CURRENT AND DEVELOPING ISSUES IN INTERREGIONAL COMPETITION AND AGRICULTURAL TRANSPORTATION

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This paper identifies current and developing issues in interregional competition and agricultural transportation. These topics are related to the extent that the cost and quality of transportation services is one major determinant of the economic distance between regions.

Interregional competition analysis was introduced to agricultural economics in the late 1930s, with the stimulus of agricultural research funds authorized by the Bankhead-Jones Act of 1935, under the leadership of Sherman E. Johnson and John D. Black. Interregional competition developed as a synonym for regional comparative advantage. Interregional competition analysis is a general set of tools designed to measure regional comparative advantage. The role of these approaches is to reveal which industries can be sustained in various geographic regions, for the purpose of guiding efficient resource allocation. Treatment of interregional competition in this paper will be limited to this original scope of interregional competition analysis, omitting consideration of subsequent developments in spatial equilibrium tools relating to optimal plant location and commodity flows.

Agricultural economists have shown interest in agricultural transportation for an even longer time. Recent interest includes a Great Plains regional project, GP-10, which addressed transportation issues in the 1960s; and a 1965 Denver conference, resulting in a book entitled *Transportation Problems and Policies in the Trans-Missouri West* (Davidson and Ottoson). When the 1970 Penn Central Railroad bankruptcy threatened rural railroad services, and the 1972–73 Soviet grain sale clogged the grain transportation and storage system, interest in agricultural transportation blossomed in the Midwest and Northeast. Despite the South's good fortune in being spared transportation crises, transportation remains an important agricultural input industry. Factors suggesting that transportation issues will be of greater analytical interest in the South in the future include the rapid trend of transport price increases, the vast changes in transport regulation, the relatively rapid increase in petroleum-based fuel prices, and the increasing importance of midwestern feedgrain imports into the South.

Current and developing issues in interregional competition and agricultural transportation research and extension can be identified not only by current market situations, but also by the profession's perception of the types of issues that can be addressed under these categories and the approaches used to analyze the issues. The approach taken here is to consider the profession's scope in problem definition and theoretical and empirical analytical approaches in these areas, as well as evolving topical issues. Interregional competition is considered first.

INTERREGIONAL COMPETITION

Sherman E. Johnson composed the charge of interregional competition analysis in 1937 after studying the definition and the determinants of comparative advantage: "Agricultural economists . . . have attempted to define comparative advantage in terms of the tendency of an area to seek the most remunerative use of its productive resources in view of its alternatives in production, and in view of the market conditions which result from the demand for various products and from other areas producing in accordance with their best alternatives" (p. 225). Under assumptions of full employment and perfect competition, market prices of factors and products are used to determine comparative advantage (Seaver, p. 1,368).

Regional comparative advantage is determined by factor endowments, the nature of other regional factor supply determinants, and the nature of regional commodity demand determinants. At least one resource must be immobile. Typically, land and its attributes are assumed immobile. Sherman Johnson listed immobile factors that determine regional advantage and disadvantage as physical (climate, soil, surface, water supply); locational (the relation to population, markets, and transportation); biological (prevalence of pests, diseases, and resilient varieties); human (the structure and density of population, nationalities, educational attainment, and rates of

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work); capital (extent and condition of existing plant and infrastructure); historical (skill and reputation for reliability); and institutional (taxation, regulation, cooperative organizations, and patterns of ownership and control). These immobile factors of production advantage determine the charge of interregional competition analysis: "We . . . need to begin by analyzing all of the factors contributing to the production advantages and disadvantages of an area at a given time, and then attempt to determine the relative permanency of each factor and to study the possible changes in its effects over a longer period" (Johnson, p. 227).

This is a broad conceptual charge. But how far can it be carried out in practice? Can one measure comparative advantage? Why would one want to measure comparative advantage?

Can One Measure Comparative Advantage?

Sherman Johnson (pp. 237–38) and Mighell and Black (pp. 294–300) outlined tremendous data needs to apply interregional competition analysis. In those early days, W. C. Waite expressed doubts about the empirical applicability of interregional competition analysis. One can speak in general terms of relative, regional advantages and comparative advantage, he said, ". . . but as we attempt to pin the discussion down to more and more specific problems we find the concept becoming more and more elusive and difficult to examine precisely. Moreover, the factual data become increasingly difficult to assemble . . . The list of qualifications grows and grows and when we finally arrive at logical exactness, we have the thing in a straight jacket. The creature looks strange indeed and so far removed from actual life that we wonder about its usefulness in the analysis of current problems" (pp. 238–39). Awesome data requirements limited early applications of interregional competition analysis to a collection of regional supply response studies for a single commodity, milk (Mighell and Black, pp. 10–11).

Introduction of mathematical programming algorithms and computers tempted agricultural economists to devise large models to handle the large amounts of data required. Early conceptual models made room for multiple-commodity trade-offs, but used rigid economic functions (Judge; Hall and Heady). Reactive programming (Seale and Tramel) and simultaneous equations methods (Lee and Seaver) have injected price-responsive supply and demand information into these models.

However, applications of interregional competition analysis suffer from two deficiencies in fundamental economic principle. First, applications have been limited to single-commodity industries.[1] Single-commodity models violate the opportunity cost foundations of regional specialization. Comparative advantage theory states that entrepreneurs in different regions will tend to specialize in production of commodities for which they hold a comparative advantage, or comparative cost, and trade for other commodities. The theory is based on opportunity cost. Given an endowment of an immobile resource, producers in region A may be able to supply two goods at prices lower than producers in region B would offer, but be unwilling to do so because of an opportunity to specialize in producing the commodity for which they hold relatively the greatest advantage and trade for the other.

Single-commodity industry location models obscure the opportunity costs of regionally endowed resources inherent in the comparative advantage concept (e.g., Schrader and King; Byrkett et al., Grise; Ryland and Guise). Gordon King recognized this problem in 1963 in an evaluation of the Schrader-King cattle feeding location study: "The present model of feedlot location singled out one activity in the feed-livestock complex for analysis, and thus is not entirely satisfactory from the view of interregional competition and the concept of comparative advantage. Although the quantification of a more complex model, incorporating alternative livestock products, is theoretically feasible, present knowledge of some of the key variables such as regional feed conversion efficiency seriously limits its potential usefulness" (p. 104).

Lee Day has argued that the bias introduced in interregional competition models from not considering commodity interactions is largely insoluble (p. 193). When one tries to limit the size of a problem by selecting commodities and areas to consider, one biases the results. Transportation models and reactive programming models using explicit supply functions, and activity analysis using implicit supply functions all suffer the same sources of bias: omitted commodities, regional specification and aggregation. Recent studies verify these sources of bias. Pendse and Youde show that introduction of other commodities for backhaul opportunities can affect transfer costs sufficiently to change regional, "optimal" flows. Byrkett et al. show that results of a cattle feeding location model are sensitive to the way the origin and destination regional configuration is selected.

Effective measurement of comparative advantage requires incorporation of multiple-commodity opportunity trade-offs, that is, opportunity costs. Estimated commodity supply and demand functions are subject to fixed levels of activity in other commodity industries.

[1] Fedeler and Heady provide an exception. These authors test the effects of transportation system changes on the location of crop commodity production; livestock commodities are omitted.

Evaluating effects of a change in the price or quantity in one market without allowing for change in other markets is a partial equilibrium solution; comparative advantage is a general equilibrium concept. Bressler and King conceptually show the type of commodity interaction required with use of interregional offer curves (pp. 279–325). But this is empirically impractical.

The second, and related, fundamental violation of economic principle lies in the nonmarginal use of "competitive equilibrium" prices to ease data collection. In pure competitive equilibrium, market prices of resources and products represent marginal opportunity costs and markets are separated locationally and temporally by only transportation and storage costs (prices), respectively. If the analyst believes the markets are working so well, it is unclear why he or she would want to measure comparative advantage; comparative advantage would be visible to the observer. If the analyst believes the markets are not working so well, then prices would not represent marginal opportunity costs, and markets would be separated by other than transportation and storage costs; to use prices as parameter estimates would yield biased results and any prescriptions made would be erroneous.

Much of the price data used in interregional competition analysis clearly does not represent a competitive equilibrium. Many transport rates are regulated. Prior to 1981, the railroad and common carrier trucking industries were characterized by cartels with limited entry and price protection governed by the Interstate Commerce Commission. Tobacco, sugar, peanut and cotton allotments, marketing order quotas, import restrictions, and grain price supports all represent divergences from pure competitive equilibrium that prohibit measurement of pure comparative advantage with market price data. This is not a problem in itself if the analyst makes clear the assumption that these regulatory diversions from pure competition are assumed as permanent, exogenous institutional characteristics attached to resources.

The problem arises when the analyst uses a single-commodity model and market price data to measure the change in comparative advantages when one of these permanent, exogenous rules is changed. If prices in one market represent opportunity costs at one equilibrium position, assuming certain exogenous rules, these prices no longer represent opportunity costs at a different equilibrium position after a nonmarginal change of conditions. Nonmarginal changes send waves through many markets, with feedbacks affecting opportunity costs in each market. If the analyst is simulating competitive data, rather than using market data, there is a measurement problem of not including all of the variables used by decision makers. This will be discussed further in the next section.

Can one measure comparative advantage? No. The insoluble problems of including all of the relevant markets simultaneously and measuring opportunity costs of resources in unobservable situations prevent measurement. A detailed visualization of the invisible hand is a prerequisite.

Why Measure Comparative Advantage?

At times, interregional competition models are used in a normative sense to represent how an industry should be structured to enhance efficiency or welfare and to prescribe adjustments accordingly. That is, if an observed price basis separating two markets is greater than the model-estimated basis, a market imperfection is thought to have been discovered. The normative usefulness of interregional competition results is suggested by Sherman Johnson (pp. 235–37) and by Mighell and Black (p. 3) as a guide to public action to influence private action.

The chief problem in using interregional competition analyses to judge industry efficiency lies in omission of many decision variables that are important to decision makers (a source of bias). In 1937, W. C. Waite warned that, although some immobile factors of production advantage are constant within regions, "as we come closer to the individual farm there are multitudes of variations and a wide variety of factors still remaining" (p. 239). An economic analyst cannot perceive the information costs and the value of production plant dispersal to control risk, as decision makers perceive these factors (Pasour and Bullock). After the 1980 summer heat wave destroyed broiler flocks in Arkansas, it is difficult to imagine that broiler producers would consider it efficient to locate plants solely on the basis of regional consumption quantities and transport rates. Results of models that grossly abstract from the multitude of decision variables faced by decision makers cannot serve as standards against which to judge the quality of entrepreneurial decisions.

Welfare measurements derived from single-commodity interregional competition models not only suffer the bias of obscuring opportunity costs, but also by making interpersonal utility comparisons. When producers' and consumers' surpluses are merged to estimate net welfare effects of regulations, the implicit assumption is made that the marginal utility of income is equal for all affected individuals. Leo Blakley and his colleagues are careful to identify group gains and losses from removing market restraints without netting the effects (Blakley and Kloth; Blakley and Riley).

The previous discussion suggests that interregional competition analysis cannot fulfill either the original objective of measuring comparative advantage or prescriptive purposes. Is there a role left for interregional competition analysis?

There do remain roles of seeking an understanding of the dynamic market processes that cause industry location changes, and of developing outlook information to assist private entrepreneurs and government producers in making investment decisions.

The agricultural economist should not take himself so seriously. Rather than tell clients where they should be, the analyst can concentrate on helping his client determine for himself where he should be and how to get there. By spending fewer resources on data collection and more resources on simple conceptual modeling, economists can develop a greater understanding of how market forces are affected by various stimuli. This kind of information would be useful to decision makers seeking to improve their decision-making procedures.

The author proposes construction of opportunity gradients as a new approach to interregional competition analysis. By concentrating the focus of empirical studies on a few representative points in space rather than trying to cover all space, the analyst could consider more alternative opportunities. Feasibility and estimated, *ex ante* opportunity costs of alternatives would be considered that are not now considered by interregional competition models. One would not be measuring exact magnitudes of change, but seaching for likely directions of change in opportunity. If there is any truth to the assumed similarity of opportunity within regions, then comparative results for geographic points would be representative of regional comparisons. The emphasis on numerical estimates would be replaced by emphasis on directional change, decision alternatives, and probabilities of change. Results would be more understandable to clientele groups, as well as more complementary with individual decision-making activity.

Topical Issues

There are numerous issues of current interest that can be handled with an opportunity gradient approach. A few of these topics can be stated in terms of refutable hypotheses:

1. Aflatoxin-related corn quality uncertainty and introduction of contract rail rates will reduce substantially the relative opportunity of corn production in the South and enhance the relative opportunity of corn production in the Midwest;
2. corn quality uncertainty and introduction of contract rail rates will increase the relative opportunity of broiler production in Mississippi, Louisiana, Texas, and Arkansas and decrease the relative opportunity of broilers for North Carolina and Georgia;
3. removal of the flue-cured tobacco and peanut allotment programs will increase the relative opportunities of tobacco and peanut production in South Carolina and Georgia and decrease the relative opportunities of tobacco and peanut production in North Carolina;
4. increasing fuel prices will increase the relative opportunity for fresh vegetable production in the South and decrease the relative opportunity for fresh vegetable production in California;
5. the demographic shift from the Frost Belt to the Sun Belt, by moving consumption centers nearer to fresh produce production areas will increase the relative opportunity of fresh fruit and vegetable production in the Southeast and reduce the relative opportunity for fresh fruit and vegetable production in California;
6. railroad rate deregulation will increase relative opportunities for grain storage on railroad mainlines and reduce relative opportunities for grain storage off of railroads and on rail branch lines;
7. increasing irrigation water prices will increase the relative opportunity for cattle feeding in eastern Nebraska and decrease the relative opportunity for cattle feeding on the High Plains.

There are numerous other issues that likely will affect relative regional opportunities of agricultural industries. The deregulation mood of the country suggests that agricultural economists could prepare decision makers with information on likely changes in relative opportunities if price protections of marketing orders and milk commissions were abolished. The same can be said for changes in subsidies implicit in international trade barriers and preservation of unprofitable branch rail lines. Destruction of the railroad and motor carrier cartels and changes in the "common carrier" system of freight transportation regulation could have substantial effects upon relative spatial opportunities in agricultural industries.

Agricultural economists must develop some fresh tools to handle these issues. Continued refinement of the empirical detail of single-commodity models will not improve on measurement of relative opportunities. Evaluating effects on relative opportunities of nonmarginal market and institutional changes will not be done accurately with price data applicable only to marginal changes. The principles of interregional competition can continue to aid decision makers to make better decisions in a dynamic, evolving market process. But new tools are needed.

AGRICULTURAL TRANSPORTATION

Attention to agricultural transportation issues, with exceptions, suffered the same problems as interregional competition analysis. Transportation issues have been treated as competitive equilibrium issues and analyzed with plant location and commodity flow models. Market and policy changes are represented as exogenous, synthesized changes in the level of transportation rates.

The effects of these changes on agricultural industries are studied with competitive equilibrium models that assume perfectly elastic transportation supply at a designated rate, perfectly inelastic or product-price-responsive quantities to be shipped, and a shipper decision rule as simple as selecting the mode of transport with the lowest rate.

These studies represent estimates of the effect on agriculture of exogenous transport market changes using single-commodity models. Unfortunately, competitive equilibrium methods using simple assumptions reveal little about the agricultural transportation market composed of carriers as suppliers, and agricultural shippers and receivers as demanders.

Transportation Research in the 1970s

During the seventies, most efforts were devoted to grain flow studies, identification of policy issues, studies of effects of relative rate changes on interregional flows of single commodity industries, and railroad line abandonment evaluations. An example of these emphases is the three objectives adopted by the north central regional research project on transportation, NC-137, which was formed in 1975: (a) to survey commodity flows and project volumes of transportable surplus to 1980, 1990, and 2000; (b) to develop a large interregional competition model that optimizes a transportation system for agriculture; and (c) to evaluate likely effects of transportation policy changes.

Grain flow surveys have sought to identify volumes of transport by mode of carrier. In an inductive fashion, results of these surveys yield information that is useful in problem definition. However, these surveys have not been used to obtain data for hypothesis testing. Policy issue identification largely has been conducted through a series of discussion papers of the "ask - the - questions - but - don't - answer - them" variety (Kriebel and Baumel; Mennem; Shaffer).

Several studies have evaluated effects on agricultural industries of changes in transportation rate structures (Wright; Baumel et al., 1973; Fedeler and Heady; Johnson and Mennem; Furtan et al.; Belcher et al.; Bunker; Shouse and Johnson). All of these studies used normative methods and assumed perfectly elastic transportation supplies; perfectly inelastic commodity supplies and demands (except Furtan); and a simple transport choice rule of cost minimization or site price maximization, where the cost of transport is the freight rate. These are competitive equilibrium issues, treated with competitive equilibrium tools, with substantial limitations arising from model specification and parameter estimation.

Probably the greatest amount of research resources applied to a single agricultural transportation issue during the last decade was devoted to evaluating railroad line abandonments (Anderson et al.). The first journal description of the railroad abandonment issue was provided by Galloway in 1970.

One approach to rail abandonment studies uses either a modified Stollsteimer plant location model with transshipment, or a network model to optimize a set of transportation and storage facilities for handling grain (Tyrchniewicz and Tosterud; Baumel et al., 1973; Berglund and Anderson; Baumel et al., 1977; Larson and Kane; Ladd and Lifferth). Perfectly inelastic supplies and demands for individual commodities, and perfectly elastic supplies of each modal transportation service are assumed. These assumptions imply that all transport savings and losses resulting from a change go to transport demanders. Each study relies on the simple decision rule that commodities move on the mode-destination combination offering the highest commodity price net of transport rate, and that temporal sales patterns are fixed. Each evaluation tests the viability of whole lines or groups of lines, obscuring the marginal contributions of each rail link. All of the tests conclude that the average effect of rail line abandonment on agriculture is negligible.

A second approach applied to railroad line evaluation is the conventional benefit-cost method of comparing benefits and costs of activities with and without railroad service (Rausch et al.; Johnson, 1976a, 1977). Applications of benefit-cost procedures have shown that portions of lines considered for abandonment can be viable when the whole line considered as a unit fails to meet investment criteria (Johnson, 1976a; Johnson et al., 1978). Benefit-cost studies of extending water navigational channels also have been undertaken (e.g., Shruben et al.).

The benefit-cost procedures have assumed perfectly elastic supplies of transportation services and simple projections of historical base traffic levels. Transport quantities demanded vary in response to what shipper firm managers estimate *ex ante* on questionnaire surveys, but not in response to a behavioral demand function. These studies rely on the same, simple decision rule as the first group of studies. Gerald criticizes the benefit-cost procedures for assuming that traffic volumes and trade patterns remain constant after a change in the rail network.

Initial efforts in analyzing rural road issues by agricultural economists are following the same pattern as efforts devoted to rail abandonment evaluations. Numerous descriptions of the issues were released, followed by mathematical programming, transshipment model (Kirby et al.), and benefit-cost (Lamb and Pine; Walzer and Stablein; Johnson, 1979; Tucker and Thompson) evaluations of rural road investments. The volume of analytical work in this area has been small relative to the magnitude of the problem.

The Agricultural Transportation Market

Most of the foregoing studies represent what might happen to agricultural markets as a result of exogenous changes in transportation markets. The issues are relevant, but they add little to our knowledge of the transportation market. Inductively, one might conclude that, since interregional competition studies have shown that transport rates do not affect the location of crop production (Fedeler and Heady) or cattle feeding (Byrkett et al.), total market demand for transportation is price inelastic. One also might induce from the lack of value found for collector rail lines in railroad abandonment studies that railroad demand is price elastic in the presence of alternative modes. Little is known about transportation supply because transport services have been introduced and removed from models in a nonmarginal, with-or-without fashion and assumed to be provided with perfectly elastic supply. The urgings of Richard King (1979) to formulate explicit, refutable, relevant hypotheses for the progress of our science are appropriate in the study of agricultural transportation markets. A few studies have addressed issues of the agricultural transportation market.

Easter et al. included infrastructural inputs in aggregate, regional, agricultural production functions to measure the marginal contribution of rural road investments in two regions of India. Results provide evidence that the marginal productivity function for roadway investment is a declining function, and that marginal productivity estimates provide a means to estimate a derived demand function for rural roads.[2] This declining, regional marginal productivity of transport facilities may provide the explanation for rail abandonment studies showing little value of collector rail lines in the Midwest, where rail and road networks are dense, and showing higher values on the Plains, where networks are less dense.

Several attempts have been made to estimate characteristics of the derived demand for agricultural transportation. In an early work, Sorenson identified railroad rate gradients for winter wheat on the Plains, where revenue-to-variable cost ratios increased for elevators located farther and farther from barge-loading river ports. More evidence of this kind could convert the captive shipper issue from a matter of speculation to a matter of elasticity estimation and documentation. A normative study of seasonal railroad rates in Oklahoma suggests that transportation competitiveness is location specific, depending on proximity to final markets and river ports (Shouse and Johnson). In that study, price elasticities of demand for rail service range from -1.02 to -3.7.

Other studies have estimated the influence of transport service quality on demand for modal services (Daughety and Inaba; Johnson 1976b; Miklius et al.; Patrick and Thompson). These studies show that agricultural demand for transport modal services is responsive to own price, other modal prices, perishability of the commodity being transported, and various service quality attributes. Consequently, rigid transport demand assumptions are not valid.

On the supply side, issues of port congestion, the railroad car shortage, and effects of regulatory commodity restrictions have been addressed. Fuller and Paggi provide an example that questions the standard assumption of perfectly elastic transport supply. They use a stochastic queueing model to estimate the level of congestion costs associated with the uncertain timing and amplitude of seasonal grain truck arrivals at the Port of Houston.

Studies of railroad car supply also show transportation supply not to be perfectly elastic. Felton has developed the applicable economic principles behind rail car capacity supply and shows the relationship between utilization and capacity and the types of incentives that might enhance freight car capacity without necessarily increasing the fleet size.

The multi-commodity backhaul issue has been treated in two studies. Pendse and Youde introduced backhauls exogenously into an interregional competition model by reducing truck rates by half to represent a 100-percent probability of obtaining a backhaul of a commodity outside the model. Johnson and Tyng distinguished regulation-determined empty mileage from logistically determined empty mileage to measure likely truck cost and fuel savings from deregulating soybean meal for truck transport in North Carolina. These studies show the importance of multiple-commodity interactions in agricultural transport markets.

These transportation market studies show that transportation economics is not just a spatial equilibrium problem. There is a transportation market to consider. Supply functions have dimensions of price, capacity, and capacity utilization. Carriers operate with multiple-product characteristics, which implies that excess capacity is not necessarily a sign of poor market performance (Pfouts). Cost functions are complex; the level of coal and cement movements may be as important as the level of soybean movements in determining the carriers' opportunity costs of moving corn. Surges in demand slide carriers up and down supply functions, causing price variation in unregulated markets, but not necessarily in the same sequence as volume surges in particular, single commodities. Demand surges also suggest that capacity "shortages" do not necessarily represent poor market performance.

[2] Spriggs uses these results to form a benefit measure for rural road investment evaluations.

Transportation demand has dimensions of price, service quality, locations and capacities of storage facilities, and locations and capacities of production facilities. Shippers of many commodities demand transport services of the same carrier for use of the same equipment. Price regulation obscures demands for service quality by muffling price premiums for added services. Directional imbalance in the volume of transportation demanded may mean that the price charged for movement from point A to point B is different than the price charged for movement from B to A. (This is evident currently in North Atlantic ocean shipping.)

The surface barely has been scratched on understanding the agricultural transportation market. Basic supply and demand characteristics must be discovered before the agricultural economics profession can make any credible attempt to evaluate the likely effects of policy and market changes. Demand characteristics include logistical attributes of commodities, for example, perishability, seasonality, inventory costs, and market channel structure. Supply characteristics include capacity, route flexibility, regulatory requirements, and directional complementarity with other commodity movements. Measurement of demand and supply characteristics suffers similar sources of bias that interregional competition models are subject to, such as omitted variables and aggregation. Again, if economists can be satisfied with developing an operational conceptual understanding of how the agricultural and transportation industries interact in a dynamic market process, without striving for precise and generally applicable market parameter estimates, economists can shed light on numerous topical issues.

The Issues

Topical issues in agricultural transportation are numerous. This summary of some of the issues will appear anti-agriculture and pro-carrier. The purpose is not to cast value judgments, but to question the way issues raised by parochial agricultural interests must be questioned if the economics profession is to approach these issues objectively.

The largest package of issues in agricultural transportation in the 1980s relates to effects of transportation deregulation on agriculture. The Motor Carrier Act of 1980 eases entry into regulated commodity movement, exempts feed products from economic regulations, and establishes a somewhat more competitive method of rate setting. The Staggers Rail Act of 1980 introduces rail rate flexibility and railroad rate and service contracts, restricts the scope of rail rate bureaus, and eases restrictions on railroad mergers and line abandonments. Interstate Commerce Commission initiatives have exempted certain piggyback categories from economic regulation.

The most useful work for agricultural economic research and extension on the demand side will be to help shippers and receivers identify and evaluate how their new set of transportation alternatives will affect their production and marketing activities. The new set of alternatives is not guaranteed to be larger, but likely will be different.

Several specific issues will have broad effects. Exemption of fresh fruits and vegetables for rail movement has proven to be useful in providing either lower rates or better service for some individuals. This action will not help everyone. Fruit and vegetable assembly for long haul movement may become more concentrated, but at least an additional market choice was introduced.

Charges have been lodged that flexible railroad grain rates would destroy the American grain merchandizing system. There is no doubt that some of the risk in the grain trade that has been borne by the railroad industry would be shifted back to the grain industry. The question lies in whether rate flexibility will generate sufficient incentives for railroads to provide more movement capacity for the industry, thereby reducing the risk of future car shortages.

Charges have been made that rate flexibility would leave many shippers and receivers captives of a single railroad, which could extract monopoly rents. The captive shipper issue is a question of the competitive position of a shipper with respect to transportation, at his particular location, in his particular commodity market. It is a question of access to logistically feasible transportation alternatives and not a question of transport prices. There is a normative issue of whether a shipper who has become accustomed to subsidies by way of cross-subsidization is entitled to continued subsidies. But economists might assist in developing transport alternatives and estimating whether product substitution would be advantageous in some locations. Economists also could educate regulators on the nature of agricultural transportation markets to help them arrive at a more meaningful test of monopoly power than the market dominance criteria.

The combined effects of railroad mergers and contract rates likely will improve service reliability and lower some rates. Commodity exemptions and easier truck entry into regulated commodity markets likely will improve truck capacity utilization. Identification and evaluation of individual or joint shipper access to these alternatives will provide a useful service to Land Grant University clientele.

On the supply side, economists first must recognize that carrier firm managers have many agricultural and nonagricultural opportunities and limited capital. Efforts will be expended where their highest net returns are expected. Carrier managers can be expected to be oblivious to any remnants of farm fundamentalism.

Greater rate and operating flexibility will necessitate closer monitoring of market forces to find opportunities. New opportunities for multi-modal connections are likely. Previously restricted opportunities for backhauls are available. Transportation supply (prices and capacities) will be responding to numerous changes in opportunities, only some of which are agricultural.

CONCLUSIONS

This paper proposed to raise doubts about the directions of research in interregional competition and agricultural transportation, and to identify current and developing topical issues in these fields. There is no intention to question the motives or scholarship of those involved in these important subjects in our profession. The intention has been to pause and take a look at what is being done and to challenge its direction for the 1980s.

Interregional competition studies are attempting the impossible and, in the process, creating biased estimates of where industries should be located. With less attention to detailed data gathering and more attention to thoughtful, logical modeling, economists can arrive at more understandable and more believable estimates of the directions of changing regional advantage.

Issues to be addressed in agricultural transportation include not only the effects on agriculture of exogenous changes in transportation markets, but also identification of basic transportation market supply and demand relationships, recognizing transportation as an agricultural input market. The structure of the transportation market is changing dramatically as the failures of regulation are being discovered. Agricultural economists can help their clientele react to changing market opportunities and economists can identify remaining rules that need to be changed.

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