The Importance of Short Line Railroads to Rural and Agricultural America

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Disclaimer

Abstract

This study aims to fill in the gap for short-line research, while maximizing accuracy of results by utilizing Association of American Railroad's Profiles database combined with American Short Line and Regional Railroad Association' Annual Data Profile. More specifically, the study: (1) attempts to quantify the importance of local and regional railroads to the U.S. rural and agricultural economy and (2) examines factors affecting short-line viability and future prospects for a viable short-line network in the future. In 2000, short lines participated in nearly 30 percent (9.9 million carloads) of all rail movements. Thousands of customers are served by these railroads. It was estimated that more than 3,000 food product customers were served, more than 2,000 lumber and farm product customers, and more than 1,000 chemical and waste scrap customers utilized the services of short-line railroads. This report identifies several factors critical to the success of short line rail roads. Success was measured and analyzed by looking at variables related to traffic volume, backhaul traffic, reliance on industries and/or commodities, number of shippers, flexibility of labor, track conditions, management, and transportation competition.

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Introduction

Since 1980, there have been more than 280 small and regional railroads (short lines) formed from track previously owned by Class I railroads in the U.S. that are currently operating.[1] These railroads operate on more than 29,000 route miles, and haul more than three million carloads of freight annually.[2]

Short line railroads have provided benefits to rural and agricultural shippers for several reasons, including, but not limited to:

- Short lines have provided continued operation of rail lines for many communities that otherwise would have lost service through rail abandonment. This has benefitted rural communities through the avoidance of adverse abandonment impacts, such as reductions in gross business volumes and personal income, increased highway investment costs, lost economic development opportunities, and reductions in property values.

- Short lines have provided improved customer service and lower rail rates in many cases. Because of the smaller network and lower traffic levels of short line railroads, monitoring of customer needs and service levels is improved. Moreover, lower track and equipment investment costs combined with lower labor costs due to less restrictive work rules for short line labor allow short lines to realize lower costs on light-density lines, some that are passed on to shippers in the form of lower rates.

However, while the cost savings and service improvements of short line operations over Class I operations on light density lines have been well documented, the nationwide importance of short lines, particularly for rural and agricultural communities has not been quantified.[3] In fact, simple statistics, such as the proportion of all carloads or tons originated that are accounted for by short lines, the number of customers that depend on short line railroads for rail service, and the role played by short lines in enhancing intramodal and intermodal competition were not compiled prior to the previous version of this study.[4] This study addresses this issue and examines the role played by local and regional railroads in the U.S. economy. Specifically, the study: (1) attempts to quantify the importance of local and regional railroads to the U.S. rural and agricultural economy, (2) examines factors affecting short line viability and future prospects for a viable short line network in the future, and (3) reviews policies aimed at enhancing the future viability of the short line railroad industry.

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[1]These statistics are compiled from two sources: AAR Railroad Profiles (1996 ed.) and Lewis, Edward A. *American Shortline Railway Guide, 5th Ed.*, 1996. A compilation of the total number of short lines established since 1980 from Profiles shows a much larger number. However, many of the short lines established since 1980 were new firms taking over an existing short line. This number represents only the short lines formed from rail line that previously was owned by Class I railroads. Appendix C shows the names, year of creation, and previous owner of new short lines formed since 1980 that are still in operation.

[2]Ibid.

[3]A previous version of this study by Bitzan and Benson (1999) was unpublished. The same methodology to assess the participation of short line railroads in carloadings, ton-miles, and customers was used in Bitzan, Tolliver, and Benson (2002).

[4]Bitzan and Benson (1999).

The next section of the report will attempt to quantify aspects of the importance of short line railroads to rural and agricultural communities.

Nationwide Assessment of the Role of Short Lines in Rural and Agricultural Communities

As stated previously, no assessment has been made regarding the volume of traffic carried by short lines, the proportion of all traffic where short lines participate, the customers served by short lines, the volumes of various commodities hauled by short lines, or the role played by short lines in shaping the intramodal and intermodal competitiveness of regions. In fact, promotional literature from the American Short Line and Regional Railroad Association, the lobbying group representing the nation's small railroads, lists the proportion of all railroad employees, revenues, and route miles accounted for by short lines, but does not provide any data regarding traffic levels or the number of customers served.[5]

One of the few printed examples that quantifies the proportion of traffic hauled by short lines was by Wolfe(1986). In discussing differences between Freight Commodity Statistics (FCS) and the Carload Waybill Sample, Wolfe (1986) states the following:

> *Since the Waybill Sample covers all classes of railroads while the FCS data covers only Class I railroads, the factored Waybill data should exceed the FCS total volume of terminated carloadings and tonnages. Although there are a few definitional differences in the concept of terminated traffic between the Waybill and the FCS data, they are relatively minor in nature. Overall, as Class I railroads account for 93 to 95 percent of all terminated traffic, the factored Waybill should exhibit tonnage and carloading figures slightly larger than the FCS data.*

However, we will show that the use of Waybill statistics to make an assessment of the role played by short lines in providing railroad services can be misleading.

Before quantifying short line traffic levels and their relationships to overall rail traffic volumes, it will be useful to present railroad definitions and what distinguishes a short line from a major freight railroad. Moreover, we will present the frequently cited data related to the importance of short lines in the rural and agricultural economy.

The Surface Transportation Board (STB) defines railroad classes based on revenues earned. Because of inflation, the revenue levels separating railroads change from year to year in an attempt to maintain consistent real revenue thresholds over time. In 2001, Class I railroads were defined by the Surface Transportation Board as those with more than $266.7 million in annual revenues, while the rest were short lines. The AAR further separates short lines into regional and local railroads. In 2001, regional railroads were defined as those

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[5]Website of the ASLRRA, http://www.aslrra.org/?AC_HISTORY.

that had revenues of more than $40 million and/or had a rail network of at least 350 miles. Local railroads are defined as those that do not meet the regional railroad threshold.

In addition to the distinctions between Class I, regional, and local railroads, one further classification is made. A number of short line railroads are primarily inolved in facilitating the flow of traffic between railroads (bridge traffic) or in serving customers within metropolitan areas or port districts. These railroads are referred to as switching and terminal railroads. Thus, the local railroad category generally is separated into "local line haul" and "switching and terminal" railroad categories.

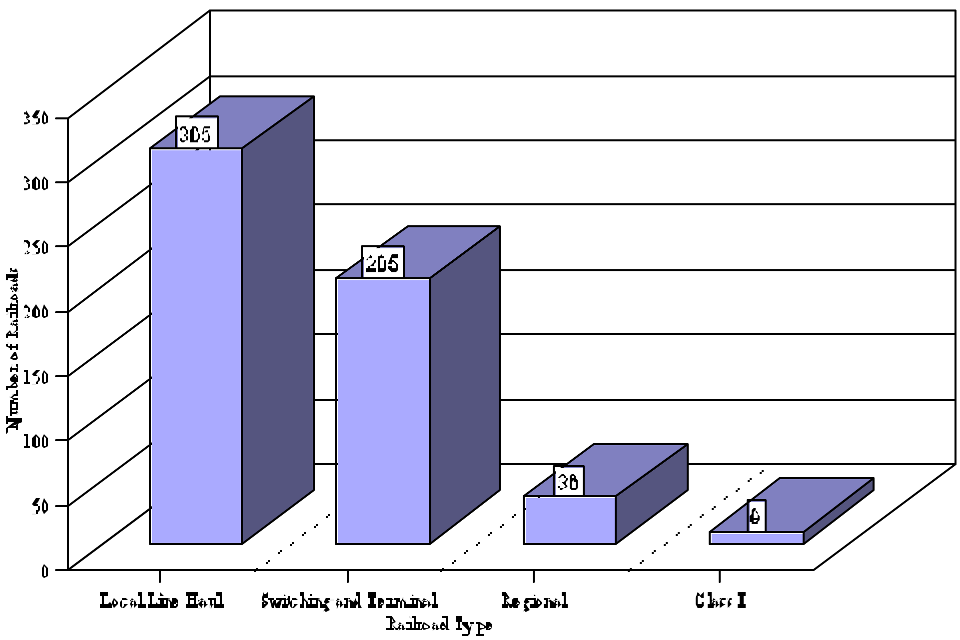

Figure 1. Railroad Industry Consist, 1999
Source: Association of American Railroads, *Railroad Ten-Year Trends 1990-1999*.

In 1999, there were 555 railroads in operation in the United States (Figure 1). Only nine of these railroads were Class I railroads, while the remaining railroads were short lines. Of the short lines, 36 were regional railroads, 305 were local line-haul railroads, and 205 were switching and terminal railroads.[6]

Short Lines account for 29 percent of all railroad route miles operated, more than 11 percent of all railroad employees, and nearly 9 percent of all railroad freight revenues in the U.S. (Figure 2). Moreover, they account for significant portions of mileage operated in many states (Figure 3).

While statistics showing the proportions of railroad miles, employees, and revenues are useful in assessing the importance of short line railroads to the U.S. rail industry, they do not give an indication of the important

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[6]Association of American Railroads, *Railroad Ten-Year Trends, 1990-1999.*

role played by short lines in hauling railroad traffic. The following section provides estimates of short line participation in U.S. railroad traffic, highlighting the types of commodities hauled by short lines, the types of customers served by short lines, and the regional variations in short line participation. An examination of the types of commodities hauled by short lines, the customers served, and the variations among regions will show the important role played by short lines in rural and agricultural America.

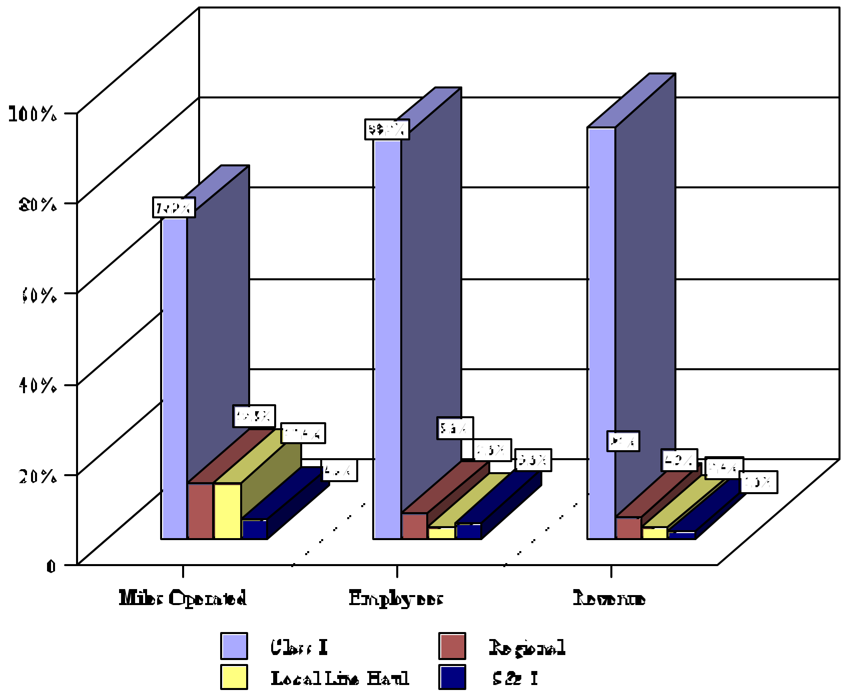

Figure 2. Miles Operated, Employees, and Revenues of U.S. Railroads, 1999

Source: Association of American Railroads, *Railroad Ten-Year Trends 1990-1999*.

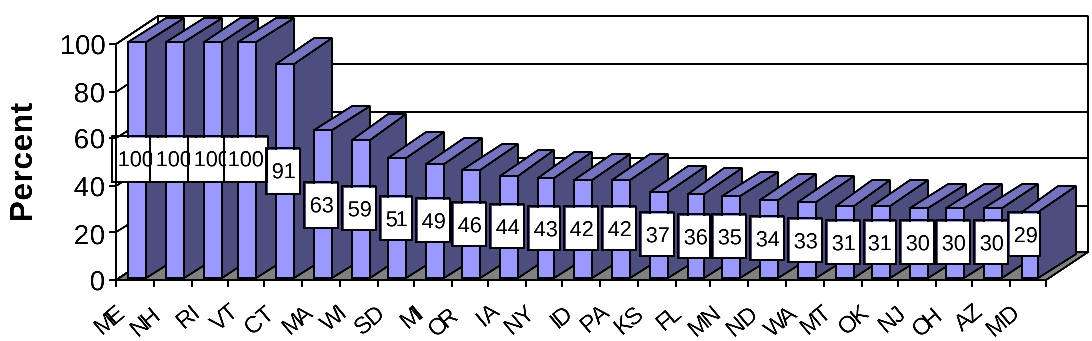

Figure 3. Percent of Rail Miles Operated by Short Lines, 2000

Estimating Rail Car Loadings by Commodity

One of the most basic measures of short line participation in hauling U.S. railroad traffic is the number of carloads handled. Participation can be measured based on the proportion of all U.S. rail carloads originated by short lines, the proportion terminated by short lines, or the proportion of U.S. carloads handled during some portion of the movement by short lines (i.e. they were (1) originated and forwarded; (2) received and forwarded; (3) received and terminated; or (4) originated and terminated). Each of these statistics provides a unique perspective on the degree of short line participation in rail movements of various commodities. The proportion originated gives some indication of the dependence on short lines by those shipping products out by rail on short lines (e.g. grain producers), the proportion terminated provides an indication of the dependence on short lines of those receiving products by rail, and the proportion handled at some point by short lines gives some indication of the dependence of all shippers of a given commodity on short line railroads.

Although the number of carloads handled by short lines is a basic measure, and therefore, one that seemingly is easy to obtain, several problems are associated with measuring the number of carloads handled with public and private data sources. One of the most frequently used data sources to estimate traffic volumes and characteristics is the Carload Waybill Sample (CWS). The Carload Waybill Sample is a source of data on railroad freight movement statistics. All railroads that terminate at least 4,500 carloads of freight per year are required to sample their movements for the CWS. The sample provides information on the commodity carried, the number of cars in the shipment, the revenues charged on the shipment, the railroads involved in the shipment, origins and destinations of the shipment, and other various data. Moreover, the sample is performed in such a manner that reliable estimates of traffic at the industry level can be obtained.

Ideally, the CWS could be used to obtain estimates of short line and regional railroad participation in carloads, ton-miles, and movements of various types. However, the CWS greatly understates short line and regional participation for at least two reasons. These include: 1) affiliated Class I railroads often perform billing functions and the short line movement shows up as a Class I movement on the waybill[7], and 2) the CWS only is collected from railroads terminating at least 4,500 carloads per year, leaving most of short lines out of the sample (less than one-half of the non-Class I railroads carry more than 4,500 carloads per year, and a much smaller portion terminates 4,500 carloads per year). In addition, because the CWS samples movements from railroads that are terminating shipments, estimates of carloads originated by railroad are not necessarily accurate. For example, a short line railroad that originates one out of every 200 shipments terminated by a reporting railroad may represent one out of every 100 in the sample, because there is no sampling procedure to assure that originating railroads are represented accurately.

To estimate the proportion of rail carloads of various commodities that short line railroads handled at some point between their origin and destination, two primary sources of data are used. These data sources include

[7]The 1993 user guide for the CWS states: “Some railroads are both reported for by other railroads and completely hidden from waybill routes (i.e., they are shown neither as reporting railroads nor as terminating carriers). Examples include the Apache Railroad (reported for by ATSF) and the Somerset Railroad (reported for by Conrail).” See *User Guide for the 1993 ICC Waybill Sample*, Association of American Railroads, Economic & Finance Division, 1994.

the Association of American Railroad's (AAR's) Profiles of U.S. Railroads database, and the American Short Line and Regional Railroad Association's Annual Data Profile.[8]

When used alone, each of the two primary data sources has potential deficiencies for making an assessment of short line participation in rail carloadings. However, when used in conjunction with one another, the data sources complement each other to provide a reasonable assessment of short line carloadings. The following paragraphs describe each data source, the data items used in each to make an assessment of rail carloads, the potential deficiencies in using each as a stand-alone source for carloads, and the methods used to combine the data sources to provide improved estimates of carloadings by short line railroads.

The first data source used is the American Short Line and Regional Railroad Association's (ASLRRA's) Annual Data Profile (ADP). The ADP is an annual data compilation of financial and operating data for the short line and regional railroad industry (1993-2000). Data are collected from a sample of local, regional, and switching & terminal (S&T) railroads through a detailed survey. Responding railroads report the number of carloads originated and terminated, originated and forwarded, received and forwarded, and received and terminated, by commodity. Because the railroads are asked to report actual carloads of each type rather than percentages, it is believed that data on carloadings of various commodities are more accurate than similar data from other sources.

However, because the ADP only captures a sample of all the local, regional, and S&T railroads in the U.S., it cannot be used as a sole source for estimating the number of commodity carloadings by short line and regional railroads. Figure 4 shows the estimated portion of the industry carloads captured by railroads responding to the survey in 1993-2000. As the figure shows, the ADP only captures about half of the industry totals between 1993 and 1996, and only about 40 percent in subsequent years.

[8]As described above, the Carload Waybill Sample, was considered but eventually eliminated as a primary data source due to major deficiencies.

One complementary data source to the ADP is the AAR's Profiles of U.S. Railroads database. The AAR's Profiles of U.S. Railroads (Profiles) database is a yearly compilation of carloads, miles of road, states served, top three commodities of carloads hauled and percentages of each, and various other data items for every railroad in the United States. The main advantage that Profiles has over the ADP is that it collects data from the entire population of local, regional, and S&T railroads, rather than a sampling.

A disadvantage of Profiles when compared to the ADP is a decrease in the number of data items collected, and a decrease in the precision of various data items. For example, while the ADP collects data on the number of carloads originated and terminated, originated and forwarded, received and forwarded, and received and terminated for each commodity, the Profiles database surveys railroads on the number of carloads hauled, the top three commodities hauled, estimated percentages of traffic accounted by each of the top three commodities, and estimated percentages of carloads originated and terminated, originated and forwarded, received and forwarded, and received and terminated. It is likely that a listing of actual carloads in various traffic categories leads to a more precise estimate than a listing of overall carloads, with various estimated percentages attached to different types of traffic.

Data from these sources can be combined in various ways to provide improved estimates of short line and regional railroad participation in shipping various commodities. However, even the combination of the two sources may understate the participation of short line and regional railroads in shipping various commodities. This is the case because some carloadings of a specific commodity may be made by railroads that 1) do not respond to the ADP survey, 2) do not report their top three commodities or percentages to the AAR (in 2000, 51 out of 566 non-Class I railroads did not report top three commodities and/or percentages), or 3) do not haul

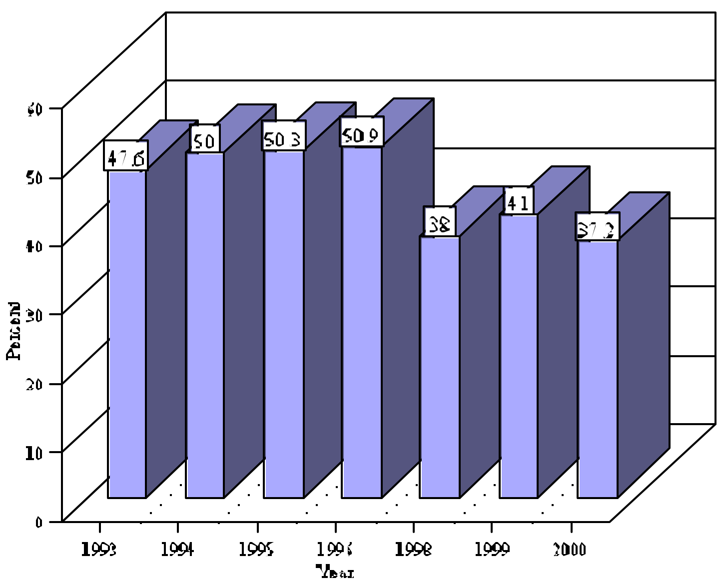

Figure 4. Estimated Percent of Industry Carloads Captured by the ADP

the particular commodity as one of their top three (in 2000, the top three commodities accounted for at least 75 percent of the railroad's carloadings for 79 percent of remaining non-Class I railroads as reported in

Profiles). Because of the potential understatement, this study adds an estimate of unknown commodity carloads to estimates of carloads by commodity. Thus, the traffic reported by commodity in this study shows a conservative estimate of short line participation in railroad movements.

Figure 5 shows the estimated carloads originated by short line and regional railroads using the CWS, the ADP, and Profiles in 2000. As the figure shows, the ADP and the CWS show less than half the carloads of Profiles. As mentioned previously, the small figure for the CWS reflects a lack of small railroad sampling by that source, while the small figure for the ADP in comparison to profiles reflects the fact that ADP is a sample and Profiles is the population. Because the CWS may not accurately represent the traffic of included short lines, it is excluded from consideration. The other two data sources are retained, however, as they have complimentary features that make their combined use desirable.

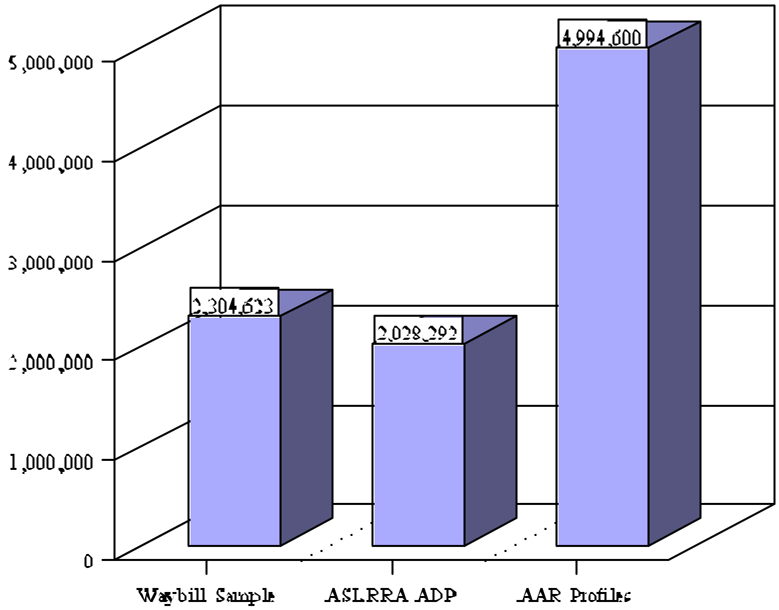

Figure 5. Carloads Originated by Local, Regional and S&T Railroads, 2000

Methodology for Estimating Carloads

In this study, two basic estimates of carloadings by short lines and carloadings by short lines of specific commodities are provided. As previously highlighted, neither one of these data sources alone will give an accurate estimate of carloadings by commodity. Profiles will miss many commodity carloadings because it only shows percentages of the top three commodities, while the ADP will miss many carloadings because many railroads do not respond to the survey every year. Thus, the two estimates use a combination of Profiles and the ADP.[9]

Both estimates used the same type of multi-step approach to estimate the carloadings of each commodity hauled by short lines. First, estimates of Profiles and ADP carloadings of a particular commodity were compared for railroads that responded to both surveys. Nearly all these estimates were close to one another, although there were some cases where inaccurate reporting affected one or the other database.

In cases where there were large discrepancies between the two data bases, previous years of carload data were examined from both sources, original survey forms from the ADP were examined to check for data entry errors or unentered notes associated with data, and/or railroad officials were contacted to explain

[9]The estimates of carloads by commodity that use both data sources are still conservative. Some commodity carloadings cannot be captured by the data sources because: (1) the ADP gathers data from a sample of short lines, and (2) Profiles only shows percentages of the top three commodities. Thus, some carloadings may not be in the top three commodities of railroads that do not report to the ADP.

discrepencies. These inquiries provide information that allowed one of the estimates to be eliminated in these cases of large discrepancies.[10] In cases where either the ADP or Profiles estimate was found to be in error, its value was eliminated by setting the carloadings of that commodity equal to missing for the estimate that was in error.

Once the inaccurate estimates were eliminated, a comparison was made between the sum of the commodity carloadings from each data source for those railroads that did not have missing observations for the commodity under either data source. The sums of commodity carloadings under each data source, where railroads respond to both surveys and did not report an error to either survey, form the base for each estimate. That is, the ADP estimate uses the sum of the ADP carloadings for these railroads, and the Profiles estimate uses the sum of the Profiles carloadings for these railroads.

Added to each estimate are the ADP carloadings where the Profiles carloadings are missing, and the Profiles carloadings where the ADP carloadings are missing. The sum of the ADP base, the ADP carloadings where the Profiles carloadings are missing, and the Profiles carloadings where the ADP carloadings are missing gives the initial ADP based estimate of carloadings where short lines participated in some way. That is, they originated the shipment and forwarded it to another railroad, or they received the shipment and forwarded it, or they received the shipment and terminated it, or they originated and terminated the shipment. However, this initial estimate overstates short line participation, since a short line could have participated in more than one segment of the movement.

Thus, the next step in formulating an ADP or a Profiles-based estimate was to reduce the initial estimate to eliminate double counting. The estimated double counting for each type of commodity was obtained from a waybill estimation. The waybill estimation of double counting used the following procedure (this was done separately for each commodity): (1) eliminate all observations where short lines did not haul any portion of the movement, (2) for the remaining observations, determine the number of legs in the shipment in which short lines participated (e.g. if a short line originated the shipment, forwarded it to a Class I, and then the Class I forwarded it to a short line to be terminated, then short lines participated in 2 legs of the shipment), (3) add up the total carloads hauled where short lines had some form of participation, (4) determine the total number of carloads that would be reported by short lines if they were reporting separately - this is the number of carloads for movements where short lines participated in any leg times the number of legs where short lines participated, and (5) determine the percentage difference between the number of carloads where short lines had some form of participation and the number of carloads that would be reported if they were reporting separately. This percentage was used to adjust reported carloadings by short lines in an attempt to eliminate double counting.

The adjustment for double counting was the final step in estimating the number of carloadings where short lines had some form of participation (i.e. originated and terminated the move, originated and forwarded it, received and forwarded it, or received and terminated the move). However, to estimate the portion of total industry carloadings where some form of short line participation took place, it was also necessary to estimate

[10] Several reasons for discrepancies were found, including (1) double counting of carloads in the ADP survey, (2) the exclusion of some miscellaneous mixed shipments from the ADP, (3) reporting only interchange cars to Profiles and not local cars, (4) the inclusion of empty or storage cars in the traffic figures reported to the ADP or Profiles, and other reasons.

the total number of industry carloadings originated. The estimate of the number of short line carloadings originated used the same process as the estimate of total short line carloadings hauled, except the adjustment for double counting was unnecessary.[11] This estimate of short line carloadings originated was added to the Class I estimate of carloadings originated by commodity provided by the Freight Commodity Statistics.[12] This provided the total number of industry carloadings.

Estimates of Short Line Participation, Origination, and Termination

One important measure in assessing the role played by short lines in the rail industry is carload participation. Carload participation shows the proportion of carloads where short lines participate in some portion of the movement. Figure 6 shows the percent of all U.S. carloadings where short line railroads had some form of participation between 1993 and 2000. As the figure shows, short lines originated and forwarded, originated and terminated, received and terminated, or bridged between 30 and 34 percent of all U.S. carloads for these years. That is, one-third of all U.S. railroad carload movements rely on short lines for completing some portion of the move between their origin and destination. The number of carloads handled by short lines at some point during the shipment ranged from a low of 9.0 million in 1993 to a high of nearly 10.3 million in 2000.

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[11]Estimates of carloads originated by commodity from the Profiles database use the same originated percentages for all commodities for a given railroad. This assumption is necessary because separate originated percentages by commodity are not provided in the Profiles database .

[12]Association of American Railroads. *Railroad Facts*, various years.

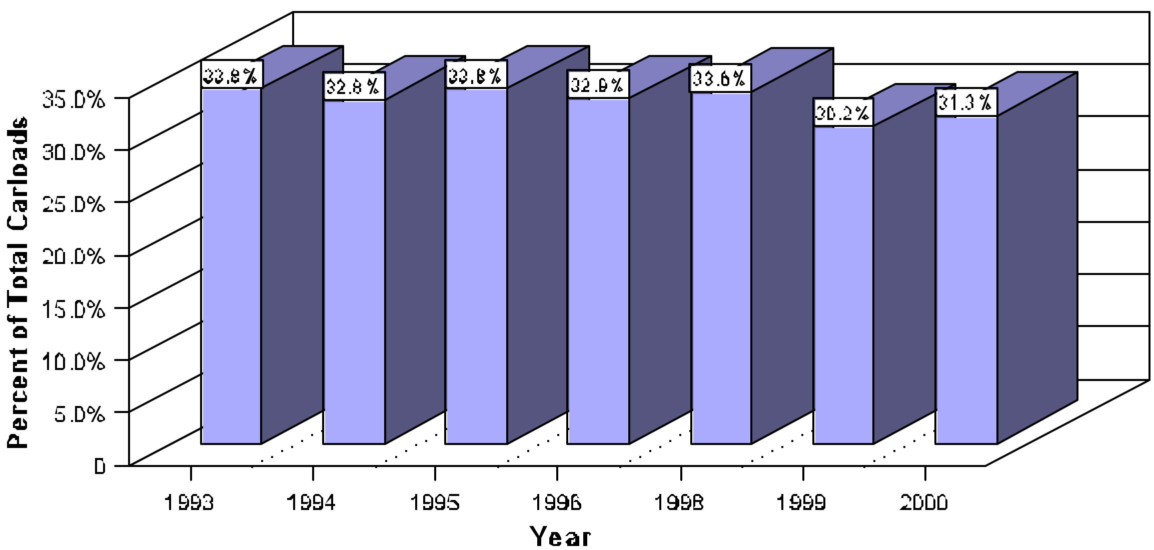

Figure 6. Short Line Participation in U.S. Carloadings, 1993-2000 - ADP-Based Estimate

Short line participation is defined as a move where the short line hauls the commodity at some point during its movement (originate, terminate, or bridge).

Figure 7 shows short line participation by commodity group in 2000, classified at the two-digit STCC code level. As the figure shows, several commodities relied heavily on short lines for completing a portion of their movement from origin to destination in 2000. For example, more than 1 million carloads of metallic ores (76 percent of all U.S. rail carloadings of metallic ores) relied on short lines for making some portion of the movement. Other commodities relying heavily on short lines for a portion of their movement included primary metal products, lumber, paper, petroleum, farm products, non-metallic ores, and stone products.

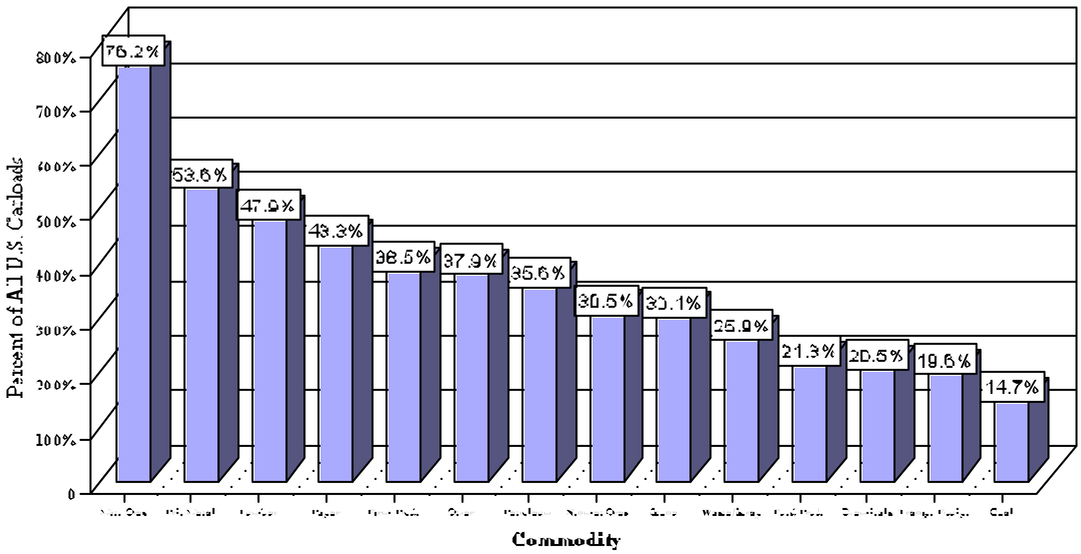

Figure 7. Short Line Participation in U.S. Carloadings, 2000 - by Commodity
ADP-Based Estimate. Short line participation is defined as a move where the short line hauls the commodity at some point during its movement (originate, terminate, or bridge).
Note: *The other category may capture some carloadings that should be listed in other categories. Other is defined as the short line carloadings where the commodity is unknown.*

Another important measure of the role that short lines play in rural and agricultural America is the portion of all carloadings that are originated by such railroads. Many rural and agricultural areas rely on short lines for access to the U.S. rail system. Short lines provide a means for rural shippers, located on light-density lines, to haul their product to long-distance markets using a low-cost form of transportation.[13] Figure 8 shows the percentage of all U.S. carloadings that were originated by short lines from 1993 to 2000. As the figure shows, between 15 and 19 percent of all U.S. rail carloadings were originated by short lines in these years. This amounts to approximately 5 million carloads originated by short lines per year.

[13]For many low-valued, bulky commodities that travel long distances to markets, rail has an inherent cost advantage over trucking.

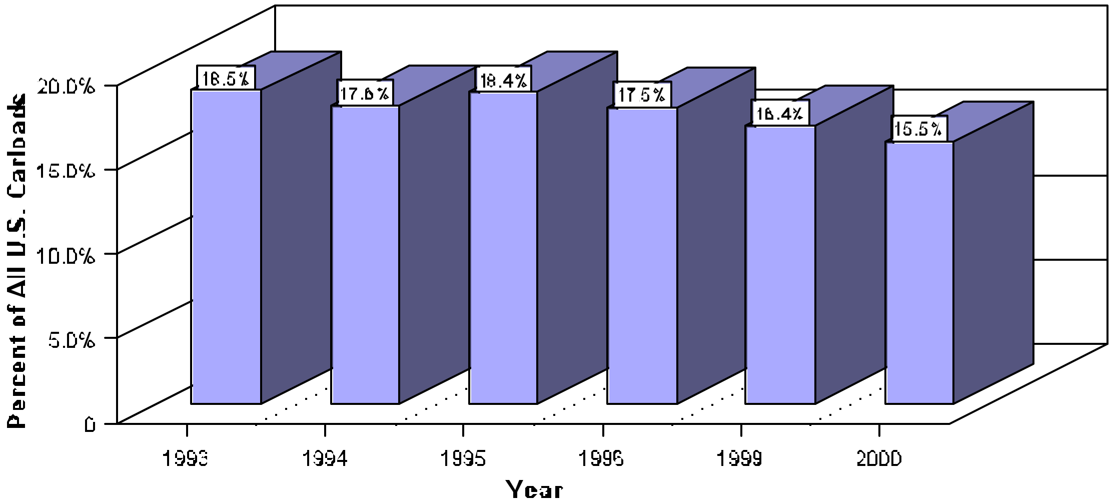

Figure 8. Short Line Origination of U.S. Carloadings, 1993-2000
ADP-Based Estimate

Figure 9 shows the percent of U.S. rail carloadings of all commodities originated by short lines in 2000. As the figure shows, eight of the 13 two-digit STCC code commodities relied on short lines for at least one-fifth of their originations. Moreover, five commodities relied on short lines for at least one-fourth of their carload originations, and one relied on short lines for at least one-half its originations.

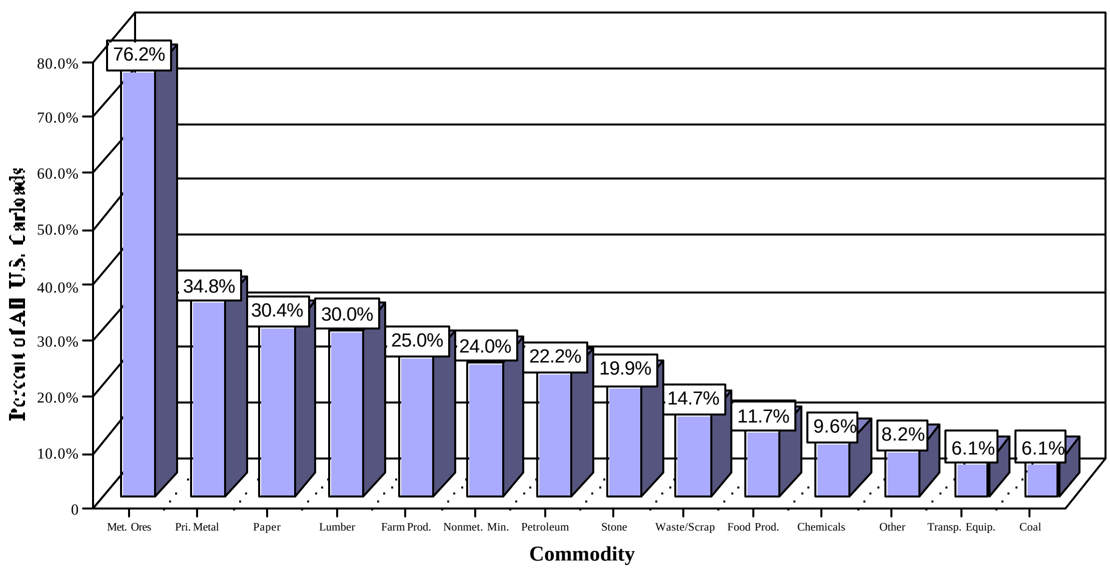

Figure 9. Short Line Origination of U.S. Carloadings, 2000 - by Commodity
Note: The other category may capture some carloadings in other categories. Other is defined as the short line carloadings where the commodity is unknown.

In addition to participation and origination statistics regarding short line carloadings, termination statistics also are important. Just as many rural and agricultural shippers rely on short lines for access to the U.S. rail system, many processors located on light-density lines rely on short lines for access to the rail system for receiving their raw materials. Moreover, farmers rely on short lines to receive chemicals, and some rural electric utilities rely on short lines to receive coal. Figure 10 shows the percentage of all U.S. carloadings terminated on short line railroads between 1993 and 2000. As the figure shows, between 16 and 19 percent of all U.S. rail carloadings were terminated by short lines during these years. This was approximately five million carloads per year.

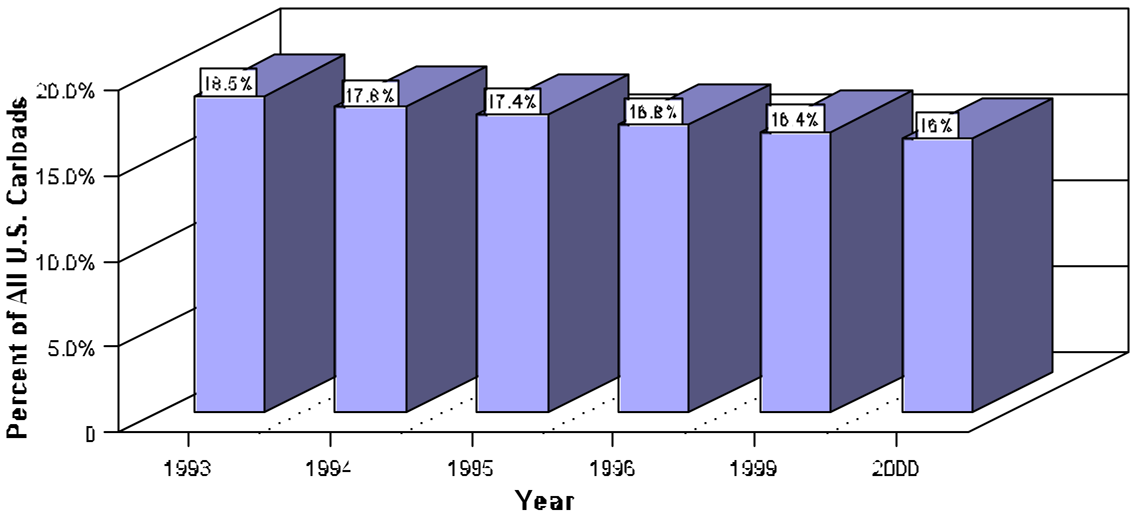

Figure 10. Short Line Termination of U.S. Carloadings, 1993-2000
ADP-Based Estimate

Figure 11 shows the percentage of U.S. rail carloadings terminated by short lines for each commodity in 2000. As the figure shows, seven out of the 13 commodities relied on short lines for at least one-fifth of their carloads terminated. Moreover, short lines play a more important role for some commodities in terminations than in originations. Short lines terminate a larger percentage of petroleum, coal, chemicals, and waste/scrap materials and than they originate.

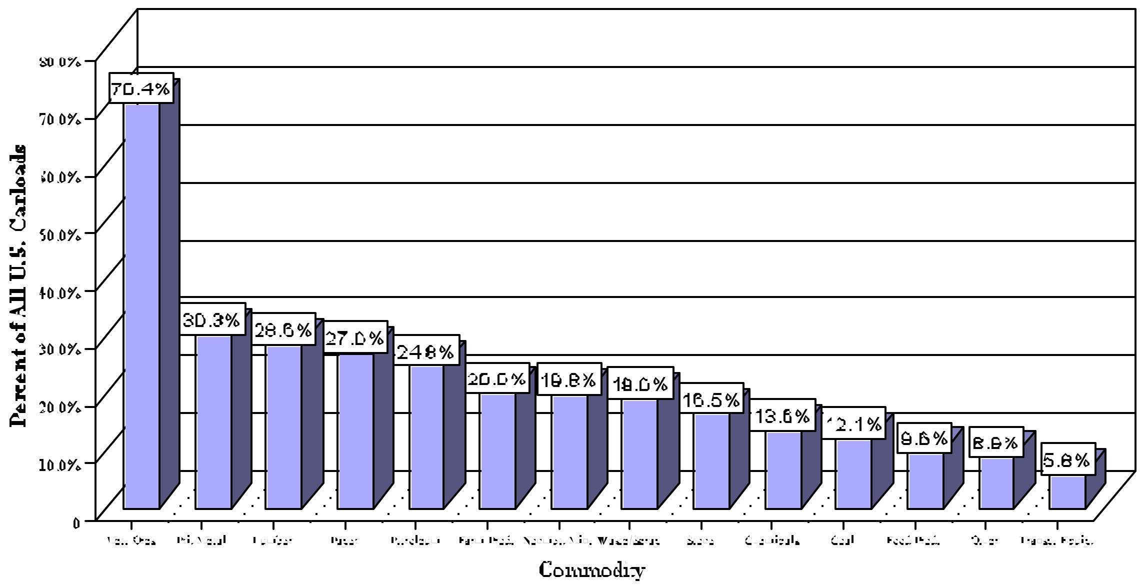

Figure 11. Short Line Termination of U.S. Carloadings, 2000 - by Commodity
ADP-Based Estimate.
Note: The other category may capture some carloadings in other categories. Other is defined as the short line carloadings where the commodity is unknown.

Revenue Ton-Miles

Another measure of the role played by short lines in the U.S. rail system is the proportion of revenue ton-miles accounted for by such railroads. Revenue ton-miles are defined as the number of commodity tons carried multiplied by the length of haul.

To estimate the revenue ton-miles of each commodity carried by short lines, the number of carloadings of each commodity are multiplied by an average load factor for that commodity, and then multiplied by the average length of haul for the railroad.[14] [15] The proportion of ton-miles carried by short lines then is estimated by dividing the short line ton-miles by the total of short line and Class I ton-miles for each commodity. Class I ton-miles are estimated by dividing revenue by revenue per ton-mile for each commodity.[16]

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[14]Average load factors at the two-digit commodity level are obtained from *Railroad Ten-Year Trends*, by dividing Class I tonnage by Class I carloadings by commodity.

[15]The ton-mile estimates for short lines could be misleading if there are systematic differences in length of haul between large and small shipments. For example, if the length of haul is greater for large shipments than for small shipments, multiplying all tonnages carried by the simple average length of haul will understate the total ton-miles carried by short lines. However, in the absence of more detailed data, these are reasonable estimates.

[16]From AAR, *Railroad Ten Year Trends: 1990-1999*.

Figure 12 shows the percentage of total revenue ton-miles accounted for by short lines between 1993 and 2000. As the figure shows, short lines accounted for a much smaller portion of U.S. ton-miles in 1993-2000 than carloadings. In fact, short lines only accounted for between 5.3 and 5.7 percent of ton-miles in these years. This is not surprising, as the length of haul of a typical short line movement is much less than that of a typical Class I movement. Moreover, in terms of assessing the importance of short lines to rural and agricultural America, revenue ton-miles should not carry as much weight. For rural and agricultural shippers, short lines play the important role of providing access to the U.S. rail system. In many cases, such shippers would be required to truck their products to a transloading facility at much higher costs, in the absence of short line rail service. The length that short lines carry shipments is less important than the degree of access they provide.

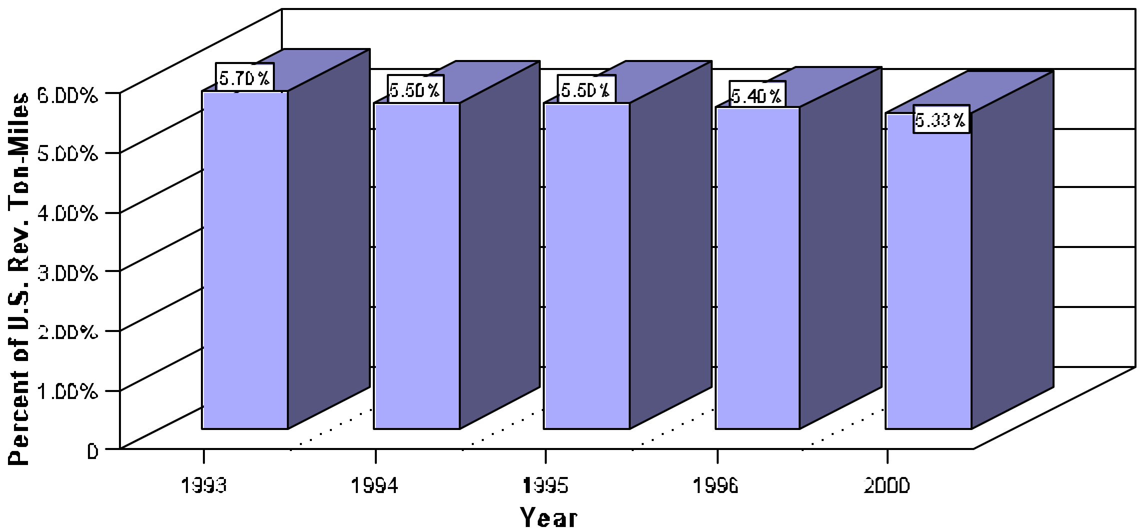

Figure 12. Short Line Percentage of U.S. Revenue Ton-Miles
ADP-Based Estimate.

Figure 13 shows the percent of ton-miles carried by short lines for each commodity in 2000. As the figure shows, short lines accounted for large portions of ton-miles for some commodities - especially metallic ores.

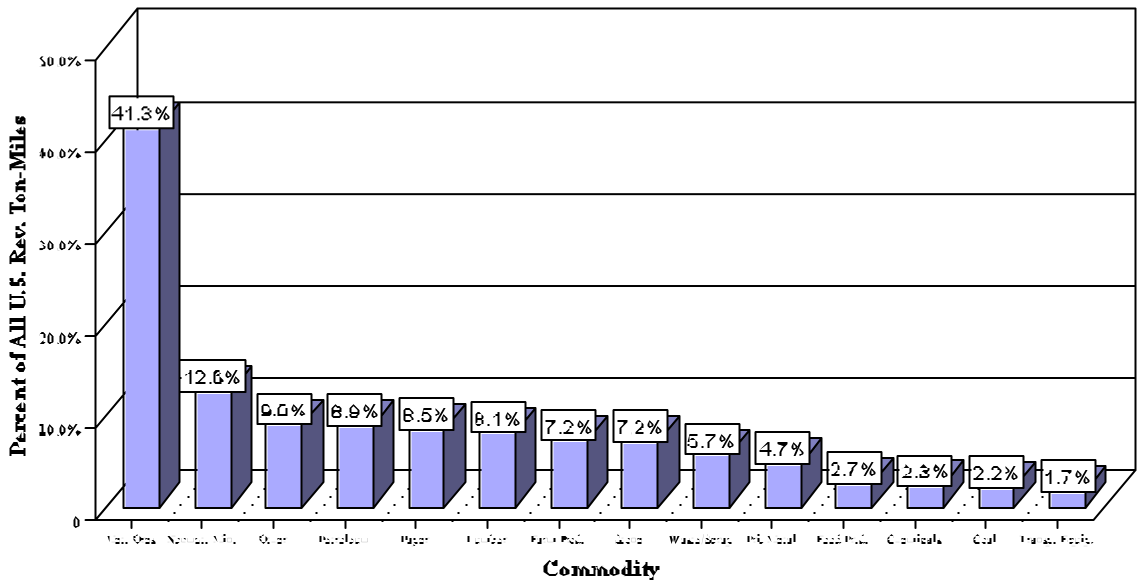

Figure 13. Short Line Percentage of U.S. Ton-Miles, 2000

ADP-Based Estimate.

Note: The other category may capture some carloadings in other categories. Other is defined as the short line carloadings where the commodity is unknown.

Customers

Another useful measure of the importance of short lines to rural and agricultural America is the number of customers that they directly serve. While short lines also have an impact on other shippers that are not directly served by short lines through their participation in other segments of the shipment; and through their impact on intramodal and intermodal competition, the number of shippers directly served by short lines provides a measure of the increased rail system access provided to shippers by short lines.

To estimate the number of shippers of various commodities directly served by short lines, the ADP and Profiles databases were used. In addition to the carload, miles of road, and length of haul data provided by the ADP and Profiles databases, the ADP collects information on the number of shippers of different commodities. However, because data on the number of shippers are not provided by Profiles, the numbers of shippers for all railroads not responding to the ADP had to be estimated. Statistical models were estimated for customers in each commodity class, and parameter estimates were used in conjunction with Profiles data to estimate the customers of each commodity class. Specifically, the following model was estimated for customers in each commodity class:

$$
\begin{aligned}
&Customers_i = b_0 + b_1 Carloads_i + b_2\, Miles\, Oper. + b_3 (Carloads_i)^2 \\
&+ b_4 (Miles\, Oper.)^2 + Regional\, Dummy + S\&T\ Dummy \\
&where: i = commodity
\end{aligned}
$$

Figure 14 shows the estimated number of customers served by short lines in 2000 for each type of commodity.[17] As the figure shows, there were more than 3,000 food products customers, and more than 1,900 in each of the commodity classes of lumber, farm products, and chemicals that were served by short lines. There also were more than 1,300 waste/scrap customers, and hundreds of customers in each of the other commodity classes.

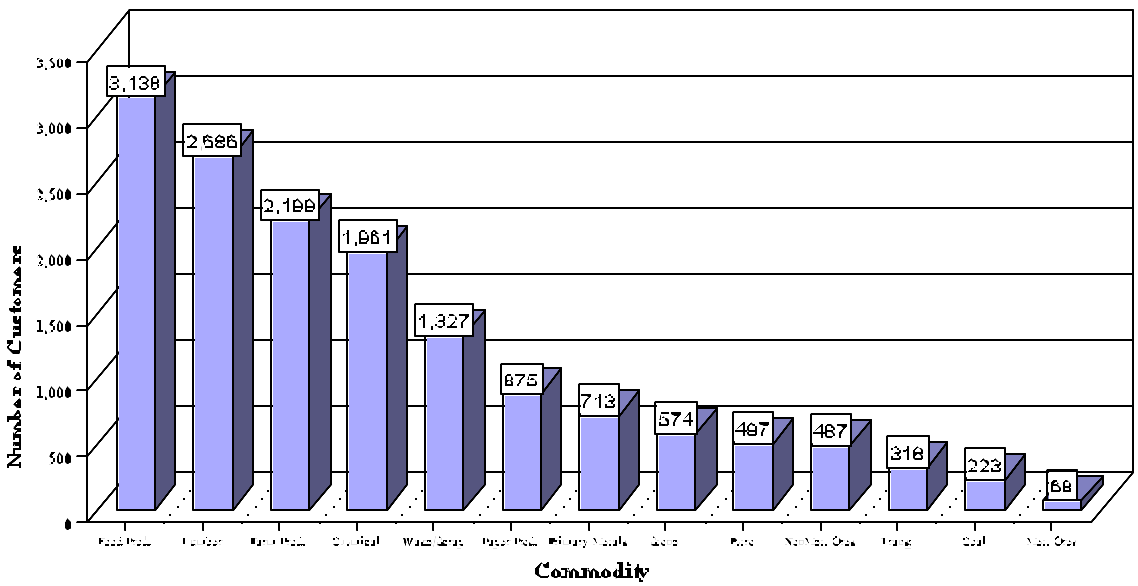

Figure 14. Estimated Number of Short Line Customers, 2000.
Note: These estimates likely understate the number of customers in each commodity class. Customers hauling unknown commodities are not estimated.

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[17] Because some commodity carloadings are unknown, the number of customers in each commodity class is understated.

Geographic Distribution of Carloadings

To gain a further understanding of the importance of short line railroads to rural and agricultural America, regions were defined that are similar in terms of commodities produced, transportation competitiveness, and social and economic characteristics. Eight regions have been defined, as shown in Figure 15. The regional definitions used are:

Region 1 - Idaho, Oregon, and Washington

Region 2 - Arizona, California, New Mexico, Nevada, and Utah

Region 3 - Minnesota, Montana, North Dakota, South Dakota, and Wyoming

Region 4 - Colorado, Kansas, Nebraska, Oklahoma, and Texas

Region 5 - Illinois, Indiana, Iowa, Kentucky, Michigan, Missouri, Ohio, and Wisconsin

Region 6 - Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, and Tennessee

Region 7 - Maryland, North Carolina, South Carolina, Virginia, and West Virginia

Region 8 - Connecticut, Delaware, District of Columbia, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont

Each of these regions is unique in terms of its production of agricultural and nonagricultural commodities, population density and degree of urbanization, transportation characteristics, and climate and topography.

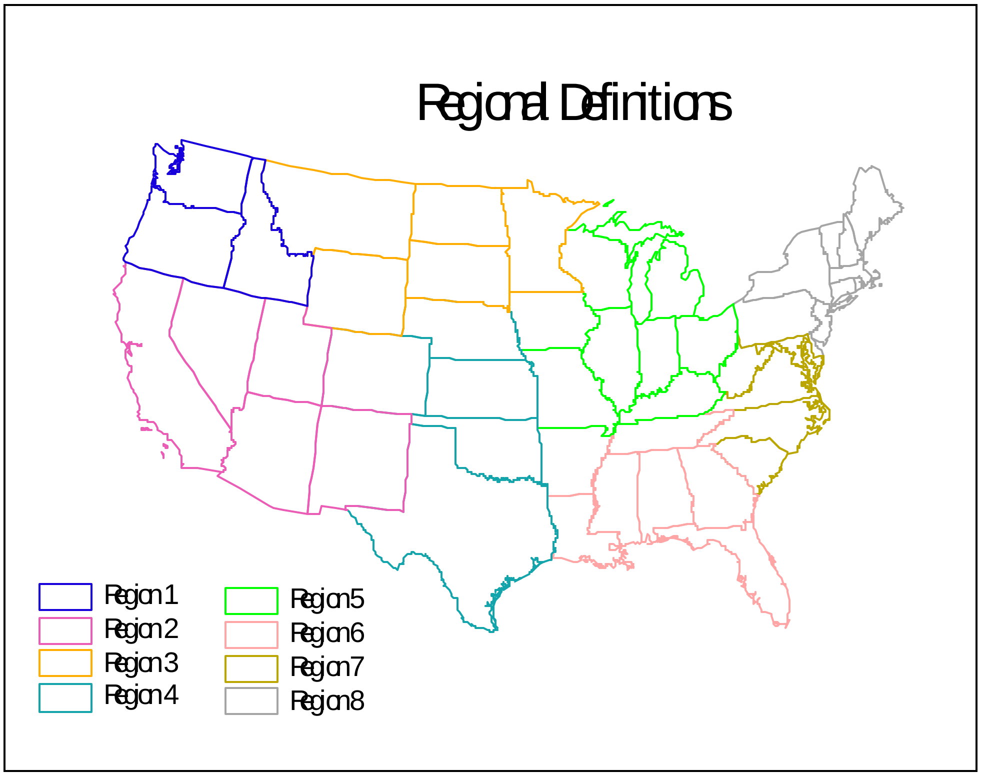


Figure 15. Regional Definitions

Table 1 shows the amounts of non-manufactured commodities produced, the value of manufacturing shipments, the transportation characteristics, and the population density for each of these regions in 2000. As the table shows, Regions 1, 3, 4, 5, and 8 are major producers of agricultural commodities. On a railcar equivalent per square mile basis, each of the five regions produces at least three railcars of farm products per square mile annually. Further, major coal producing regions include regions 3, 5, and 7, with each producing the rail car equivalent of at least 4.8 cars per square mile in 2000.

Table 1: Comparison of Production, Transportation, and Population Characteristics of the Eight U.S. Regions in 2000								
	Region 1 ID, OR, WA	**Region 2** AZ, CA, NM, NV, UT	**Region 3** MN, MT, ND, SD, WY	**Region 4** CO, KS, NE, OK, TX	**Region 5** IL, IN, IA, KY, MI, MO, OH, WI	**Region 6** AL, AR, FL, GA, LA, MS, TN	**Region 7** MD, NC, SC, VA, WV	**Region 8** CT, DE, DC, ME, MA, NH, NJ, NY, PA, RI, VT
Non-Manufactured Commodities								
Production (Rail Car Equivalent)								
Agricultural Commodities	985,304	867,676	1,831,301	1,872,791	3,563,894	681,533	394,711	550,500
Coal	39,141	614,986	3,744,748	737,213	1,968,999	243,886	1,793,321	684,001
Production (Rail Car Equiv.) per Square Mile								
Agricultural Commodities	4.02	1.49	3.92	3.16	8.74	1.97	2.59	3.35
Coal	0.16	1.06	8.02	1.24	4.83	0.70	11.78	4.16
Crude Petroleum	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Fish	0.07	0.03	0.00	0.004	0.001	0.127	0.11	0.12
Major Non-Fuel Minerals	5.52	8.63	3.87	13.99	30.83	16.93	35.25	59.91
Timber (*1996)	1.21	0.21	0.23	0.28	0.77	3.01	2.77	1.67
Total Production per Square Mile	*10.98*	*11.41*	*16.04*	*18.68*	*45.16*	*22.73*	*52.50*	*69.21*
Total Production per Mile of Rail Line	*337.3*	*418.2*	*436.1*	*349.1*	*434.7*	*329.0*	*607.6*	*661.1*
MANUFACTURING								
Value of Shipments per Mile of Rail Line (Millions)	*$18.0*	*$29.6*	*$5.9*	*$14.2*	*$27.3*	*$22.3*	*$28.2*	*$35.3*
Value of Shipments per Square Mile (Millions)	*$0.6*	*$0.8*	*$0.2*	*$0.8*	*$2.8*	*$1.5*	*$2.4*	*$3.7*
TRANSPORTATION								
Miles of Rail Line per Square Mile	*0.0325*	*0.0273*	*0.0368*	*0.0535*	*0.1039*	*.0691*	*.0864*	*.1047*

Table 1: Comparison of Production, Transportation, and Population Characteristics of the Eight U.S. Regions in 2000								
	Region 1 ID, OR, WA	**Region 2** AZ, CA, NM, NV, UT	**Region 3** MN, MT, ND, SD, WY	**Region 4** CO, KS, NE, OK, TX	**Region 5** IL, IN, IA, KY, MI, MO, OH, WI	**Region 6** AL, AR, FL, GA, LA, MS, TN	**Region 7** MD, NC, SC, VA, WV	**Region 8** CT, DE, DC, ME, MA, NH, NJ, NY, PA, RI, VT
*Proportion of Rail Miles that are Main Line (*1995)*	*0.4419*	*0.6455*	*0.4544*	*0.5882*	*0.5161*	*0.5665*	*0.5816*	*0.3656*
Average Distance of Counties to Coal or Grain Water Loading Facilities (Miles)	*172*	*457*	*298*	*237*	*67*	*69*	*118*	*152*
Population								
Population per Square Mile (2000)	43.3	77.29	16.5	55.7	141.5	127.9	172.4	334.5
Percent of Population that is Non-Metropolitan (2000)	21.0	7.5	34.5	20.6	25.5	27.2	32.1	15.5

Table 1 also shows that all of the regions, except Region 2, have large portions of population living in non-metropolitan areas. Regions 3, 5, 6, and 7 all have at least 25 percent of their population residing in rural areas.

The table shows that population density is lowest in Regions 1, 3, and 4, with all three regions having 56 persons per square mile or less. Population density is highest by far in Region 8.

Finally, in examining transportation competition, Regions 5, 6, and 7 appear to be the most transportation competitive, with rail miles per square mile above .06 for all three, and a distance from barge loading facilities of less than 120 miles.

Figure 16 shows the short line carloadings by region, after adjusting for double counting that may exist due to more than one short line participating in the same move. As the figure shows, approximately 60 percent of all short line carloads handled in the U.S. are handled by railroads that operate in Region 5. As shown in Table 1, this region is characterized by a large portion of its population residing in rural areas (25.5 percent), the largest amount of agricultural commodities produced of any region in the United States (equivalent to 8.74 railcars of farm products per square mile), and a large amount of coal production. Other areas that show short line carloadings of more than one million are Regions 3, 6, and 8. All of these regions have at least 15 percent of their population residing in rural areas, produce at least two carloads per square mile of agricultural commidities, and two of the three (3 and 8) produce large amounts of coal.

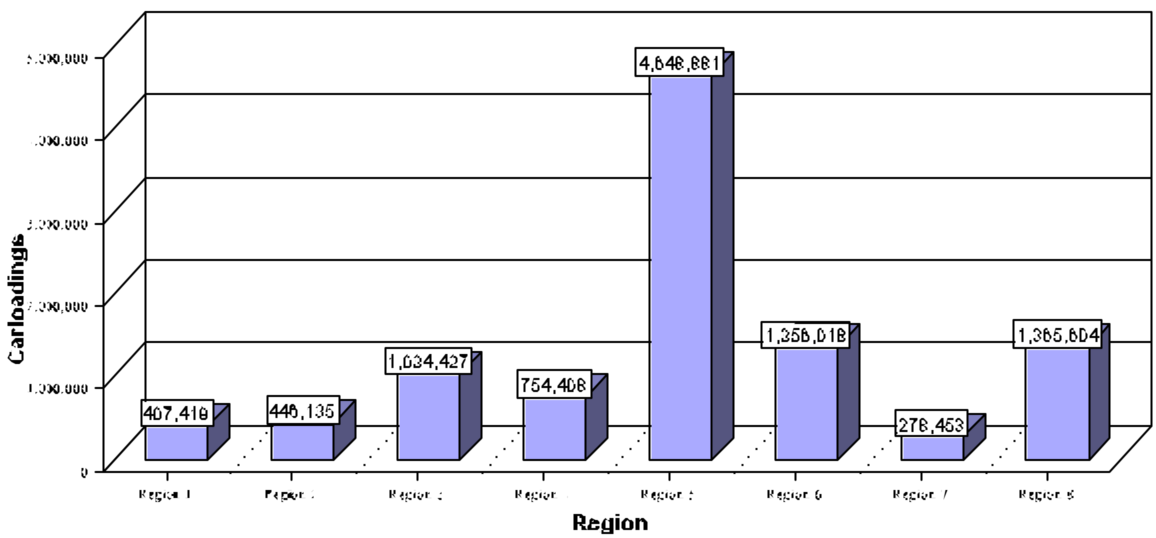


Figure 16. Short Line Carloadings by Region, 2000

Carloads originated by region in 2000 are shown in Figure 17. As the figure shows, originated short line carloadings are spread more evenly among the regions than total carloadings. However, two regions each originate more than 15 percent of all short line carloads originated in the United States. These Regions - 3 and 5 - have at least 25 percent of their population residing in rural areas and are heavily oriented toward agriculture. Moreover, regions 3 and 5 are two of the nation's largest coal producers. These statistics suggest that short lines are important in rural areas of the United States.

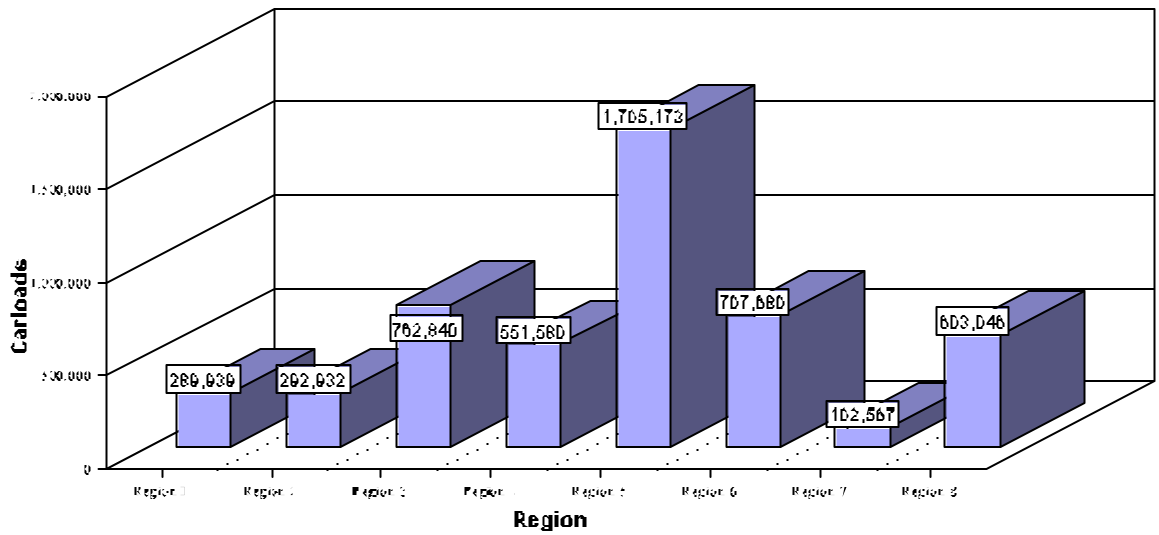


Figure 17. Total Short Line Originating Carloads by Region, 2000

One additional measure that provides an indication of the importance that short lines play in rural and agricultural areas is the proportion of coal and agricultural commodities produced that are transported by short line railroads. Although not all coal and agricultural commodities are transported to markets, this measure will provide an indication of the share of all coal and agricultural transportation that short lines have in each of the regions.

Figure 18 shows the percent of agricultural commodities produced in each region that were originated by short lines in 2000.[18] As the figure shows, significant portions of the agricultural products produced in each region were originated by short lines. In each of regions 3,4, and 5 - the largest agricultural producing regions - short lines originated at least 4 percent of agricultural commodities produced.

[18] Agricultural commodities that had at least 4,900 carloads handled in 2000, are summed by region for an indicator of agricultural production. Agricultural short line rail carloadings by region are divided by this indicator as a proxy for the percent hauled by short lines.

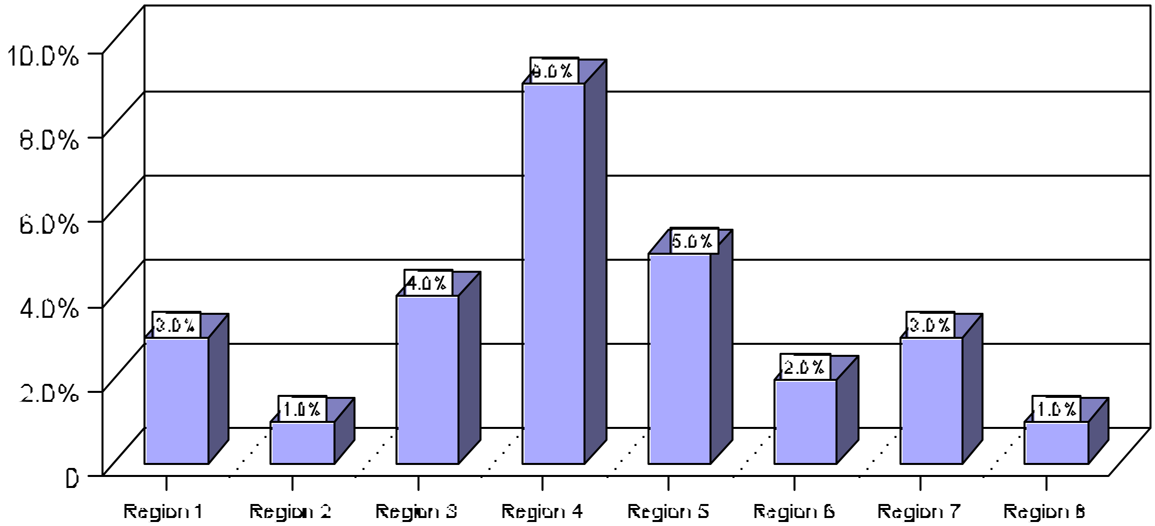


Figure 18. Percent of Each Region's Agriculture Production Originated by Short Line

Similarly, Figure 19 shows that large portions of several regions' coal production was transported by short lines in 2000. As the figure shows, more than 10 percent of the coal produced in regions 2, 5, 6, and 8 was hauled by short lines in 2000.

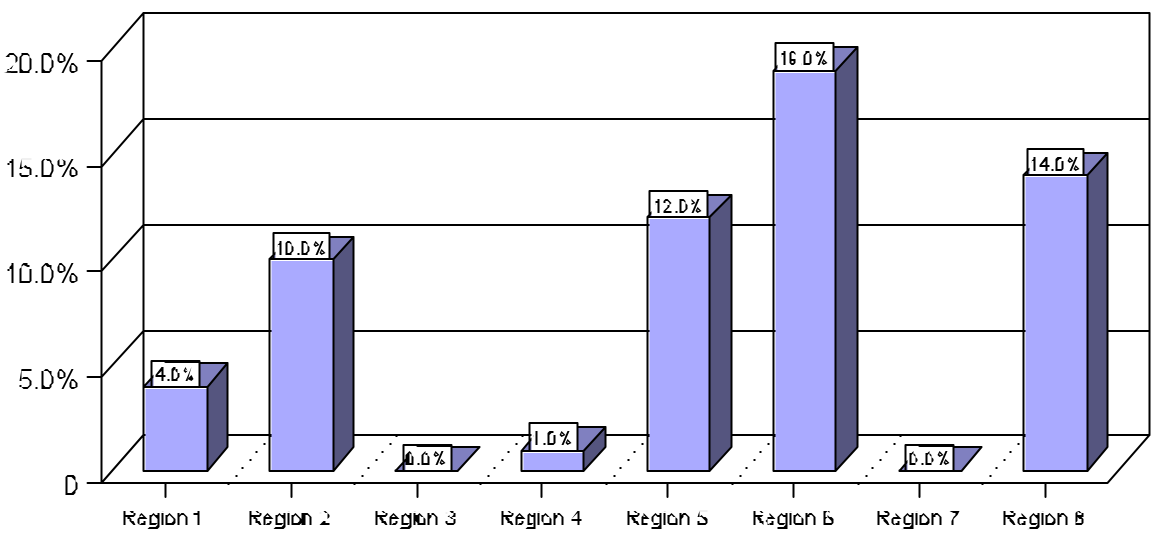


Figure 19. Percent of Each Region's Coal Production Originated by Short Lines

The next section presents a short line case study in North Dakota, a state in Region 3. As previously noted, Region 3 is heavily oriented toward agriculture and has 35 percent of its population residing in rural areas. North Dakota also is a leading producer of several agricultural commodities and its economy is heavily dependent on agriculture.

North Dakota's Experience with Short Line Rail Carriers

The North Dakota rail system is operated by two Class I and three short line railroads (Figure 20). This rail system is vital to the state's economy, as the relatively low-value natural resource based products on which the state's welfare depends are tied closely to reliable rail service and competitive rates. While certain parts of the state are competitive in local processing and terminal markets through trucks, limited truck capacity and receiver market primed for rail receipt limit truck deliveries to about 25 percent of the grain and oilseed shipments made in any given year. Although, this market share for trucks mains relatively consistent, the face distribution and characteristics of the rail shipments change as the grain marketing system continues to evolve.

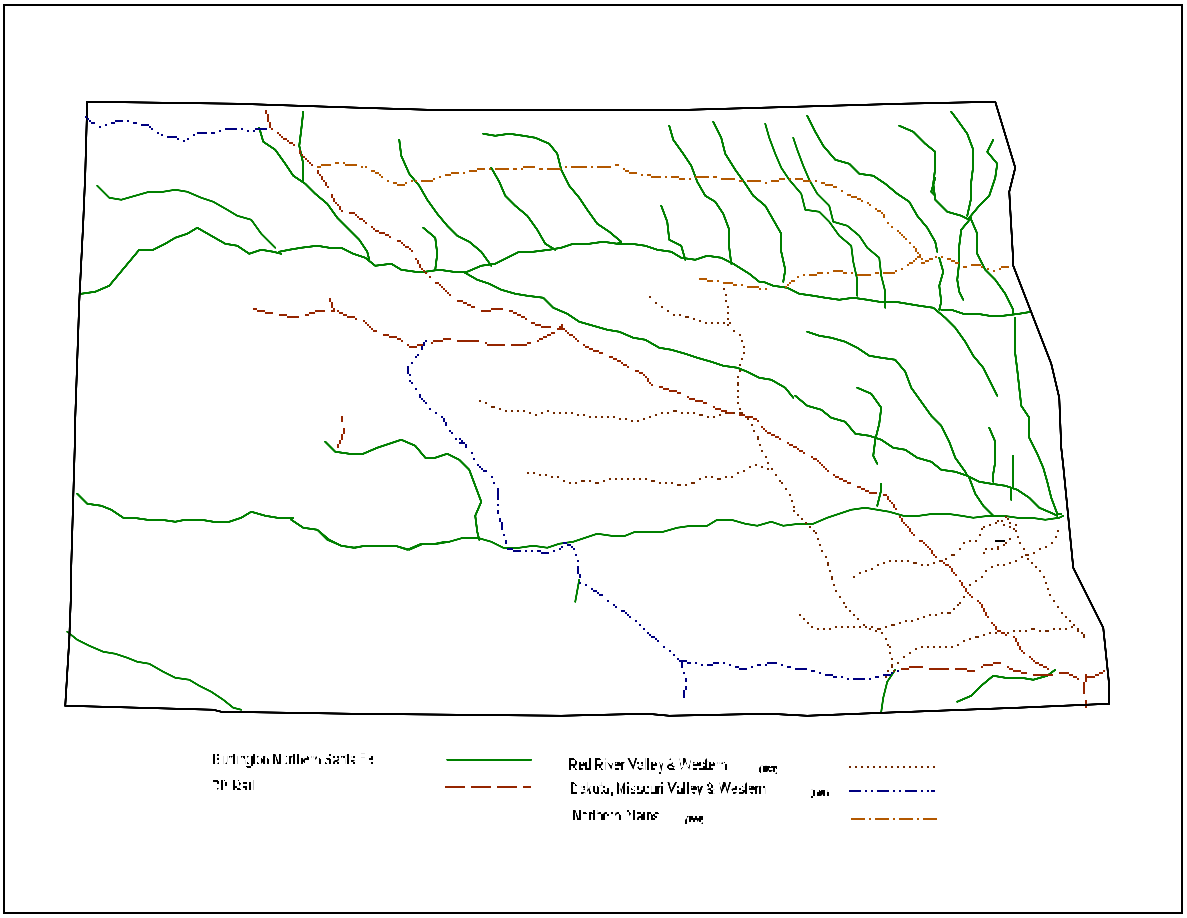


Figure 20. North Dakota Rail System

One of the most notable changes of the past decade has been the success of short line railroads in the state. Short line railroads have made a positive contribution to the economy of North Dakota, as they have allowed carriers on light density branch lines in rural areas to maintain and often improve their rail service where otherwise many of the lines would have been abandoned by their Class I operators. Although Class I carriers continue to originate a majority of the grain and oilseeds shipped by North Dakota elevators, the state's short line railroads play a vital role in moving North Dakota grain products to market.

North Dakota Rail System

The Burlington Northern Santa Fe (BNSF) operates a majority of the system with about 2,300 miles of track, serving 215 elevators across North Dakota. Canadian Pacific Rail System (CP) controls more than 580 miles of track, reaching 76 elevators in the northern, central and eastern regions of the state. These Class I railroads handled 59 percent of the grain and oilseeds originating from the state between 1991/92 and 1996/97.

Track miles and market share indicate that short line railroads are key components of North Dakota's agricultural marketing network (Table 2). The Red River Valley & Western (RRVW), a regional railroad affiliated with BN, has more than 650 miles of track in the central and southeastern regions of North Dakota in 1987 and is the primary rail carrier for 58 elevators. A second regional railroad, the Dakota, Missouri Valley & Western (DMVW), which is affiliated with CP, was formed in early 1991. The DMVW operates 243 miles of track and serves 19 elevators in the southern and central reaches of the state. Most recently, the Northern Plains Railroad (NPR) leased 328 miles of track from the CP and began service for 23 of North Dakota's elevators in February 1997.

Table 2. N.D. Track Miles, Elevators Served, and Market Share for Grain & Oilseed Origination by Railroad, 1995/96

	Track Miles (% of Total)	Elevators Served (% of Total)	Grain Handled (000 Bushels)	Avg. Market Share (91/92-96/97)
BN	2,217 55%	215 46%	220,194 40%	40%
CP	528 13%	76 20%	102,759 19%	19%
RRVW	657 16%	58 11%	58,666 11%	10%
DMVW	291 7%	19 3%	21,907 4%	5%
NPR	328 8%	23 3%		(new 2/97)

Short Line Performance

Performance of railroads will be addressed under two areas, competitiveness and customer service. Ability to maintain and grow market share, success in intermodal competition, and traffic density on lines, are operational characteristics that will be discussed in this performance section. The operational area is a more quantifiable performance item, but can not be used alone in characterizing the performance of the short lines relative to their Class I counterparts. Because the short lines in North Dakota rely on their Class I counterparts for car supply and rates, the customer service, car ordering, and car delivery should be addressed. Therefore, results of an annual North Dakota Elevator Industry surveys for 1994 through 1996 provide insight into the customer service aspects of the alternative rail ownership scenarios.

Market Share

One of the most visible measures of railroad performance is market share for shipments originated. As illustrated in Table 3, the RRVW and DMVW have accounted for about 14 percent of the shipments originated from North Dakota over the past four years. While the DMVW had a slight decline market share, the RRVW has increased market share. The RRVW has developed programs that allow its shippers to co-load[19] crops grown in relatively small volumes, such as corn and soybeans, to accumulate unit train shipments. Effectively giving its shippers access to lower unit train shipping rates, without requiring them to make huge facility investments that would otherwise be required. This special service, which was not offered by their former Class I carrier, allows these elevators to keep fixed costs down, diversify grain handlings, be more competitive in selected unit train markets, and offer producers a higher elevator board price. The relative importance of maintaining and growing the rail traffic for these lines is much greater for RRVW than is would be for a Class I carrier.

Table 3. Market Share for N.D. Elevator Grain & Oilseed Shipments

	BNSF	CP	RRVW	DMVW	Truck	Total
						(1,000 Bushels)
1992-93	39%	21%	9%	5%	26%	704,083
1993-94	41%	22%	8%	5%	24%	522,235
1994-95	41%	18%	11%	3%	28%	530,701
1995-96	40%	19%	11%	4%	27%	565,141

[19] Co-loading allows elevators coordinating rail car loading efforts to form a unit train shipment within the bounds the railroad tariff limitations and rate structure.

Intermodal Competition

Intermodal competition for North Dakota rail carriers is limited to truck, as any barge shipment require at least a 300-mile “front-haul.” North Dakota has a unique system in place to collect this intermodal information. The N.D. Public Service Commission requires each elevator in the state to submit monthly forms describing the market and mode used for grain and oilseed shipments made during the past month. With summaries of these data shippers can identify trends and market shifts, and carriers can measure their success in gaining intramodal and intermodal market share.

As illustrated in Table 4 the DMVW does relatively well in maintaining a strong intermodal split, compared to CP, its Class I counterpart. The RRVW numbers are low in comparison to its Class I counterpart, BNSF. It should be noted, however, that the bulk of the lines operated by this railroad line are located in the area of the state that is most vulnerable to the truck market. From this region of southeast North Dakota the Minnesota terminal markets, about 350 miles away, provide opportunities for elevators in this area to find competitive truck rates. If the RRVW was not operating in this area and was not responsive to its market (i,e. unit train rates), more producer deliveries to terminal markets would likely result. This increased producer delivery to terminal markets outside the state would be detrimental to smaller/mid-sized elevators and their rural communities, and costly for the state as revenues would be moved out of the state and the need for investment in rural roads would be accelerated.

Table 4. Modal Distribution for N.D. Grain & Oilseed Shipments, Percent Originated by Rail from Elevators served by Each Railroad

	BNSF	CP	RRVW	DMVW
	(% Rail)			
1992-93	71%	84%	70%	93%
1993-94	75%	82%	66%	90%
1994-95	75%	72%	69%	78%
1995-96	73%	77%	71%	83%

Traffic Density

Although operational costs are not discussed in this profile of North Dakota short lines, traffic density is an indicator of operational efficiency. Short lines profitably operate lines that were deemed unprofitable by their former Class I operators. Cost structures will not be addressed in this section of the report, but volumes handled may provide some insight into relative efficiencies of rail operations.

This comparison was based on the origination of grain from N.D. elevators, using the N.D. Public Service Commission Grain Movement data. Grain accounts for more than 70 percent of the non-coal traffic originated from North Dakota (State Statistics, N.D. Public Service Commission R1Reports). While some of the short line successes may be attributed to incremental increases in traffic, it is evident in looking at the bushel densities among the rail carriers, that short lines can continue service to lines that have substantially lower densities (Table 5). The average short line track density of 85 bushels per mile is 30 percent lower than that of Class I lines in North Dakota. Assuming the grain is a primary commodity for N.D. rail traffic, this density measure provides an important indicator for operating efficiency. As short lines in North Dakota operate under their Class I counterpart's tariff rate, this density measure suggests that different cost structures allow short lines remain profitable with two-thirds the revenues per mile of track, compared to the Class I carriers.

Table 5. Traffic Density - Grain Shipments per Mile of Track, Average 1992-93 to 1995-96

	BNSF	**CP**	**RRVW**	**DMVW**
	(Bushels/Mile of Track)			
Avg. Bushels/Year	232,534	115,521	54,376	25,359
Miles of Track	2,217	856	657	291
Grain Traffic Density	**105**	**135**	**83**	**87**

Customer Service

Customer service is a rather broad category that covers less tangible efforts of rail carriers to serve their customers. In 1995, the Upper Great Plains Transportation Institute began an annual survey of North Dakota elevators. The primary purpose of the effort was to provide shippers with a regular opportunity to provide feedback to their carrier regarding the service they received during the previous marketing year. These results provide a base for shippers to discuss concerns with carriers and gauge their carriers performance, relative to other carriers in the state.

Elevator managers and railroad personnel were asked to assist in identifying major customer service items. These items were then grouped under these five categories:

- Services of Marketing and Sales Personnel
- Timely Delivery of Equipment
- Convenience of Ordering
- Availability of Order Information
- Condition of Equipment

To gauge relative importance of these customer service categories, the initial question in the customer service section of the survey for 1994 asked elevator managers to rank these components in order of importance (Table 6). Timely delivery of equipment was identified as the most important service activity by 81 percent of the respondents. The convenience of ordering, condition of equipments, and availability of order information were all considered important, ranging from 2.8 to 3.0 in importance on a scale of 1 to 5, with 1 being most important. Service of sales and marketing personnel received the lowest rating, 3.4.

Table 6.	**N.D. Elevators' Rating of Railroad Customer Service Activities, 1996**			
	BNSF	**CP**	**RRVW**	**DMVW**
Marketing and Sales Service	3.0	2.9	4.1	4.0
Timely Delivery of Equipment	2.8	2.6	3.5	4.5
Car Ordering Process	3.0	3.1	4.1	2.5
Condition of Equipment	2.9	4.1	3.6	4.0
Availability of Order information	3.2	3.3	4.0	4.0
Access to Marketing Personnel	2.9	3.1	4.3	3.5
Attitude of Marketing Personnel	2.9	3.7	4.5	4.0
Attitude of Train Crew	3.4	3.4	4.2	5.0
AVERAGE	**3.0**	**3.3**	**4.0**	**3.9**

In the next section of the survey elevators are asked to rate the service they received from their primary rail carrier over the past year. These questions covered the service categories defined by the managers and railroads. In the 1996 survey, the RRVW and DMVW scored higher on average than did their Class I counterparts. The RRVW had the greatest success in meeting its customer's service expectations during 1996, with an average service rating of 4.0.

The DMVW was second in customer service with a slightly lower overall score of 3.9. The CP and BN were rated 3.0 and 3.3, respectively (Table 6). As illustrated in Figure 21, the short line carriers have consistently outscored the Class I carriers in customer service.

When elevators are grouped by primary carrier, timely delivery of equipment is the most important service activity for each group. The grain industry demand for rail service is cyclical in nature with peak demand usually occurring during harvest with strong export demands. Thus, equipment management for elevators and railroads is challenging. To provide a year-to-year comparison of ability of rail carriers to delivery equipment in a timely fashion, data is collected via the annual elevator survey, regarding the delivery of rail tariff orders. Tariff cars are provided in accordance with common carrier obligation, as it was defined in the Interstate Commerce Act. Under the common carrier obligation rail carriers are required to provide equitable service to all rail users. Requests for rail cars under the tariff system are made directly to the railroad. Delivery of tariff cars is not guaranteed by rail carrier. Thus, delivery of these cars in a timely matter is an indicator of responsiveness to the market. As illustrated in Figure 22, the RRVW has outperformed the Class I carriers in delivery of tariff cars over the past three years.

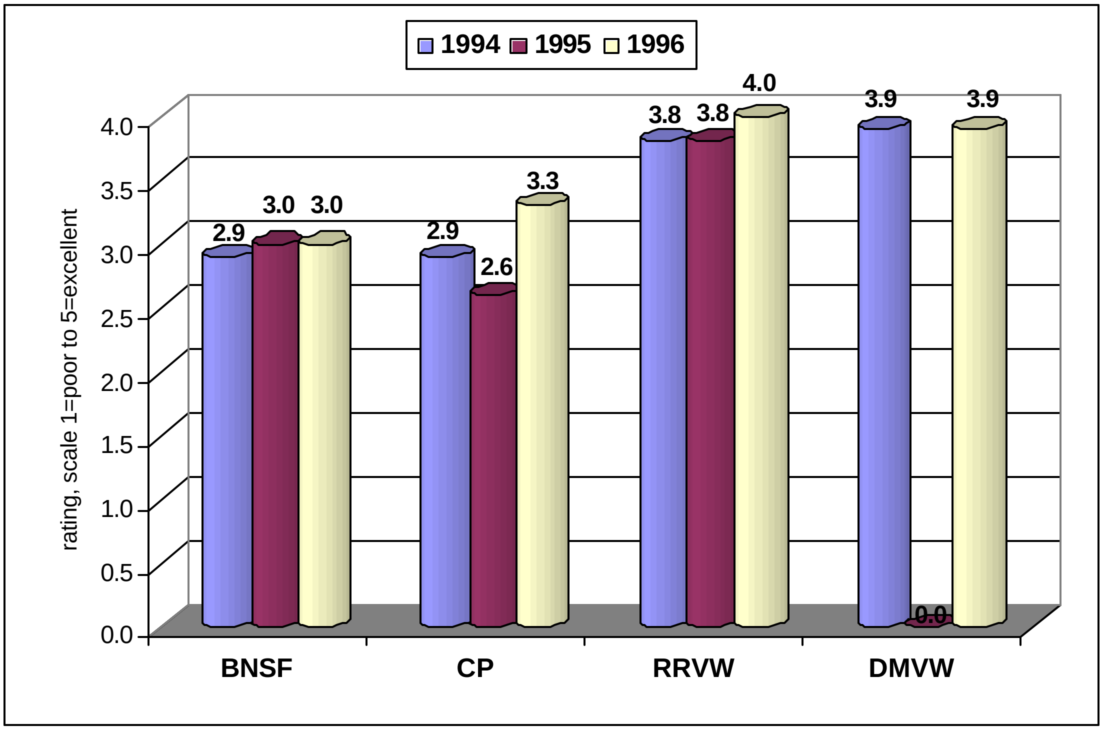


Figure 21. N.D. Elevator Rating of Rail Customer Service

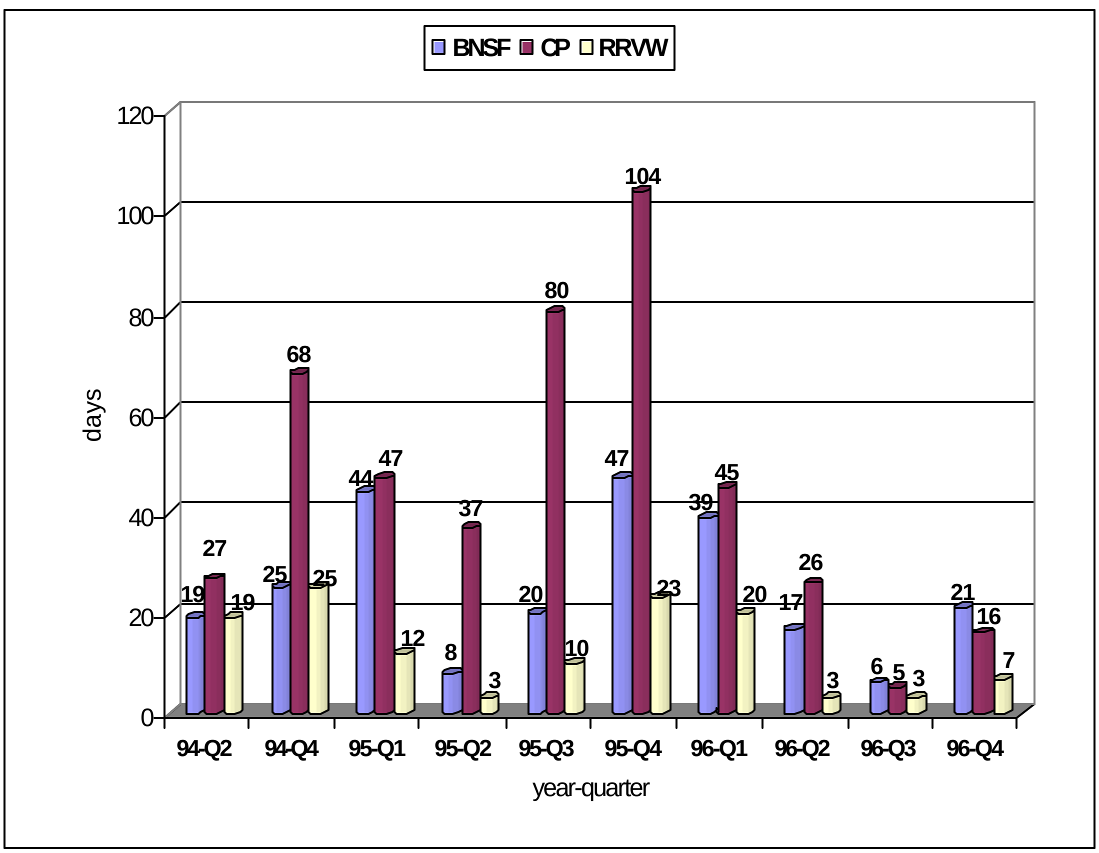


Figure 22. Delay of Delivery for Tariff Rail Car Orders

Short Line Viability

This section of the study examines the viability of short line and regional railroads in the United States. First, the literature examining short line and regional railroad viability is reviewed. Next, the Annual Data Profile of the American Short Line & Regional Railroad Industry is used to examine viability factors identified in the literature review and their relationships to profitability. Finally, viability factors are examined by region to illustrate the likely future viability of short line and regional railroads in various regions of the U.S.

Although there have been many studies examining the performance and operation of the short line railroad industry, few have directly examined the reasons that short lines succeed. Two authors have performed extensive research in this area - K. Eric Wolfe and John F. Due. The review of literature in this section focuses on some of the studies performed by these two authors.

Two studies by Wolfe (1989A and 1989B) examined financial and demographic ratios of local and regional railroads to explore the relationships between such indicators and railroad success or failure. In both studies, Wolfe paired 70 failed railroads with 70 successful railroads based on the type of railroad, the year operations began, types of commodities carried, and the region that the railroad served. He found that several financial and demographic ratios provided an indication of whether the local or regional railroad was likely to be successful, and that such ratios showed significant differences between successful and failed railroads for up to 12 years before failure. These important financial and demographic variables included those indicating the degree of liquidity realized by the railroad, the ability of the railroad's assets to generate income, the leverage position of the railroad, and the profitability of the railroad. While the role that profitability has in forecasting the long-term viability of a local and regional railroad is obvious, the roles of leverage positions, asset income generation, and liquidity also are quite intuitive. If the railroad realizes a short-term downturn in profitability due to a downturn in an industry that it serves, or due to some other short-term reason, the firm's ability to generate cash to cover ongoing expenses may be important in ensuring viability. Moreover, if the local or regional railroad does not have a liquidity position that allows it to obtain cash to cover such expenses, the leverage position of the railroad may be important, as the firm will be more successful in borrowing money with a more favorable debt position, thereby allowing continued viability in difficult times. Finally, firms that can generate a great deal of income from their assets make better use of the resources at their disposal, suggesting an increased likelihood of long-term viability. Results of these studies provide a useful tool for assessing the financial position of local and regional railroads, and the implications of financial positions for long-run viability.

Another study by Wolfe (1988) attempted to measure the causes of local and regional railroad service failures from 1970 to 1987. He found that during this period, 169 local and regional railroads experienced service failures. Several other findings regarding local and regional railroad failures were: 1) a lower percentage of failures occurring in the first five years of firm operation than in other industries (29 percent for local and regional railroads from 1970-1987, and 56 percent for all industries), 2) an increasing percentage of failures occurring in the first five years over time in the industry (1960-1974 -- less than 5 percent, 1975-1979 -- 20 percent, 1980-1987 -- 42 percent), and 3) a higher failure rate for all local and regional railroads when compared to firms in other industries (3 percent for local and regional railroads compared to .93 percent for all industries from 1980-1987). As in the previous studies, Wolfe paired 70 failed railroads with 70 successful railroads based on the type of railroad, the year that operations began, types of commodities carried, and the region that the railroad serves. However, instead of comparing financial ratios of the failed and successful railroads, he compared operational and managerial characteristics of the two types of firms. He found that several factors contributed to the failure of local and regional railroads, including limited traffic volume, an inability to capture economies of density and size, reliance on one type of commodity, a limited amount of backhaul traffic, high rehabilitation costs, lost financial aid, increased competition, poor economic conditions in general, loss of management, unqualified management, and unrealistic business plans.

A series of studies by Due (1977 and 1984), Due and Meyer (1988), and Due and Leever (1993 and 1998) examined the formation and failure of local, regional, and switching and terminal railroads in the United States. The studies focused on the number of short lines and the miles of new short lines forming over various periods, regional distribution of new short lines formed, types of ownership of the new lines, physical characteristics and purchase prices, the number of lines and miles of short line abandoned, and reasons for success and failure of these lines. In examining the failure of newly formed short lines, the authors cite several reasons including: inadequate traffic, mismanagement, inadequate capital, an inability to charge high rates, poor relationships with connecting railroads, the purchase of track in poor physical condition, and the purchase of track at prices that exceed their value.

One study (Due and Meyer, 1988) examined factors influencing success and failure of small railroads in great detail. In highlighting the obvious need for adequate traffic volumes to ensure short line viability, the authors discuss three reasons why the costs of short line operation cannot be reduced below certain levels: (1) a minimum outlay for track maintenance costs must be realized regardless of the amount of traffic traveling on the line (the authors estimate several thousand dollars per mile in 1987), (2) a minimum number of employees are needed for any amount of train operations, and (3) a minimum amount of administrative, equipment maintenance, and traffic expenses will be realized for any amount of operations. The authors also highlight several important factors affecting the costs of operation, including the frequency of operations required (more for manufacturing than bulk shipping), flexibility of labor, the number of shippers served (the authors argue that fewer shippers will mean lower transactions costs), condition of the track, wage rates paid to employees, and the weight of cars that must be handled given the railroad's track conditions. Other factors influencing the success of short lines included managerial ability, the availability of capital, and physical disasters.

Important Viability Factors

Based on the literature review, it is apparent that there are several factors contributing to local and regional railroad viability. These include:

Traffic Volume - An important advantage that short line railroads realize over Class I railroads is the ability to operate on light-density lines at a lower cost. Short lines realize cost advantages due to an ability to operate at lower speeds (meaning less maintenance and equipment requirements), and due to more flexible labor. However, it is apparent that substantial economies of density exist in short line operation, meaning railroads that operate with low traffic volumes experience much higher average costs. Due and Meyer (1988) suggest the following traffic categories for assessing viability, with some qualifications:

<10 cars per mile - hopeless

10-20 cars per mile - marginal and doubtful
20-40 cars per mile - marginal to better
40-100 cars per mile - good chance of success
More than 100 cars per mile - excellent chance of success[20]

While these ranges may serve as general guides, it is difficult to assess the viability of short lines on traffic alone. Moreover, although cars per mile is a frequently cited measure of traffic volume, it does not take the distance or weight of haul into account, as such data are often not available.

Backhaul Traffic - Wolfe (1988) points out the importance of backhaul traffic in contributing to railroad viability. Railroads that have backhaul traffic realize improved equipment utilization, and consequently, lower costs per unit of traffic. When a railroad reduces the amount of empty backhaul traffic, it reduces the amount of time that the equipment is involved in unproductive activities.

Reliance on Several Industries or Commodities - Wolfe (1988) also highlighted the improved long-term viability likely to result from serving a diverse set of industries. Because the demand for railroad transportation depends on the demand for other commodities, a reduction in the demand for a particular commodity or a reduction in its supply can have an impact of reducing traffic on rail lines serving the shippers of that commodity. Carriers, which are diversified in terms of the industries and commodities they serve, are less impacted by fluctuations in the market for a particular commodity.

Number of Shippers - Due and Meyer (1988) argue that an increase in the number of shippers can have a negative impact on railroad viability because of the increase in transaction costs realized from serving more shippers. However, increased shippers also may mean more traffic - a factor that contributes positively to short line viability. Thus, a good measure of the impact that shippers have on transaction costs is the number of customers per carload handled. If carriers can obtain the same number of carloads from fewer customers, they will realize lower transactions costs.

Flexibility of Labor - One of the major benefits that short line railroads realize when compared to Class I railroads is a lower labor cost. Although lower wages may be part of this benefit, the major labor cost saving results from the increased flexibility of short line labor when compared to Class I labor. Most short line labor is either nonunionized or not unionized across craft lines. That is, unionized and

[20]Due and Meyer. "Success and Failure of Newly Formed Railroad Companies," Prepared for the U.S. Department of Transportation, 1988.

nonunionized workers in the short line industry perform multiple tasks. This results in large improvements in labor productivity. Thus, one factor influencing short line viability is the flexibility of the labor in place.

Track Conditions - One of the most frequently cited reasons for failure by Due and Wolfe is poor track, and prohibitive expenses associated with upgrading track. According to the authors, rail line sometimes is purchased at inflated prices, given track conditions. An inability to obtain the large amount of capital necessary for rail rehabilitation or the inability to recoup such outlays with traffic revenues often result in short line failure.

Management - Due and Wolfe also suggest that management abilities often are contributing factors to short line railroad success or failure. However, the most recent article by Due and Leever (1998) suggests that mismanagement is no longer a major reason for short line failure. This is not to suggest that mismanagement will not result in failure. Rather, most of the managers in the short line industry today are experienced and qualified.

Capital Availability - Just as other heavy industries must continually invest to maintain and improve capital stock, the short line industry must invest in track, right-of-way, and ancillary facilities to continue to provide operations and the desired capacity for moving goods. The ability to make investments depends on capital availability. Moreover, because short line firms are smaller than their Class I counter parts, it often is more difficult for them to obtain capital. The ability of short lines to obtain capital impacts their likely viability.

Transportation Competition - As highlighted by a previous USDA study[21], the level of transportation competition has a profound impact on the revenues and traffic that railroads can generate, and therefore, an impact on the likely success of operation. A close proximity to barge loading facilities or to terminal markets, a large number of rail miles per square mile (possibly indicating duplication of rail service), and a large number of highway miles per square mile all increase the price elasticity of demand for a given rail service, diminishing the likelihood of short line success.

In this section of the report, factors that appear to be important to short line viability were examined for one year for railroads that exhibit different levels of short-run profitability. While short-run profitability is not the same as long-term viability, it nonetheless provides an indication of how the factors identified above can affect the success of short lines.

[21]The Impact of Railroad Restructuring on Rural and Agricultural America.

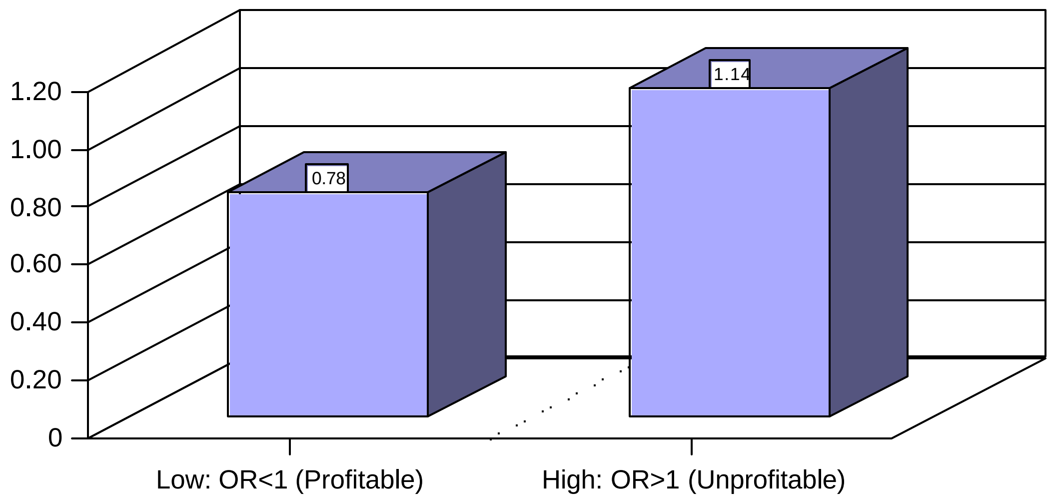
Specifically, this section makes comparisons of the viability factors described above between railroads that realized operating ratios below one in 2000 and those that realized operating ratios above one in 2000. Operating ratio is defined as the railroad's operating expenses divided by its operating revenues. Thus, operating ratios of one or below suggest profitable operations in the short run, while operating ratios above one do not.

In the following pages, comparisons of the means are made between railroads achieving operating ratios below one (profitable) and those achieving operating ratios above one (unprofitable). T-tests are performed to determine whether the average of viability factors are different between the two groups.[22] While a t-test that shows one particular variable (e.g. traffic density) to be higher for the profitable railroads, it does not necessarily mean that higher levels of that variable lead to higher profitability, since the t-test does not show the effect that the variable has on profitability when controlling for other factors. However, because there is no solid theoretical model to relate viability factors to operating ratio, the comparison of means is preferred to a regression technique.

[22] To eliminate outliers for the t-test analyses, a univariate procedure identified and eliminated the top and bottom 1 percent of observations for each variable. To eliminate outliers from revenue and expenditure per ton-mile, the top and bottom 5 percent were eliminated.

Revenue and Cost Characteristics

Figure 23 shows the average operating ratios of the profitable and unprofitable groups for local line-haul railroads.[23] As the figure shows, the average operating ratio is much lower for the profitable group, and the difference is statistically significant.



T-Test of Equal Means = 14.48, P Value = .0001

Figure 23. Operating Ratio Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

When examining the individual components that make up the operating ratio, operating revenues and expenses, it is apparent that profitable railroads are more successful in keeping expenses down than the unprofitable railroads. Figures 24 through 27 show that expenses per carload are significantly lower for the profitable group and that revenues per carload are significantly higher for the profitable group, but that there are no significant differences in revenues and expenses per ton-mile among the two groups. These results suggest that on average, the profitable railroads are successful because they are better able to control expenses and earn higher revenues on a carload basis. One apparent contradiction in the results is that the operating revenues per carload are higher for the profitable group, while the operating revenues per ton-mile are lower for the profitable group. This apparent contradiction may be explained by differences in commodity weights and lengths of haul among the included railroads. However, it should be noted that the differences on a ton-mile basis are not statistically significant.

[23]The three classes of short line railroads should not be grouped for analyzing viability because of the large differences among their operations. This section only examines local line-hauls because it has the largest sample size. The averages used for each group are the weighted averages using an appropriate weighting factor (for all ratios this is the denominator).

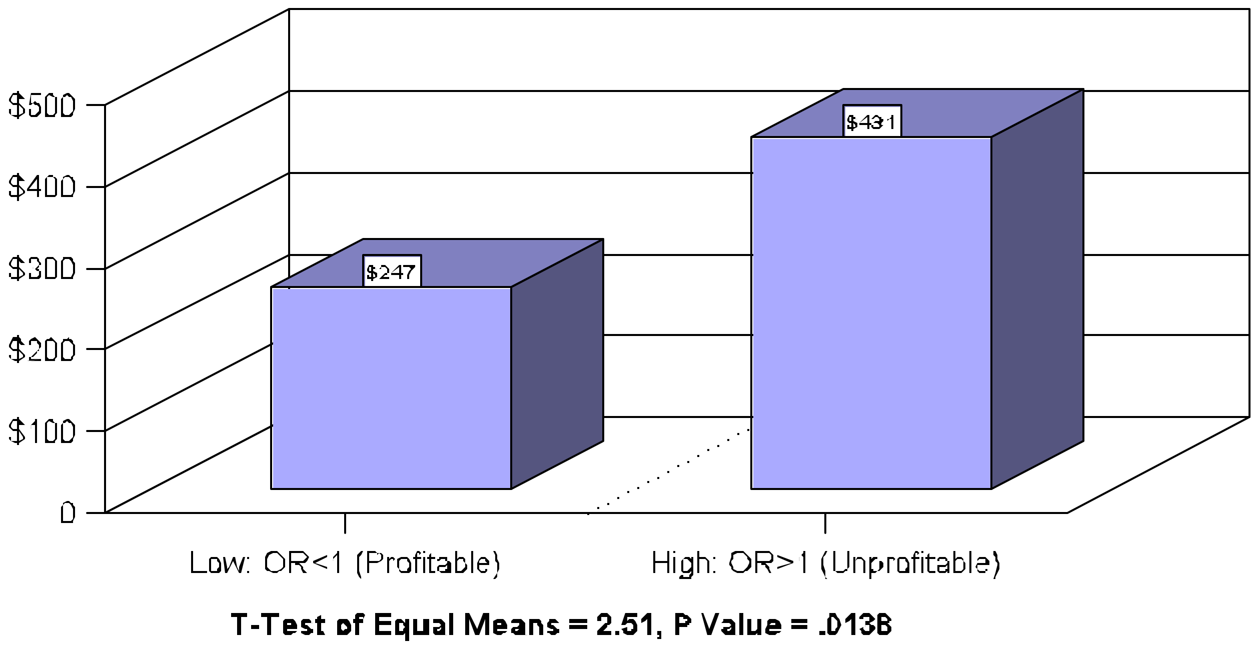


Figure 24. Operating Expense per Carload Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Rations)

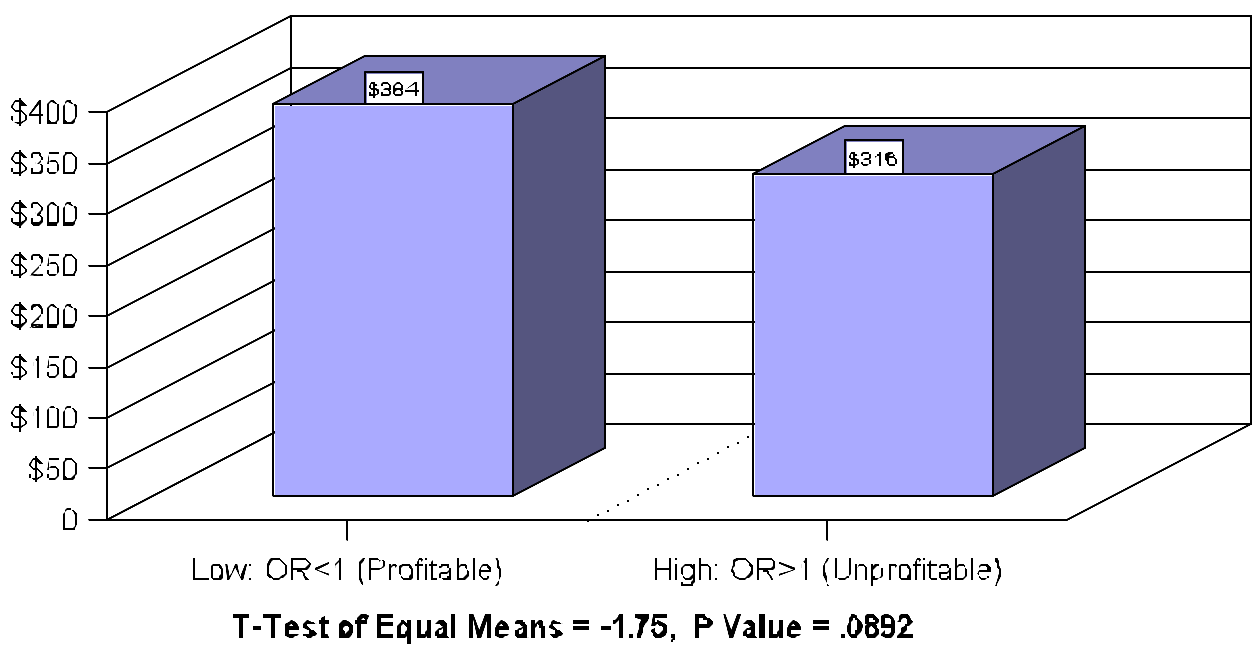


Figure 25. Revenue per Carload Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

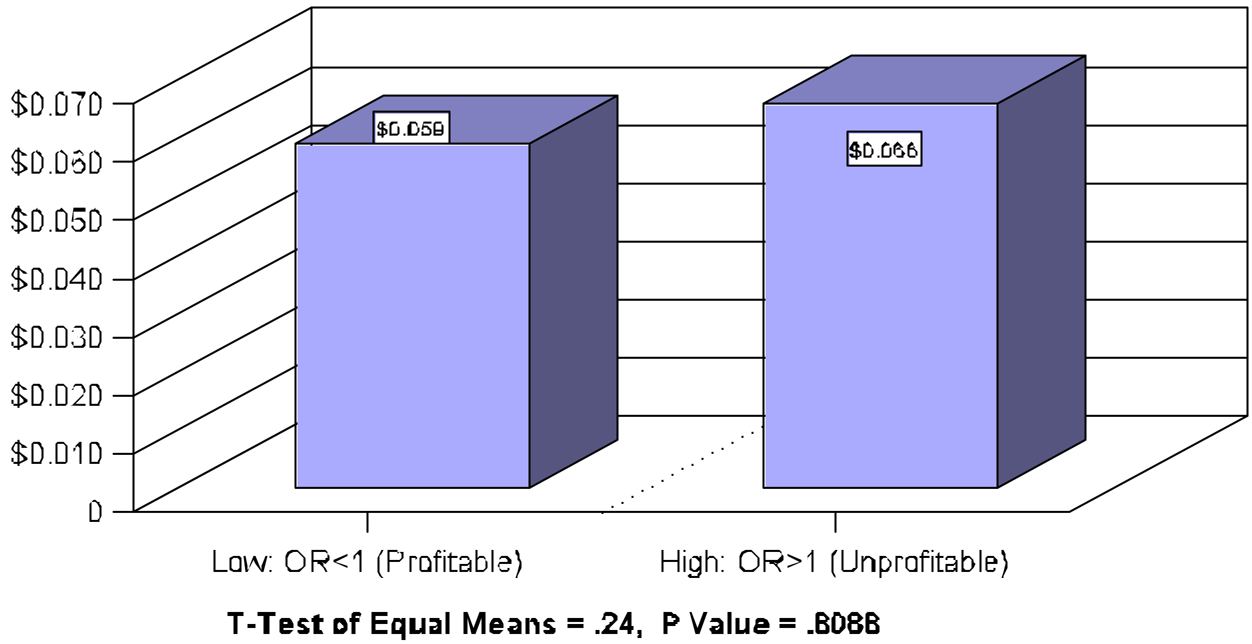


Figure 26. Operating Expense per Ton-Mile Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

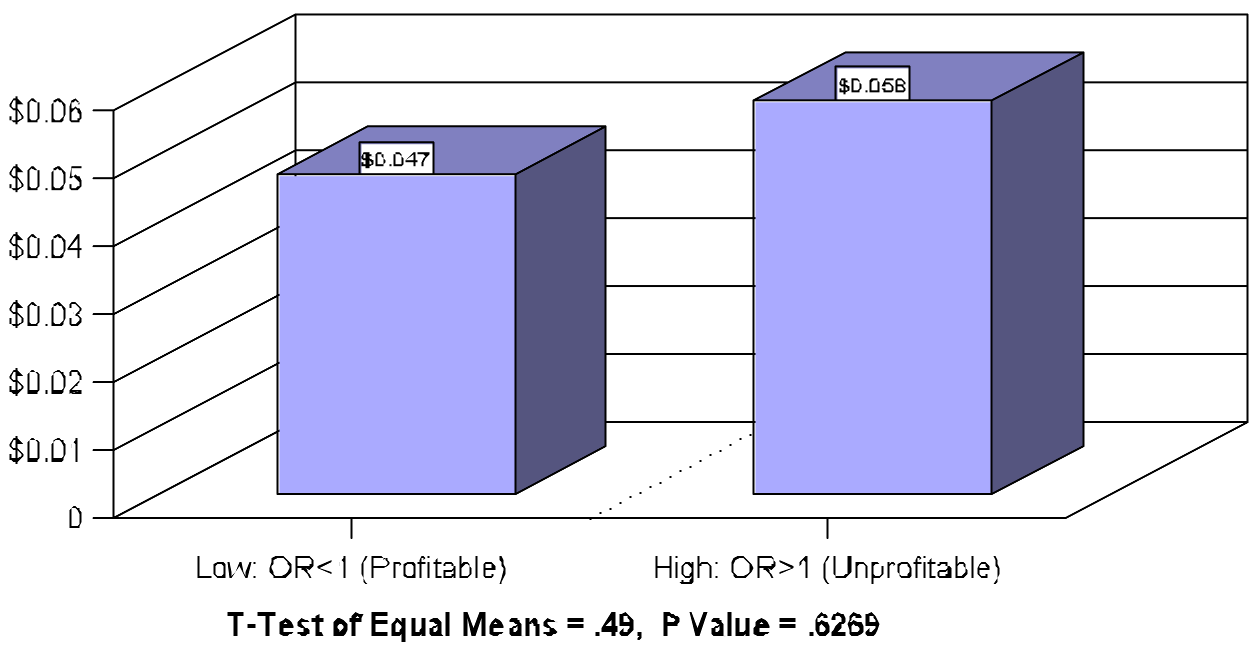


Figure 27. Revenue per Ton-Mile Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

Traffic Comparisons

Figures 28 and 29 provide comparisons of carloads per mile and ton-miles per mile for railroads with low and high operating ratios. As the figures show, the profitable railroads have much higher traffic levels than the unprofitable railroads, using either traffic measure. These high traffic numbers in combination with the low expenses of these railroads supports the notion that there are substantial economies of density for short line railroads. As Due and Wolfe pointed out in their series of studies, the traffic level is one of the most important factors in determining short line success or failure.

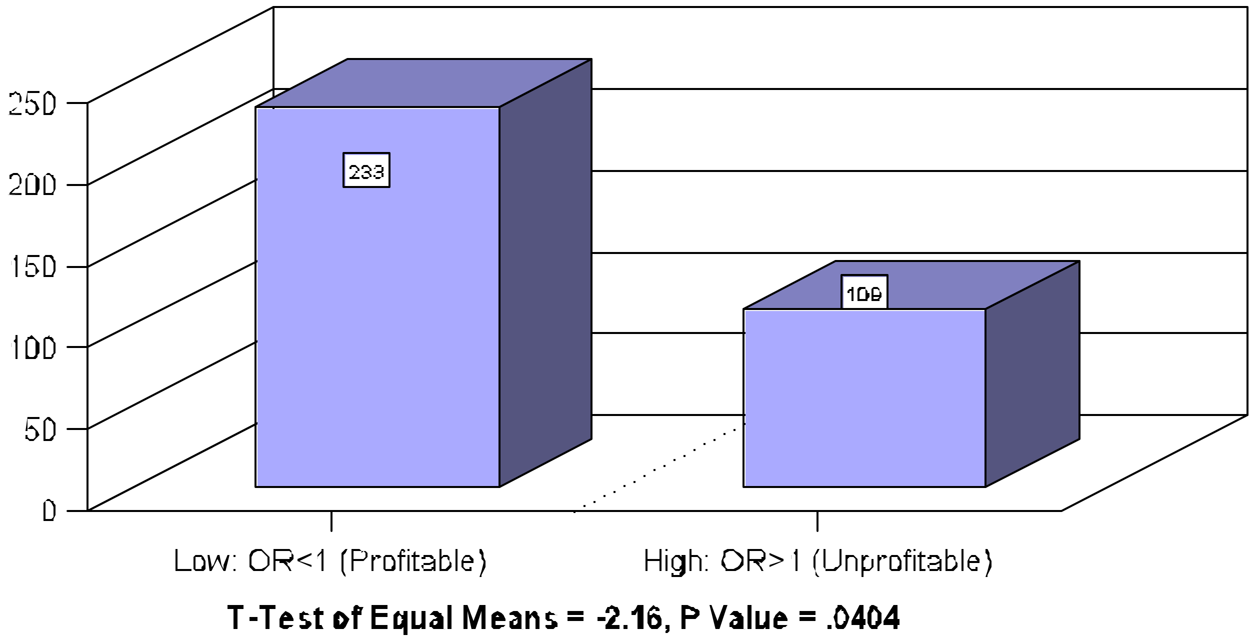


Figure 28. Carloads per Mile Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

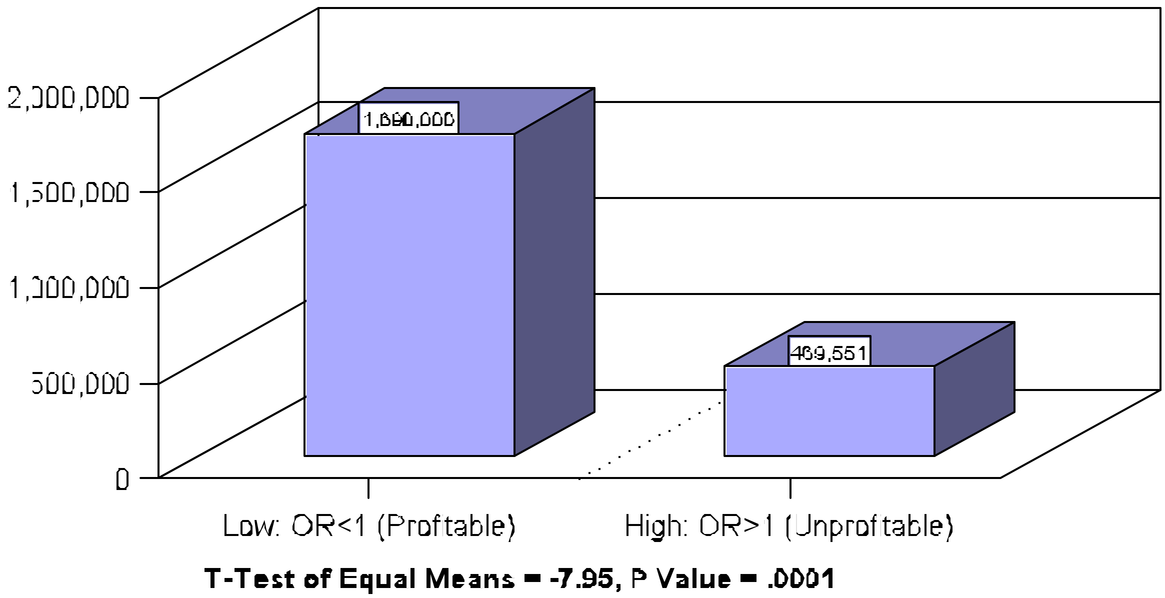


Figure 29. Ton-Miles per Mile Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

Backhaul Traffic Comparisons

Figure 30 compares the ratio of originated to terminated carloads or terminated to originated carloads (whichever represents more traffic) for profitable and unprofitable railroads. As the figure shows, profitable railroads terminate one carload for each 1.65 carloads originated, while unprofitable railroads terminate one carload for each 2.2 carloads originated. The difference between the two means is not statistically significant at conventional levels. However, the direction of the difference is consistent with the expectation that railroads with more balanced traffic are likely to realize lower expenses due to better equipment utilization.

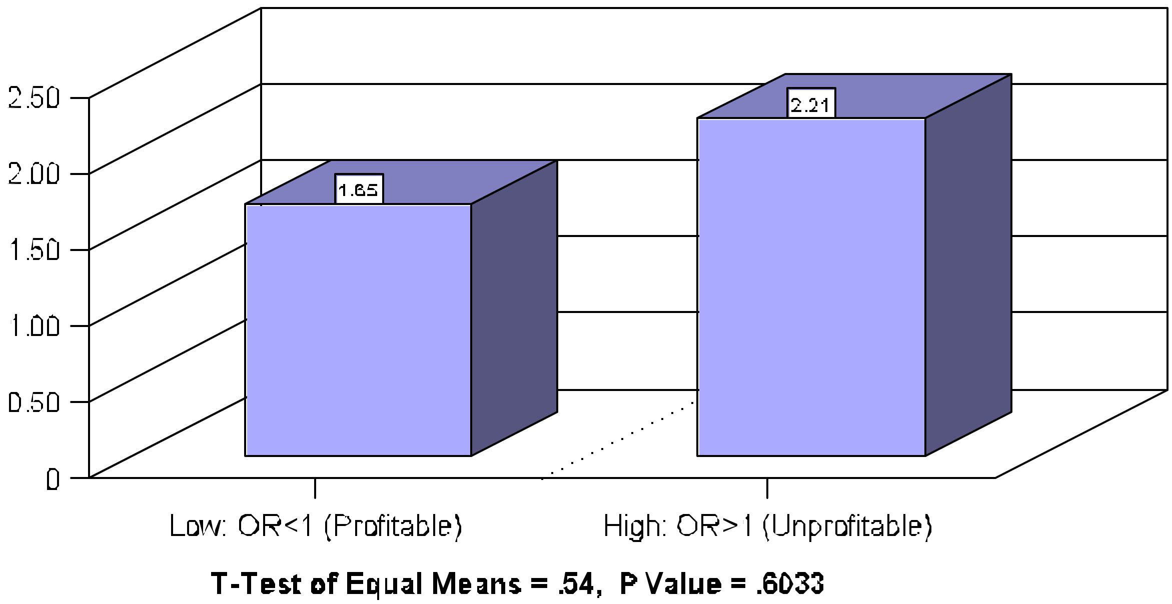


Figure 30. Traffic Balance Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

Industry and Commodity Diversity

As highlighted previously, carriers that are diversified in commodities handled and shippers served can avoid some of the negative impacts associated with fluctuations in the market for a particular commodity. Although measures of product diversity are more likely to be good measures of long-term rather than short-term viability, they nonetheless may have an impact on current profitability. This is the case, because at any particular time the demand for a particular commodity or its supply may be down, causing lower profitability for carriers that are dependent on that commodity. Carriers that carry more commodities are less likely to be experiencing the effects of commodity down-turns at any particular time.

Two measures of industry and commodity diversity are compared here. The first, concentration index of commodities hauled, ranges between 0 and 1 with an index of 1 representing dependence on one commodity and an index close to zero representing wide diversity in the commodities carried. The concentration index of commodities hauled is calculated as follows:

$$Conc. = \sum_i S_i^2$$

$$where\ S_i = share\ of\ carloads\ that\ are\ accounted\ for\ by\ commodity\ i$$

The second measure is the number of industries served. Just as railroads hauling a wider diversity of commodities are protected from commodity fluctuations, railroads serving a diverse mix of industries are similarly protected.

Figures 31 and 32 show the concentration index of commodities hauled and the number of industries served by profitable and unprofitable short lines. As the figures show, profitable short lines hauled a less diverse set of commodities, but served more industries. The first difference is statistically significant, while the second is not. Although the finding of greater commodity diversity among unprofitable railroads than among profitable is not as expected, it is important to remember that commodity diversity is more an indicator of long-term viability than short-term profitability.

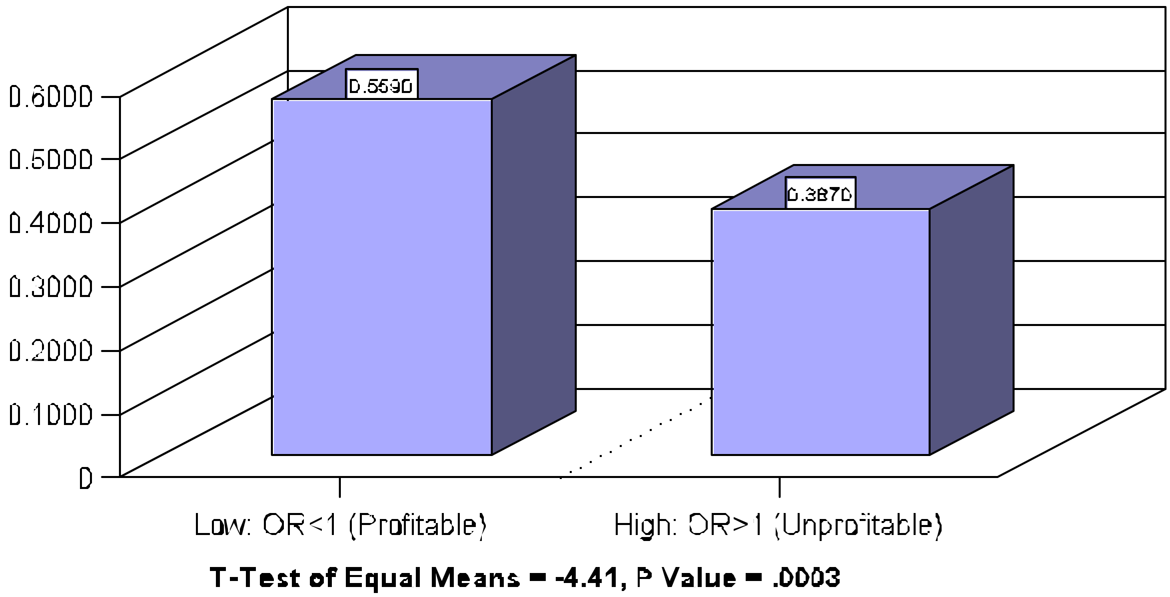


Figure 31. Concentration Index of Commodities Hauled Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

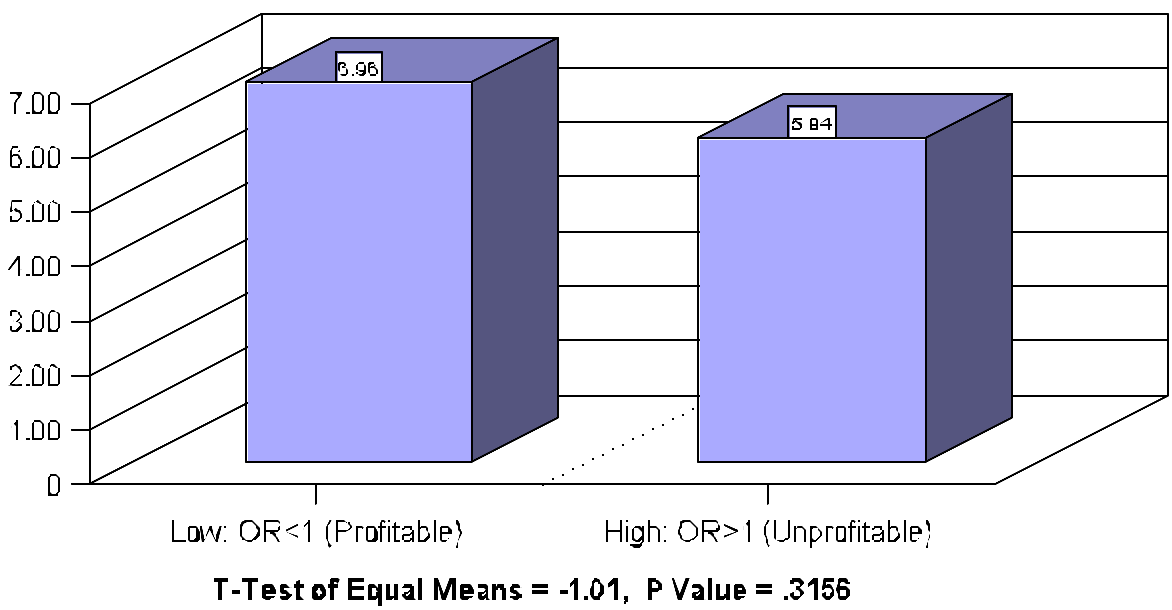


Figure 32. Number of Industries Served Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

Number of Shippers

As highlighted earlier, an increase in the number of shippers served by a short line is likely to increase the amount of traffic hauled by that short line. Thus, an increase in shippers is likely to have a positive impact on profitability. However, as Due and Meyer (1988) pointed out, an increased number of shippers also is likely to increase transactions costs for a short line.

Two measures are examined here. The first is the number of shippers served, and the second is the number of shippers served per carload handled. A lower number of shippers served per carload handled is likely to lead to higher profits, since a lower amount of shippers for a given amount of traffic means lower transactions costs and larger shipment volumes, which lead to cost savings.

Figures 33 and 34 show the number of shippers served and the number of shippers served per carload handled. As Figure 33 shows, the number of shippers served is higher for profitable railroads than unprofitable railroads, likely reflecting increased shipment volumes. Further, the number of shippers per carload is much lower for the profitable group, as shown in Figure 34. However, while these means show the expected relationships, neither difference is statistically significant.

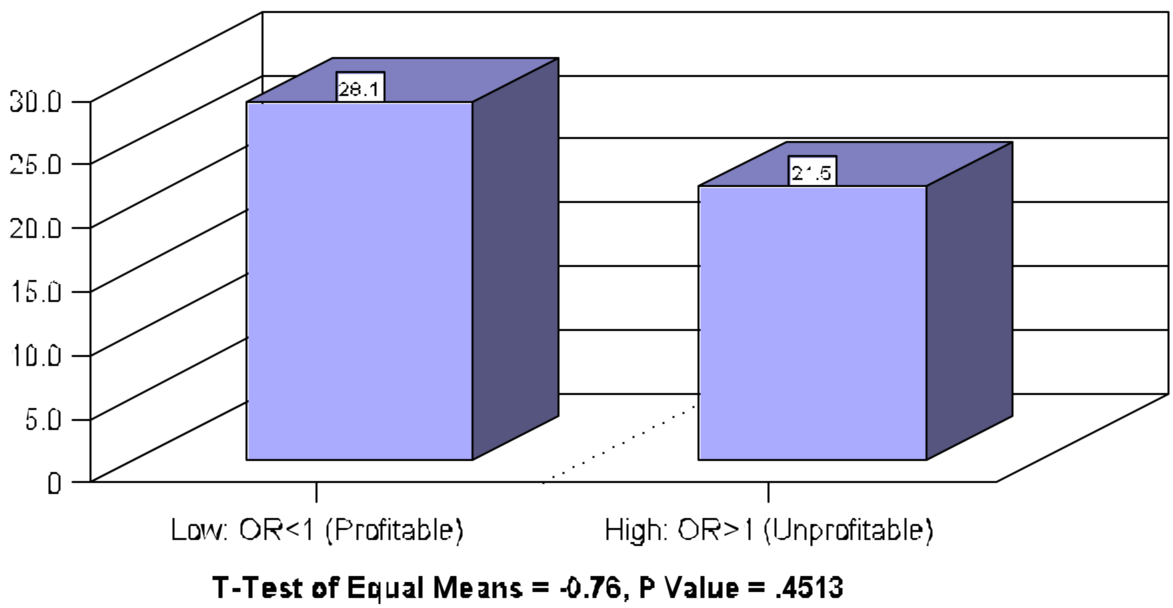


Figure 33. Number of Customers Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

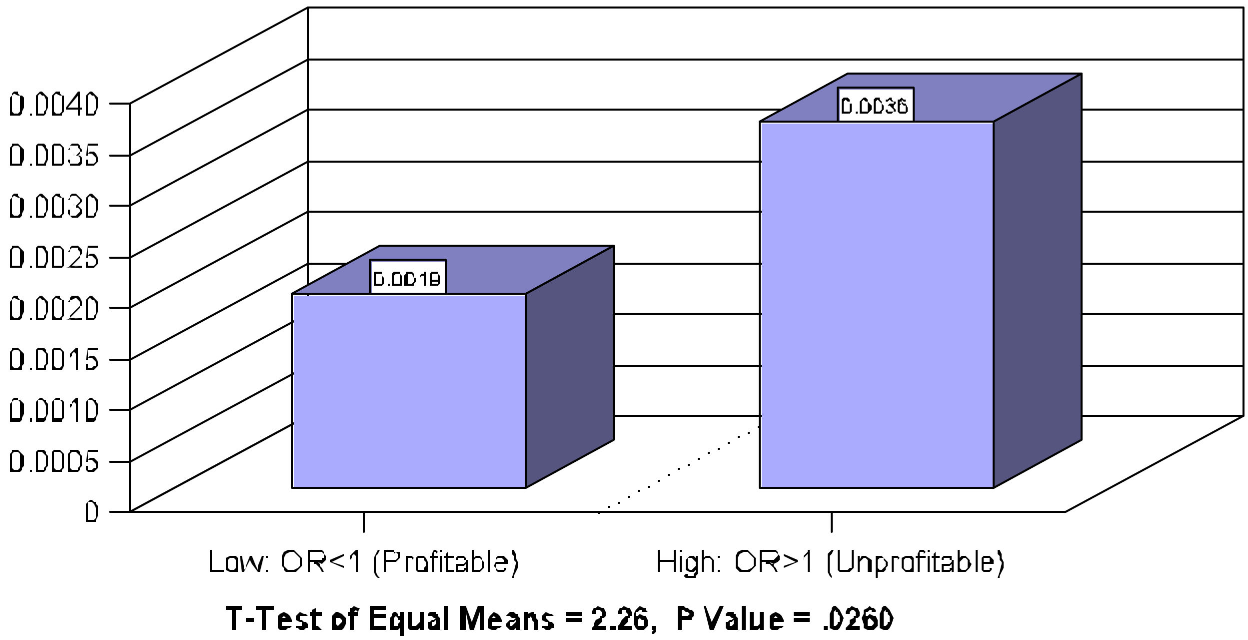


Figure 34. Customers per Carload Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

Flexibility of Labor Comparisons

One factor, often thought to be an indicator of labor flexibility for short lines, is the degree of unionization. Unionized workers may be tied to craft lines, and therefore be less flexible in performing various tasks.

Figure 35 compares the degree of unionization for profitable railroads against that for unprofitable railroads. Surprisingly, the degree of unionization is much higher for the profitable railroads than for the unprofitable railroads. This suggests that unionized labor in the short line industry is different than that in the Class I industry - that is, it is more flexible. It appears that unionization in the short line industry raises that wage level (Figure 36), but does not reduce the level of productivity (Figures 37 through 39).[24]

Support for the idea that labor flexibility is important to short line success is provided in Figures 37 through 39. These figures show significantly greater labor productivity for profitable short lines than for unprofitable short lines. Ton-miles and carloads per employee and ton-miles per man hour are much higher for profitable railroads than for unprofitable railroads. Figure 40 shows no significant difference in carloads per man hour among the two groups.

[24]However, it is possible that higher profits attract unionization. That is, unions may target railroads that are more profitable for organization.

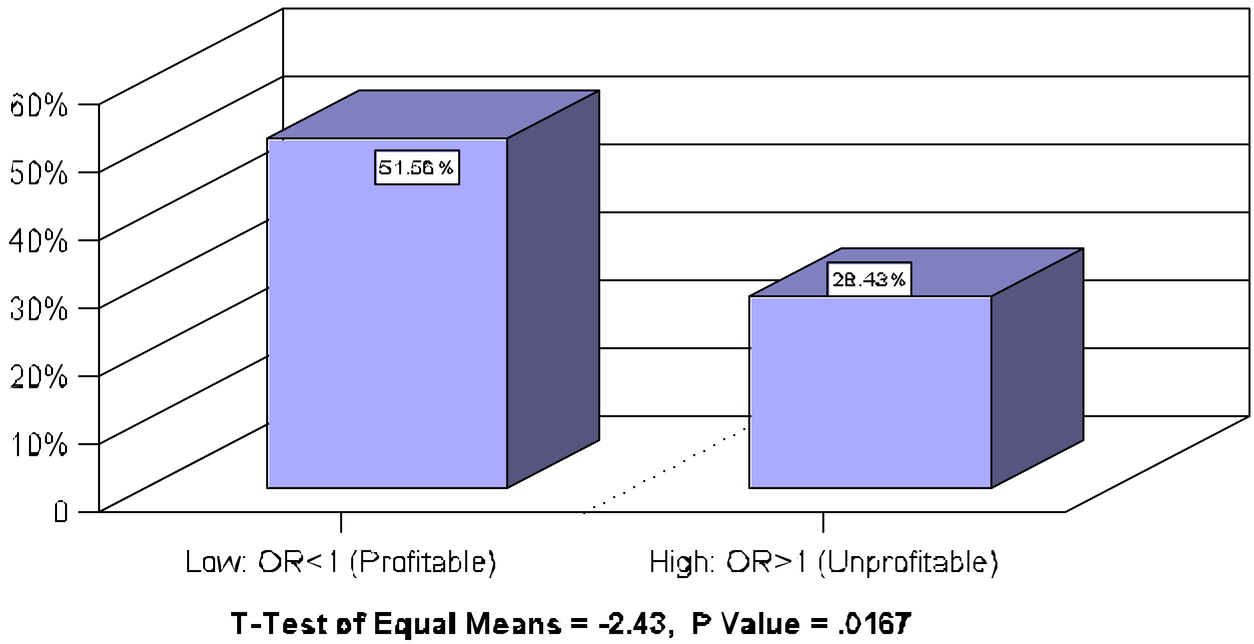


Figure 35. Percent of Employees Covered by Unions Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

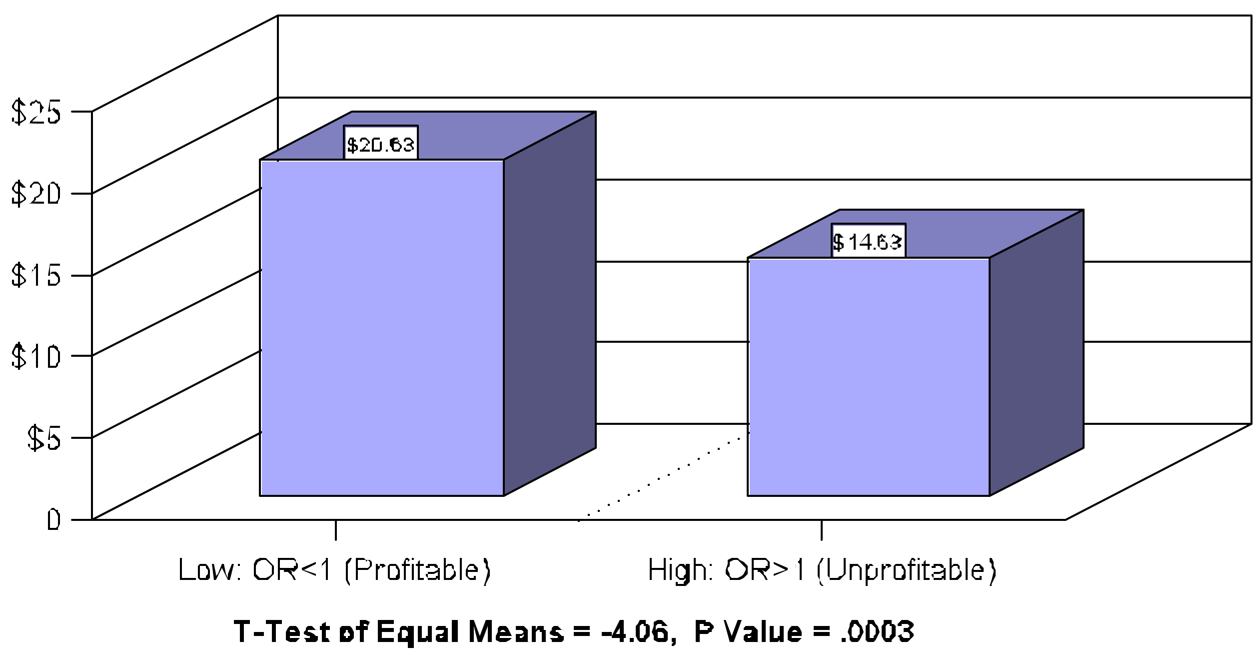


Figure 36. Average Employee Compensation per Hour Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

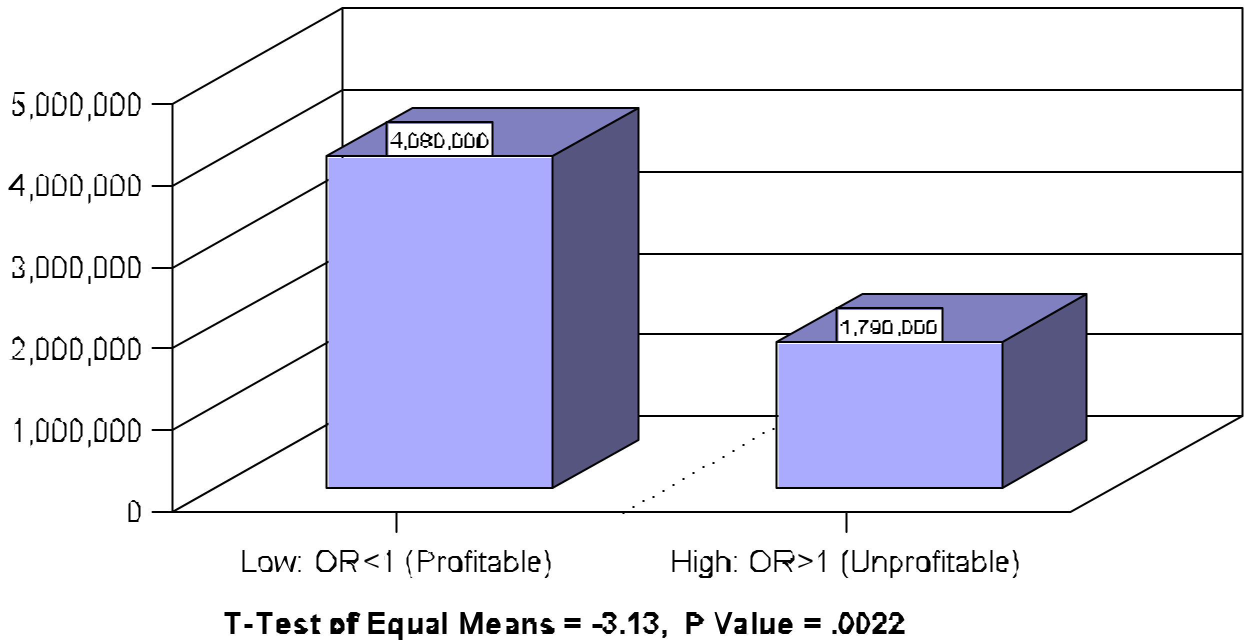


Figure 37. Ton-Miles per Employee Compensation, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

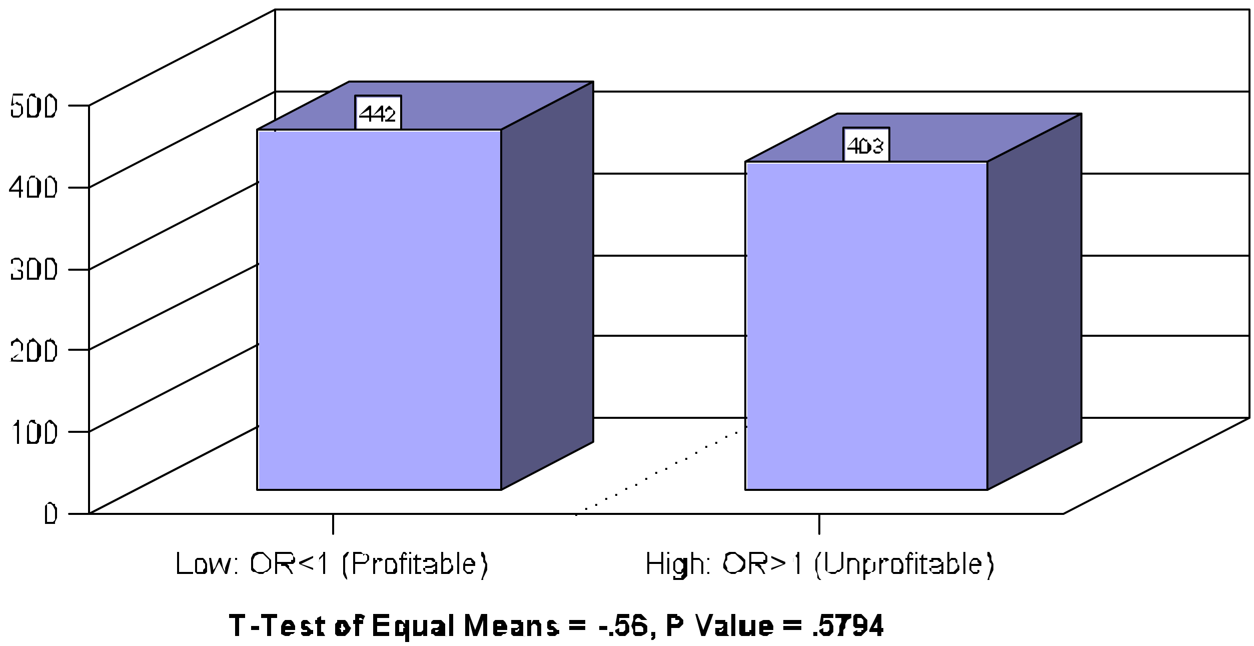


Figure 38. Carloads per Employee Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

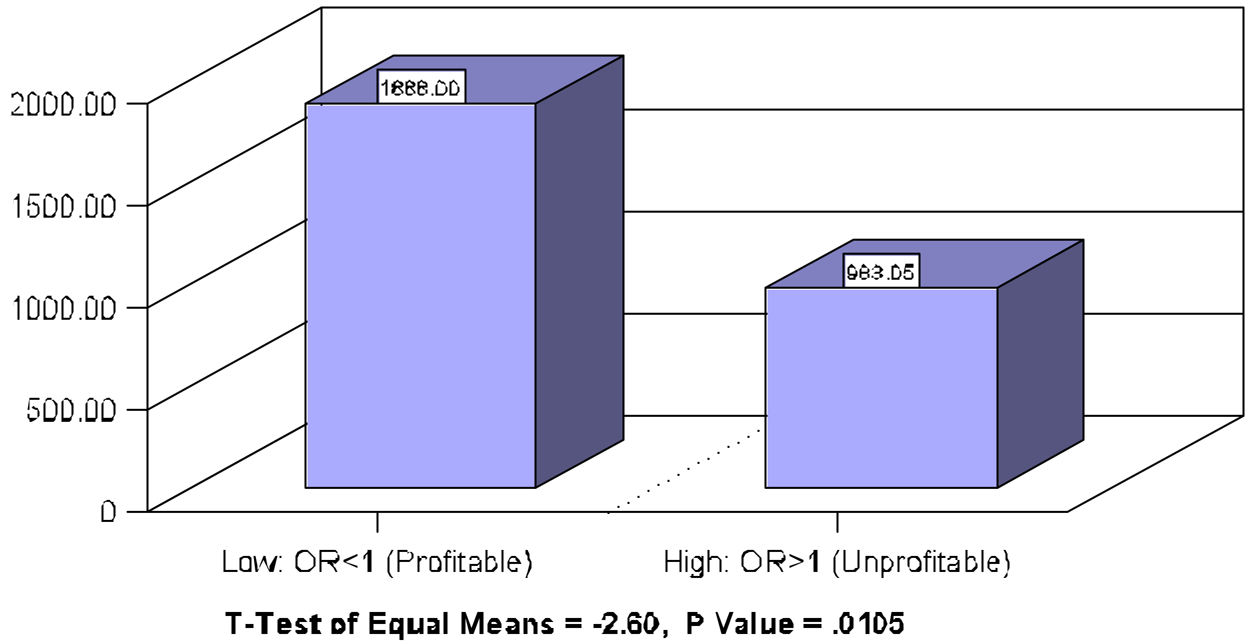


Figure 39. Ton-Miles per Man Hour Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

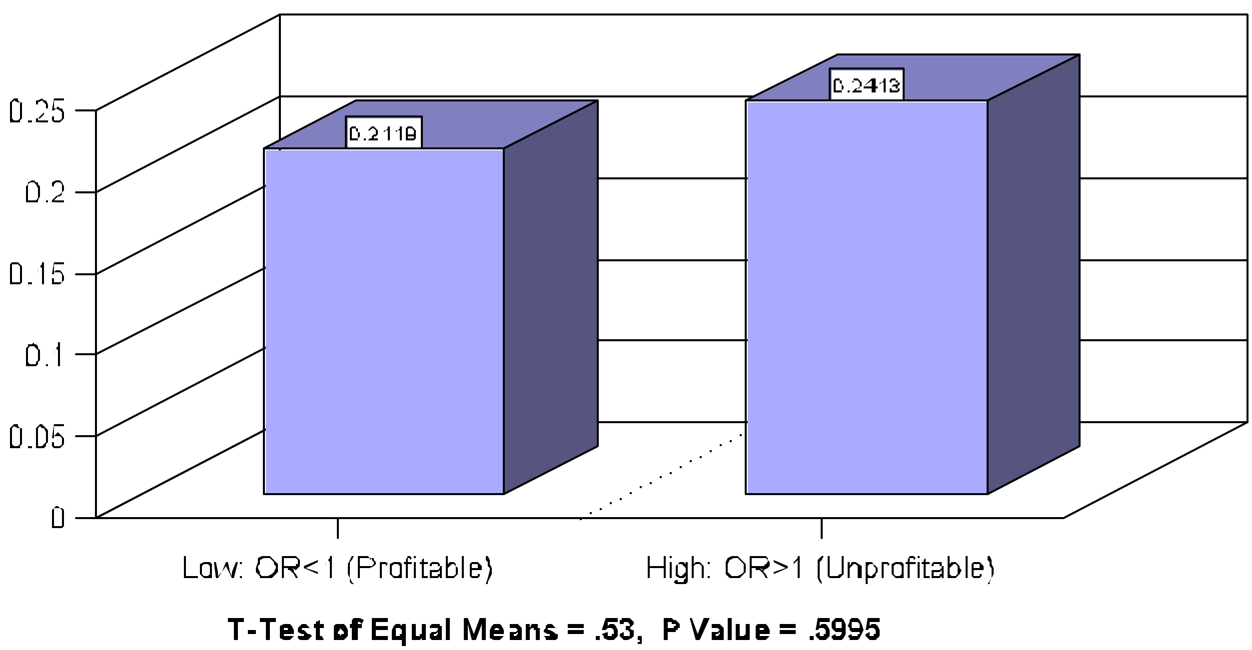


Figure 40. Carloads per Man Hour Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

Track Conditions

The quality of track among short lines is difficult to assess. However, two proxies of track conditions are the percent of track miles less than 90 pounds per yard, and the percent of track miles that are excepted. The weight of the rail provides an indicator of its ability to handle large rail cars. The percent of track excepted provides a measure of the amount of track limited to speeds of 10 mph and is not allowed to carry hazardous materials.

Figures 41 and 42 show that the percent of track less than 90 pounds per yard and the percent of track excepted both are greater for the profitable group. These results are not as expected and may raise concerns given the impending industry switch to 286,000-pound rail cars.

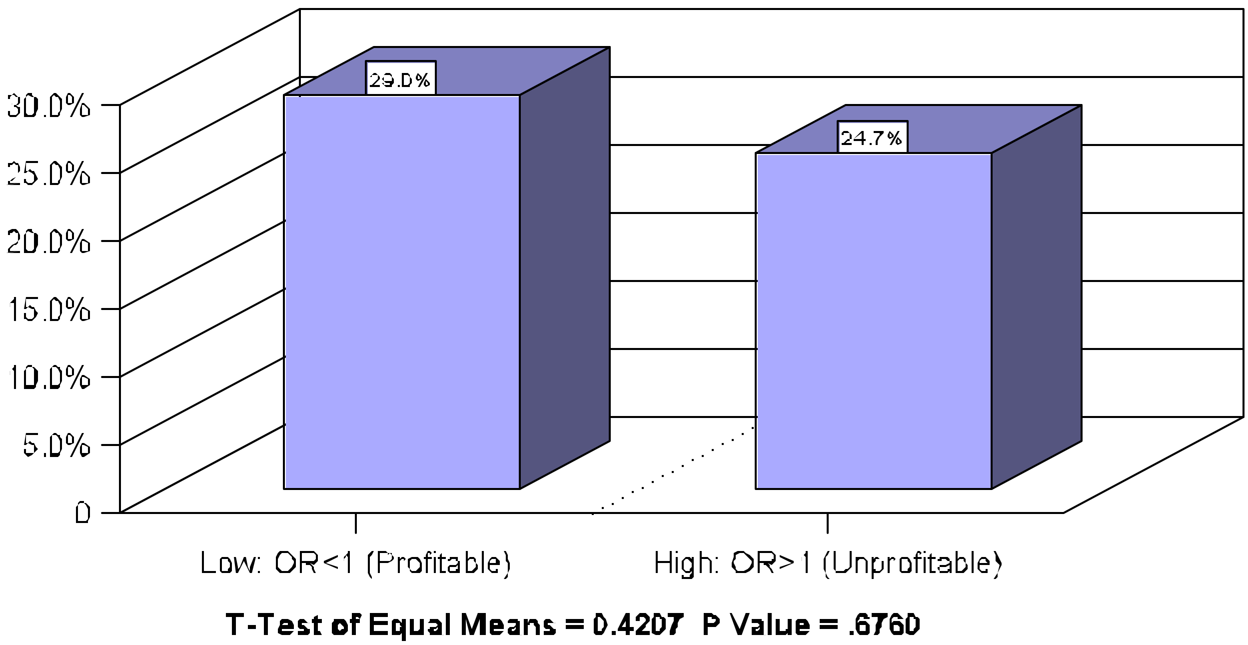


Figure 41. Percent of Track <90 lbs. Comparison, 1996
(Local Line-Haul Railroads with Low and High Operating Ratios)

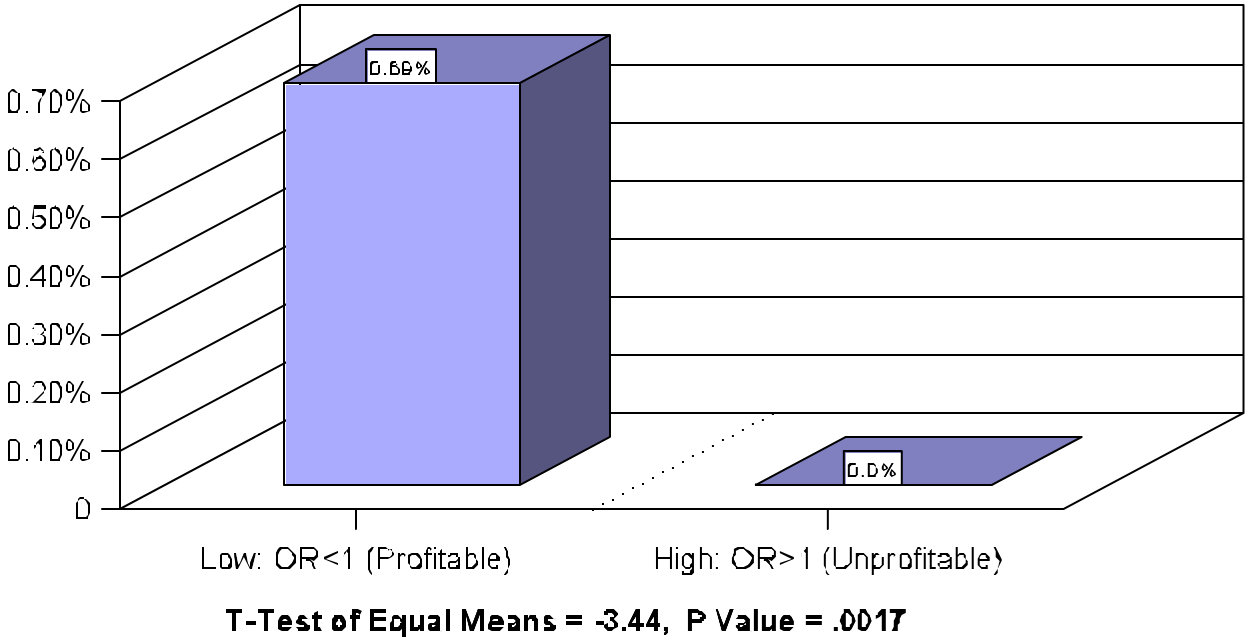


Figure 42. Percent of Track that is Excepted Comparison, 2000
(Local Line-Haul Railroads with Low and High Operating Ratios)

Mean Viability Factors of Local Line-Haul Railroads by Region

Mean viability factors are examined by region for all local line-haul railroads responding to the ADP.[25] Because many railroads did not respond to the ADP, these mean values may not be representative of the local line-haul railroads in each region. Nonetheless, some insight into different characteristics of the local line-haul railroads will be provided by examining these mean values.

Figure 43 shows the weighted average operating ratio for local line-haul railroads in each of the previously defined regions.[26] As the figure shows, on average, the local line-haul railroads in each of the regions show positive short-term profitability.

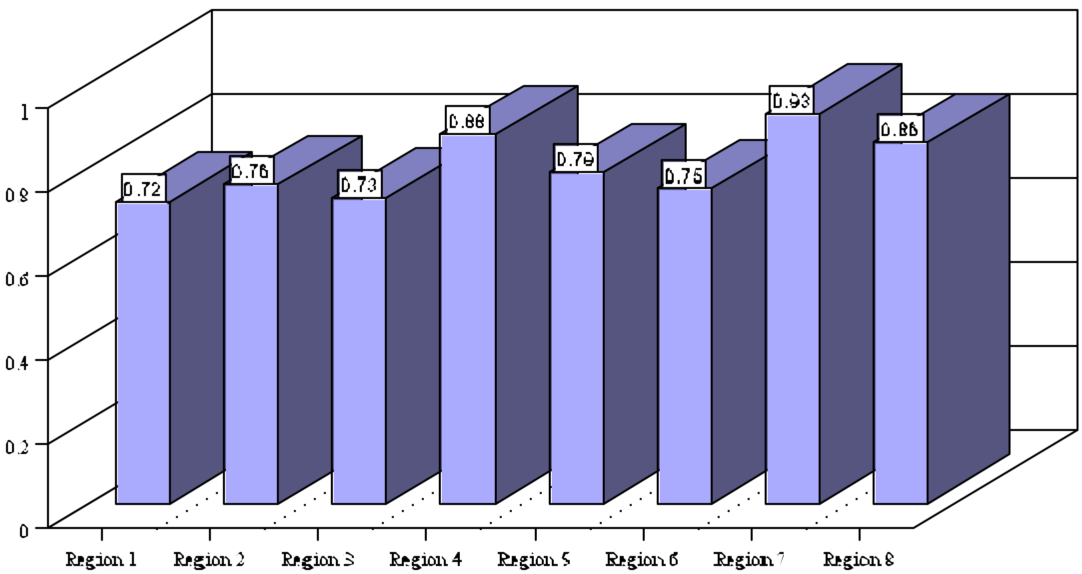


Figure 43. Operating Ratio, 2000

As highlighted in the previous section, profitable short lines are those that are more successful in keeping expenses down, not necessarily those that generate higher revenues. Figures 44 through 47 show operating expenses and revenues per carload and per ton-mile on a regional basis.

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[26]Weighted by operating revenues. All averages in this section (except total customers and industries served) are weighted averages, where the denominator is used as the weighting factor.

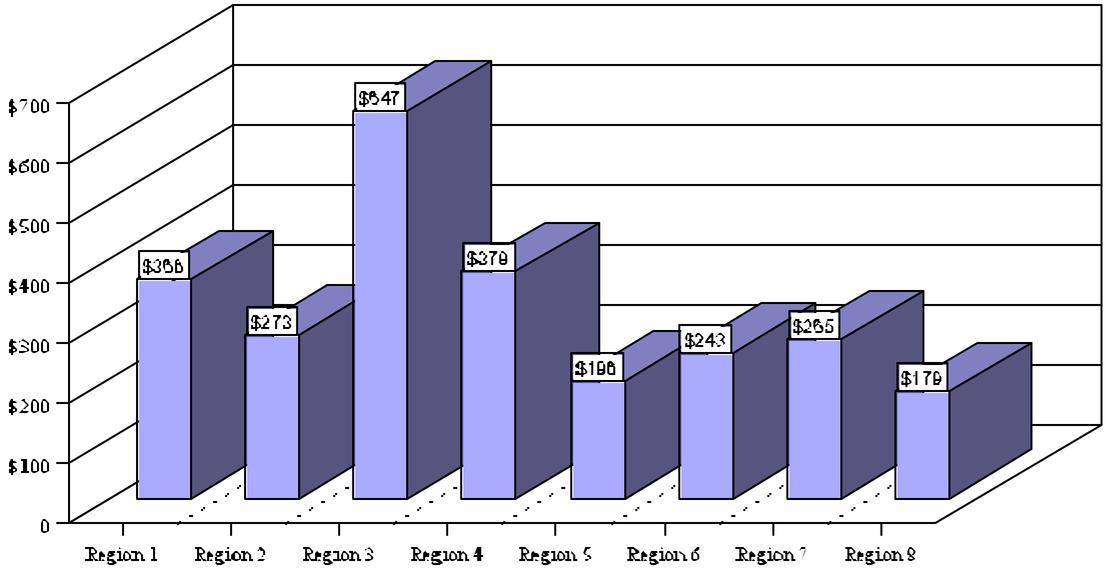

Figure 44. Operating Expenses per Carload, 2000

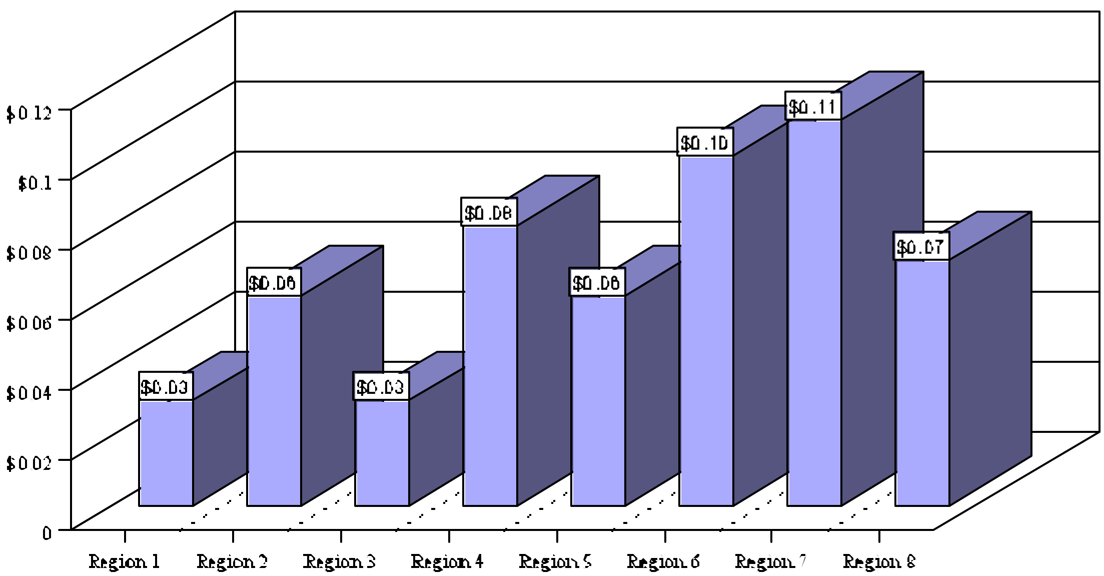

Figure 45. Operating Expenses per Ton-Mile, 2000

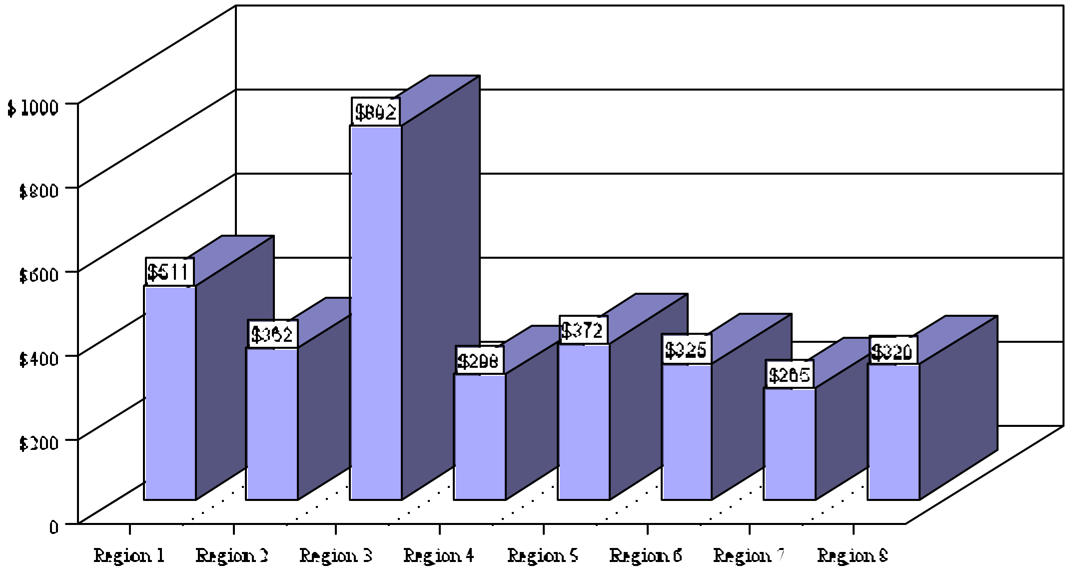

Figure 46. Operating Revenue per Car, 2000

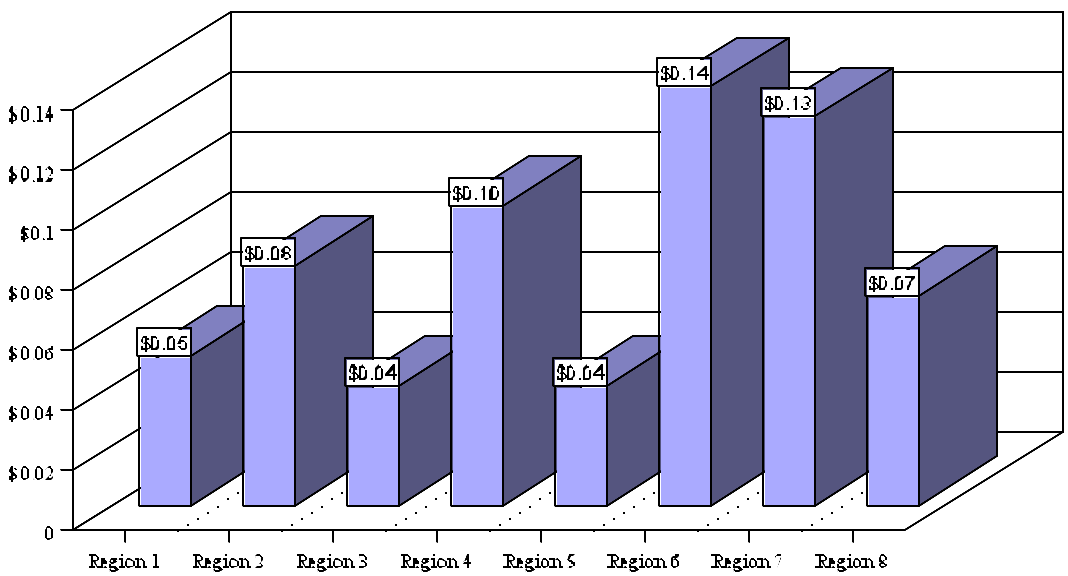

Figure 47. Operating Revenue per Ton-Mile, 2000

Figures 48 and 49 show two alternative measures of traffic density by region. As the figures show, local line-haul railroads in Regions 2, 5, 6, and 8 have high traffic densities, and are likely taking advantage of economies of density. Local line-haul railroads in Region 7 have somewhat smaller traffic densities, while local line hauls in Regions 1, 3, and 4 have low traffic densities. Given the important role played by traffic density in determining short line success or failure, these traffic figures suggest that the future of lines in Regions 1, 3, and 4 may be more tenuous than that of lines in other regions.

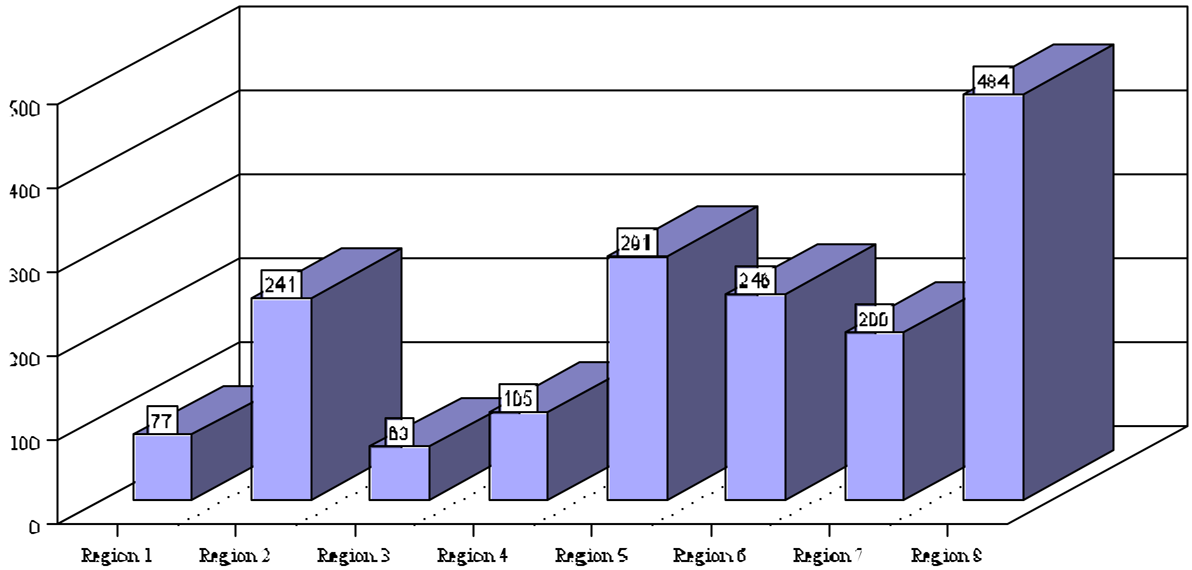

Figure 48. Carloads per Mile, 2000 (Local Line-Haul Railroads)

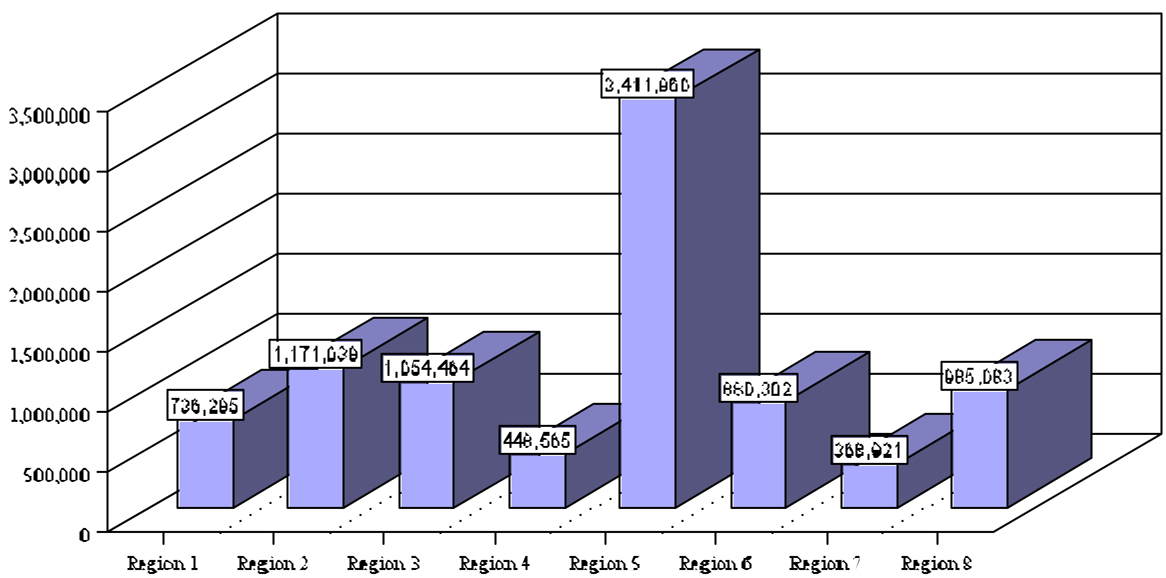

Figure 49. Ton-Miles per Mile, 2000

Figure 50 shows traffic balance comparisons among local line-haul railroads in different regions.[27] As the figure shows, railroads in regions 2, 5, 6, and 8 show much more balanced traffic than those in other regions. This balance in originations and terminations of carloadings by railroads in these regions, suggests better utilization of equipment, and presumably lower costs.

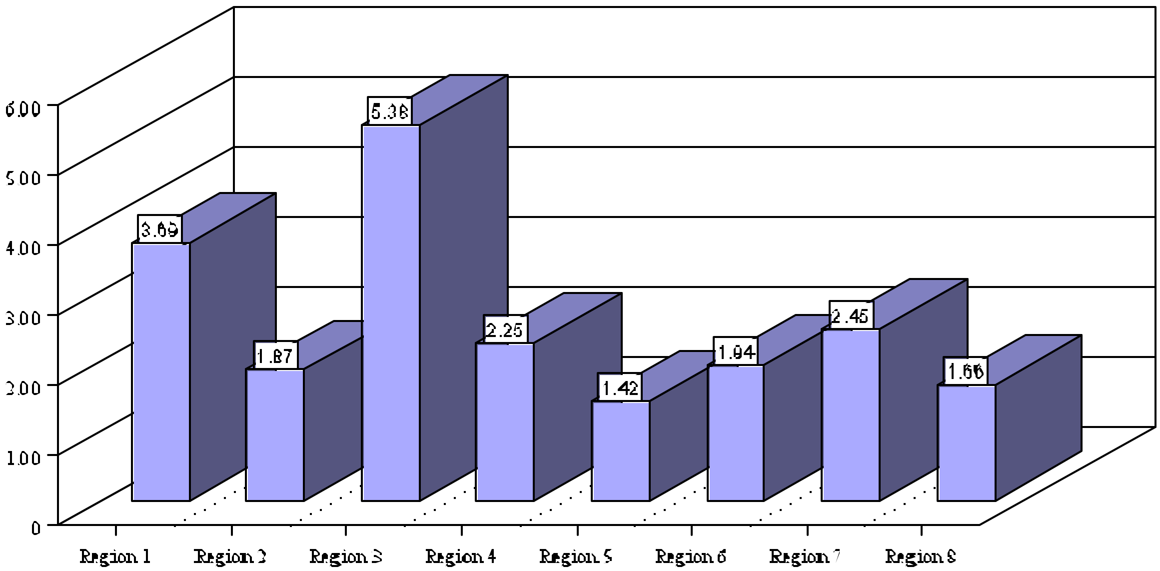

Figure 50. Traffic Balance, 2000

[27]Recall that balance is defined as the ratio of originated to terminated carloads or terminated to originated carloads (larger of the two divided by the smaller of the two).

As highlighted previously, one important consideration in long-term viability is the diversity of commodities and industries served. Short lines that carry a diverse set of commodities and serve a number of industries are less likely to be affected by down-turns in any one industry. As Figures 51 and 52 show, local line-haul railroads in Regions 6, and 7 show a diverse set of commodities hauled and a large number of industries served. Regions 2 and 5 show a large number of industries served despite a relatively homogeneous set of commodities hauled.

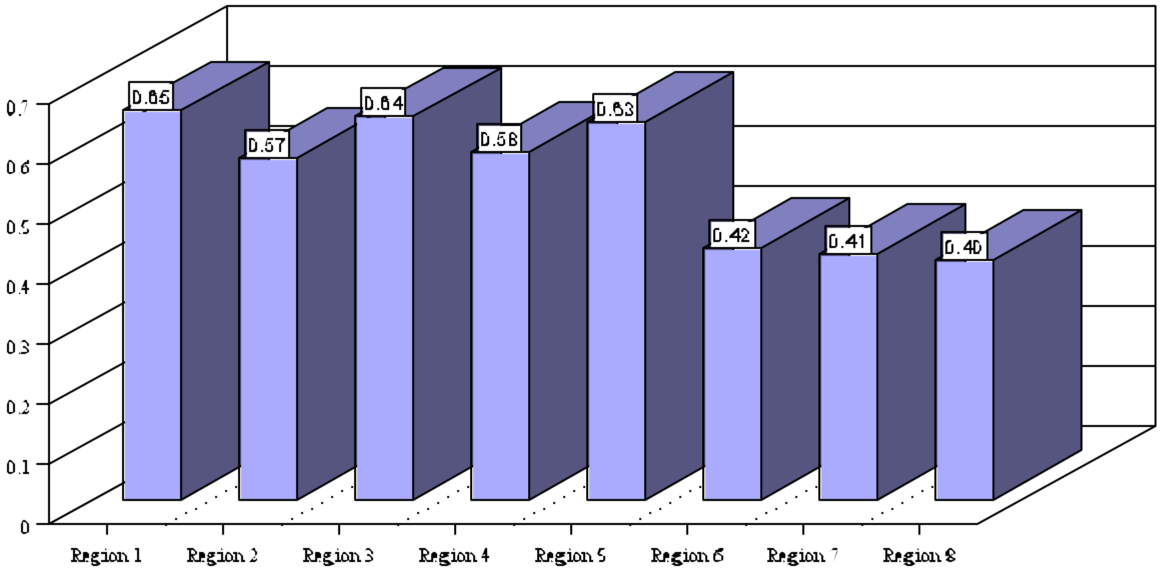

Figure 51. Concentration Index of Commodities Hauled, 2000

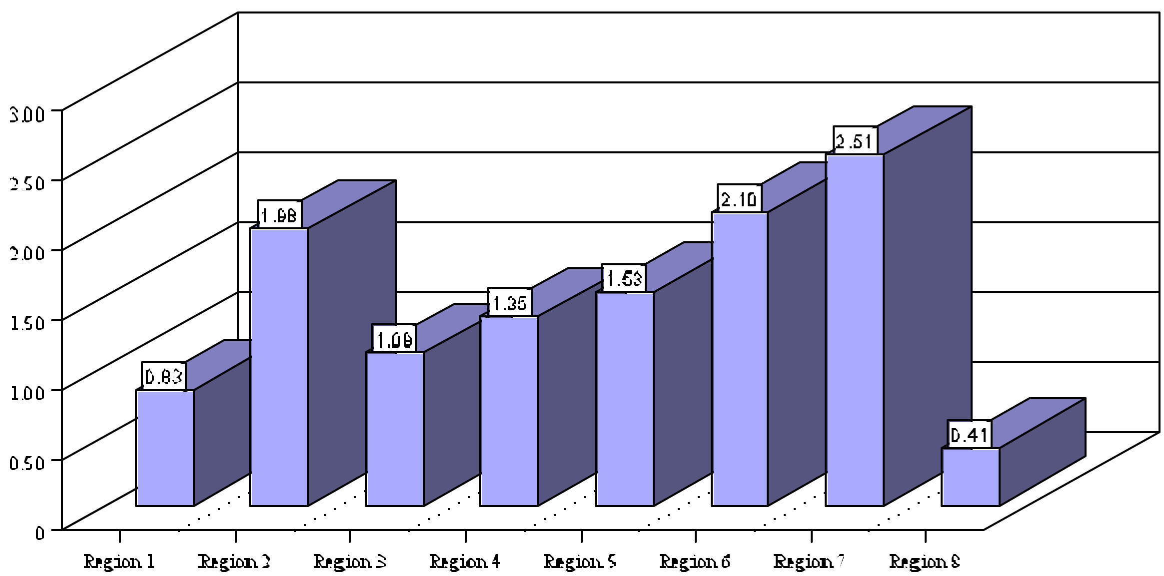

Figure 52. Number of Industries Served, 2000

Previously, the importance of the number of customers and the number of customers per carload to short line railroads was discussed. Because an increase in the number of customers is likely to increase traffic volumes, an increased number of customers is expected to increase profitability. However, serving more shippers also increases transactions costs. Thus, an increase in the number of shippers per carload is expected to decrease profitability. Figures 53 and 54 show the number of customers per railroad and the number of customers per carload for each region, respectively. As Figure 53 shows, local line-haul railroads in Regions 1,3,4, and 5 have a much larger number of customers than those in other regions. Figure 54 shows that the customers per carload also are higher for these same regions. This suggests that shippers in these region are shipping smaller annual volumes than those in other regions. Region 7 shows a low number of customers on average (Figure 53) and a high number of customers per carload (Figure 54). This suggests fewer shippers with smaller traffic volumes.

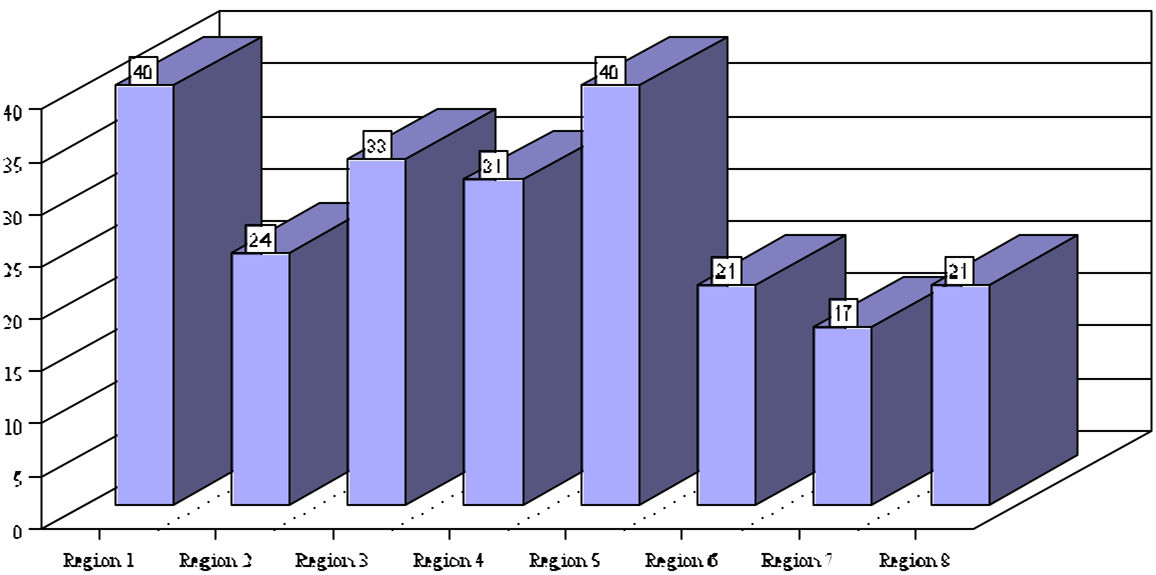

Figure 53. Number of Customers, 2000

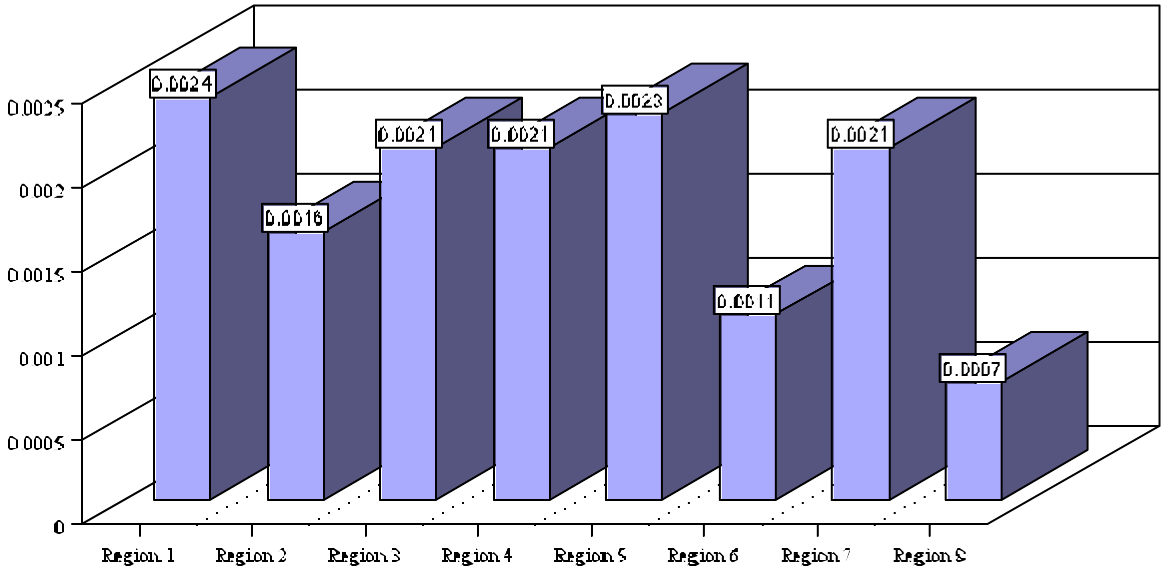

Figure 54. Customers per Carload, 2000

Figures 55 and 56 show regional differences in labor union coverage and in the average hourly compensation of employees for local line-haul railroads. As was shown previously, these figures show that lower wages and less union coverage are not necessarily associated with more profitable railroads.

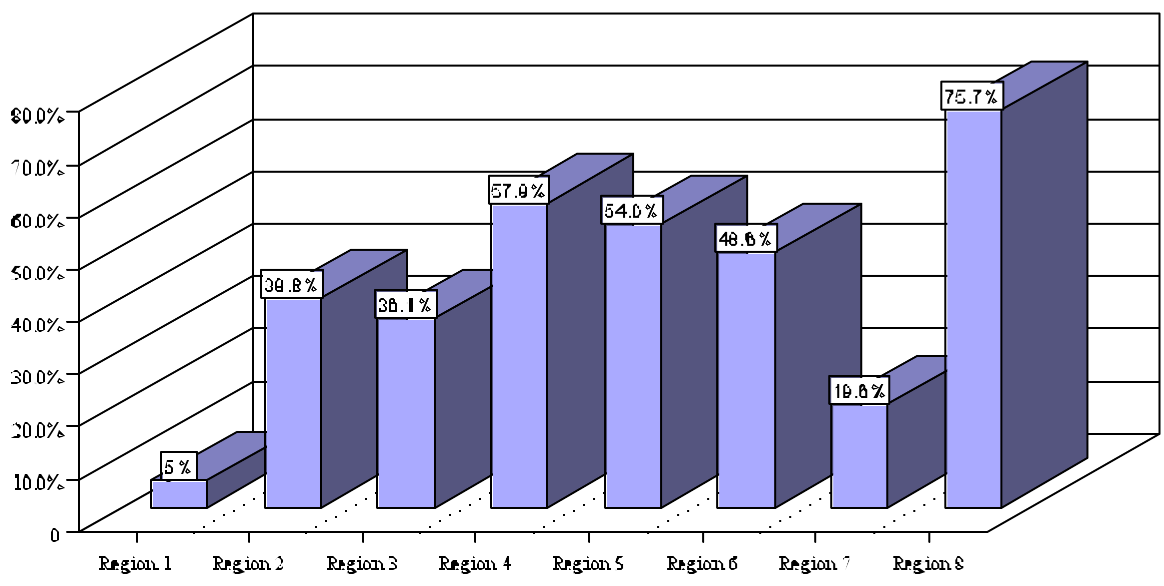

Figure 55. Percent of Employees Covered by Labor Union Agreements, 2000

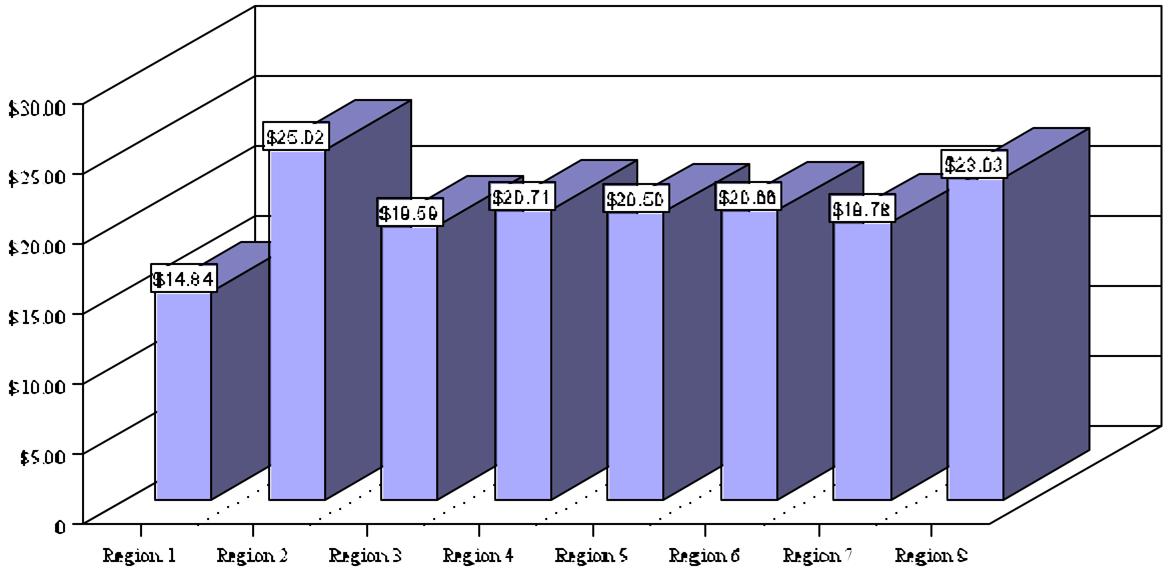

Figure 56. Average Employee Compensation per Hour, 2000

Figures 57 through 60 show that regions with high traffic levels also show high levels of labor productivity.

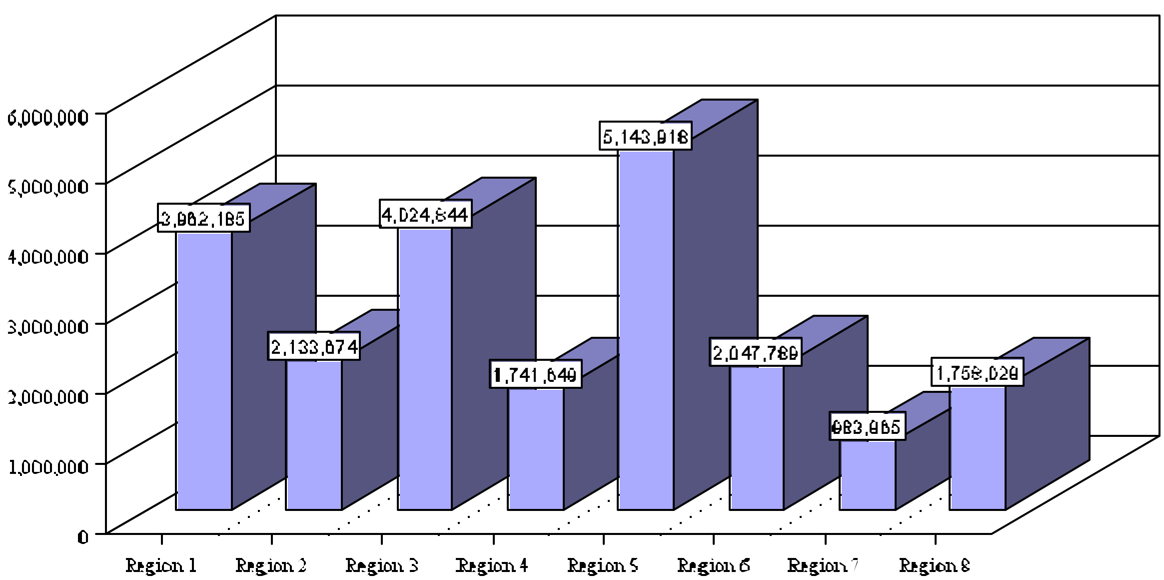

Figure 57. Ton-Miles per Employee, 2000

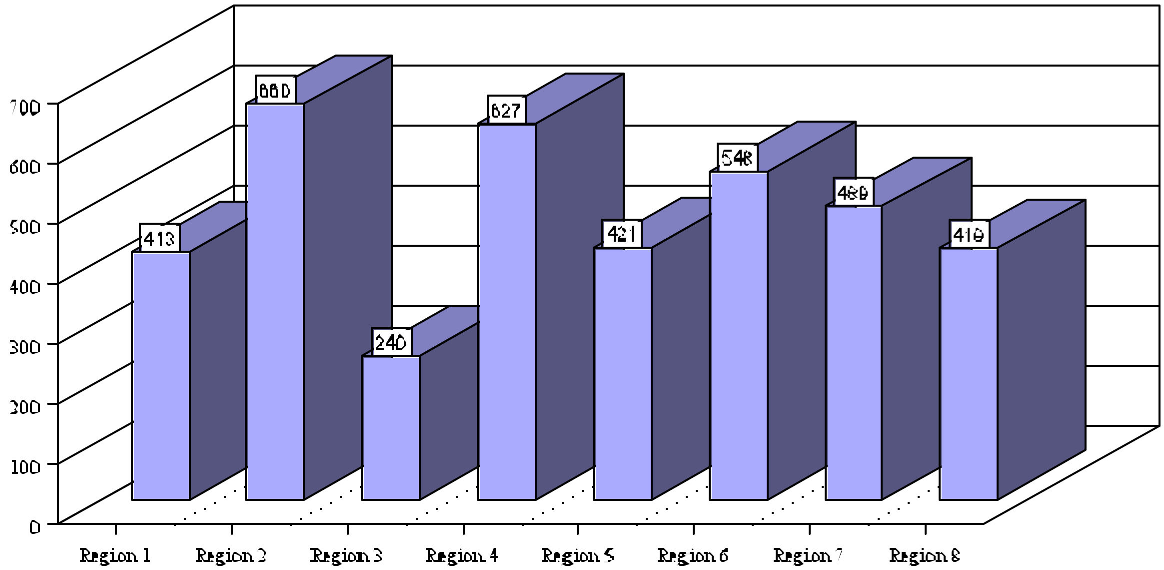

Figure 58. Carloads per Employee, 2000

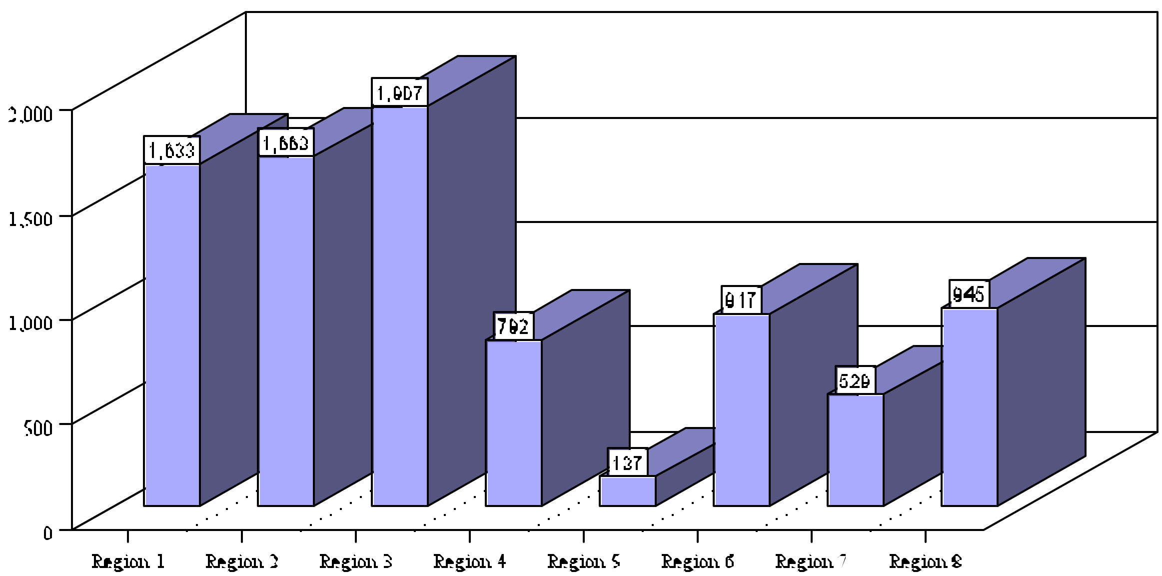

Figure 59. Ton-Miles per Man Hour, 2000

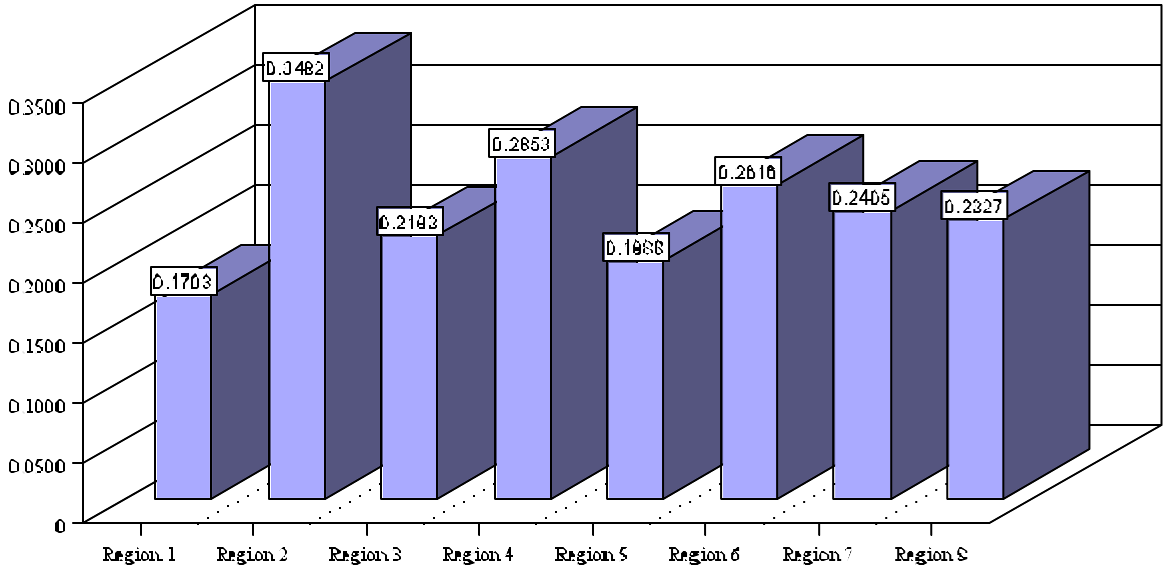

Figure 60. Carloads per Man Hour, 2000

Figure 61 shows that there is a lot of track that is less than 90 pounds in most regions, suggesting that an industry switch to larger rail cars may mean abandonment or upgrading of a large number of short line track miles. Figure 62 shows that there is not a lot of track that is excepted in any of the regions except region 3. This suggests that most traffic is able to operate on track in reasonably good condition.

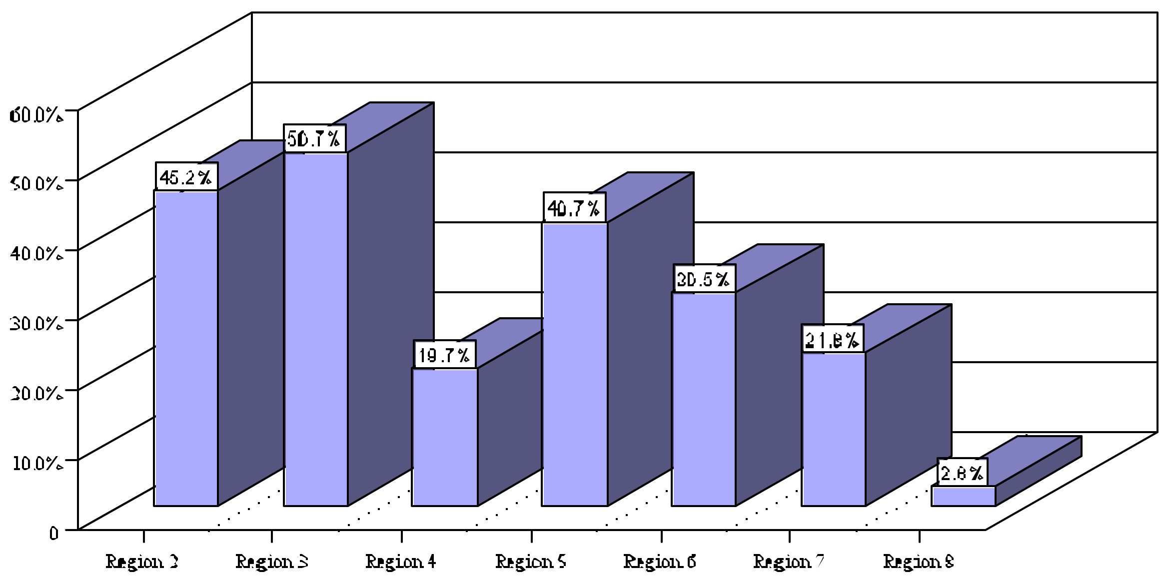

Figure 61. Percent of Track <90 lbs., 1996

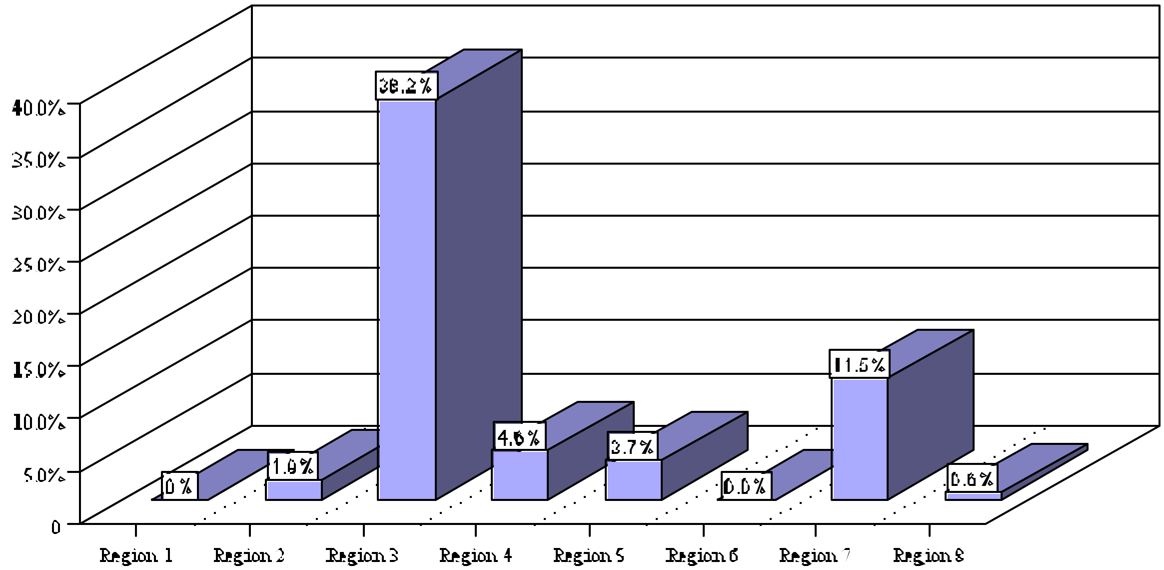

Figure 62. Percent of Track that is Excepted, 2000

Conclusion

This study aims to fill in the gap for short-line research, while maximizing accuracy of results by utilizing Association of American Railroad's Profiles database and the American Short Line and Regional Railroad Association' Annual Data Profile. More specifically, the study: (1) attempts to quantify the importance of local and regional railroads to the U.S. rural and agricultural economy and (2) examines factors affecting short-line viability and future prospects for a viable short-line network in the future.
This report validates the importance of short line rail roads in the United States. Of the 555 railroads in operation in 1999, 546 of them were short line railroads. Short lines participate in a significant number of movements, especially in rural states dependant on agriculture. These lines are invaluable to rural areas that otherwise would not have access to Class 1 railroads. In 24 continental states, 30 percent or more of railroad miles are operated by short lines.

In 2000, short lines participated in nearly 30 percent (9.9 million carloads) of all rail movements. Results indicate short lines are important in the transportation of various commodities, especially metallic ores, primary metals, lumber, paper, and farm products. Nearly 16 percent (five million carloads) were originated by short line railroads in 2000, and the same number were terminated. Although short lines contributed to a high number of carloads, only 5.33 percent of revenue ton miles were accounted for by short lines in this year. Nevertheless, this was significantly higher for specific commodities, especially metallic ores where short lines accounted for 41.3 percent of revenue ton-miles.

Thousands of customers are served by these railroads. It was estimated that more than 3,000 food product customers were served, more than 2,000 lumber and farm product customers, and more than 1,000 chemical and waste scrap customers used the services of short-line railroads.

Being such a vital asset to the movement of goods in this country, it is important to understand the factors that lead to the success of these railroads. This report identified several factors critical to the success of short line rail roads. Success was measured and analyzed by looking at variables related to traffic volume, backhaul traffic, reliance on industries and/or commodities, number of shippers, flexibility of labor, track conditions, management, and transportation competition. Using operating ratio to distinguish profitable railroads from those that are not profitable, t-test results indicate profitable railroads are better at keeping expenses down. When compared to unprofitable ones, profitable railroads have higher traffic levels, serve more industries, have more customers, and have more productive employees.

Finally, the factors attributed to short line success were compared among eight separate geographical regions. Again, results concluded that these railroads are important to rural areas and regions economically dependant on the agricultural industry. The statistics presented in this report demonstrate that short line railroads are an integral component of the United States transportation system, working in conjunction with Class 1 railroads to serve the largest possible number of customers.