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PROCEEDINGS —

*Twenty-fourth Annual Meeting*

Volume XXIV • Number 1

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TRANSPORTATION RESEARCH FORUM

# PROCEEDINGS —

## Twenty-fourth Annual Meeting

Theme:

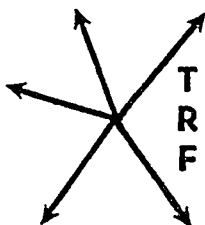
“Transportation Management, Policy and  
Technology”

November 2-5, 1983  
Marriott Crystal City Hotel  
Marriott Crystal Gateway Hotel  
Arlington, VA



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**TRANSPORTATION RESEARCH FORUM**

# Regulatory Reform and Railroad Freight Rate Structures for Lumber

by John E. Tyworth\*

**R**AILROAD PRICING in a freer market environment and the subsequent restructuring of rates may have a significant impact on the ability of lumber-producing regions to reach key markets and thus on the earnings of rail carriers. Yet the importance of maintaining competitive rate structures has been and remains a controversial issues [1,7,8,13].

This research examines railroad pricing for lumber traffic and competitive regional rate relationships. The results, which build upon prior work and represent the initial findings of continuing research, profile railroad pricing behavior, both before and after recent regulatory reform, and describe the effects of such reform on competitive rate structures [13].

## 1980 REGULATORY REFORM

The Staggers Act of 1980 authorizes the ICC to institute a cost recovery index system as the best practical method to supplant the burdensome evidentiary requirements and lengthy proceedings associated with general rate increases. The new index system allows railroads to recover inflationary cost increases quarterly as part of a "zone of rail carrier rate flexibility" framework. In addition, the zone framework allows additional rate increases that are divorced from the issue of cost recovery.

Contract ratemaking is another element of regulatory reform that is playing an increasingly important part in railroad pricing for lumber. Already about 25 percent of such pricing is related to forest products[5]. Unfortunately, the confidential nature of contract rates prevented (at this stage of the research effort) the study of this dimension. Finally, the relatively recent TOFC/COFC exemption (and, perhaps, the proposed boxcar exemption) also will have a significant role in such pricing.

## DESIGN OF STUDY

The research questions addressed in this study are:

1. How have rail carriers responded to regulatory reform in terms of lumber ratemaking for regulated flatcar or boxcar service?
2. What impact has regulatory reform had on competitive regional rate relationships?

## Data Collection.

The framework for data collection relies on the methodology established in prior work but corresponds to the expanded production and market areas shown in Figure 1[13]. Nearly ten thousand rates from and to representative points for the 1971-1981 period were recorded. As shown in Figure 1, the Coast Region has a single base point, while the Southern Pine Region includes seven base points. These seven states produce approximately 75 percent of the total Southern Pine lumber and are responsible for about 95 percent of rail lumber traffic shipped from this region to the Western Trunkline and the Official Territory states shown in Figure 1[11,16].

Thus, the basic unit of observation is the "effective rate" for each link  $l = 1, \dots, 120$  between representative origins  $j$  ( $j = 1, \dots, 8$ ) and markets  $k$  ( $k = 1, \dots, 15$ ) for each quarter  $t$  ( $t = 1, \dots, 44$ ) from 1971 to 1981. The calculation of effective rates required two steps. In the first step, the effective rate for a 100,000 lb. shipment in a 50-foot box or flat car was computed as follows for each new rate introduced during the study period.

$$ER = \frac{[(BR)(W) + (100,000 - W)(IR)]}{100,000} \quad (1)$$

where

ER = effective rate

BR = base rate

IR = incentive rate

W = threshold weight required for IR.

In the second step, a single observation was constructed for each quarter by computing a weighted average effective rate ( $\overline{ER}$ ). Specifically, the formula used is:

$$\overline{ER} = (\overline{ER}_i)(P_i) \quad (2)$$

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## BASE POINTS IN PRODUCTION REGIONS AND TARGET MARKET STATES

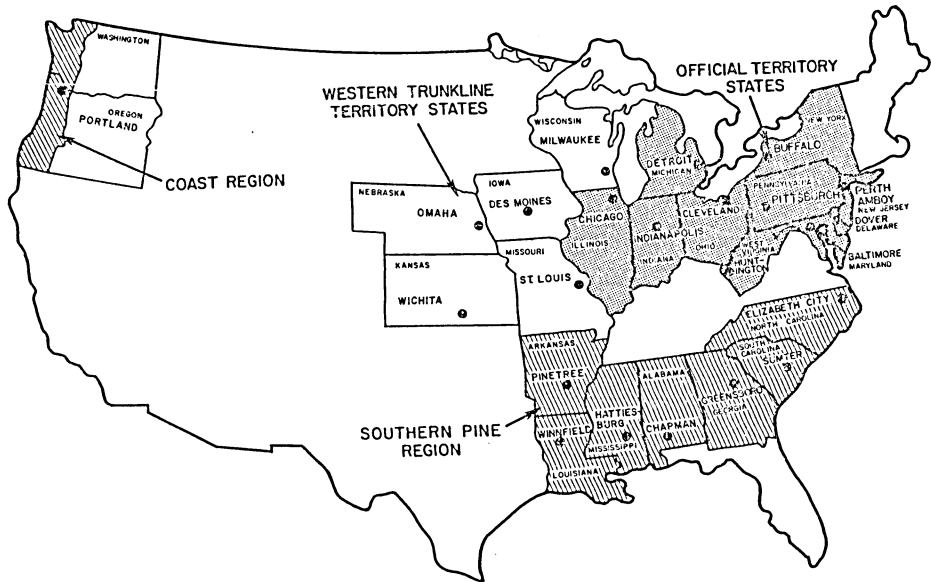


FIGURE 1

where

$\overline{ER}$  = weighted average effective rate

$ER_i$  = effective rate  $i$  for  $i=1, \dots, 4$   
(max) changes/quarter

$P_t$  = proportion of quarter  $t$  in which  $ER_i$  was in effect.

Finally, a composite rate was constructed for the seven Southern Pine Region origins to make adjustments for changing production and distribution patterns. The composite rate was developed by weighting each  $\overline{ER}_j$  from the Southern Pine base points by its proportion of total Southern Pine (seven state) lumber distribution to each target state as follows:

$$CER = (\overline{ER}_j)(D_j) \quad (3)$$

where

$CER$  = composite Southern Pine Region rate index

$\overline{ER}_j$  = Weighted average effective rate for origin  $j$   $j=1, \dots, 7$

$D_j$  = proportion of total lumber traffic to market area state  $k$   $k=1, \dots, 15$  originating in state  $j$   $j=1, \dots, 7$ .

### Approach

An investigation was made of the changes (both before and after 1980 regulatory reforms) in the rate structures for major links between representative origin and market base points (see Figure 1). As part of this investigation, the changes in competitive rate relationships from 1971 to 1981 and the discernible effects that a freer market environment has had on such relationships were examined. The approach was to measure and study differences between rates (in terms of structure and level) for lumber shipments from the Coast and Southern Pine base points to common destinations in each of the fifteen target market area states.

### FINDINGS

#### NEW FEATURES

##### Southern Pine Region

Railroad ratemaking for Southern Pine Region lumber traffic has traditionally relied on the mileage structure. In addition, the application of open-ended incentive rates for lumber has been and remains a key feature of railroad pricing.

ing. Only 2 of the 105 links studied (7 southern origins and 15 market states) did not offer an incentive option in 1971.

New features first appear during the study period in the third quarter of 1978. The number of structural changes, however, increases only slightly after 1980 regulatory reform. The apparent trend is toward more diversity in railroad pricing. In 1978, some railroads departed from other southern rail carriers and initiated market-oriented reductions ranging from 20 to 30 percent of base and incentive rates applicable to about 27 percent of the 105 southern links. Each reduction, however, carried with it a larger 100,000 lb. threshold (up from 90,000 lbs.) for the incentive structure and restricted service to special purpose flat cars. In 1980, other railroads followed suit by reducing rates and raising the incentive threshold weight requirement for approximately 40 percent of the links. In 1981, this trend continued with the introduction of several single rate applications. Finally, in 1981 southern rail carriers created some additional pricing flexibility when they published separate (but higher) rates for shipments in box cars that were applicable to 6 percent of the links.

### Coast Region

In contrast to the mileage structure that has prevailed in the Southern Pine Region, the group rate structure has long been used for transcontinental lumber traffic originating in the Pacific Northwest. In addition, open ended incentive rates, which were widely available to southern mills in 1971, were not offered to Coast Mills for shipments destined to states east of the Rocky Mountains until 1977 and, then, only to some of the Western Trunkline Territory states. The incentive structure initiated in 1977 was a three-tiered system (with 85,000 lb. and 120,000 lb. incentive rate thresholds) that encouraged shipments substantially larger than the then typical 75,000 lb. load [1,14,15]. In 1978, a similar incentive two-tiered system (with an 85,000 lb. threshold) was offered for lumber shipments to Official Territory states.

### RATE RESTRUCTURING

Coinciding with the double-digit inflation of the 1979-1981 period and the Staggers Rail Act of 1980 is the rapid rise in railroad freight rates for lumber, especially rates applicable to the Coast Region. The increased pricing flexibility permitted by the Act clearly helped

the railroads to adjust rates for rapidly rising costs, as well as make any market oriented adjustments deemed necessary to make lumber traffic more profitable.

As shown in Figures 2 and 3, however, the greater pricing freedom for railroads since 1980 appears to have aggravated competitive rate relationships. These figures portray each end of the spectrum for the fifteen market states. In Figure 2, the effective rates remain within a narrow range throughout the 1971-1981 period and indicate, perhaps, that intraregional competitive considerations, rather than distance factors, prevailed in this pricing situation. The spread between Coast Region and Southern Pine Region rates increases gradually until 1979 (quarter 33), and then grows rapidly.

On the other hand, all the rates shown in Figure 3 continuously diverge from 1971 to 1981. Given the mileage structure, rate levels follow textbook theory and are higher for the more distant origin base points. Moreover, the growing spread between all rates throughout the study period (but especially after 1980 regulatory reform) clearly illustrates the effects of pricing policy, which relies mainly on horizontal percentage rate increases to offset rising costs, on the regional rate relationships. Figure 3, however, also illustrates the significant market-oriented rate reductions offered by some rail carriers in 1978 (quarter 31) to mills in Arkansas and Louisiana.

From the railroad industry's perspective nonetheless, ratemaking for the past twelve years has been a case of running harder just to stay even. Thus, regional cost recovery indexes (available only for the 1976-1981 portion of this study) were used to deflate the nominal rate series [18]. Figures 4 and 5 contain the deflated rates series for Kansas and Illinois, respectively. For both states, rate levels applicable to lumber traffic generate from SFPA origins remain roughly constant from 1976 to 1981. Likewise, deflated rates for the Coast Region stay at about the same level until 1979 (quarters 24 to 36); then the rate level increases by a relatively small amount before leveling off.

Table 1 provides additional evidence of the nature of rate restructuring after regulatory reform. The mean spread between the effective rate from the Coast Region and the composite effective rate from the Southern Pine Region to common market area base points (computed for the six quarters immediately preceding and following the passage of the Staggers Rail Act of 1980) is shown by state. For every state, the

### EFFECTIVE RATES FOR 100,000 LB. SHIPMENTS OF LUMBER FROM COAST AND SOUTHERN PINE ORIGINS TO ILLINOIS

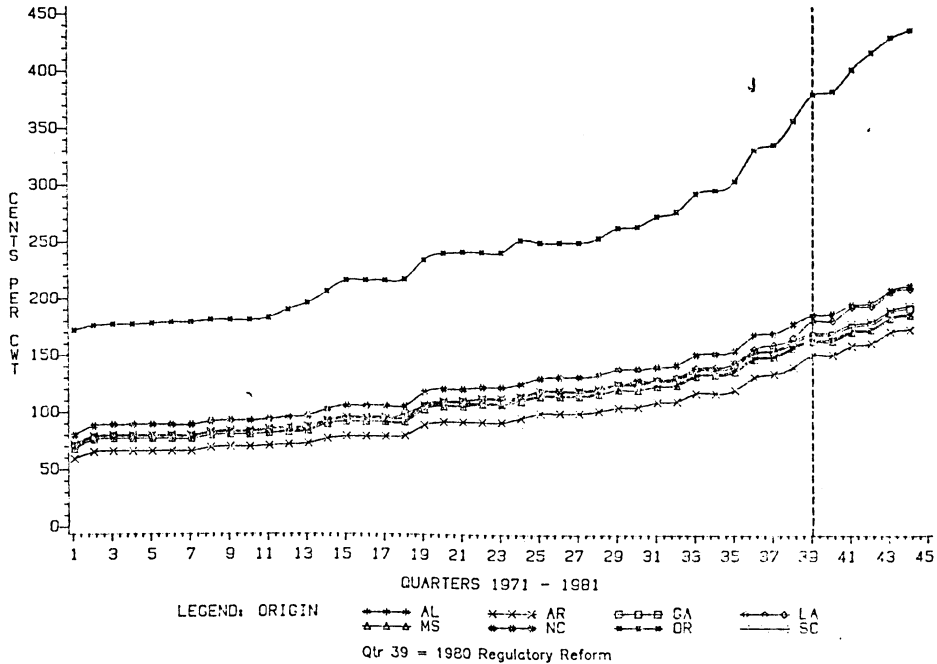


FIGURE 2

rate spread (for both nominal and deflated series) is significantly larger (at the .01 level) after regulatory reform. It is not known, of course, to what extent contract or exempt TOFC rates may have offset such restructuring.

#### SUMMARY AND CONCLUSIONS

The results of the investigation show that rail carriers, especially those serving southern mills, introduced more pricing flexibility after the regulatory reform initiated in 1976 and after the expanded reform of 1980. Alternative rate applications offered by groups of railroads or individual carriers serving the Southern Pine Region appear with increasing frequency after 1977. For both regions, however, the trend since 1977 has been to restructure rates to provide incentives for larger loadings in larger freight cars, especially flatcars.

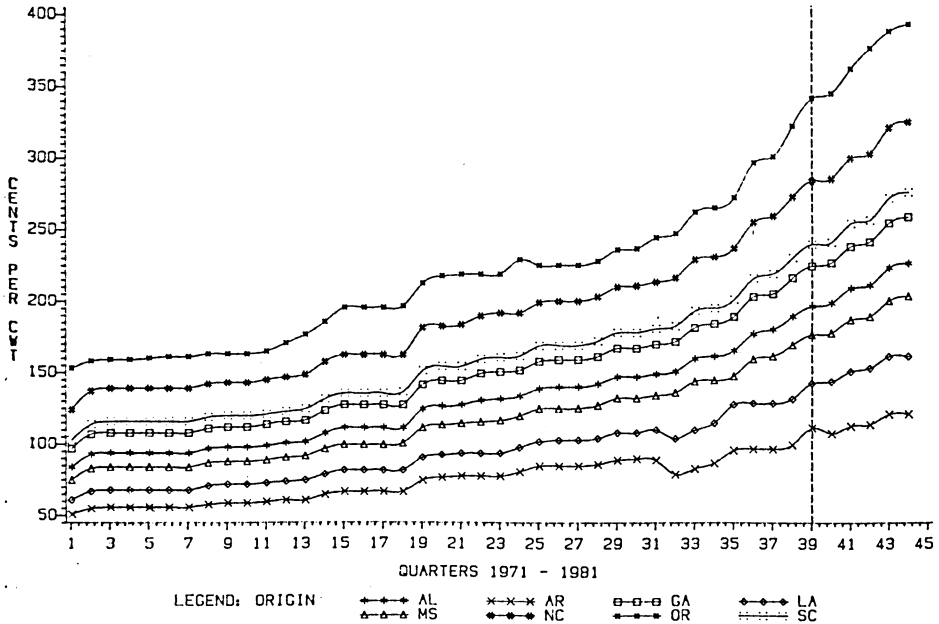
In addition, in the freer post-reform market environment, rates relationships have thus far experienced substantial restructuring. Although nominal effective

rates from and to representative base points rose throughout the 1971-1981 time period, the longer haul shipments from the Coast Region, not surprisingly, experienced greater increases (especially after the 1980 regulatory reforms were instituted) than the shorter haul shipments from the Southern Pine Region. As expected, the deflated rates series showed substantial leveling. Nonetheless, the post-reform increase in the disparity between deflated rates from the two competing regions to the same points in midwestern and eastern markets remained statistically significant.

The extent to which contract rates have aggravated or alleviated such disparities is an issue that was not included in this study but is one that deserves further research.

Furthermore, the overall importance of competitive rate relationships in the distribution of lumber remains controversial and is an issue that is part of continuing research.

EFFECTIVE RATES FOR 100,000 LB. SHIPMENTS OF LUMBER FROM COAST AND SOUTHERN PINE ORIGINS TO KANSAS



Qtr 39 = 1980 Regulatory Reform

FIGURE 3

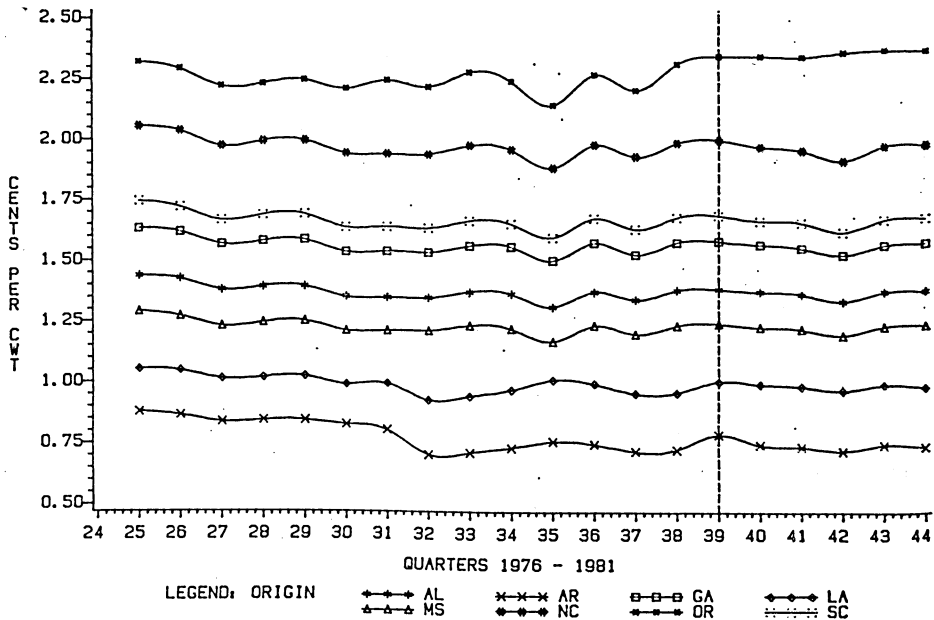
REFERENCES

1. ICC. 1978 *Ex Parte 270 (Sub. No. 7) Investigation of the Railroad Freight Rate Structure—Lumber and Lumber Products.* 345:2550-2940.
2. ICC. 1980. *Notice of Proposed Rule-making Ex Parte 290 (Sub. No. 2), Railroad Cost Recovery Procedures.* November 21, 1980.
3. Mead, Walter J. 1966. *Competition and Oligopsony in the Douglas Fir Lumber Industry.* Los Angeles: University of California Press.
4. ODonnell, Patrick. 1981. "Northeast Sawmills Blame Log Exports for Price Rises that Cost Workers Jobs." *Wall Street Journal*, Jan. 16:33.
5. "Rail Contracts Finally Start to Roll." 1982. *Traffic Management*, pp. 67-69.
6. Random Lengths. 1981. *1980 Yearbook.* Eugene, OR: Random Lengths Publications.
7. Sampson, Roy J. 1951. "The Relationship between Railroad Freight

8. .... 1961. *Railroad Shipments and Rates from the Pacific Northwest.* Eugene: University of Oregon Bureau of Business Research.
9. .... 1965. *Oregon Rail and Water Commodity Flow-Trends.* Eugene: University of Oregon Bureau of Business Research.
10. .... 1976. "Pacific Northwest Freight Transportation: Problems and Opportunities." *Oregon Business Review* 34:4-5.
11. SFPA. 1980. *Distribution of Southern Pine Shipments.* New Orleans: Southern Forest Products Association Statistical Dept. (annual).
12. .... 1980. *Southern Rail Rate Manual.* New Orleans: Southern Forest Products Association.
13. Tyworth, John E. and Ronald S. Koot. 1981. "The Impact of General Rate Increases on the Penetration of Midwestern Lumber Markets."



### DEFLATED EFFECTIVE RATES FOR 100,000 LB. SHIPMENTS OF LUMBER FROM COAST AND SOUTHERN PINE ORIGINS TO KANSAS

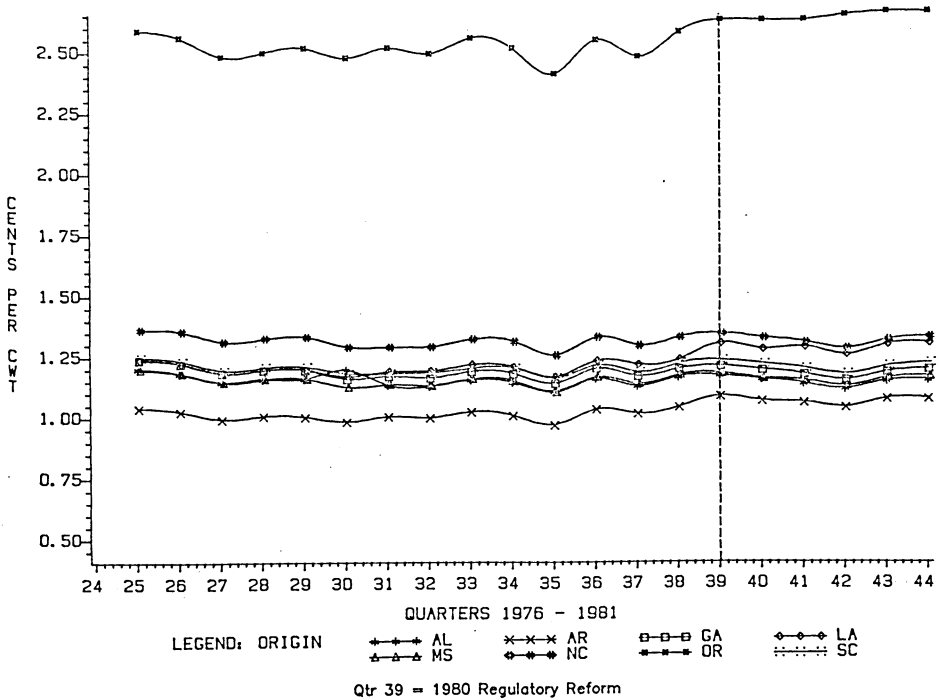


Qtr 39 = 1980 Regulatory Reform

FIGURE 4

- Logistics and Transportation Review*. Vol. 17, No. 3 (Autumn 1981), pp. 343-359.
14. WWPA. 1976. *Ex Parte 330 Increased Freight Rates West and Interterritorial—1976*. (Verified statement on behalf of Western Wood Products Association). Portland, OR: mimeographed.
  15. .... 1977. *Ex Parte 336 Increased Freight Rates and Charges—1977*. (Verified statement on behalf of Western Wood Products Association). Portland, OR: mimeographed.
  16. .... 1980. *Statistical Yearbook of Western Lumber Industry*. Portland, OR: Economic Services Dept.
  17. .... 1980. *Freight Rate Circular*. Portland, OR: Western Wood Products Association. Nos. 940-1010.
  18. Association of American Railroads. 1982. *Railroad Cost Recovery Index*. (Series RCR-1, Tables C-3 and C-4). Washington, D.C.

**DEFLATED EFFECTIVE RATES FOR 100,000 LB. SHIPMENTS  
OF LUMBER FROM COAST AND SOUTHERN PINE ORIGINS  
TO ILLINOIS**



**FIGURE 5**

TABLE 1

**MEAN SPREAD BETWEEN LUMBER RATES FROM COAST AND  
SOUTHERN PINE REGIONS TO SELECTED STATES—  
BEFORE AND AFTER 1980 REGULATORY REFORM**

Market Area State	Before* (n = 6)**		After* (n = 6)**		Difference***	
	Nominal	Deflated	Nominal	Deflated	Nominal	Deflated
<b>Official Territory</b>						
DE	297	2.32	404	2.58	107	0.26
MD	251	1.95	346	2.20	95	0.25
NJ	241	1.87	334	2.13	93	0.26
NY	208	1.62	291	1.85	83	0.24
OH	233	1.81	319	2.03	86	0.22
PA	230	1.79	319	2.03	89	0.24
WV	270	2.17	380	2.43	101	0.26
<b>Western Trunkline</b>						
IA	156	1.21	203	1.29	47	0.08
IL	180	1.40	236	1.50	56	0.10
IN	233	1.81	322	2.05	89	0.24
KS	135	1.04	180	1.14	45	0.10
MI	207	1.60	289	1.84	82	0.24
MO	225	1.75	290	1.85	65	0.10
NE	116	0.89	156	0.98	40	0.09
WI	155	1.17	199	1.26	44	0.09

\*Cents per cwt.

\*\*Six quarters before and after Oct. 1, 1980.

\*\*\*t-statistic for test of two means is significant at  $< .01$   
Rates deflated by AAR Regional Cost Recovery Indexes (1977=100).