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## PRICE AND THE STRUCTURE OF FREIGHT CAR OWNERSHIP

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The recurring shortage of railcars to haul agricultural and forest products continues to be of utmost interest to farmers and agriculturally related enterprises. Pricing systems internal to the railroad industry prior to 1964 may have discouraged railroads from purchasing an adequate supply of railcars to meet the needs of shippers [2 and 3]. These same pricing systems also may have discouraged railroads from purchasing high cost market-oriented equipment. An endeavor has been made to examine the performance of railroads in upgrading the quality of their fleets in response to a significant change in the pricing system in 1964.

### MARKET-ORIENTED RAILCARS

Technology has produced railcars that are compatible with modern facilities and handling methods. This market-oriented equipment is needed by railroads to furnish the services and conveniences demanded by shippers.

These market-oriented railcars take many forms and the improvements in operations they make possible are numerous. Special service boxcars have wide doors, sliding center sills and other features that permit the use of modern handling methods. Covered hopper cars are used to carry grain and other flowing bulk commodities. These cars have roof hatches for loading and hopper outlets for unloading. Truck trailers on specialized flatcars are now in wide use and permit fast loading and unloading. These flatcars turn around three times as fast as the average freight car [2].

Other types of market-oriented cars have been in wide use for a number of years. The mechanical refrigerated car is a direct descendant of the ice bunker car. Tank cars for hauling liquids have also been in use for many years. The ownership and/or

control of these cars has been quite different from general purpose railcars.

### FACTORS REFLECTED IN RAILCAR OWNERSHIP

A number of factors influence the ownership of railcars. First, there are approximately 70 independent Class I railroads in the United States. Since these railroads have standard equipment, the railcars owned by any one railroad may be used by any other. When a railcar moves from one railroad to another with a load and is emptied, economic logic dictates that the terminating railroad use the emptied car productively, if feasible, rather than returning it empty.

Railroad freight can be classified into two basic types, raw materials and manufactured goods. Raw materials are usually bulkier than manufactured goods. Railroads serving an area that is primarily a producer of raw materials have few terminations of loaded cars and, thus, must backhaul a large supply of empty cars in order to have them available for shippers' needs. However, railroads serving the industrial areas have a number of empty cars belonging to other railroads at their disposal. By productively using cars terminated, these railroads can operate with a minimum of owned cars. However, since different railroads are involved, the equity of the owning road must be protected.

Early in the history of railroads there were agreements between roads for the use of one road's railcars by the other road. Different types of agreements were entered into until finally the Committee on Car Service of the Association of American Railroads presented the Association with a per diem code that became effective July 1, 1902. This agreement, with modifications, is still in effect.

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Historically, per diem rates have been quite low, ranging from \$.20 per day, in 1902, to \$2.88 in 1959, regardless of the original cost of the car (Table 1). The late Professor Yehuda Grunfeld, University of Chicago, in an article on per diem rates, indicated that with a life of 30 years per car and a return on investment of 6 percent the per diem rate of \$2.75 (in effect in 1957) would reimburse an owner fairly for a new car costing approximately \$6,400 [3, p. 62]. Data from the Interstate Commerce Commission indicates that the cost of new railcars ranged from an average of \$8,715 for regular hopper cars to an average of \$15,667 for refrigerated cars in 1959. Using Grunfeld's analysis, the \$2.88 per diem rate of 1959 would not compensate the owner even for the lowest priced new railcars. Since 50 percent or more of the life of a car may be spent on a per diem basis, adequate per diem rates are required to create incentive for investment in market-oriented cars. However, this article is not directed to the adequacy of freight car supply but rather to the quality or composition of the fleets. Grunfeld's analysis showed that a flat per diem rate allows margin for investment only in the lowest-cost cars, and none at all for higher-cost cars.

A graduated scale of per diem rates was instituted by the American Association of Railroads on January 1, 1964 (Table 2). This scale of per diem rates was

based on "original cost per car depreciated." These rates ranged from \$2.16 for a car valued at \$1,000 or less to \$7.74 for a car costing \$20,000 or more. On March 1, 1965, this was modified and the maximum charge became \$12.18 for a car costing \$30,000 or more with subsequent rates for different cost above the previous maximum. This scale of per diem rates was instituted to encourage the purchase of more and higher priced railcars. (Beginning August 1, 1969, the ICC effected new methods of computing car rental costs which include charges for both days of use and mileage.) The scale appears to have incorporated two of the three principles of a good per diem system discussed by Grunfeld [3, pp. 56-57].

### The Impact of the Graduated Per Diem Scale

A look at various aspects of railcar ownership in the period 1959 to 1967 reveals some interesting insight into the influence of railcar price and per diem rates on railcar ownership. During this period, there was almost a steady decline in the total number of railcars owned by Class I railroads (Table 3).

As would be expected, the railroads owned primarily general purpose railcars. However, over the 1959-1967 period there was substantial change in the relationship between general purpose and market-

TABLE 1. PER DIEM RATES FOR RAILROAD FREIGHT CARS, 1902-1963

Year initiated	Per diem rate	Year initiated	Per diem rate
	Dollars		Dollars
1902	.20	1920	.90
1906	.25	1920	1.00
1907	.50	1945	1.15
1908	.25	1947	1.25
1910	.30	1949	1.75
1910	.35	1952	2.00
1913	.45	1953	2.40
1916	.75	1957	2.75
1917	.60	1959	2.88

Source: [2, p. 28].

**TABLE 2. PER DIEM RATES FOR THE USE OF RAILROAD OWNED FREIGHT CARS OPERATING IN THE U.S. BETWEEN COMMON CARRIER RAILROADS, JAN. 1, 1964**

Original cost of car depreciated	Per diem group	Per diem rate per car day
		Dollars
1,000 and less	1	2.16
1,000.01 to 5,000.00	2	2.79
5,000.01 to 10,000.00	3	3.58
10,000.01 to 15,000.00	4	4.50
15,000.01 to 20,000.00	5	6.15
20,000.01 to 25,000.00	6	7.11
25,000.01 to 30,000.00	7	9.00
30,000.01 to 35,000.00	8	10.18
35,000.01 and over	9	12.18

Source: [2, p. 32].

**TABLE 3. MARKET-ORIENTED, GENERAL PURPOSE AND TOTAL RAILCARS OWNED BY CLASS I RAILROADS (1959-1967)<sup>a</sup>**

Year	Market-oriented railcars	General purpose railcars	Total railcars
1959	177,264	1,499,122	1,676,386
1960	187,978	1,470,314	1,658,292
1961	193,345	1,410,896	1,604,241
1962	204,494	1,345,573	1,550,067
1963	221,610	1,290,696	1,512,306
1964	245,542	1,242,843	1,488,385
1965	295,896	1,182,109	1,478,005
1966	340,939	1,147,176	1,488,115
1967	373,743	1,103,423	1,477,166

<sup>a</sup>Market-oriented railcars, as used in table, includes special boxcars, covered hopper cars, refrigerated cars, rack cars, tank cars and for 1965-67 special service flatcars. General purpose railcars include all other cars owned by Class I railroads.

Source: [4, Table 163].

oriented railcars owned by railroads. General purpose cars decreased from 1,499,122 in 1959 to 1,103,423 in 1967, while market-oriented cars increased from 177,264 to 373,743 (Table 3). Market-oriented cars increased from 10.6 percent of the total fleet in 1959 to 25.3 percent in 1967.

More dramatic changes are observed when we look at the pattern of ownership and purchase of various types of new cars during the 1959-1967 period. The increase in ownership of market-oriented cars over this period ranged from 37.3 percent for rack cars to 159.4 percent for special service boxcars (Fig. 1). Contrast these increases with general purpose railcars which decreased from 47.5 percent for stock cars to 14.6 for hopper cars. The purchase of market-oriented cars increased by 410.0 percent from 1959 to 1967 while general purpose cars decreased by 12.6 percent (Fig. 2).

The purchase of market-oriented cars shifted from the minor to the dominant role. In 1959, they accounted for only 18.3 percent of new cars purchased but increased to 56.6 percent in 1967 (Table 4). While much of the market-oriented equipment is a recent development, they were available at the beginning of the period, thus, giving further credibility to Grunfeld's hypothesis concerning the influence of graduated per diem rates on the purchase of such

equipment. The increased purchases of high cost cars in 1962 and 1963 could have been caused by several forces, one of which could have been anticipation of the initiation of a graduated per diem scale.

#### ALTERNATIVES FOR THE GROWTH OF FLEETS OF MARKET-ORIENTED RAILCARS

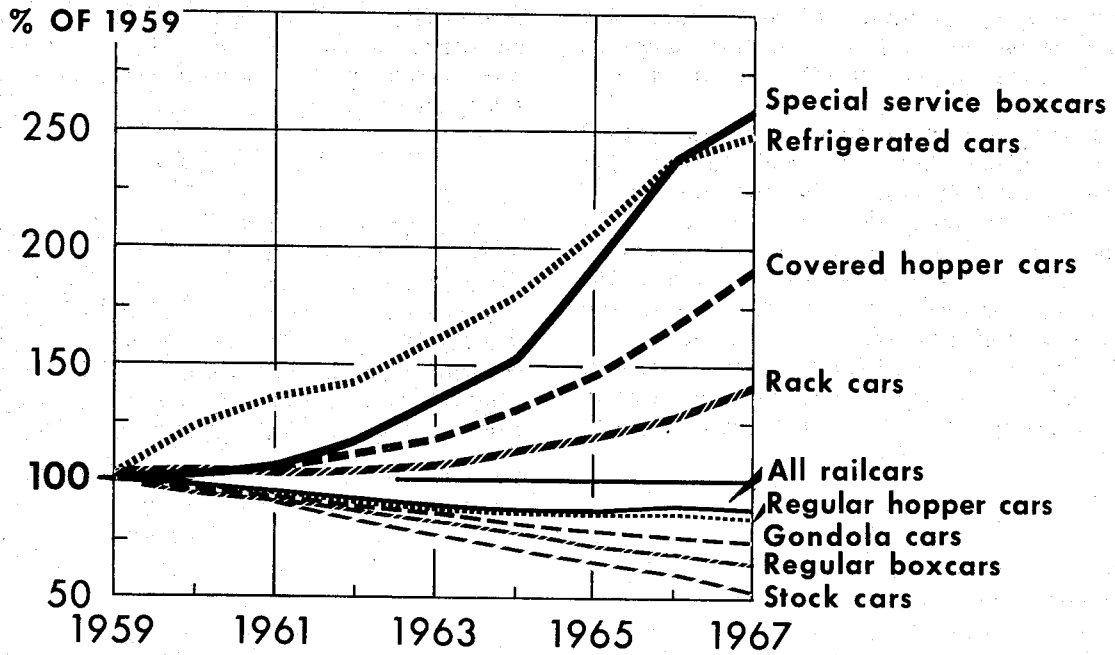
The demand before 1964 for market-oriented railcars was not met by the railroads because of their internal pricing system. In order to meet the needs of shippers wishing to use high cost equipment specialized to their systems, car companies came into being. Also, some shippers started purchasing their own railcars. These cars were assigned to haul for a specific shipper and could be used by someone else only through special arrangement. While this method of car ownership permitted shippers the benefits of market-oriented railcars it was somewhat restrictive in that it permitted less than full utilization of available equipment.

The importance of the car companies and private ownership to the shipping public can be seen when we look at their ownership of certain types of railcars. Private car lines owned 96.3 percent of all tank cars and 81.3 percent of all refrigerated cars in 1959. They owned 97.2 percent of all tank cars and 55.5

**TABLE 4. MARKET-ORIENTED AND GENERAL PURPOSE RAILCARS PURCHASED, BUILT AND LEASED BY CLASS I RAILROADS (1959-1967)**

Year	Market-oriented railcars	General purpose railcars	Total railcars
1959	7,738	34,550	42,288
1960	9,427	44,337	53,764
1961	6,058	19,992	26,050
1962	10,533	18,592	29,125
1963	16,297	16,675	32,972
1964	22,643	29,285	51,928
1965	37,013	25,679	62,692
1966	44,760	30,297	75,057
1967	39,467	30,200	69,667

Source: [4, Table 22];



URE 1. COMPARISON OF SELECTED RAILCARS IN SERVICE BY CLASS 1 RAILROADS IN THE UNITED STATES, 1959-67

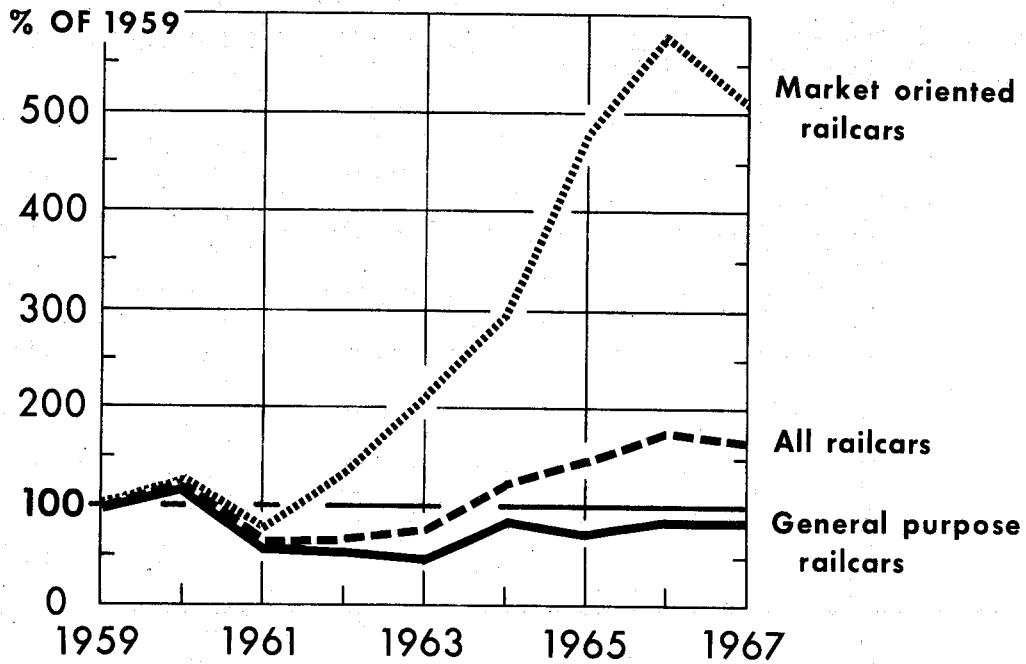


FIGURE 2. NEW RAILCARS PURCHASED AND INSTALLED BY CLASS 1 RAILROADS IN THE UNITED STATES, 1959-67

percent of all refrigerated cars in 1967. It should be noted, however, that private companies owning most of the refrigerated cars were holding companies owned jointly by several of the Class I railroads.

The private car lines had a steady increase in total railcars over the 1959-1967 period (Table 5). Car shortages existed throughout the latter years of this period. While the bulk of the cars were high-cost, the car lines did own some general service equipment, such as boxcars, gondola and open hopper cars. The relationship between market-oriented and general purpose cars varied little over the 1959-1967 period. Market-oriented cars accounted for 84.1 percent in 1959 and 82.6 percent in 1967. However, the percentage increase for general purpose cars was 35.0

percent while market-oriented cars was only 20.7 percent (Fig. 3). These figures indicate that shippers are depending more on the railroads for market-oriented equipment although private car lines are still a very important source of railcars.

### CONCLUSIONS

In conclusion, patterns of ownership and purchase of new railcars by railroads 1959-67 provide rather strong support for Grunfeld's hypothesis that the flat per diem rates in existence from 1902 to 1963 gave insufficient incentive for railroad-owned car fleets to be tailored to market demand. A second point Grunfeld made was to the effect that, if the supply of freight cars is to keep up with demand, per diem rates

**TABLE 5. MARKET-ORIENTED, GENERAL PURPOSE AND TOTAL RAILCARS OWNED BY PRIVATE CAR LINES (1959-1967)<sup>a</sup>**

Year	Market oriented railcars	General purpose railcars	Total railcars
1959	256,057	48,270	304,327
1960	268,024	53,483	321,507
1961	266,691	55,882	322,573
1962	258,540	66,649	325,189
1963	271,289	63,482	334,771
1964	280,699	63,996	344,695
1965	285,818	61,767	347,585
1966	298,693	65,513	364,206
1967	309,003	65,139	374,142

<sup>a</sup>Market-oriented railcars include refrigerated, tank cars, and other specialized cars. General purpose railcars include boxcars, gondola and open hopper cars.

Source: [5].

should be in accord with the cost of new cars, not the average value of the existing fleet. The 1964 per diem agreement incorporated this feature in principle, at least.

Thus, two of the three roles specified for the per diem pricing system have been recognized by the

Association of American Railroads in the current pricing system. However, we cannot judge the degree to which the present per diem scale is optimum. The third role, that of varying per diem rates seasonally in line with car demand so as to achieve optimal spatial distribution, has not been attempted in recent decades [1, 6].

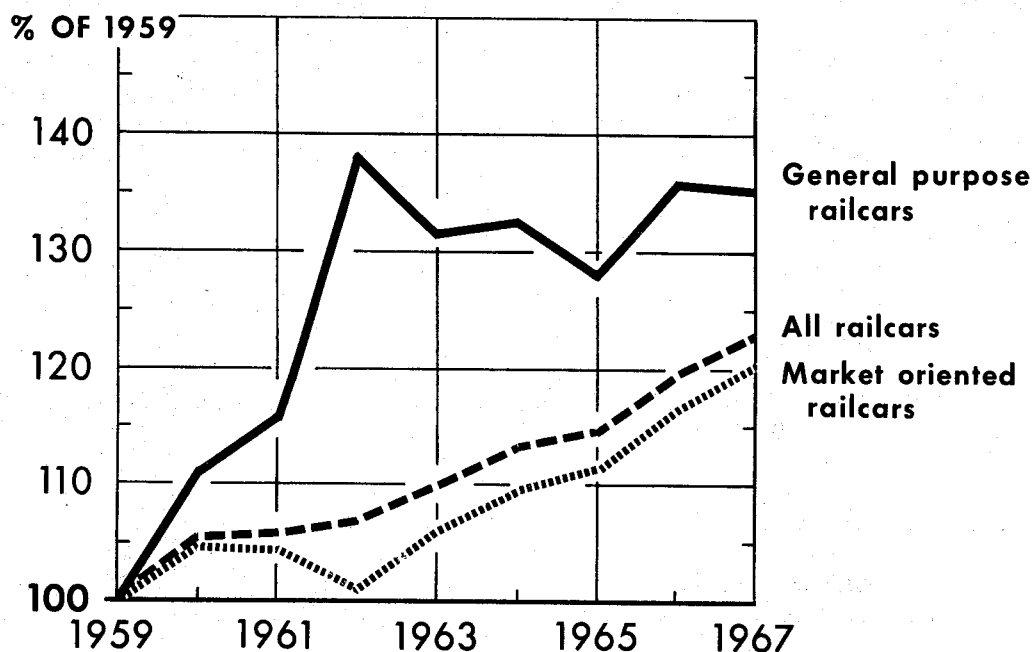


FIGURE 3. COMPARISON OF TWO GROUPS OF RAILCAR IN SERVICE BY PRIVATE CAR LINES IN THE UNITED STATES, 1959-67

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