural amenities, this region provides a fine laboratory for testing these frameworks.

Western Aridity and Western Agricultural Economics

Historians and observers of the West have identified various characteristic features that distinguish it from other regions. Historians Malone and Etulain, for example, identify (a) aridity, (b) "a common shared history . . . a frontier experience," (c) federal land ownership, and (d) "a common attachment to the mystique of the 'wild'" as distinctive "core features." Starrs, a geographer, says that "for most Americans, the West is a realm of dryness, federal lands, expansive vistas, and abrupt relief" (p. 108).

Although different observers emphasize different features of the West, there is one characteristic that explicitly appears or is implied on everyone's list, and that characteristic is "aridity."

As Stegner noted, "The only exception to western aridity, apart from the mountains that provide the absolutely indispensable snowsheds, is the northwest corner, on the Pacific side of the Cascades. It is a narrow exception . . ." (p. 60). Apart from the Pacific Northwest rim and the mountain snowsheds, the land west of the 100th meridian generally gets less than the 20 inches of annual rainfall ordinarily needed for unirrigated crops. In an essay entitled "Living Dry," Stegner argues (and I would agree) that much of what is distinctive about the West derives from its aridity:

Aridity, and aridity alone, makes the various Wests one. The distinctive western plants and animals, the hard clarity (before power plants and metropolitan traffic altered it) of the western air, the look and location of western towns, the empty spaces that separate them, the way farms and ranches are either densely concentrated where water is plentiful or widely scattered where it is scarce, the pervasive presence of the federal government as landowner and land manager, the even more noticeable federal presence as dam builder and water broker, the snarling states'-rights and antifederal feelings whose burden Bernard DeVoto once characterized in a sentence—"Get out and give us more money"—those are all consequences, and by no means all the consequences, of aridity (p. 61).

Characteristics of the Western Region

Gardner, in a paper written for the National Rural Studies Committee on the future of rural areas in the western region, identified four characteristics of the West that have had and will continue to have an impact on rural areas. These characteristics, which flow directly from the West's aridity, are (a) a predominately urban economy and low population densities; (b) an agricultural sector with much of the output produced under irrigation; (c) an "assertive federal presence notably in land ownership, but also in debilitating legislation"; and (d) the value of the region's resources and climate for residence and recreation.

Urban Concentrations and Sparsely Settled Hinterlands. The West is well known for its wide open spaces: seven of the 11 westernmost states rank in the bottom 10 states

by population density. However, four of the 11 states also rank in the top 10 states by percentage of urban population. Gardner offers an economic explanation for this: "The high cost of providing private and public goods and services for people living at low densities is one reason for greater urban settlement in the west. Economies of agglomeration imply that a critical mass of population is essential to providing many goods and services at low cost" (p. 116). The presence of urban concentrations proximate to large expanses of publicly owned land is the source of intense conflict. As Gardner states, "What the urban West wants from the public lands and water resources is not what the traditionally rural west is willing to give" (p. 116).

Irrigated Agriculture. While irrigated agriculture is not the exclusive province of the western U.S., the "water withdrawals for irrigation have greatly exceeded those for all other uses combined" (Gardner, p. 116). Urban population growth and claims to water for environmental purposes and Native American fishing rights ensure that conflicts over water now used by agriculture will continue to be a source of conflict in coming years.

Federal Presence. The western U.S. contains the bulk of the federal lands, and federal lands constitute almost half of the western land area (47–48% of the land in 11 western states). Almost all of this is in federal forests and public domain used for grazing. For states like Nevada, 87% of the land is federally owned. Federal management practices on these lands and restrictions on the use of the lands by those harvesting trees or grazing cattle on the lands are thus of some consequence. Demands for improved water quality and the requirements of the Endangered Species Act have led to grazing and timber harvest restrictions, and will be a continued source of conflict.

Demand for Recreational Amenities. Heightened demand for outdoor recreation, particularly on public lands, and for attractive retirement destinations has created pressures for these restrictions. The rural west has attracted retirees for decades, and recreation revenue is considerable in Colorado, Oregon, New Mexico, and Utah (Gardner, p. 116).

Impact on Western Agricultural Economics

The above characteristics of the western region have defined the work environment of western agricultural economists, and led to pioneering work in resource economics and regional economics. The following section of the article draws heavily on Castle et al., who compiled an extensive postwar review of natural resources literature commissioned by the American Agricultural Economics Association.

Resource Economics. Gardner's last three characteristics of the West—the prevalence of irrigation-dependent agriculture, the dominant federal presence, and the relatively heavy nonextractive and recreational demands for natural resource use (particularly on public lands)—provided impetus for pioneering work in natural resource economics. Western agricultural economists were in the forefront in the post World War II evolution of modern natural resource economics out of land economics. Ciriacy-Wantrup made a pioneering contribution to a developing natural resource economics in his book *Resource Conservation: Economics and Policies*, which was concerned with intertemporal distribution of resource use and the influence of institutions on this use. Castle (1965) urged a focus on externalities in the study of resource issues, contributing to the integration of welfare economics principles into resource economics.

Western agricultural economists were early and steady contributors to two major strands of resource economics: water resource economics and the economics of outdoor recreation. Ciriacy-Wantrup, Kelso, Gardner, Huffman, and other western agricultural economists were early contributors to the literature on water resource economics that led to the landmark 1964 work, *Economics and Public Policy in Water Resource Development* (edited by Smith and Castle). This effort grew out of more than a decade of work by the Committee on the Economics of Water Resource Development of the Western Agricultural Economics Research Council. Much of the work dealt with criteria for public investment and benefits and costs of water development (Castle, Kelso, and Gardner), and with the development of techniques for valuing nonmarket goods.

Recognition of the increasing economic importance of tourists and recreationists, plus an interest in nonmarket valuation of goods for project evaluation, spawned a great deal of research in the economics of outdoor recreation. Clawson, in a seminar at the University of Wisconsin (later published by Resources for the Future), developed the "travel cost method" of estimating a demand function for a recreational site. Brown, Singh, and Castle first applied this method in their study estimating the value of recreational salmon-steelhead fishing. These early estimates were used (and misused) to allocate fishing access between user groups and to argue for expenditures to mitigate fishing habitat loss (Castle and Brown). Stevens; Reiling, Gibbs, and Stoevener; and Wennergren and Fullerton embellished the framework in ways that improved the specification of the model. Westerners also have been in the forefront in the development of the "contingent valuation method," the other leading contender in nonmarket valuation techniques. Mitchell and Carson credit Ciriacy-Wantrup with first proposing the idea of using a "direct interview method" for measuring values associated with natural resources, and western agricultural and resource economists with much of the pioneering methodological work (Randall and others at the University of New Mexico, and Cummings and others at the University of Wyoming). The Western Regional Research Project W-133 continues to be one of the primary forums, if not the most important forum, for people working on issues of nonmarket valuation of resources.

Regional Economics. It might be argued that Gardner's first three western characteristics (urban concentrations and low-density spaces, irrigation, and federal land prevalence) created the environment in which western agricultural economists were stimulated to pioneering empirical efforts in regional economics. Perhaps the low density of population and economic activity in western rural areas made small regional economies seem more transparent and accessible to empirical analysis. And local interest in the impacts of federal decisions led western agricultural economists to generate some of the earliest applications of state- and local-level Leontief input-output models to resource and water issues (Martin and Carter; Rao and Allee; Jansma; Jansma and Back; Stoevener and Castle; Bromley, Blanch, and Stoevener). Western agricultural economists have continued to pioneer in the application of sophisticated economic models to regional economies. Robinson, with his colleagues at the University of California, has been a leader in the development and regional application of computable general equilibrium models (Berck, Robinson, and Goldman). Holland at Washington State University (Holland, Weber, and Waters), and Robison and his associates (Robison and Miller) at the University of Idaho have, through development of multiregional core-periphery input-output models, spawned a western applied literature on rural-urban economic interdependence (Holland and Weber).

The Next Meridian: New Growth Theory and New Institutional Economics

Charles Wilkinson has written a book on western institutions entitled *Crossing the Next Meridian*. He argues that, in order to achieve environmental sustainability (his "next meridian") in the western U.S., we need to let go of the "lords of yesterday"—the water and land law that has shaped the modern West. I believe, for economists, there is an important boundary to cross in our understanding of the dynamics of spatial development and institutional change. In order to cross this meridian and better understand the dynamics of western economies, we need to let go of familiar frameworks and explore new economic models.

During the past decade or so, economists have become more willing and able to incorporate increasing returns into models of growth and institutional change. Alfred Marshall recognized that the comparative static analysis of economic behavior which became the standard in economic theory in the 20th century would not be adequate to analyze dynamic systems with increasing returns. As Castle has pointed out (1989a, b; 1990), Marshall's insight got lost in the formalization of "equilibrium economics" stimulated by Samuelson in the middle years of the century.

Spatial Economic Change

It has long been recognized that neighboring regional economies often grow at different, even diverging, growth rates over long time periods. This has stood as a challenge to conventional growth models, which would predict that growth rates in proximate regions would converge.

Both Kaldor and Myrdal developed models of regional growth in which the presence of increasing returns—stemming from induced technical change, agglomeration economies, and induced institutional innovations—generates cumulative change and allows divergent growth rates. In part, perhaps, because these models were not based on conventional economic assumptions, they did not penetrate the mainstream economics literature. Kaldor's wage rates, for example, are determined through a neo-Keynesian process that allows wage rates to differ from their marginal value product over long time periods.

In the mid-1980s, however, growth models that allowed cumulative self-reinforcing growth by incorporating increasing returns and imperfect competition began to appear in mainstream economics discourse. Krugman (1996) traces this so-called "new growth theory" to Romer's (1983) seminal work. Romer (1986) argued that technological change might be endogenous and that increasing returns in knowledge may generate endogenous growth in which growth rates can be increasing over time.

Krugman (1996) has taken these insights and used them to explain increasing geographic concentrations of population and economic activity. In what he calls the "new economic geography," Krugman (1995), attempts to explain city size and location by examining the interplay of centralizing economic forces (increasing returns and transportation costs) and dispersing forces (immobile factors of production). Krugman's model implies that increasing urban concentration is generated by the interaction of the better access to markets and inputs in urban areas and the increasing returns inherent in complex production processes with high fixed costs. Kilkenney has demonstrated,

however, that if the cost of transporting agricultural products falls more slowly than the cost of transporting manufactured goods, the centralizing tendencies of the Krugman model are weakened.

Krugman's model also suggests that history matters, that random economic events can have long-lasting implications, and that growth rates in core and periphery economies need not converge toward equilibrium.

Institutions

While economists have long recognized the importance of institutions, historically they have been reluctant to treat them as variables amenable to analysis. Those who did study institutions and identify themselves as "institutional economists" generally developed and applied analytical frameworks that do not depend on standard assumptions about economic behavior. Because of this, traditional institutional economics has been regarded in most economics programs as an intellectual curiosity.

Over the past several decades, Douglas North has been attempting to explain differences in economic growth rates by examining institutional change. Like traditional institutional economists, North defines institutions as "the rules of the game," the laws and norms by which societies live and the mechanisms that enforce rules and norms. North's innovation is to hypothesize that institutional change is the outcome of the interplay of institutions and "organizations" (groups of individuals with a common purpose). North and the "new institutional economics" have been given a serious hearing by mainstream economists because, in contrast to the traditional institutional economists, they adopt the conventional optimizing assumptions about economic behavior. North examines how institutions affect transactions and transformation costs in their role of reducing uncertainty, and how organizations respond to their institutionally constrained choice sets to change institutions to better serve their own objectives.

Libecap (1996a) describes the "new institutional economics" as a framework that "seeks to extend the range of applicability of neoclassical economic theory by considering how property rights structures and transaction costs affect incentives and economic behavior" (p. 4). The new institutional economics pays attention to, among other things, transactions costs, information problems, and bounded rationality, but retains the conventional emphasis on individual maximization and marginal analysis.

Crossing the Next Meridian

For Wilkinson, crossing the next meridian involves abolishing old ideas and replacing them with new ones (p. 305). For economists, crossing the meridian of understanding the dynamics of economic change can be more incremental, I believe. In this concluding section, I would like to suggest three directions for future work in agricultural economics in the West that involve exploring and developing new frameworks that build on well-developed foundations. I will then assert that the Western Agricultural Economics Association can serve a useful catalytic role in helping western agricultural economists better address the learning and information needs of the people we serve in their roles as consumers, producers, citizens, and policy makers.

Rural-Urban Economic Interdependence

The new economic geography is rather pessimistic about the future of rural areas. Growth in this model tends to cluster in cities, given the historical location of large-scale production and demand, continually decreasing transport costs, and the economies of agglomeration in knowledge-intensive industries. Western economists and agricultural economists have been suggesting that traditional growth models do not pay enough attention to the role of environmental amenities in explaining the location of economic activity (Power; Rasker; Johnson and Rasker). These economists are challenging the traditional view that rural economies are driven by extractive commodity exports. Although their work does not consider the way amenities might modify the dynamics of location in a world with increasing returns and decreasing transport costs, their insight that amenities matter in location decisions deserves to be taken seriously. The new economic geography models provide a framework for examining this insight. The agglomerative forces at work in urban areas probably enhance the scarcity value of rural amenities. Urban growth has a potential spread effect beyond the demand for rural raw materials for urban manufacturing.²

Western agricultural economists could profitably explore how including environmental amenities in a model of urban-rural spatial dynamics with increasing returns might modify the predictions about urban concentrations that emerge from Krugman's work. Such an undertaking might result in redefining the terms of economic interdependence between urban core and rural periphery in economic models. Given the high urban densities, magnificent amenities and sparse rural hinterlands, and the spatial variation in growth rates, the American West is a fine laboratory for testing both the basic new economic geography model and its amenity-based extension.

Institutions and Institutional Change

Given the rapidly changing institutional relationships in the West and the heightened conflict over property rights in water, land, and other natural resources, western agricultural economists might profitably take another look at the economics of institutions and institutional change, particularly as practiced by the "new institutional economists." As Libecap (1996b) points out, there are three implications of the "new institutional economics" for economists interested in rural areas. First, property rights structures matter in rural economic development, because of their impacts on investment and growth and on the distribution of the gains of trade. Second, institutions matter—even if we can derive the "optimal policy mix," we cannot assume that we will get there. Understanding the importance of transactions costs and the distribution of gains and losses from policy change can be important in designing arrangements that move governments toward the optimum. Finally, policies matter, for they have an impact beyond the immediate impact through their rearranging of incentive structures.

This set of economic ideas may be particularly useful to those involved in designing institutions to address such perennial and emerging concerns of agriculture as water allocation, riparian zone management, grazing rights, endangered species, and agricultural wages.

² This was suggested to me by David Kraybill.

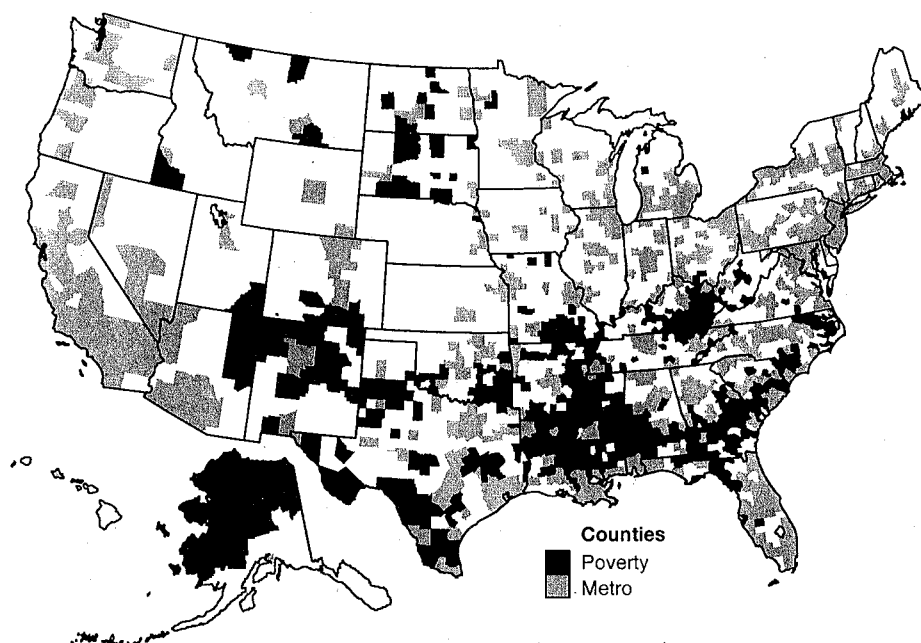


Figure 1. Persistent poverty counties are concentrated in the Southeast, Southwest, and Appalachia

Poverty, Inequality, and Growth

Finally, western agricultural economists might usefully pay more explicit attention to poverty and the size distribution of income, and their relationship with economic growth. Poverty in this country is often regarded as a problem of the southeastern region. While persistent poverty is a prevalent feature of that region's economic landscape, it is also a blight on a significant portion of the West, as shown in figure 1 (U.S. Department of Agriculture 1995). There is also considerable evidence that, during the last quarter of a century, the distribution of income in this country has become more unequal (Weinberg). Long ago, Kuznets, in a thought experiment outlined in his presidential address to the American Economics Association, hypothesized an inverted-U relationship between growth and inequality, suggesting that inequality increased in the early stages of growth and decreased after a certain level of income was attained. Western agricultural economists have a long, albeit thin, history of attention to income distribution and growth issues. Adelman and Morris examined the relationship between economic growth and income distribution in developing countries; their findings suggested that economic growth leads to greater income equality, as Kuznets hypothesized. Adelman and Robinson have summarized economists' work on this issue.

More recently (Chang), economists are suggesting that the direction of causality from growth to inequality implied in the above discussion may not be valid, that we don't know whether growth affects income distribution, or inequality affects growth, or whether the two are simultaneously determined. I am not aware of any work that rigorously examines changes in the size distribution of income in a model of core and periphery growth dynamics or explores the idea that spatial concentrations of poverty

set up their own self-reinforcing dynamic in a core-periphery framework. Some stylized facts can guide our inquiry of these complex relationships (U.S. Department of Agriculture 1997). Nonmetro poverty rates are consistently higher than metro poverty rates. Job growth rates are sometimes higher in metro counties (early and mid-1980s, mid-1990s) and sometimes higher in nonmetro counties (early 1990s). The poverty gap between metro and nonmetro areas appears to decrease when job growth in nonmetro areas is higher, and to increase when it is lower than in metro areas.³ I would suggest that the western U.S. might be a fine laboratory for developing and testing a rigorous model of core-periphery growth dynamics with the size distribution of income or poverty endogenous, given the variations in growth, poverty, and income inequality across the region and the rich variations in population density and distance from urban centers in the spatial matrix.

WAEA as Catalyst

There are still intellectual frontiers to cross in agricultural and resource economics, both disciplinary ones and those of practical policy-oriented application. The WAEA can play a catalytic role in the crossing of these frontiers by supporting three types of activities: (a) learning opportunities for agricultural economists about the most important developments in economic theory and methods, (b) focused interaction of academics and policy makers on critical agricultural and resource issues in the region, and (c) opportunities for us (particularly those of us privileged to serve in academic institutions) to reflect on our professional responsibilities to the society that supports our work (Sullivan).

The American West's aridity, urbanization, sparsely settled hinterlands, heavy federal presence, and environmental amenities put a unique cast on western agricultural and resource issues. These characteristics indeed often generate policy issues that don't exist in the rest of the country. I have argued in this article that in the past some of our most outstanding work has evolved out of the application of the best current thinking in economics to western policy issues. I believe that we can continue to make positive contributions by keeping ourselves and our students and collaborators up to date on the best of current economic thought and applying it in addressing the concerns of western agriculture and rural areas. If nothing else, this will keep our work fresh. I believe it will also ensure that western agricultural economists continue to make original contributions to economic thought and practice.

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³ The spatial dynamic is, of course, more complex than a simple metro/nonmetro dichotomy would suggest. We know, for example, that poverty incidence in 1995 was higher in central cities (20.6%) than in either nonmetro counties (15.6%) or metro areas outside central cities (9.1%) (Baughner and Lamison-White). To capture this properly would require an urban core/suburban ring/rural periphery framework.

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