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PREVIEW

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**Discrimination in the rail rate structure for grain shipments
before and after the Staggers Act**

Falcon, Elmo Tumaneng, Ph.D.

The University of Nebraska - Lincoln, 1989

PREVIEW

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PREVIEW

**DISCRIMINATION IN THE RAIL RATE STRUCTURE FOR GRAIN SHIPMENTS
BEFORE AND AFTER THE STAGGERS ACT**

by

Elmo T. Falcon

A DISSERTATION

**Presented to the Faculty of
The Graduate College in the University of Nebraska
In Partial Fulfillment of Requirements
For the Degree of Doctor of Philosophy**

Major: Agricultural Economics

Under the Supervision of Professor Dale G. Anderson

Lincoln, Nebraska

December, 1989

DISCRIMINATION IN THE RAIL RATE STRUCTURE FOR GRAIN SHIPMENTS
BEFORE AND AFTER THE STAGGERS ACT

Elmo T. Falcon, Ph.D.

University of Nebraska, 1989

Adviser: Dale G. Anderson

The passage of the Staggers Act in 1980 gave U.S. railroads significant rate-making flexibilities, including the right to negotiate rates and other terms of trade with individual shippers. These new pricing freedoms afford railroads major opportunities for rationalizing outmoded rate structures and, through the effects of rates on patterns of traffic, for reducing costs of transport. At the same time, however, some shippers, prominent among them country grain elevator operators, have expressed concern that these pricing freedoms are leading to discriminatory abuses of the sort which prompted regulation in the first place in 1887.

Ordinary least squares procedures were used to analyze the structure of price-cost ratios of grain shipments, both before and after the passage of the Act. Tests for differences in the means and variances of price-cost ratios over time were used in assessing overall intensity of discrimination over time. The findings shed light on how both level and pattern of discrimination have changed over time.

Results point to a greater degree of discrimination, following the Staggers Act, lodged against smaller shippers and against grain shipments moving over hauls where railroads have the most market power.

Commodity discrimination, traditionally directed against the higher valued of the grains and, in the immediate pre-Staggers era at least, against shorter-haul shipments, decreased in intensity. The pattern of discriminatory price differentials between high- and low-density hauls, although it varied across regions and commodities, was generally unaffected by the railroads' increased rate-making freedom. But, while findings indicate discrimination remains a significant factor in railroad pricing policy and although the emerging pattern of discrimination appears to be more consistent with railroad profit-maximizing behavior, the intensity of discrimination on average has declined. Results suggest on balance a growing competitiveness of rail rates for grain shipments and a decline in the overall degree of price discrimination following deregulation.

PREVIEW

TITLE

DISCRIMINATION IN THE RAIL RATE STRUCTURE FOR GRAIN

SHIPMENTS BEFORE AND AFTER THE STAGGERS ACT

BY

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ACKNOWLEDGEMENTS

I wish to express my sincere appreciation to my adviser, Dr. Dale G. Anderson, for his continued support, encouragement, and guidance throughout the entire course of my program. I wish to sincerely thank Dr. David Rosenbaum and Dr. Michael Turner for serving in my reading committee and for their invaluable comments and suggestions. My sincere appreciation is also extended to other members of my supervisory committee: Dr. James Kendrick, Dr. Harish Gupta, and Prof. J. Richard Felton.

I have also benefited from my many discussions with Dr. J. Schmidt, Dr. A. Azzam, and Ghulam Sarwar. To them and to my other colleagues at the Department of Agricultural Economics, my special thanks.

Finally, I wish to express my deepest gratitude to my parents for impressing upon me the value of education; to my wife, Cornelia, and to my daughters, Kia and Inez, whose unwavering love and support have been my source of inspiration.

E.T.F.

DISCRIMINATION IN THE RAIL RATE STRUCTURE FOR GRAIN SHIPMENTS BEFORE AND AFTER THE STAGGERS ACT

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PREVIEW

CHAPTER I

INTRODUCTION

Prior to 1980, U.S. railroads were one of the nation's most heavily regulated industries. Concern over the railroads' alleged exercise of monopoly power through discriminatory or "value-of-service" pricing was a major factor prompting the industry's initial regulation in 1887. In its pre-deregulation zeal to equalize rates among shippers, the Interstate Commerce Commission (ICC) failed to account for differences in costs in serving different shippers. The result was discrimination against lower cost shipments, including those moving in large lots and over high-density routes (Friedlaender and Spady, 1981). At the same time, the ICC's mandate to ensure the financial viability of railroads, required the maintenance of a rate structure that discriminated against high-valued goods. Many observers believe that rail rate regulation not only failed to eliminate pricing discrimination but actually encouraged it (Keeler, 1983).

While an inflexible rate structure based on value-of-service considerations may have served well the interest of the railroads in the early stages of regulation, it clearly did not do so upon the development of the motor carrier industry. Railroads gradually lost their monopoly power over high-valued traffic and with it the cross-subsidization rationale for a value-of-service price structure (Felton, 1967). The consequent decline in their market share in intercity freight traffic contributed to the railroads' sagging financial conditions and to the increasing clamor for deregulation.

The 4-R Act of 1976 and the more comprehensive Staggers Act (PL 96-440) of 1980 gave the railroads major rate-making flexibilities. The

Staggers Act allowed the railroads to set tariff rates subject only to certain maximum limits. At the same time, the Act legalized contracting and mandated secrecy of the contracted rates. These provisions mean that railroads can charge rates based on demand conditions relating to specific hauls, prompting concerns that rates would increase and become more discriminatory and that certain captive shippers would be badly disadvantaged as a result.

Early views of the probable impact of deregulation on the level of rail rates varied. Friedlaender (1969), in her analysis of the rail rate structure during the 1960s, suggested that deregulated rail rates for water-competitive bulk traffic would be near marginal costs while rates for non-competitive bulk traffic would lie above marginal costs with the upward limit governed by the extent to which rates account for final product prices. In essence, deregulated rail rates would depend largely on the total elasticity of transport demand.

A slightly different view was advanced by Levin (1981) who predicted that the level of rail rates after deregulation would be more significantly influenced by the degree of inter-railroad competition since inter-modal competition is effective only for certain commodity classes. Thus, other things constant, a higher degree of intra-modal competition would result in a more elastic transport demand and lower rates. Levin believed that rates would increase little for agricultural and other bulk goods because of generally effective inter-railroad competition in these markets.

Friedlaender and Spady (1981), on the other hand, predicted that rates for bulk goods would decline and that those for manufactures would

increase if railroads were afforded more pricing latitude. They observed that price-marginal cost ratios for bulk shipments were already significantly higher than those for manufactures. Thus, in the Official Territory (Northeast), the ratio for bulk traffic was 1.10, that for manufactures 0.49; in both Southern and Western Regions, the respective ratios were 1.70 and 0.95.

The passage of Staggers Act has prompted a number of studies aimed at determining its impact on rail rates, and in particular on rates for grain shipments. Interest in the rate impacts of deregulation for grain shipments stems from the alleged tendency of grains and other bulk shipments to be captive markets for rail carriers. Klindworth, et al. (1984) and Fuller, et al. (1987), however, concluded that deregulated rail rates declined by as much as 30 percent. Adam and Anderson (1985), in a study of grain bid prices at selected Nebraska elevators, found a similar decline in grain rates following the Staggers Act.

While evidence abounds that rail rates have declined since 1980, relatively little attention has been given to the effects of deregulation on the pattern of rail prices and on the propensity of rail carriers to discriminate. Hauser and Baumel (1986), in a study of the competitiveness of rail rates for export grain shipments before and after the Staggers Act, found variations in price-variable cost ratios from one traffic corridor to another which they attributed to varying degrees of inter-modal competition. McDonald (1987), in an analysis of export grain rates following deregulation, concluded that rates were significantly affected by the level of intra- and inter-modal competition for a particular haul. Length of haul and shipment size were

also found to be significant determinants of rail rates, although the extent to which these rates are discriminatory could not be inferred without reference to the shipments' relative costs.

The present study addresses directly the issue of discrimination in the rail rate structure for corn, wheat, soybeans, and sorghum grain shipments before and after deregulation. More precisely, it is concerned with the extent to which rail rates deviate from variable costs and with the factors which account for the deviations. The study is based on the premise that railroads' pricing behavior, given their new rate-making flexibilities, should be consistent with the profit-maximizing behavior of oligopolists. This presumption stems from earlier observations that even under rate regulation there persisted a less-than-optimal or distorted rate structure (Boyer, 1981). As Friedlaender and Spady (1981) have also suggested, the ICC's efforts to eliminate personal price discrimination in the past had led to economic discrimination against volume shippers and those on high-density routes. To the extent rate regulation was effective in limiting the railroads' pricing freedom, increased discrimination, especially against the more captive shippers, might be anticipated in a deregulated environment. It has, however, been argued that the ability of railroads to discriminate is tempered by geographic as well as product market competition (see, for example, Heaver and Nelson, 1977). Thus the outcome is very much in doubt.

Specifically, this study seeks to determine: a) the extent of pricing discrimination as between small- and large-volume shippers and whether its pattern has changed with the advent of contracting; b) the

extent to which deregulation has led railroads to discriminate against shippers on low-density routes; c) whether railroads have exploited shippers on routes where they have a high market share; d) whether long and short haul, as well as commodity price discrimination tendencies, apparently prevalent in the past, have persisted after deregulation; and e) whether the overall degree of price discrimination has increased as some opponents of deregulation had predicted.

The study is organized as follows: Chapter II deals with the definition of price discrimination; Chapter III reviews pertinent literature in rail rate discrimination; Chapter IV develops a theoretical model of price discrimination; Chapter V covers methodology; Chapter VI discusses the results of the study; and Chapter VII provides the summary and conclusions.

CHAPTER II

CONCEPTS OF PRICE DISCRIMINATION

A. Definition

Koch (1974) defines price discrimination in an economic sense as the "sale of technically similar goods or services at prices that are not proportional to the marginal costs of manufacture, sale, and delivery, with due allowance for risk and uncertainty." The relativity of prices to costs distinguishes the economic definition of price discrimination from the legal definition. Legally, price discrimination involves simply the sale of similar goods or services at different prices irrespective of differences in costs. Equal prices are always legal. The economic definition, on the other hand, regards the sale of similar goods at uniform prices as discriminatory in the presence of cost differentials.

Consistent with the above economic definition price discrimination can be expressed in terms of the price-cost ratios of the products or services in question. More specifically, in a two-market or buyer case, price discrimination is deemed to exist when

$$(1) \quad (p/mc)_1 \neq (p/mc)_2,$$

where p is price, mc is marginal cost, and the subscripts refer to markets 1 and 2. A market, in this context, is distinguished by price elasticity of demand differentials rather than by mere geographic or temporal boundaries. It is easy to see from equation (1) that price discrimination arises in the homogeneous goods case where $mc_1 = mc_2$, when $p_1 \neq p_2$. In the case of heterogeneous goods, where $mc_1 \neq mc_2$, discrimination can arise either with $p_1 = p_2$ or $p_1 \neq p_2$. The sufficient condition is that $mc_1/mc_2 \neq p_1/p_2$. The price-cost ratio as a

measure of price discrimination is preferred over the absolute differential of price from cost, $[(p - mc)_1 \neq (p - mc)_2]$, since it highlights two important efficiency issues: 1) the divergence of price from cost as measured by the absolute value of the ratio, and 2) the inequality of ratios across markets (Stigler, 1966).

Price discrimination results from the deliberate efforts of sellers to maximize overall profits across various markets. In the simple case, where the marginal costs in the different markets are equal, discrimination results in prices being keyed to differences in demand elasticities, or to "what the market can bear," such that prices, and consequently the price-cost ratios, are higher where demand is relatively more inelastic.¹ Discriminatory prices deviate from costs in a systematic fashion in contrast to short-run random price dispersions obtaining in competitive markets.²

"Similar goods," in Koch's definition, is also interpreted to include differentiated products which may or may not have significant differences in physical characteristics but which are nonetheless related in terms of demand. The implication is that the products in question are substitutes or potential substitutes for each other. A first class airline ticket, for example, is similar to an economy class ticket even though the former entitles the buyer to certain amenities. This interrelatedness of demand is the distinguishing factor of price discrimination and makes it a special case of the multi-product profit maximization rule. In the ticket example, the first class fare is discriminatory if it is greater than the economy class fare by more than the difference in cost of providing the two levels of service.

B. Conditions for Price Discrimination

The necessary conditions for pricing discrimination are inherent in the preceding discussion. First, the seller must sell in two or more markets. By definition, these markets may be geographic, temporal, or individual consumers having different demand elasticities owing to differences in the availability of substitutes; differences in time; or to differences in income, taste and preferences, or age of buyers. Transference of demand from high- to lower-cost markets or arbitrage must ordinarily be prevented since they would blur the distinction among markets and erode the benefits of discrimination. Transference of demand is, however, consistent with the aims of pricing discrimination should the movement of demand from one market to another result in increased overall profitability for the seller. This is the basis for the use of self-selecting devices to facilitate discrimination (Tirole, 1987). Second, the seller must have some degree of monopoly power. This condition is tautological since price discrimination can come about only in an imperfect market in which a seller is faced with a negatively-sloping demand curve. The importance of monopoly power, however, is that it ensures the seller's ability to effectively separate market through deterrence of competitive entry or product differentiation. Consequently, differences in demand elasticities across markets, which are the bases for discrimination, are preserved or enhanced.

C. Types of Discrimination

Differing abilities and opportunities for sellers to discriminate lead to different types as well as degrees of economic price discrimination. Pigou (1920) provides a tripartite classification:

first-degree discrimination, in which a different price is charged for each buyer of the same commodity; second-degree discrimination, in which different prices are charged for different quantities or blocks of the same goods; and third-degree discrimination, in which a different price is charged for each market.

In the first-degree case (Figure 2.1), the seller charges each customer the highest possible price he is willing to pay for a unit of good or service. Thus the first customer is charged P_1 , the second P_2 , the third P_3 , and so on. Without price discrimination, the price per unit for all n units would have been P_n . The effect, therefore, of segmenting the market by individual buyers is that the seller captures all of the consumer surplus represented by the area ABC .

The market demand curve can also be viewed as an individual buyer's demand curve with the seller charging the same buyer different prices for each unit and thus resulting in the latter's loss of all his consumer surplus. The buyer in this case is given an all-or-nothing option by the seller, i.e., either he buys all n units at the different prices or none at all. The ordinary demand curve thus becomes a marginal revenue curve with a new "all-or-nothing" demand curve (D_1) drawn to represent the buyer's willingness to buy at alternative average prices. In reality, first-degree price discrimination is rarely observed since sellers invariably lack perfect monopoly power and full knowledge of buyers' reservation prices.

A less extreme and much more common case is second-degree price discrimination, a form prevalent in public utilities and exemplified by a block pricing structure. As shown in Figure 2.2, given an individual

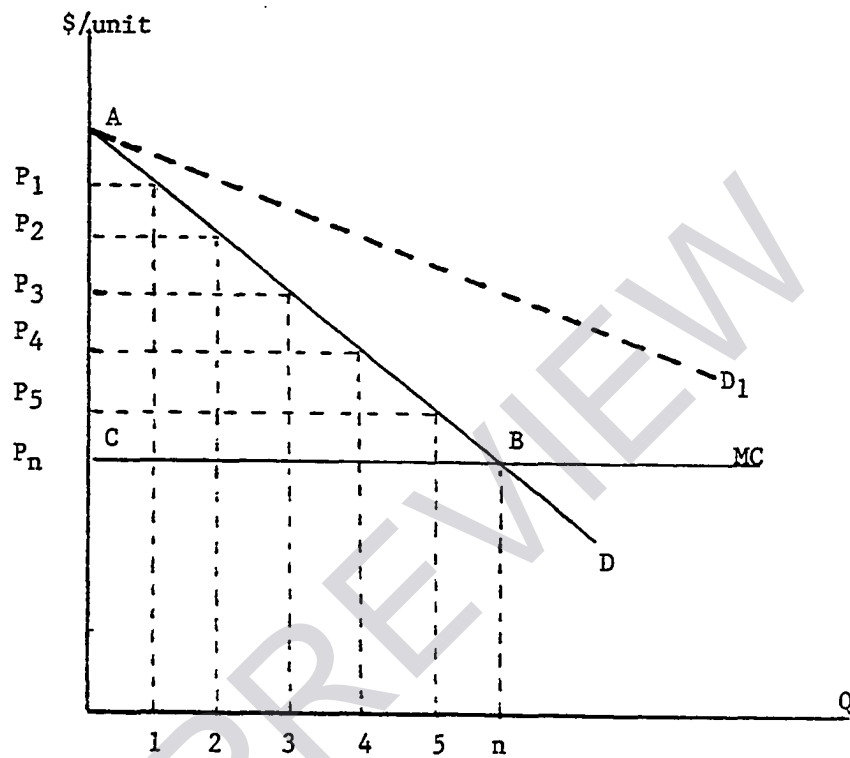


Figure 2.1 First-Degree Price Discrimination .

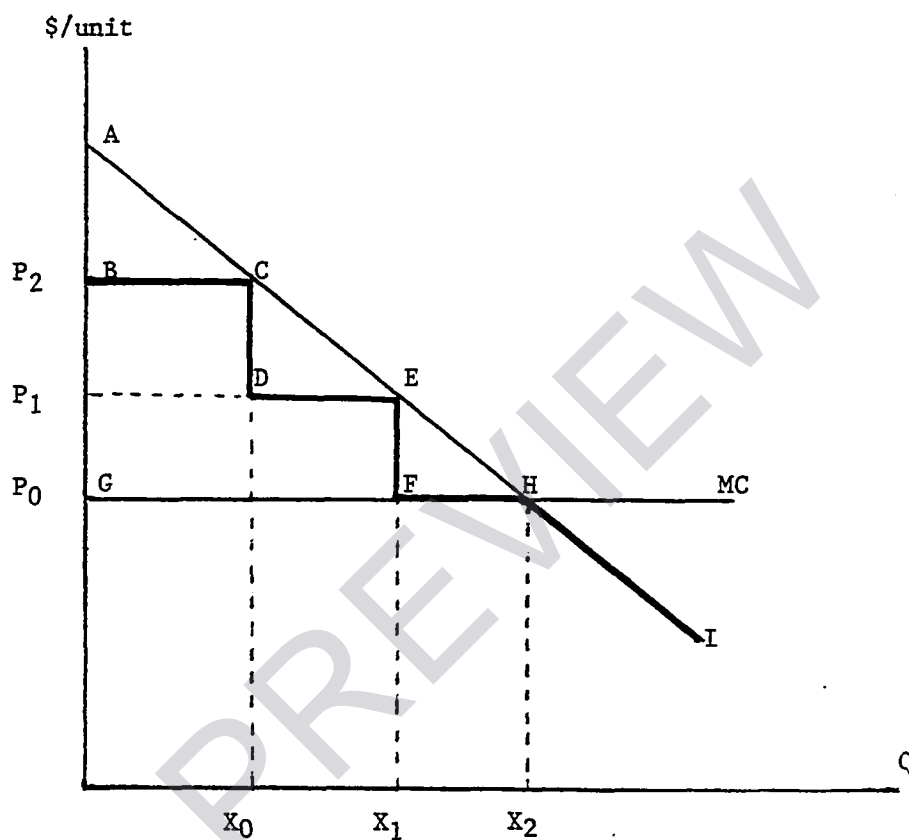


Figure 2.2 Second-Degree Price Discrimination