GRAIN REVENUES ON NORTH DAKOTA LINE-SEGMENTS

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SUMMARY

This report summarizes activities undertaken pursuant to activity three under the contract existing between the North Dakota Highway Department and the Upper Great Plains Transportation Institute (UGPTI). The activities include the development of data sources and programs which would allow the estimation of historical rail revenues for any line-segment in the State, as well as potential revenues which could be derived from increases in the railroad's market share. The programs have been written in Statistical Analysis System (SAS) programming language and utilizes data bases compiled and managed by UGPTI.

Table 1 presents a summary of line-segment results for crop year 1980-81. The rail revenues have been developed by multiplying the actual tonnages shipped by actual rates for each station to each destination. The potential revenues have been calculated by multiplying both rail and truck tonnages by the actual rates to determine the amount of revenues which are potentially-available to the rail mode.

INTRODUCTION

Branchline revenues are a significant factor in line-segment viability studies. Grain revenues, in particular, are important since many branchlines in the state are dependent upon grain to sustain the long-term operations of the segment.

The purpose of this activity is to develop a set of computer programs and procedures which, utilizing existing data bases, can be used to develop estimates of branchline revenues on a crop-year basis. The report which follows describes the programs which have been developed.

Overview of Procedures

The programs developed for this activity utilize two primary sources of data: (1) grain and oilseed movement data, and (2) rail rates developed from individual tariffs. The grain movement data are compiled and maintained internally by the UGPTI. These data are arrayed by line-segment, station, commodity, and destination. The applicable rates are developed from railroad freight tariffs (BN tariff 4016 and Minneapolis Grain Exchange Rate Book No. 15, primarily), and are commodity-specific and on an origin-destination basis as well. The grain movement data, in addition, show the annual split for rail versus truck. The distinction allows the calculation of potential as well as historical rail revenues.

Defining the Rate Level

Several levels of rates may actually have been in effect during any given crop year. Since individual station data is currently available on an **annual** basis only, it is first necessary to determine the most appropriate rate level for use in calculating the revenue totals for any given crop-year.

Using the simple mid-point of the year would be one alternative for approximating the rate level. This would assume, however, an even distribution of traffic throughout the year. A preferred method, which has been used here, is to examine the distribution of the movements throughout the year and to calculate a weighted mid-point from this.

For purposes of clarification, the weighted mid-point, in this instance, lies on the 50 percentile boundary of the frequency distribution of all grain and oilseed movements during crop year 1980-81, based on the time of shipment. Below the weighted-point, lie half of all grain bushels originated in North Dakota during one's time-frame.

The weighted midpoint for North Dakota shipments falls during the time-frame which Ex Parte 375-C rate level was in effect. The rate level became effective in December of 1980 and was in effect the remainder of the crop year.

SUPPLEMENTAL SOURCES

UGPTI grain movement data have large miscellaneous categories for designations. This complicates revenue calculations for destinations other than Minneapolis, Duluth, or the Pacific Northwest. Also, the location of rates in rail tariffs for other than the three destinations is an extremely arduous process. Even if such rates were easily accessible, the destination must still be known in order to estimate revenues accurately.

The alternative to this would be to estimate rail revenues from Rail Carload Waybill statistics, compiled and published by the ICC and FRA. The UGPTI obtains annually a one percent sample of all North Dakota traffic. From this sample, it is possible to proxy interterritorial revenues for North Dakota grain commodities moving to destinations other than the three noted above. It is not necessary to know the precise destination in order to approximate revenues in this manner. The average revenue from territory-to-territory reflects the individual revenues which occurred on specific movements. (For example, if 20 sample movements occurred from various North Dakota origins to the Southern states, the average of these 20, taken from the waybill sample, will reflect to the central tendencies of the underlying movements).

Where miscellaneous destinations were considered, therefore, rates were developed from interterritorial waybill statistics.

Revenue Calculations

Grain bushel totals from UGPTI data are sorted by commodity, and converted to hundredweights. These are then compared to the rates on a station-by-station basis. Since the rates differed across commodities, each commodity group has been treated separately. The total revenues for each line-segment shown in Table 1 are thus a summation of the individual revenue calculations for all stations on the branchline for each commodity to all destinations, such that the revenues for any line-segment equal

$$\sum_{i=1}^{n} R_{ijk}$$

where Rijk equals the revenue from station i for commodity j to destination k.

Updating the Data Bases

The revenue bases may be updated through-out succeeding crop years based on changes in rate structures and movement characteristics. For example, it is likely that North Dakota Public Service Commission formatting requirements for elevators will include percentage of shipments by single-car as opposed to various classes of multiple-car shipments. This may, in fact, be implemented during or after crop year 1982-83. At that time, it will be possible to update these using multiple car and trainload tariffs.