STATE SHORT LINE RAILROADS AND THE RURAL ECONOMY

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PREFACE

This research project is funded in part by the University Transportation Centers Program. The Program was created by Congress in 1987 to "contribute to the solution of important regional and national transportation problems." A university-based center was established in each of 10 federal regions following a national competition in 1988. Each center has a unique theme and research purpose, although all are interdisciplinary and also have educational missions.

The Midwest Transportation Center is one of the 10 centers; it is a consortium that includes Iowa State University (lead institution) and The University of Iowa. The Center serves Federal Region VII which includes Iowa, Kansas, Missouri, and Nebraska. Its theme is "transportation actions and strategies in a region undergoing major social and economic transition." Research projects conducted through the Center bring together the collective talents of faculty, staff, and students within the region to address issues related to this important theme.

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The Kansas Wheat Commission also provided financial support for the study. The Kansas Wheat Commission is a state agency, headquartered in Manhattan, Kansas, with the sole purpose of increasing the marketing of wheat and wheat products. The Kansas Wheat Commission is funded entirely by wheat producing farmers through a per bushel checkoff fee.

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Midwest Transportation Center, Kansas Department of Transportation, or the Kansas Wheat Commission.

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EXECUTIVE SUMMARY

As Class I railroads have reduced the size of their systems, short line railroads have acquired many miles of rural branchline that would otherwise have been abandoned. Short lines currently operate 25 percent of total U.S. rail mileage.

The case for short line railroads centers around the following three arguments.

- Short lines have lower labor costs than Class I railroads and are thus more likely to be able to operate low density lines profitably.
- Short lines can provide superior shipper service.
- If short lines are successful, they reduce the number of truck shipments, resulting in less highway maintenance and rehabilitation cost.

The case against short line railroads is composed of the following three arguments.

- Short lines are not likely to survive in the long run because of large deferred maintenance expenses.
- Short lines are too dependent on a few commodities for most of their revenue.
- Short lines are too dependent on Class I railroads for equipment and market access.

The short line industry has experienced rapid growth since 1980 and likely will continue to grow at a rapid rate given the stated plans of Class I railroads to spinoff parts of their systems to short line operators in the 1990s. As a result, shipper groups and potential short line operators are likely to request state financial assistance. Thus, states need to know which of the above views of the short line rail industry is most likely to prove correct. Accordingly, the objectives of the study are as follows:

1. Determine if short line railroads are a viable transportation alternative to abandonment.
2. Identify the key factors that determine short line success or failure.
3. Compile a profile of a successful short line railroad to help guide the allocation of state financial assistance.

The objectives are accomplished through personal interviews of executives of 12 Iowa and Kansas line haul short lines and 264 shippers located on these railroads. Executives and shippers also completed detailed questionnaires. Additional input was obtained from officials of the Iowa Department of Transportation (IDOT) that administer the Iowa railroad financial assistance programs.

For analysis purposes, the shippers are divided into grain and non-grain as well as Iowa and Kansas shipper groups.

The study identifies the criteria that shippers regard as most important in their selection of a particular mode of transportation. Shipper use of a particular mode, and its economic viability, depends on the ability of the mode to satisfy these criteria.

Both the grain and non-grain shippers ranked the transportation rate as the most important determinant in their choice of transportation mode. However, the grain shippers ranked market access and weekly service as the second and third most important determinants, whereas the non-grain shippers selected delivery time and dependability of delivery time. Thus, since grain and non-grain shippers place emphasis on different price-service criteria in making modal selections, they will tend to prefer different modes since the available modes have different abilities to meet the selection criteria of a particular shipper group.

The personal interviews and analysis of the detailed questionnaires yield the following conclusions regarding shipper actual use of transportation modes in 1991.

1. Grain shippers located on Iowa short lines heavily used their railroad for both inbound and outbound freight. In 1991, Iowa grain shippers moved 77 percent of their combined corn and soybean shipments by short line and received 54 percent of their fertilizer tonnage by short line.

2. In contrast, Kansas grain shippers employ motor carriers more than short lines for outbound grain shipment and inbound fertilizer receipts. In 1991, Kansas grain shippers moved 46 percent of their grain shipments by railroad and 54 percent via motor carrier. They also received 75 percent of their fertilizer tonnage by motor carrier.

3. Iowa non-grain shippers (manufacturing firms and public utilities) employed railroads and motor carriers about equally for inbound freight in 1991. However, they utilized motor carriers much more than railroads for outbound freight shipments.

4. Two-thirds of the Kansas non-grain shippers received 50 percent or more of their 1991 inbound freight by motor carrier. Also, 70 percent of the Kansas non-grain shippers reported that they used motor carriers to ship 50 percent or more of their 1991 outbound freight.

It is not known why the Iowa short lines appear to meet the mode selection criteria of shippers better than Kansas short lines. Hypotheses include the following:

- Kansas short lines as a group are not as experienced as the Iowa short lines.
- The Iowa short lines and Class I railroads have developed more mutually beneficial feeder relationships than is the case in Kansas.
- The acute Class I rail car shortage in Kansas may have caused many Kansas grain shippers to employ motor carriers even though they may have preferred to ship by rail.

In addition to actual use, shipper evaluation of the price and service performance of their short lines is an alternative method of measuring the economic viability of short line railroads. If the shippers view short lines as providing a competitive transportation service, it can be inferred that they have a viable role in the transport market. To test this hypothesis, shippers were requested to evaluate the price-service performance of their short lines, independent of the performance of competing modes. Then the shippers were asked to compare the price-service performance of their short lines to the performance of their previous Class I railroads and to motor carriers. The evaluations and comparisons revealed broad based shipper support for short line railroads. The major conclusions of the shipper modal evaluations and comparisons are as follows:

1. Shippers on Iowa and Kansas short lines indicated general approval of their short line railroads. This is true whether the sample is divided into grain vs. non-grain or Iowa vs. Kansas shipper groups.

2. Both the grain and non-grain shipper groups rated the short lines as better than their previous Class I railroads. However, the grain shippers observed a greater improvement than did the non-grain shippers.

3. When the sample is divided into Iowa and Kansas shipper groups, both groups rated the price and service performance of their short lines as better than that provided by their previous Class I railroads. However, there are statistically significant differences in opinions of the Kansas and Iowa shipper groups regarding how much better the short line performance is compared to the predecessor railroad.

4. Other evidence from the shipper questionnaires indicates that they view short lines more favorably than their previous Class I railroads. For example, there is no evidence that short line rail service restricts shipper options on either inbound or outbound freight movements. Also, after Class I rail service was replaced by short line rail service, 38 percent of the shippers said they shipped more or much more by rail while only 14 percent said they shipped less or much less.

5. Both the grain and non-grain shipper groups think short lines perform best (relative to motor carriers) on rates. However, both shipper groups rate short line performance as worse than motor carriers on service characteristics related to transit time, dependability of transit time, and frequency of service.

6. The Iowa and Kansas shipper groups revealed that their short lines performed better than motor carriers on inbound and outbound rates (except Kansas shipper comparison of Rates on Outbound Freight). However, both shipper groups indicated that short line performance is worse than motor carriers on service characteristics related to access, transit time, dependability of transit time, and frequency of service.

7. The Iowa shipper group is more impressed with the rate and service performance of their short lines (relative to motor carriers) than the Kansas shippers are with their railroads.

The above evaluations and comparisons indicate that the shippers regard the rates and service of short lines as equal to or better than that provided by other types of transportation. Of course, there are exceptions to this conclusion. Shippers requiring fast delivery times and frequent service regard motor carriers as a superior alternative to either short line or Class I railroads. However, the shipper opinion analysis reveals substantial shipper approval of short line railroads.

The hypothesis of economically viable short lines is reinforced by other information obtained from the shipper questionnaires. To assess the ability of short lines to compete with other modes, the shippers were asked to select the mode that they feel provides the best service. The mode receiving the largest percentage of "votes" from the Iowa and grain shipper groups is short line railroads. In contrast, motor carriers received the most "votes" from the Kansas and non-grain shipper groups. This result is consistent with the actual use of motor carriers and short lines by the various shipper groups.

For the shippers who prefer the service of short lines, the most frequently cited reason for their preference is the high quality service geared to the transportation needs of the individual shipper. The grain shippers that prefer the service of short line railroads also cited a number of rail shipment advantages for grain that include the following:

- The opportunity to obtain origin grades for grain that allow the shipper to select the best market for a given grain shipment.
- Faster payment with rail shipments compared to motor carrier shipments.
- Less paperwork with rail shipments due to the larger railroad shipment sizes.
- Less congestion around the grain elevator during harvest periods.
- The efficiency of shipping much larger volumes by railroad.
- The ability to ship a large amount of grain more quickly by railroad compared to motor carriers.

The shippers who prefer motor carrier service frequently cited the fast delivery times, especially for short hauls, as one of the major reasons for their preference. They also mentioned

other reasons such as dependable pick-up, delivery, and transit times and the ability to provide door-to-door service to more locations than railroads. Manufacturing firms practicing Just-in-Time (JIT) inventory management techniques cited their need for fast, dependable, small order size, motor carrier service. Other reasons for preferring motor carrier service include better equipment availability and the ability to ship products with little advance notice to the carrier.

Some shippers prefer the service of Class I railroads because they have direct access to more markets and are able to supply more and better equipment than short lines.

The shippers were also requested to select the transportation mode that provides the best combination of rates and service. When the choice criteria are changed in this way, the impact is to reduce the percentage of shippers that prefer motor carriers. However, the addition of rates to the selection criteria does not change the preferred mode of any shipper group.

As expected, the reasons for shipper mode preference on the basis of rates and service include many of the service factors cited by shippers when the mode selection is based solely on service. Thus, only the rate related reasons for shipper mode preferences are discussed below.

Shippers who prefer the rates and service of short lines mentioned the low rates (relative to motor carriers) for longer haul shipments. Some shippers also stated that short line rates are lower than Class I rail rates due to lower labor costs. Grain shippers prefer to employ railroads for longer haul shipments because the low rates allow them to receive a higher price for their grain.

Shippers who prefer motor carriers when the mode choice criteria are rates and service mentioned the low motor carrier rates for short haul movements as the primary reason for their preference. Grain shippers located close to their primary markets employ motor carriers since the low motor carrier rates for short hauls allow them to realize a higher price for their grain.

The shippers who prefer Class I railroad rates and service mentioned some rate advantages of Class I railroads (relative to short line railroads) as the major reasons for their preference. Based on their experiences, these shippers noted that the rates for "Class I railroad only" movements are lower than joint Class I railroad-short line movements because of the switching charges reflected in joint rates. These shippers also said that since Class I railroads have direct access to more markets than short lines, the Class I railroad can offer lower rates to more markets due to less interlining.

When the entire shipper sample is considered and the mode selection criteria is service, the number of shippers preferring short line railroads or motor carriers is virtually identical. If the selection criteria are rates and service, the number of shippers that prefer short lines substantially exceeds the number that prefer motor carriers. This reaffirms the conclusion that shippers regard short lines as a viable transportation alternative.

The profile of a successful (profitable) short line railroad contains the following components.

Traffic Components

1. Adequate traffic density.
2. Stable, non-seasonal traffic to minimize excess capacity.
3. Diversified traffic base to avoid the risk of market downturns in individual industries.
4. Traffic base includes some high valued products that will generate higher rail revenue per carload.

Management and Labor Components

1. Motivated, skilled, flexible employees and management with extensive prior experience in the rail industry.
2. Management team should include people skilled in railroad operations, marketing, and finance.
3. The marketing department should include people with a good understanding of the markets of the firms on the rail line.
4. The management of the short line should have their home office located close to the shippers on the rail line.
5. Good management control of railroad costs.

Relationship to Class I Railroads

1. Multiple connections to different Class I railroads.
2. Guaranteed access to Class I overhead traffic and rail cars.
3. Reasonable switching charges with Class I railroads to maximize market access and inbound freight sources for the short line's shippers.
4. Short line sets local rates for movements on its own system.
5. Develop a feeder relationship with Class I railroads that benefits both railroads.

Financial Components

1. Equity investment by both the shippers and the railroad.
2. Realistic business plan based on conservative estimates of short line traffic, revenue, and expenses coupled with rigorous analysis of the strengths and weaknesses of actual and potential competitors.
3. The purchase price of the line should be based on conservative estimates of expected traffic, revenue, deferred maintenance expense, and operating expense. Paying a reasonable price for the line insures that principal and interest payments can be serviced by actual cash flow.
4. The short line should be appropriately capitalized at the beginning of its operation, permitting the railroad to make needed investments in equipment and track quality.
5. To rehabilitate track, short lines need long term loans at low interest rates that can be accomplished through loans or grants from the state or state guarantees of bank loans.

Track Quality Component

1. The short line needs to invest in track quality as soon after line acquisition as possible so that it can provide high quality service and attract traffic.

State Assistance Components

1. Provide financial assistance to short line railroads.
2. Furnish short lines with information regarding sources of engineering services, economic consulting services, railroad equipment suppliers, and retired railroad executives willing to give management advice.

3. Promote economic development through provision of an entrepreneurial business climate and aggressive recruitment of new business firms.
4. State financed insurance plan to protect short line assets from catastrophic events.

To be profitable in the long run, short lines do not need to have all the components in the profile. Weaknesses in some areas can be offset by unusual strengths in other areas. However, a profitable short line probably needs to have a majority of the components in each of the major areas of the profile.

As the Class I rail industry reduces the size of its system in the future, states must choose between abandonment and financial assistance of short line railroads. Since the study has shown short line railroads to be a viable transport alternative, we recommend state financial assistance, modeled on the Iowa programs, which have the following characteristics.

1. A mix of alternative types of assistance including grants, loans, loan guarantees, and economic development projects.

2. Flexibility in the types of railroad projects that are eligible for assistance.

3. Rigorous examination of business plans submitted by applicants to insure realism in estimates of revenue and expense.

4. Short lines eligible for state assistance must have a management team with extensive prior experience in the rail industry.

5. Projects receiving state assistance should require equity investment by both the railroad and the shippers.

6. Assure the safety of state assistance funds by the state retaining control of the railroad assets in case the short line operator fails.

7. Continually monitor the performance of railroads receiving state assistance and require detailed annual reports containing traffic, financial, and operating data.

8. Require short lines receiving state assistance to invest a given annual amount in track maintenance.

Other recommendations, in addition to the above state financial assistance recommendations, include the following public policies.

- Close coordination between the short line financial assistance programs and other state and private agencies whose objective is to promote economic development in rural areas.

- The federal government should consider reduced regulatory requirements for short line railroads to help them reduce their costs.

- States should consider paying some of the costs of maintaining rail-highway crossings to help short lines lower their costs.

- States should consider grants for short line track rehabilitation so the short lines won't have to incur as much debt as they otherwise would for this purpose.

- To reduce the shortage of grain hopper cars, states should consider short term leasing of hopper cars and sublease them to short lines in their state.

This study has concluded that in the current environment, short line railroads are a viable transportation alternative. However, the long term financial survivability of short line railroads as an industry is not assured. Nine of the 12 Iowa and Kansas short lines in our sample have been in service for five years or more. One third of these nine railroads have posted consistently negative financial results. Perhaps the short line railroad industry will evolve as all the other industries in a market driven global economy in which the well managed will prosper while the poorly managed will fail.

CHAPTER 1

INTRODUCTION

The Research Problem

Agriculture and agribusiness are a major part of the Central Plains economy. The Central Plains states lead the nation in many aspects of agricultural activity. For example, among the 50 states, Nebraska and Iowa are ranked first and second respectively in feed grain exports. Kansas ranks fourth in feed grain exports and first in wheat exports. Iowa ranks first in soybean exports and Nebraska ranks eighth. In terms of total U. S. agricultural exports, Nebraska ranks second; Iowa, third; and Kansas fourth.

The Great Plains is geographically remote from major domestic and foreign food consumption centers, the economic viability of Great Plains agriculture depends upon efficient, low cost rail transportation. Recent trends in the industry have resulted in the loss of rail service for many rural shippers.

Battered by motor carrier competition and public policy changes in the 1980s, railroads have attempted to increase profitability by reducing employment and the size of their systems. Railroad abandonment isn't new. Railroad mileage has been falling since the 1920s and the reduction in the 1980s was especially large. Miles of road owned by Class I railroads fell from 164,822 in 1980 to 116,626 in 1991. Kansas ranks third among the states in railroad mileage. Missouri and Nebraska rank sixth and tenth respectively. As Class I railroads continue to reduce the size of their systems, large numbers of rural shippers in the Great Plains face the loss of rail service.

As Class I railroads have reduced their systems, short line railroads have acquired many miles of branchline that would otherwise have been abandoned. Between 1970 and 1989, 240 short line railroads were created with most of these occurring after passage of the Staggers Act in 1980. Of these, 80 percent are still operating. In 1991, short lines operated 25 percent of the total railroad mileage, employed 11 percent of the industry's workers, and accounted for 9 percent of total railroad revenues.

In March 1991 two bills were introduced in the Kansas legislature that would provide state assistance to short line railroads. A similar bill was passed in Nebraska. At the federal level, the Kansas delegation sponsored a bill that would require Class I railroads to make a good faith effort to sell lines

targeted for abandonment. As Class I rail mileage continues to fall, legislators, rural communities, and shipper groups may ask for assistance in establishing short lines. Thus the four states need to know if short lines offer an economically viable mode of transportation in order to evaluate the question of state assistance for rail short lines.

Development of the Short Line Rail Industry

Before proceeding with a general discussion of the growth of the short line industry, it is useful to define what we mean by a short line railroad. The Association of American Railroads (AAR) has developed the following definitions.

Regional Railroad -- A non-Class I line-haul railroad which operates 350 or more miles of road, and/or which earns revenues of at least $40 million.

Local Railroad -- A railroad which is neither a Class I nor regional railroad, and which is primarily engaged in providing line-haul service.

Switching and Terminal Railroad -- A non-Class I railroad primarily engaged in providing switching service in a terminal area, or which receives a switching charge from a line-haul carrier.

In this report, the term "short line" includes regional, local, and switching and terminal railroads. The term "line haul short line" includes only regional and local railroads. It should be noted that other federal government agencies have adopted different definitions for short line and regional railroads. The Interstate Commerce Commission (ICC) and the Federal Railroad Administration (FRA) define a short line railroad as a line haul railroad which operates fewer than 250 miles of track, while a regional railroad is a line haul railroad that operates 250 miles or more of track.

The number of short line railroads declined from 1009 in 1916 to only 238 in 1970 (Levine et. al., 1982). However, several events occurred in the 1970s and 1980s that helped trigger explosive growth of the industry. The bankruptcies of the Milwaukee Road and the Rock Island created opportunities for short line development since parts of these two Class I railroads offered opportunities for profitable operation. Federal transportation policy also stimulated short line formation. The 3-R Act of 1973, the 4-R Act of 1976 and the Local Rail Service Assistance Act of 1978 all included provisions for operating subsidies and rehabilitation for light density branchlines. The Staggers Rail Act of 1980 and the Motor Carrier Act of 1980 greatly increased the degree of competition within the rail industry

and between railroads and motor carriers. In the new competitive environment, railroads adopted a cost reduction strategy to maintain profitability. The sale or lease of branchlines to short line operators is part of that cost reduction strategy.

As Table 1 indicates, 44 short lines with 2,526 miles of rail line were created in the 1970-79 interval. However, this growth was dwarfed by the explosive growth of the 1980-89 period during which 227 short lines were created accounting for 21,117 miles of rail line. During the 1970-91 period, a total of 317 short lines were created, operating 28,812 miles of road. During the 1980s, the peak year of short line creation was 1987 during which 46 short lines were formed and 6,674 miles of rail line were transferred to short line operation. The least activity occurred the following year when only five short lines were created with only 104 miles of rail line. The decline was partly due to legal challenges raised by rail labor unions who argued that a railroad had a duty to bargain the effect of a short line sale with its employees. The issue reached the Supreme Court in the Pittsburg and Lake Erie Railroad v. Railway Labor Executives' Association case in which the court held that labor protection is not required in short line sales (Thoms, Dooley and Tolliver, 1989). Although uncertainty remains concerning short line sales and labor protection, 31 short lines were created in both 1989 and 1990 and 15 in 1991, accounting for 7,855 miles of rail track.

In the 1980s, track mileage sold or leased by Class I railroads to short lines increased relative to abandonment mileage. For example, during the 1970-79 period, U. S. railroads abandoned 19,771 miles compared to only 2,526 miles sold or leased to short line operators (see Tables 1 and 2). Abandonment increased in the 1980-89 interval to 20,891 miles but this was exceeded by the 21,117 miles transferred to short line operation (see Tables 1 and 2).

In 1989, ten major Class I railroads were surveyed to determine how many miles of track they plan to transfer to short line operators over the 1990-95 period (U. S. DOT, 1989). The seven responding railroads reported plans to transfer 17,265 miles of track to short lines (see Table 3). This would increase the total short line industry mileage by 60 percent. Based on this survey, the number of short lines in the western U. S. should increase sharply in the 1990-95 period as the Santa Fe and the Union Pacific plan to spinoff 9,700 miles of track between them during this period. In addition, Southern Pacific has announced plans to spinoff 3,000 miles of its system to short line operators in 1993.

Table 1
Creation of Short Line Railroads
1970-1991

Year	Number of Short Lines Created	Miles of Road
1970	1	2
1971	2	53
1972	3	66
1973	4	414
1974	1	14
1975	1	242
1976	8	183
1977	8	900
1978	8	368
1979	8	284
1980	12	1,578
1981	10	587
1982	24	1,470
1983	15	341
1984	26	1,506
1985	27	2,620
1986	31	3,551
1987	46	6,674
1988	5	104
1989	31*	2,686
1990	31*	3,811
1991	15*	1,358
Total, 1970-79	44	2,526
Total, 1980-89	227	21,117
Total, 1970-91	317	28,812

* These are the number of lines created in these years and still operating in 1992. There may be some short lines created in these years that ceased operation or were absorbed by other railroads prior to 1992.

Source: (1970-88) Levine, et. al., Statistics of Regional and Local Railroads, Association of American Railroads, pp. 49, 51 (1988).
(1989-91) Compiled from data in Association of American Railroads, Profiles of U. S. Railroads, 1992 Edition.

Table 2
U. S. Railroad Abandonment 1970-1991

Year	Miles Abandoned
1970	1,782
1971	1,287
1972	3,458
1973	2,458
1974	529
1975	708
1976	1,789
1977	2,500
1978	2,417
1979	2,873
1980	2,321
1981	1,342
1982	5,151
1983	2,454
1984	3,083
1985	2,343
1986	1,417
1987	818
1988	1,293
1989	699
1990	256
1991	396
Total, 1970-79	19,771
Total, 1980-89	20,921
Total, 1970-90	40,918

Source: (1970-88) Levine, et. al., Statistics of Regional and Local Railroads, Association of American Railroads, pp. 49, 51 (1988).
(1989-91) Interstate Commerce Commission, ICC91-Interstate Commerce Commission 1991 Annual Report, Washington, D.C., April 1992.

Table 3
Miles of Potential Short Line Spinoffs by Class I Railroads

Class I Railroad	Miles of Track
Union Pacific System	5,716
Atchison, Topeka and Santa Fe	4,000
Burlington Northern	2,244
CSX Transportation	2,115
Chicago Northwestern	1,797
Norfolk Southern	1,251
Grand Trunk Western	142
Total	17,265

Source: U. S. Department of Transportation, Federal Railroad Administration, Deferred Maintenance and Delayed Capital Improvements on Class II and Class III Railroads: A Report to Congress, p. 94, Washington, D. C., 1989.

Characteristics of Short Line Railroads

Most regional and local railroads are very dependent on three or fewer commodity groups. On average, the top STCC (Standard Transportation Commodity Code) group accounts for 66.4 percent of a line haul short line's annual carloads, while the top three STCC groups are nearly 90 percent of annual carloads (Dooley, 1991, p. 18). In 1988, the top three commodity groups hauled by local and regional railroads were Lumber and Wood Products (24), Chemicals (28), and Farm Products (01) (Dooley, 1991, p. 20). The numbers in parentheses refer to Standard Transportation Commodity Code (STCC) numbers.

Regional and local railroads created after 1970 have lower average densities (carloads per mile of track) than those created before 1970. The average density for regional railroads plunged from 499.9 cars (before 1970) to 115.4 cars (after 1970). The corresponding figures for local railroads are 446.9 and 108.9 miles (Dooley, 1991, pp. 20-21).

Line haul short lines created after 1970 have more miles of track than those formed before 1970. The mean miles of track for regional railroads increased from 391.3 miles (before 1970) to 693.6 miles (after 1970). For local railroads, the corresponding figures are 41.6 miles and 60.6 miles (Dooley, 1991, p. 23).

Regional and local railroads formed since 1970 have fewer employees than those created before 1970. The mean employment fell 42.7 percent for regional railroads and 60.9 percent for local railroads. For railroads created since 1970, the average regional railroad employed 304 people and the average local railroad, 13.5 (Dooley, 1991, p. 23).

In conclusion, the short line industry has two distinct segments--those railroads created before 1970 and those formed after 1970. The average traffic density of the former is four times that of the latter. Thus, the survival of recently formed short lines will depend heavily on their ability to control costs.

The Case For and Against Short Line Railroads

The case for short line railroads centers around the following three arguments.

1. Short lines have lower labor costs than Class I railroads and are thus more likely to be able to operate low density lines profitably.

2. Short lines can provide superior shipper service.

3. If short lines are successful, they reduce the number of truck shipments, resulting in less highway maintenance and rehabilitation cost.

Short lines have several labor cost advantages. For example, short lines formed since 1970 operate with an average of 0.54 employees per mile of track compared to 1.88 employees for Class I railroads. Thus, the average short line's per mile work force is only 29 percent that of Class I railroads (Dooley, 1991, p. 28).

Class I railroads may have contracts with up to 19 separate labor unions, each with their own set of work rules. These rules generally prevent employees from performing tasks outside their job classification, resulting in a loss of labor flexibility. Most short lines operate with non-union labor and do not have to contend with restrictive work rules.

Short line employees have much lower wages and benefits than Class I rail employees. For example the Burlington Northern (BN) railroad pays an average hourly wage that is 152 percent to 247 percent higher than that paid by the typical short line railroad (Dooley, 1991, p. 31). As a percent of annual salary, the average benefit package for BN employees is over twice that of the average short line employee. Burlington Northern fringe benefits are 35 percent of total salary as opposed to only 17 percent for the average short line employee (Dooley, 1991, p. 33).

The lower labor costs of short lines translate into lower operating costs and possibly lower rates for shippers and receivers. Lower rates may allow short lines to recapture some of the traffic lost by the previous Class I railroad to motor carriers.

Another part of the case for short line railroads is their ability to provide superior shipper service. Proponents of short lines argue that since they have a relatively small number of shippers, the short line is more likely to know the transportation needs of each shipper on its line. Also the flexible work rules of short line employees allow the short line railroad to tailor its service to the needs of individual shippers. Finally, it is argued that short lines must provide superior service in order to survive.

If short line railroads can profitably operate light density rail lines, abandonment will be avoided and the reduction in potential truck traffic will reduce highway damage costs. A study of the impacts of abandonment of three Santa Fe branchlines in south central Kansas found that abandonment would cause an eight percent increase in wheat bushels transported by motor carrier and that the additional trucking would cause a 50 percent increase in road damage costs (Babcock, et. al., 1992, p. 118 and 124).

The case against short line railroads is composed of the following three arguments:

1. Short lines are not likely to survive in the long run because of large deferred maintenance expenses.

2. Short lines are too dependent on a few commodities for most of their revenue.

3. Short lines are too dependent on Class I railroads for equipment and market access.

With respect to the first point, critics of short lines argue that they are doomed because of large deferred capital costs that more than offset their labor cost advantage. Short lines seek to profitably operate a rail line that the previous Class I railroad wants to abandon. As the Class I railroad allows service to decline, shippers on the line turn to other modes of transportation and the condition of the line is allowed to deteriorate. At some point, the prospective short line operator will have to incur large rehabilitation costs in order to improve service and attract traffic.

Critics of short lines argue that they are too dependent on a few commodities. If a downturn occurs in the industries on the rail line, the resulting decline in traffic may cause the railroad to fail. In some cases, the closure of a single firm on the line may produce a disastrous decrease in traffic. Also many short lines are heavily dependent on grain traffic and short line critics argue that the seasonal nature of grain shipments will not generate enough revenue for profitable operation.

Critics also point to the heavy dependence of short lines on Class I railroads for market access and equipment. It is argued that the short line may provide superior service on its own system, but since the short line is dependent on the Class I railroad for ultimate delivery, it is unable to guarantee quality service for the entire movement. Also the short line will usually have to interline with a Class I railroad and the resulting switching charges may cause the short line to become non-competitive. Also, the critics point to the near total dependence of short lines on Class I railroads for rail cars. In a period of equipment shortage, the Class I railroad may allocate rail cars to the shippers on its own system, leaving the short line with less equipment to originate traffic.

Research Objectives

The short line railroad industry has experienced rapid growth since 1980 and will likely continue to grow at a rapid rate given the stated plans of Class I railroads to spinoff parts of their systems to short line operators. As a result, shipper groups and potential short line operators are likely to request state financial assistance. Thus, states need to know which of the above views of the short line industry is most likely to prove correct. Accordingly the objectives of this study are as follows:

1. Determine if short line railroads are a viable transportation alternative to abandonment.
2. Identify the key factors that determine short line success or failure.
3. Compile a profile of a successful short line railroad to help guide the allocation of state financial assistance.

Methodology

The objectives are achieved through personal interviews of executives of Iowa and Kansas line haul short lines and the shippers on those railroads. Each of these groups also completed detailed questionnaires. The questionnaires and personal interviews of short line shippers reveal the strengths and weaknesses of these railroads and thus indicate whether the users of short lines regard them as a viable transportation alternative. The questionnaires indicate shipper use of short lines relative to competing modes and the shippers compare the rates and service of short lines to their previous Class I railroad and to motor carriers. They also reveal whether they prefer short lines, Class I railroads, or motor carriers as their primary carrier. The shipper sample is stratified by state and by grain vs. non-grain shipper. Tests of statistical significance are performed to determine if different types of shippers evaluate short line performance differently.

A profile of a successful (profitable) short line railroad is specified based on personal interviews of Iowa and Kansas short line executives, the shippers located on these railroads, and officials of the Iowa Department of Transportation that administer the Iowa short line financial assistance programs. Additional information for the profile was gleaned from the detailed questionnaires completed by the short line executives.

CHAPTER 2

REVIEW OF OTHER SHORT LINE RAILROAD STUDIES

This chapter is not intended to be a comprehensive review of the short line railroad literature. The intent is to review the studies whose objectives and findings relate most directly to our study.

Sidhu, et. al., (1977) attempted to determine the influence of volume of traffic and length of haul upon small railroad costs per ton mile and to determine the economic viability of light traffic rail lines. The authors studied two sets of cross section data in an attempt to derive the long run cost function of small railroads, assuming that firms have made all feasible long run adjustments.

The first sample consisted of 209 Class II railroads and utilized data for 1968 from ICC published statistics. The second sample consisted of 44 Class II railroads and used 1973 data obtained from ICC reports filed by the lines. No attempt was made to merge the 1968 and 1973 samples or to compare the findings of the two years due to differences in the samples and the data available.

Sidhu concluded that there is evidence of substantial economies of traffic density and that those economies were far greater for regional railroads than for main lines. Also, she concluded that viability of railroads with traffic between 50,000 and 200,000 ton miles per mile of line is dependent upon which railroad firms the railroad connects with, length of haul, and ability to hold costs down. Short lines with traffic between 200,000 and 800,000 ton miles per mile of line and below 25 miles in length of haul are almost certain to be viable unless the main line haul is very short. Railroads having over 800,000 ton miles per mile of line are viable even without a main line connection.

The authors also found that the two largest components of cost, maintenance of way and transportation rail line, are influenced by volume but not by average length of haul. Therefore, overall costs per ton mile are not influenced as much as expected by the length of haul.

Sidhu concludes that the economic feasibility of a short line is a function of its traffic density, the length of haul on both the short line and the connecting main lines, and the costs of shipping by an alternate mode.

Hirschey (1979) investigates the relationship between light density line output and costs, using 1973 data. The author employs a model that relates long run incremental cost to various output characteristics for both on branch and off branch rail service. The output characteristics employed are quantity, distance, bulk, and frequency.

The author used 1973 costs developed by USRA for 300 individual branch lines located in 17 Northeastern states. The author's cost function is estimated for 10 U.S. regions.

He found significant scale economies for on branch traffic density with elasticities between 0.24 and 0.32. For off branch service, the elasticity was close to 1.0, indicating no economies to traffic density. Other cost elasticities with respect to various variables are as follows:

	On Branch	Off Branch
Distance	0.24 to 0.47	0.33 to 0.35
Tons per Carload	0.17 to 0.32	0.49 to 0.52
Frequency of Service	0.24 to 0.28	

John Due (1984) summarized the experience of all short lines formed between 1970 and April 1984 and attempted to determine the factors related to the success of these lines.

The data was gathered from the Departments of Transportation of the various states and directly from railroad companies for 122 railroad companies that operated 151 lines.

According to Due, the factors that contributed to the increased presence of short line railroads are: the Staggers Act, which allowed easier abandonment of lines; the availability of federal funds for assistance to new lines; and legislation that insures first right of acquisition to a firm that will continue to operate a line.

Due identified seven factors required for success: competent, experienced management; shipper support; adequate quality of track at a reasonable price; adequate traffic; access to more than one connecting carrier; adequate capital; and state or local government assistance.

Due also surveyed those having experience with failed lines regarding the reasons for failure. The following causes of failure were identified:

Inadequate traffic	15
Physical problems	7
Management problems	6
Lack of shipper support	5
Lack of capital	2
Lack of rate division	1

In addition, Due identified the following as risks that can lead to the failure of short lines:

1. A sharp decline in traffic from the shutdown of a major shipper or a shift in business practices.
2. Increased truck competition, particularly of a backhaul nature.
3. Physical hazards such as fire destroying trestles, washouts, or bridge collapse.
4. Loss of the sole connecting line.
5. Cancellation of joint rates by the connecting carrier or a surcharge imposed by the major carrier on joint traffic.
6. A serious derailment.

When the preservation of a line is expected to make contributions to the development of an area in excess of the subsidy, Due has no objection to a local government or a state subsidizing the operation

of the line. However, Due cautions that although a subsidy permits continuation of a line suffering a loss, it may result in failure to control expenses adequately.

Due concludes that many of the lines are economically viable and can be operated without continuing subsidy. Thus the sale of these lines by major railroads to local short lines provides a net gain to the railroads and to the shippers and communities served.

Due also states that small railroads have generally provided far more satisfactory service to their shippers than the major railroads. Thus the shippers have benefitted by the transfer of these lines to the new companies.

Dooley and Rodriguez (1988), assessed the potential effects that short line operations may have upon the level of rail services received by grain shippers on light density rail lines.

The data was gathered by telephone interviews during July and August 1987 from 130 grain elevator managers located on short line railroads in North Dakota, South Dakota, and Minnesota. Questions regarding elevator characteristics, the importance of various transportation service characteristics, and shipping patterns were asked. Thirty six of the elevators did not use rail service and another 14 did not qualify as grain shippers. Of the remaining 80 elevators, 68 responded.

Dooley and Rodriguez found that elevators ranked rates and reliability as the two most important factors when choosing a mode of transportation. Rates seem to be more important to multiple car shippers since those elevators had made considerable investments in order to access lower multiple car rates. Reliability was ranked second since an elevator's ability to plan shipments depends upon the reliability of its carriers.

The ranked order of the remaining factors was customer service, transit time, and loss/damage. Customer service was ranked above transit time by single car shippers, but the order was reversed for multiple car shippers. Many of the shippers noted an increase in sales calls, and felt that the short line was more responsive to local needs. Although most elevators operators felt that motor carriers provided better service than short lines, the study found that 70 percent of the respondents preferred rail service to truck. Most of the elevator managers feel that shipping grain by rail is more efficient and cost effective.

The majority of elevators received better service from the short line than from the former Class I railroad, according to Dooley and Rodriguez. Some of the reasons for preferring the short line include more individual attention, better working relationships, the short line's need to survive, and a caring attitude. The reasons given for preferring the Class I railroad were the advance notice for ordering cars from the short line and the increased demurrage fees of short lines.

The number of operational problems dealing with car switching, shipment tracing, snow removal, loss and damage, and equipment condition were the same or less with the short line. Also, grain shippers experienced fewer track maintenance and condition problems under short line ownership. Car and locomotive shortages were the only areas where grain shippers had significantly more problems under short line ownership. However, short lines provided more frequent pickup and delivery of rail cars than the former Class I railroad, especially for multiple car shippers.

Dooley and Rodriguez reported that nearly 40 percent of the elevators shipped more grain by the short line than they did by the former Class I railroad. Although rail shipments increased, most shippers do not credit all of this to an improvement in the quality of service. Changing market conditions and access to new markets may also be factors in the increased rail shipments. Another reason for shipping more by rail was the desire to maintain local rail service. Those shipping less grain by rail did so due to market conditions and increased competition by trucks.

Mielke (1988) identified common provisions for the sale of railroad lines and discussed the impacts that they have on new carriers. He was particularly interested in determining whether sales of railroad lines are structured to influence the new carriers' operations, and if so, how this is done.

He used mail surveys, personal and telephone interviews, and secondary sources to obtain his data. Mielke received responses from seven of the eleven railroads active in trackage sales since 1970 and from 32 short line railroads.

The short line railroads formed from 1970 to October 1986 were mainly lines that were authorized for abandonment. These sales have generally been for cash with no attempt to influence short line railroad operations.

Between October 1986 and October 1988, many sales were structured to encourage a continuing relationship between the buyer and the seller through the establishment of a feeder railroad line. The Class I railroad's goals are to eliminate operating and ownership costs while benefitting from the continued freight revenues. Cash generation is a secondary goal in these cases. Unlike divestitures, feeder line sellers attempt to maximize their economic return on a long term basis rather than through a one time influx of cash. Thus, the seller is more concerned with the short line's ability to generate and interchange traffic with the seller than it is with the selling price.

Mielke found that the trend to establish feeder short lines has resulted in Class I railroads structuring sales to influence short line railroads. Class I railroads often use physical factors such as interchange capabilities with the seller only or the use of trackage rights. Other ways of influencing the short line are the use of contractual limitations, contractual incentives, and indirect incentives (i.e.,the provision of accounting services).

If this strategy is successful, Class I railroads will sell branch lines more willingly. The advisability and legality of some of the methods used to influence short line railroads is unclear at this time and will be influenced by future administrative, legislative, and judicial actions which will also determine how much this strategy will be used.

Wolfe (1988) attempted to identify, explore, and quantify the underlying causes of business failure of short line and regional railroads in the United States. A 17 year time frame (1970-1987) was chosen to help evaluate the effects on railroad viability of business recessions, energy crises, interest rate fluctuations, and deregulation. In some cases the data went back as far as 1960.

Wolfe's sources of identifying railroad failures included Profiles of U.S. Railroads assembled by the Association of American Railroads (AAR), American Shortline Railway Guide by Lewis, studies by Due, and AAR files on railroads that had been identified as failures or had released their codes for re-use. The financial data came from Moody's Transportation Manual, the ICC's file of annual railroad reports, and surveys sent to each railroad and its state's office of transportation.

Wolfe determined that 136 line haul short lines and 33 switching and terminal railroads had experienced service failures between 1970 and 1987. Wolfe obtained data on more than 70 failed railroads and paired a successful railroad of similar type, year established, commodities carried, and geographic region to each of these. Over 50 financial and demographic characteristics were assembled for each railroad.

Wolfe found that the 1970 to 1987 five year short line failure rate (the percentage of short lines that failed within the first five years of operation) of 30 percent is close to the long term historical failure rate of 29 percent for all railroads. During the period between 1980 and 1987, the five year failure rate of short line railroads increased to 42 percent due to several factors including economic conditions. These failure rates are all less than the 56 percent figure experienced by all firms in the economy.

When Wolfe compared the relative failure rates per 10,000 firms for the period 1980 to 1987, he found that local and regional railroads had a failure rate of 3.02 percent, motor carriers had a failure rate of 1.39 percent, and all firms in the economy had a failure rate of .93 percent.

From his data, Wolfe identified twelve key factors underlying failures of local and regional railroads:

Limited Traffic
Economies of Size and Density
Single Factor Reliance
Traffic Balance
High Rehabilitation Costs
Loss of Financial Aid
Competition

Insurance
General Economic Conditions
Loss of Key Management Personnel
Inexperienced Management
Realistic Business Planning and Flexible Financial Instruments

Wolfe found that limited traffic was cited as the dominant cause of failure in almost one half of the cases. This low traffic level was also found to be caused by a variety of reasons including: depressed demand in primary or secondary industries; the closing of a dominant supplier's plant; no longer a need for railroad service; and excessive optimism of the market potential.

Relative to economies of scale, Wolfe found that relatively small railroads must have relatively large traffic bases in order to be cost competitive. These economies exist when average costs declined due to haul returns (increases in the number of miles of track operated) and due to density returns (increases in the number of revenue ton miles per mile of track).

Using visual inspection of scattergrams of data from successful railroads, Wolfe found that both operating expenses and total costs per ton mile declined significantly as the number of miles of track operated increase. Generally, economies of size in miles of track were nearly exhausted at 75 miles for line haul short line railroads. However, he also observed that similar economies of scale could be obtained by efficient railroads that operated as few as 20 miles of track. In addition, Wolfe found significant differences when comparing the average length of failed local and regional railroads (31 miles) with that of successful ones (53 miles).

Also, from the scattergrams, Wolfe noted that average unit costs tended to be lower when a railroad had more than 250,000 revenue ton miles per mile of track (RTMPMT). However, efficient railroads could achieve the same economies of density with as little as 90,000 revenue ton miles per mile of track. The fact that his results were 50,000 RTMPMT higher than those of Sidhu was attributed to larger capacity freight cars and more fuel efficient locomotives. Wolfe also found a statistically significant difference between the traffic density of failed local and regional railroads (253,000 RTMPMT) and that of similar successful railroads (434,000 RTMPMT).

Wolfe states that local and regional railroads usually depend on a single shipper, industry, or other railroad for the majority of their business. Thus, the risk of those local and regional railroads failing is tied to another entity. Since the demand for transportation is derived, a decline in demand for commodities could result in that firm's failure. He notes a statistically significant difference between failed railroads' single commodity concentration ratio of 77 percent and that of successful railroads of 68 percent. In addition, lines that relied on metallic ore or building materials faced more carloading volatility than those lines that relied on coal and chemical traffic.

Traffic balance also plays an important role in determining a railroad's costs and ultimate viability. According to Wolfe, a balance between cars originated and cars terminated can reduce average unit costs. The successful railroads averaged 2.5 carloads originated to every carload terminated, whereas the failed railroads averaged 3.3 carloads originated to every car terminated. The second leading cause of failure in Wolfe's study was high rehabilitation costs. In nearly 20 percent of the cases, failure was attributed to substandard track, structures, or equipment. In this situation, poor track often led to poor service, which resulted in decreased traffic.

Since Class I railroads are usually self insured, except for catastrophic losses, insurance cost increases have affected local and regional railroads more than the Class I railroads. In addition, according to Wolfe, local and regional railroads generally have higher premiums since they require smaller deductibles. Since many local and regional railroads cannot afford adequate insurance, one significant accident can place them at risk.

General economic conditions can affect the viability of railroads in many ways. One way that Wolfe listed is that when interest rates are high, then all businesses minimize their inventories and look for carriers with faster transit times. This results in shipping smaller quantities, and shifting much of what had gone by railroad to truck.

Wolfe notes that a lack of realistic contingency plans has also affected the viability of local and regional railroads. This became critical in cases where the railroad was heavily dependent on debt and had failed to recognize the effect of business cycles on the commodities the railroad depended on.

Wolfe concludes that local and regional railroads have been relatively successful since more than 80 percent remain in business, but feels that it is too soon to be able to assess their long term viability.

Wolfe (1989) tried to determine if certain financial and/or demographic ratios can be employed as a method of assessing the relative viability of local and regional railroads. The study does not consider other important factors such as the economy, the competitive environment, and managerial expertise that also relate to the success of a particular railroad.

Wolfe's conclusions are derived from the same data as his 1988 paper and the methodology is the same as that of the other study. Of the three models Wolfe developed, the best model correlated three variables to railroad success: ratio of operating revenues to total assets, three year compound growth rate of operating revenues, and fixed charge coverage. The best model that Wolfe developed correctly classified railroads up to 96 percent of the time for the final year and about 73 percent of the time in the preceding three years. Thus, Wolfe concludes that his model does not include all the variables that can predict service failures.

From his initial results, Wolfe found that debt played a much larger role in the financing of failed local and regional railroads than in the successful railroads. The successful railroads averaged 0.89 debt to equity, 0.43 debt to asset, and 0.58 total liability to asset ratios compared to 1.93, 0.73, and 0.90 respectively for failed local and regional railroads.

Wolfe also noted that the failed railroad was usually smaller in mileage than the typical successful one. For the 18 year data base, the failed railroads were two thirds smaller than the successful railroads and had long run debt to equity ratios that were over twice as high.

In "Long Run Financial and Demographic Differences Between Failed and Successful Local and Regional Railroads", Wolfe gives a more complete description of the ratios and characteristics tested in the earlier studies. The data and methods are the same.

Due to the small size of the railroads tested, Wolfe states that liquidity and cash flow are important in determining railroad viability. Those railroads experiencing cash flow or liquidity problems often need to borrow more money. However, Wolfe found that the degree of leverage among the failed local and regional railroads prevented them from borrowing more money. Of all the liquidity variables, constant dollar cash flow was the best discriminator between successful and failed railroads. This variable was significant at the .01 level for up to nine years prior to failure.

Efficiency variables test the ability of the local and regional railroad's assets to generate income. Wolfe also states that asset turnover can be interpreted as a proxy for returns to density. Wolfe found that successful railroads overall were able to generate 59 cents of revenue for every dollar of total assets and 68 cents for every dollar of fixed assets. This was more than three times that of their failed counterparts.

Also, failed railroads had negative retained earnings to net investment ratios for as long as 13 years prior to failure. Wolfe states that the inability of failed railroads to maintain cash flow and increase retained earnings reduced their ability to fund capital expenditures.

Wolfe states that the operating ratio is one of the best measures of management's ability to handle a changing environment. While successful railroads generally had operating ratios of less than 75 percent, failed firms often had operating ratios exceeding 100 percent for up to twelve years before failure.

Other factors that Wolfe found to be significant were returns to density and over dependency on single industries or firms. Wolfe states that the successful railroads were able to take advantage of economies of scale and density. Failed railroads seemed to be unable to generate enough traffic to be cost competitive. Also, when a railroad was dependent on just one or two commodities, that railroad's fortunes were linked to those of its major commodities.

Wolfe concludes that traffic downturns, rather than entire plant closings, were usually associated with railroad failure. This loss of traffic results in higher overall average costs which undermine the carrier's competitive position. Failed railroads seemed to be much more susceptible to slight traffic reductions than those railroads which were successful.

The U.S. Department of Transportation (1989) explored the development of small railroads from 1970 through 1988, assessed the current condition of small railroad lines, and estimated the need for rehabilitation on those lines.

The statistical data in this report comes mainly from Profiles of U.S. Railroads. Information not available from Profiles of U.S. Railroads was derived from a Federal Railroad Administration (FRA) survey of 458 regional, local, and switching and terminal railroads that were operating independently as of mid 1988. The FRA received responses from 358 of these railroads.

The FRA found that 246 of the 458 small railroads began operations after January 1, 1970; 56 during the 1970s and 190 since 1980. Of these 246 railroads, 223 acquired lines that were previously operated as part of a large railroad.

Of those railroads responding to the FRA study, more reported grain as their top commodity (14 percent) than any other product or commodity group. However, coal had the most carloads carried by these small railroads, consisting of 24 percent of the total carloads.

In the FRA study, small railroads tended to be highly dependent on a single commodity or small group of commodities. More than 20 percent of the respondents reported that their top commodity accounted for more than 90 percent of their total carloads during 1987. In addition, for more than half of the respondents, over 90 percent of their total carloads consisted of their top three commodities.

According to the FRA study, 48 percent of the carloads handled by these local railroads were originated by that railroad and transferred to another railroad, 29 percent were received from another railroad and terminated on the short line, and the rest was local and bridge traffic. The carloads handled by the regional railroads were split nearly equally between local, originating, terminating, and bridge traffic.

The FRA study found that 44 percent of the carloads handled by the responding railroads in 1987 moved less than 150 miles from the origin to the destination. In addition, 26 percent of the carloads moved between 150 and 500 miles, 16 percent moved between 500 and 1000 miles, and only 8 percent moved more than 1000 miles.

The FRA reported substantial variations in traffic density among its sample railroads. The wide variations in density among the railroads are primarily due to the differences between the seven large established regional railroads and the others.

According to a survey by the USDOT in 1989, seven of ten Class I railroads planned to transfer an additional 17,265 miles of track to short lines. This would increase the total short line mileage by 60 percent.

An advantage of preserving the branchlines that is cited by the USDOT is the reduced cost of highway maintenance. Numerous states have done studies that indicate the cost of road and highway maintenance will rise substantially if freight is diverted from railroad to motor freight.

Although there has been much concern regarding the loss of industry and jobs, studies surveyed by the USDOT have shown that after railroad abandonment, almost all of the freight continued to move by other modes. Even shippers who had indicated that they could not survive without railroad service have generally found alternative transportation once railroad service was abandoned. Only in rare and isolated instances was a plant shut down or employment lost.

As an additional competitor, a small railroad may create downward pressure on freight rates. Therefore, the USDOT concludes that a reduction in the number of carriers available could result in increased freight rates.

Although the economics of light density trackage creates opportunities for short line railroads, the USDOT finds that it often leaves them with structural problems. The trackage being acquired since 1970 by small railroads was generally not profitable for the previous railroad. Since much of the trackage has experienced a cycle of deferred maintenance dating back five years or more by the time it is sold, the new carriers acquiring these lines inherit a deferred maintenance problem.

The USDOT concluded that the newly formed small railroads have proven they can operate light density lines profitably, even though the prior Class I railroad was unable to operate those same lines at a profit. The USDOT attributed the success of short line railroads to 2 factors: offering service and rates tailored to the needs of local shippers and a more flexible cost structure than the larger railroads.

The USDOT found that although most of the newly formed small railroads would be marginally profitable, most of them would be able to provide service and remain in business. The main factors determining the success of a small railroad are the nature of the traffic available, the competition from trucks and other railroads, and the rates that can be charged on the traffic.

Common problems facing newly formed short line railroads include overestimating the amount of new traffic that can be attracted; inaccurate figures on existing traffic; and the inability to recover traffic that had shifted to other modes of transportation. In addition, the USDOT has concluded that some operators paid too much for the lines in relation to their profit potential.

Despite the above problems, the USDOT found that less than 4,000 miles of railroad line operated by small railroads has gone out of service since 1980. This averages less than 2.3 percent per year of the total mileage operated by this sector of the industry.

The major objective of the Office of Transportation Analysis (1989) study is to determine how shippers compare the services and rates offered by their new short line or regional railroad with those of the railroad that previously served them. The study also investigated whether perceived service and rate changes varied with shipper characteristics.

The study was conducted with a two part sample. First, a carrier sample was selected that included all 14 regional railroads and 64 short lines formed since 1980 and still providing service as of October 1987. These railroads provided lists containing about 5,500 shipper names and addresses. Questionnaires were mailed to a stratified sample of 627 shippers.

The principal conclusions of the study are as follows:

1. An overwhelming 94 percent of the survey respondents believed that service levels had been maintained or improved, while 88 percent reported that rate levels had declined or stayed the same.

2. Good communications appear to exist between the new short line and regional railroads and their shippers. In most cases, customers feel they are receiving responsive personal attention.

3. Some shippers stated that rail rates declined as a result of contracts, better routing of traffic, or absorption of switching charges. Respondents dissatisfied with rate changes claimed that imposition of surcharges and/or high demurrage charges were factors in their higher rates.

4. The degree of shipper satisfaction with service and rates was not significantly affected by shipper characteristics such as size or access to other modes of transportation.

5. Shippers whose predecessor railroad was a Class I indicated significantly more often that rates had improved than did shippers with prior Class II or Class III railroad service.

6. With respect to rates, receivers of grain reported improvements more often than did receivers of other major commodity groups.

7. Some of the shippers no longer used their short line railroad. About half of these cited unacceptable rates and/or inadequate service as the principal reasons.

8. The majority of the former users of short lines stated that they shifted to an all truck logistics system.

Walter and McNair (1990) calculated financial ratios for twelve of the short line railroads in Iowa, and used those ratios as inputs to viability and bankruptcy models.

The data for the 14 Class II and Class III railroads in Iowa was 1986 data reported to the Iowa Department of Transportation. The railroads were rated according to their performance compared to that of viable railroads for traffic density, cash flows, debt to asset ratio, operating ratio, and earnings as a percent of total assets.

The study found that only the Iowa Interstate had traffic density in the highest category, those having over 800,000 ton miles per mile. Five of the short lines had traffic between 200,000 and 800,000 ton miles per mile, but exceeded the length of haul guideline of 25 miles. This meant that these lines would need additional revenue to maintain their track. Three railroads had traffic less than 50,000 ton miles per mile and thus were not likely to survive.

When comparing the averages of the other four viability measures along with the density of traffic, the Cedar Rapids & Iowa City, and the Dakota & Iowa railroads were better than the averages for successful railroads for all measures. The Appanoose County, the Chicago, Central & Pacific, the Iowa Interstate, and the Iowa Northern railroads were all weaker than the averages of successful railroads in four or more viability categories.

When using Altman's Z'' Model, a discriminant analysis, the study found that the Cedar Rapids & Iowa City, the Keokuk Junction, and the Dakota & Iowa railroads appeared to be the strongest. The Iowa Terminal and the Burlington Junction lines were rated as strong and the Cedar Valley score was in the mid-range of that needed to be viable. The remaining railroads were rated weak by this model.

Fitzsimmons (1991) analyzed the impact of the structural characteristics of railroad transportation markets on the incidence of intramodal competition reported by Class II and Class III line haul railroads.

He mailed a questionnaire to 345 small railroads and analyzed the results using a logit model, testing two hypotheses:

> The probability that a railroad will experience intramodal competition depends upon the diversity of its service mix.
>
> The probability that a railroad will experience intramodal competition depends upon characteristics facilitating customer choice.

Fitzsimmons found that intramodal competition faced by some small railroads is directly related to all three measures he used to measure the complexity of services provided by that railroad to customers in its market. Hypothesized factors affecting complexity of service mix were: length of route; diversification of commodities; and the presence of local and overhead traffic. All three of these were shown to be statistically significant.

In addition, when testing facets of customer choice, Fitzsimmons found that intramodal competition is directly related to the number of connecting railroads. No significant correlation was found between intramodal competition and the carriage of manufactured goods nor for shipper ownership of the railroad.

Fitzsimmons concluded that any explanation of intramodal competition must recognize the bargaining power of railroad customers and the factors which affect their freedom to choose particular railroads.

Dooley (1991) measured the economies of size and density that are available to short line railroads. He examined the theoretical framework of cost for the short line railroad industry in order to develop theoretically consistent estimates of short line costs using a short line simulation costing model.

The method of the study is development of a short line simulation costing model relying primarily on data in Profiles of U.S. Railroads published by the Association of American Railroads.

The principal conclusions of the study are as follows:

1. Fixed costs dominate the cost structure of short line railroads.

2. Increases in traffic density offer substantial opportunities for lowering short line average costs. For example, an increase in traffic density from 20 to 30 cars per mile lowers average total cost per car by 30 percent.

3. Economies of size are less significant for short lines. For example, increasing the size of the network from 56 to 129 miles decreased average total cost per car by only 7 percent.

4. The concern with new short lines should be with traffic density, not the size of the network.

CHAPTER 3

TRANSPORTATION CHOICES OF SHIPPERS LOCATED ON IOWA AND KANSAS LINE HAUL SHORT LINE RAILROADS

In this part of the report, we discuss the transportation choices of shippers located on Iowa and Kansas line haul short lines. For Iowa and Kansas grain shippers, we delineate outbound shipments of grain and inbound receipts of fertilizer by railroad and motor carrier. The principal rail and truck destination markets for grain and origins of fertilizer are also described. We reveal the inbound and outbound commodities shipped by Iowa and Kansas non-grain shippers and the use of railroads and motor carriers for these movements.

There are 264 shippers in our study. Each of these was interviewed by a member of the research team and the shippers also completed detailed questionnaires. Of the total sample of 264 shippers, 163 of these are grain shippers and 101 are non-grain shippers, almost all of which are manufacturing firms. The total sample is composed of 125 Iowa shippers and 139 are located on Kansas short lines. The distribution of shippers by short line railroad is as follows:

Iowa Railroads:

Chicago, Central & Pacific Railroad 43
Iowa Interstate Railroad, Ltd. 32
Cedar Rapids & Iowa City Railway 20
Iowa Northern Railway 16
Cedar River Railroad Company 8
Keokuk Junction Railway 6

Kansas Railroads:

Kyle Railroad 60
Kansas Southwestern Railway 27
South Kansas & Oklahoma Railroad 17
Garden City Western Railway 14
Northeast Kansas & Missouri Railroad 11
Southeast Kansas Railroad Co. 10

Iowa Grain Shippers

In 1991, the Iowa grain shippers in our sample shipped 100.6 million bushels of corn by rail and 18.9 million by motor carrier (see Table 4). In addition, they shipped 27.1 million bushels of soybeans by rail and 19.4 million by truck. For corn and soybeans combined, the Iowa grain shippers in our sample moved 127.7 million bushels by rail and 38.3 million by motor carrier. Therefore, short lines originated 84.2 percent of the corn, 58 percent of the soybeans, and 76.9 percent of the combined corn and soybean shipments. In addition, the Iowa grain shippers in our survey received 53.5 percent of their fertilizer by rail.

We did not survey every grain shipper on the six Iowa line haul short lines in our sample. Thus, it is not known if the above figures mirror those of the entire shipper population on these railroads. We surveyed relatively few shippers in the eastern one-fourth of the state. It is possible that these shippers, located relatively close to Mississippi River markets, rely more heavily on motor carriers.

Nevertheless, it appears that Iowa grain shippers rely substantially on their short lines for shipping grain and receiving fertilizer. This is evidenced by the fact that 80 percent of the Iowa shippers in our sample relied on railroads to ship 50 percent or more of their corn. In addition, 54 percent of the sample shippers employed railroads to ship 50 percent or more of their soybeans, while 56 percent received at least 50 percent of their fertilizer tonnage by rail.

The principal markets for corn shipped via motor carrier by our sample of Iowa shippers are ports on the Mississippi River and Iowa corn processing locations. Most of the corn shipped to the Mississippi River is exported through Louisiana ports. The corn loading ports on the Mississippi River include Prairie du Chien, Wisconsin and the Iowa ports of Dubuque, Clinton, Davenport, Muscatine, Burlington, and Keokuk. Corn is trucked to many processing locations in Iowa but the two cited most often by our sample of shippers are Cedar Rapids and Eddyville.

The major market destinations for corn shipped via railroad by our sample of shippers are ports on the Mississippi and Illinois Rivers, corn processing plants in Cedar Rapids, Iowa; and Chicago. Some of the corn remains in Chicago and some is delivered to connecting railroads that serve markets east and south of Chicago.

Ports on the Mississippi River and Iowa soybean processing locations are the principal market destinations for soybeans shipped by motor carrier. As is the case with corn, most of the soybeans delivered to Mississippi River ports are exported to other countries from Louisiana export locations. Soybeans are shipped by motor carrier to many Iowa soybean processing locations. The two mentioned

most often by our sample of shippers are Des Moines and Cedar Rapids. However, several shippers also cited Iowa Falls, Eagle Grove, Mason City, and Sioux City.

The major market destinations for soybeans shipped by railroad are ports on the Mississippi and Illinois Rivers, soybean processing firms in Cedar Rapids, Iowa; and Chicago. As is the case with corn, some of the soybeans remain in Chicago, while some are delivered to connecting railroads that serve markets east and south of Chicago.

Fertilizer is delivered by motor carrier from a wide variety of origins to our sample shippers. The origins most frequently cited by shippers are ports on the Mississippi River, as well as Fort Dodge and Sioux City, Iowa.

Canada, Florida, and Mississippi River ports are the most frequently mentioned origins of fertilizer delivered to shippers via railroad.

Table 4
1991 Grain Shipments Originated by Railroad and Motor Carrier
by Sample Shippers on Iowa Line Haul Short Lines*

Grain	Rail Shipments	Motor Carrier Shipments	Total Shipments
Corn	100,583,721	18,895,732	119,479,453
Soybeans	27,143,738	19,355,345	46,499,083
All Grain**	127,727,459	38,251,077	165,978,536
Fertilizer	64,550	56,078	120,628

* Grain shipments are measured in bushels, fertilizer in tons.
** The sum of corn and soybean shipments.

Kansas Grain Shippers

In 1991, the Kansas grain shippers in our sample shipped 35 million bushels of wheat by rail and 38.8 million by motor carrier (see Table 5). In addition, they shipped 14.1 million bushels of sorghum by rail and 10.5 million by truck. Shipments of corn by rail totaled only 1.6 million bushels compared to 10.6 million by motor carrier. Soybean shipments by rail were 2.6 million bushels, much less than the 3.6 million bushels shipped by truck. For the four grains combined, rail shipments were 53.3 million bushels, while truck shipments totaled 63.4 million. The Kansas grain shippers in our sample received only 47,996 tons of fertilizer by rail compared to 154,594 tons by motor carrier.

The above 1991 figures indicate that short lines in Kansas are not the dominant mode for agricultural shipments as they are in Iowa. For wheat, only 47.4 percent was shipped by rail compared to 52.6 percent for motor carriers. Only 13.1 percent of the corn and 41.9 percent of the soybeans were shipped by rail. The corresponding percentages for trucks are 86.9 percent and 58.1 percent respectively. Sorghum is the only grain for which the sample shippers used railroads more than motor carriers, 57.6 percent (rail) vs. 42.4 percent (truck). For the four grains combined, railroads account for 45.6 percent of the shipments and trucks 54.4 percent.

The 1991 principal market destinations for wheat shipped via motor carrier by our sample Kansas shippers are flour mills and grain terminal locations in Kansas and Oklahoma. Of the many diverse markets, the most often cited by shippers are Kansas City, Salina, Topeka, Wichita, and Atchison, all of which are in Kansas.

The principal markets for wheat shipped by rail are the same as those for truck shipments. The markets mentioned most often by shippers are Kansas City, Salina, Wichita, and Topeka.

Cattle feedlots in the western Great Plains and poultry feeding locations in Missouri and Arkansas are the principal markets for sorghum delivered by motor carrier. Grain terminals in Salina, Kansas are another major market for sorghum delivered via truck.

The major markets for sorghum shipped by rail are grain terminal firms in Kansas City, Topeka, and Salina, Kansas.

Most of the corn shipped by our sample Kansas shippers is delivered by motor carrier to cattle feedlots in the western Great Plains. The small amount transported by rail is delivered to firms in Kansas City, St. Joseph, Missouri, and Atchison, Kansas.

The principal market destinations for soybeans shipped by motor carrier are soybean processing plants located in Wichita and Emporia, Kansas. The major markets for soybeans shipped by rail are soybean processing plants and grain terminal locations. The markets cited most often by sample shippers are Kansas City and Wichita.

The sample Kansas grain firms receive fertilizer from a wide variety of locations both within and outside Kansas. With respect to motor carrier deliveries, the origins cited most often by shippers are Kansas City, Lawrence and Clay Center, Kansas; and Enid and the Port of Catoosa, Oklahoma.

Railroad deliveries of fertilizer are generally shipped over longer distances. For example, the shippers cited Idaho, Wyoming, and Florida as primary origins for rail delivered fertilizer. However, several shippers also mentioned Kansas City and Enid, Oklahoma.

Table 5
1991 Grain Shipments Originated by Railroad and Motor Carrier
by Sample Shippers on Kansas Line Haul Short Lines*

Grain	Rail Shipments	Motor Carrier Shipments	Total Shipments
Wheat	35,048,522	38,814,799	73,863,321
Sorghum	14,051,294	10,495,543	24,546,837
Corn	1,626,471	10,553,126	12,179,597
Soybeans	2,621,276	3,567,310	6,188,586
All Grain**	53,347,563	63,430,778	116,778,341
Fertilizer	47,996	154,594	202,590

* Grain shipments are measured in bushels, fertilizer in tons.
** The sum of wheat, sorghum, corn, and soybean shipments.

Iowa Non-Grain Shippers

Tables 6 and 7 contain 1991 inbound freight, shipped by motor carrier and railroad, by a sample of non-grain shippers located on Iowa line haul short lines. The two tables list the commodities shipped by truck and railroad by Standard Transportation Commodity Code (STCC) number. An examination of Tables 6 and 7 reveals that the total number of commodities received is about the same for railroad and truck. There is also similarity in the types of commodities shipped via the two modes, as the Iowa non-grain shippers in our sample moved several commodities by rail and truck in the following three commodity groups.

Coal and Non-Metallic Ores (11 and 14)
Food and Kindred Products (20)
Chemicals and Allied Products (28)

Iowa non-grain shippers in our sample also relied on motor carriers to receive many products in the Farm Products (01) and Primary Metal Products (33) commodity groups.

The sample non-grain shippers as a group employ rail and truck about equally for inbound freight. About 48 percent of the sample shippers reported using railroads to receive 50 percent or more of their total inbound freight in 1991. Many of these shipments involve a joint movement by a Class I railroad and a line haul short line. The remaining 52 percent of the sample non-grain shippers said they employ motor carriers to obtain 50 percent or more of their total inbound freight.

Table 6
1991 Inbound Freight Delivered by Motor Carrier to
Shippers on Iowa Line Haul Short Lines*

Farm Products (01)	Corn Oats Soybean Meal Cattle	Wheat Corn Cobs Meat Meal Hogs
Coal and Non-Metallic Minerals (11 & 14)	Coal Sand Granite Soda Ash	Limestone Gravel Quartz
Food and Kindred Products (20)	Wheat Flour Wheat Bran Beer	Wheat Middlings Oat Hulls Animal Feed Ingredients
Lumber and Wood Products (24)	Lumber Doors Wood Chips	Wooden Pallets Mouldings
Pulp, Paper and Allied Products (26)	Paper Bags Pulpboard	Paper Boxes
Chemicals and Allied Products (28)	Salt Anhydrous Ammonia Paint Ethylene Oxide	Water Softener Salt Liquid Fertilizer Ink
Stone, Clay, Glass and Concrete Products (32)	Flat Glass Portland Cement	Glass Windows
Primary Metal Products (33)	Steel Steel Coil Aluminum	Stainless Steel Scrap Steel Metal Alloys
Fabricated Metal Products (34)	Nuts Screws	Bolts
Transportation Equipment (37)	Railroad Car Parts	

* Numbers in parenthesis following the commodity names are Standard Transportation Commodity Code Numbers.

Table 7
1991 Inbound Freight Delivered by Railroad to
Shippers on Iowa Line Haul Short Lines*

Farm Products (01)	Corn Oats	Wheat Corn Cobs
Coal and Non-Metallic Minerals (11 & 14)	Coal Soda Ash Limestone Granite Gravel	Quartz Manganese Ore Quartz Sand
Food and Kindred Products (20)	Wheat Middlings Oat Hulls Farina Soybean Meal Animal Byproduct Animal Feed Ingredients	Wheat Bran Corn Grits Molasses Meat Meal Beer
Lumber and Wood Products (24)	Lumber Mouldings	Doors
Pulp, Paper and Allied Products (26)	Paper Paper Bags	Paper Boxes Pulpboard
Chemicals and Allied Products (28)	Salt Water Softener Salt Phosphoric Acid Zinc Oxide Anhydrous Amonia	Highway De-icer Salt Ethylene Oxide Ferrous Sulfate Magnesium Oxide
Petroleum and Coal Products (29)	Coke	
Stone, Clay, Glass and Concrete Products (32)	Glass Windows	Portland Cement
Primary Metal Products (33)	Coil Steel Metal Alloys	Scrap Steel
Electrical Machinery (36)	Electrical Transformers	
Transportation Equipment (37)	Rail Cars For Repair	

* Numbers in parenthesis following the commodity names are Standard Transportation Commodity Code Numbers.

Tables 8 and 9 display 1991 outbound freight, shipped by motor carrier and railroad, by our sample of Iowa non-grain shippers. An examination of the tables indicates that more outbound commodities are shipped via motor carrier compared to railroad. However, the three major commodity groups of outbound freight are the same for both modes. They are as follows:

Food and Kindred Products (20)
Chemicals and Allied Products (28)
Primary Metal Products (33)

The sample non-grain shippers as a group utilize motor carriers more than railroads for outbound freight shipments. Approximately 71 percent of the sample shippers reported that they used motor carriers to ship 50 percent or more of their total outbound freight in 1991. The corresponding figure for railroads, including joint Class I and short line movements, was only 29 percent.

In summary, the Iowa non-grain shippers utilize short lines and motor carriers in approximately equal proportions for inbound freight but rely more heavily on motor carriers for outbound shipments. This is in contrast to Iowa grain shippers who employ railroads for most of their outbound grain traffic.

Kansas Non-Grain Shippers

Tables 10 and 11 display 1991 inbound freight, shipped by motor carrier and railroad, by a sample of non-grain shippers located on Kansas line haul short lines. An examination of the two tables indicates that the total number of commodities received by railroad and motor carrier is approximately the same. The types of commodities received via the two modes are also similar. The largest number of commodities received by both railroad and motor carrier are in the Chemicals and Allied Products (28) group. The Kansas non-grain shippers also reported receiving several commodities via both modes in the Food and Kindred Products (20) and Coal and Non-Metallic Minerals (11 + 14) commodity groups. Most of the rail shipments are a joint movement by a Class I railroad and a line haul short line. Although the total number and types of inbound commodities received by the two modes are about the same, the amounts received are substantially different. Two-thirds of the sample shippers received 50 percent or more of their 1991 inbound freight by motor carrier. The corresponding figure for railroads is only about one-third, with one shipper receiving most of its inbound freight by pipeline.

Table 8
1991 Outbound Freight Shipped by Motor Carrier by
Shippers on Iowa Line Haul Short Lines*

Coal and Non-Metallic Ores (11 & 14)	Crushed Limestone Aggregates Gravel	Sand Potash
Food and Kindred Products (20)	Flour Wheat Gluten Corn Gluten Corn Germ Cereals Oat Byproducts Beef Animal Byproduct	Wheat Starch Corn Syrup Corn Starch Gluten Meal Oat Flour Pork Pet Food Animal Feed
Lumber and Wood Products (24)	Doors	Mouldings
Pulp, Paper and Allied Products (26)	Corrugated Boxes	Business Forms
Chemicals and Allied Products (28)	Liquid Fertilizer Ethanol	Ferrosilicon Anhydrous Amonia
Stone, Clay, Glass and Concrete Products (32)	Glass Windows	
Primary Metal Products (33)	Steel Flat Steel Sheet and Plate Steel Bars and Angles Brass Coil Scrap Metal	Stainless Steel Pig Iron Aluminum Copper Coil
Non-Electrical Machinery (35)	Farm Machiner	
Electrical Machinery (36)	Household Appliance	

* Numbers in parenthesis following the commodity names are Standard Transportation Commodity Code Numbers.

Table 9
1991 Outbound Freight Shipped via Railroad by
Shippers on Iowa Line Haul Short Lines*

Coal and Non-Metallic Ores (11 and 14)	Sand Gravel Crushed Limestone Aggregate
Food and Kindred Products (20)	Wheat Flour Wheat Starch Wheat Gluten Corn Syrup Corn Starch Corn Gluten Animal Feed Industrial Corn Starch Oat Flour Oat Byproduct Animal Feed Gluten Meal Cereals Molasses Animal Byproduct
Chemicals and Allied Products (28)	Salt Fertilizer Anhydrous Amonia Ferrosilicon Electrode Paste
Primary Metal Products (33)	Steel Bars and Angles Flat Sheet Steel Scrap Steel Pig Iron Cast Iron Scrap
Non-Electrical Machinery (35)	Farm Machinery
Electrical Machinery (36)	Household Appliance
Transportation Equipment (37)	Repaired Railroad Cars

*Numbers in parenthesis following the commodity names are Standard Transportation Commodity Code Numbers.

Table 10
1991 Inbound Freight Delivered by Motor Carrier to
Shippers on Kansas Line Haul Short Lines*

Farm Products (01)	Wheat Corn	Sorghum Soybeans
Coal and Non-Metallic Ores (11 and 14)	Coal Potash Gypsum	Soda Ash Sand Flux
Food and Kindred Products (20)	Vegetable Oils Sunflower Meal Molasses Animal Byproducts	Soybean Meal Wheat Middlings Grain Mill Byproducts
Lumber and Wood Products (24)	Lumber	Wooden Pallets
Pulp, Paper and Allied Products (26)	Packaging Material	
Chemicals and Allied Products (28)	Refrigerant Gas Phenol Solvents Polyvinylchloride Resin Plastic Resin Silicon Carbide Briquettes Nitrogen Fertilizer Solution	Methanol Trichlorethylene Plating Chemicals Polyethylene Alapatch Acid Liquid Urea
Petroleum and Coal Products (29)	Petroleum Products	Coke
Rubber and Plastic Products (30)	Tires	Tubing
Stone, Clay, Glass and Concrete Products (33)	Cement	
Primary Metal Products (33)	Steel Coil Steel	Scrap Metal
Fabricated Metal Products (34)	Ball Bearings Disc Blades Nuts	Hydraulic Cylinders Wheels Bolts
Electrical Machinery (36)	Electric Motor Parts	
Hazardous Waste	Electric Transformer Oil	

* Numbers in parenthesis following the commodity names are Standard Transportation Commodity Code Numbers.

Table 11
1991 Inbound Freight Delivered by Railroad to
Shippers on Kansas Line Haul Short Lines*

Farm Products (01)	Wheat	Soybeans
Non-Metallic Minerals (14)	Limestone Gypsum Potash Phosphate	Talc Sand Soda Ash
Food and Kindred Products (20)	Vegetable Oil Soybean Meal Wheat Middlings Animal Byproducts	Molasses Sunflower Meal Grain Mill Byproducts
Lumber and Wood Products (24)	Sawdust	
Pulp, Paper and Allied Products (26)	Paper	
Chemicals and Allied Products (28)	Phosphoric Acid Hydrofluoric Acid Phenol Trichlorethylene Polyvinylchloride Resin Liquified Petroleum Gas Plating Chemicals	Alcohol Methanol Nitrogen Fertilizer Solution Polyethylene Plastic Resin Solvents Anhydrous Amonia
Petroleum Products (29)	Asphalt Coke	Petroleum Products
Rubber and Plastic Products (30)	Plastic Food Trays	
Stone, Clay, Glass and Concrete Products (32)	Cement	
Primary Metal Products (33)	Steel Scrap Metal	Silvery Pig Iron
Fabricated Metal Products (34)	Nuts	Bolts
Hazardous Waste	Electric Transformer Oil	

* Numbers in parenthesis following the commodity names are Standard Transportation Commodity Code Numbers.

Tables 12 and 13 contain 1991 outbound freight, shipped by motor carrier and railroad, by our sample of Kansas non-grain shippers. An examination of the tables indicates that more outbound commodities are shipped via motor carrier than railroad. However, the three major commodity groups of outbound freight are the same for both modes. They are as follows:

Chemicals and Allied Products (28)
Petroleum and Coal Products (29)
Food and Kindred Products (20)

The sample non-grain shippers as a group ship much more outbound freight by truck than railroad. In 1991, 70 percent of the sample shippers reported that they used motor carriers to ship 50 percent or more of their total outbound freight. The corresponding figure for railroads, including joint Class I and short line movements, was only 25 percent. The remaining five percent of the Kansas non-grain shippers used pipeline for the majority of their outbound shipments.

In summary, Kansas non-grain shippers located on our sample short lines used motor carriers much more than railroads for both inbound and outbound freight in 1991. Thus, Kansas short lines have the minority market share for all four types of traffic analyzed in this study--outbound grain, inbound fertilizer, inbound non-grain commodities, and outbound non-grain commodities.

Modal Choice Determinants

The above discussion reveals the 1991 transportation choices of a sample of Iowa and Kansas shippers located on line haul short lines. We now turn our attention to the determinants of these choices. In the questionnaires completed by each shipper, they were asked to rank eight modal choice determinants, where 1.0 is the rank assigned to the determinant they considered the most important in their modal selection, rank 2.0 is next in importance, etc. The determinants selected for the questionnaire are those identified as significant by the freight mode choice literature. They are as follows:

The transportation rate
Ability to ship to many markets (market access)
Amount of time required to deliver my freight from origin to destination
Predictability of the time it takes to ship my freight to destination
The amount of weekly service provided by the carrier
Lost or damaged goods
Shipment tracing capability
Billing procedures

Table 12
1991 Outbound Freight Shipped by Motor Carrier by
Shippers on Kansas Line Haul Short Lines*

Non-Metallic Minerals (14)	Stone
Food and Kindred Products (20)	Flour, Soybean Meal, Soybean Oil, Refined Molasses, Boxed Beef, Animal Feed
Lumber and Wood Products (24)	Wooden Pallets, Livestock Bedding, Kitty Litter
Pulp, Paper and Allied Products (26)	Industrial Paper Bags
Chemicals and Allied Products (28)	Packaged Salt, Bulk Salt, Liquified Petroleum Gas, Refrigerant Gas, Carbon Tetrachloride, Chloroform, Methylchloride, Methylene Chloride, Hydrogen Chloride, Sodium Hydroxide, Perchloroethylene, Chlorine, Fertilizer, Anhydrous Amonia
Petroleum Products (29)	Butane, Isobutane, Propane, Gasoline, Asphalt Roofing Material
Rubber and Plastic Products (30)	Plastic Pipe, Plastic Trash Bags, Plastic Food Trays
Stone, Clay, Glass and Concrete Products (32)	Cement
Primary Metal Products (33)	Scrap Metal
Fabricated Metal Products (34)	Metal Castings, Mechanical Hand Tools
Non-Electrical Machinery (35)	Solid Waste Handling Equipment, Boiler Equipment, Grain Drying Equipment, No Till Grain Drills
Electrical Machinery (36)	Electric Motors
Hazardous Waste	Electric Transformer Oil

* Numbers in parenthesis following the commodity names are Standard Transportation Commodity Code Numbers.

Table 13
1991 Outbound Freight Shipped via Railroad by
Shippers on Kansas Line Haul Short Lines*

Non-Metallic Minerals (14)	Stone
Food and Kindred Products (20)	Flour Soybean Oil Soybean Meal Boxed Beef
Lumber and Wood Products (24)	Sawdust
Chemicals and Allied Products (28)	Packaged Salt Liquified Petroleum Gas Carbon Tetrachloride Chlorine Hydrogen Chloride Perchloroethylene Bulk Salt Refrigerant Gas Chloroform Methylene Chloride Sodium Hydroxide
Petroleum Products (29)	Butane Propane Asphalt Roofing Material Isobutane Gasoline
Rubber and Plastic Products (30)	Plastic Food Trays
Stone, Clay, Glass and Concrete Products (32)	Cement
Primary Metal Products (33)	Scrap Metal
Non-Electrical Machinery (35)	Boiler Equipment
Hazardous Waste	

* Numbers in parenthesis following the commodity names are Standard Transportation Commodity Code Numbers.

Table 14
Ranking of Modal Choice Determinants of Grain and Non-Grain Shippers

Modal Choice Determinant	Grain Shipper Mean Rank	Non-Grain Shipper Mean Rank	t statistic	
			Value	Prob.
Transportation Rate	1.5	2.0	2.96	.003
Market Access	2.5	4.1	5.37	.000
Delivery Time	4.1	2.9	5.93	.000
Dependability of Delivery Time	4.6	3.6	4.36	.000
Weekly Service	3.9	4.6	2.95	.003
Lost or Damaged Goods	6.3	5.8	1.97	.051
Shipment Tracing	6.8	5.9	5.15	.000
Billing Procedures	6.1	6.8	3.23	.001

Table 15
Ranking of Modal Choice Determinants of Iowa and Kansas Shippers

Modal Choice Determinant	Iowa Shipper Mean Rank	Kansas Shipper Mean Rank	t statistic	
			Value	Prob.
Transportation Rate	1.7	1.6	0.73	.466
Market Access	3.1	3.2	0.42	.677
Delivery Time	3.4	3.9	2.22	.027
Predictability of Delivery Time	4.0	4.4	1.46	.147
Weekly Service	4.3	4.0	1.33	.185
Lost or Damaged Goods	6.0	6.2	1.20	.230
Shipment Tracing	6.6	6.4	0.93	.352
Billing Procedures	6.8	6.0	3.71	.000

For purposes of comparison, the shippers in the sample are separated by type (grain vs. non-grain) and location (Iowa vs. Kansas). Table 14 contains the mean rankings of modal choice determinants by the grain and non-grain shippers. Both groups ranked the transportation rate as the most important determinant in their modal selection. However, other than this, there is little agreement on the relative rankings of the other mode choice determinants. The grain shippers ranked market access and weekly service as the second and third most important determinants, whereas the non-grain shippers selected delivery time and dependability of delivery time.

Table 14 also contains *t* statistics for the mode choice determinants. The *t* statistics determine if there is a statistically significant difference in the mean rank assigned to each determinant by the two groups of shippers. As indicated in Table 14, the *t* statistics reveal a statistically significant difference (at the .000 probability level) in the mean rankings of all the mode choice determinants, except Lost or Damaged Goods which is statistically significant at the .051 probability level. Thus, it is clear that grain and non-grain shippers place emphasis on different price-service factors in making modal selections.

Table 15 contains the mean rankings of modal choice determinants by the Iowa and Kansas shippers. Both groups of shippers selected the transportation rate as the most important modal choice determinant. The second and third highest ranked determinants by both shipper groups are market access and delivery time. An examination of the *t* statistics in Table 15 indicate a statistically significant difference (at the .05 level or more) in mean rank for only two of the eight mode choice determinants--Delivery Time and Billing Procedures. Thus, there is relatively little difference in the emphasis placed on various mode choice determinants by sample shippers in Iowa and Kansas.

Summary

The principal findings of this chapter can be summarized as follows:

1. Sample Iowa grain shippers rely heavily on their short lines to ship grain and receive fertilizer. In 1991, 84.2 percent of the corn, 58 percent of the soybeans, and 53.5 percent of the fertilizer was shipped via rail by sample Iowa grain shippers.

2. Sample Kansas grain shippers employ motor carriers more than short lines for outbound grain shipment and inbound fertilizer receipts. In 1991, motor carriers accounted for 52.6 percent of the wheat shipments, 86.9 percent of the corn shipments, and 58.1 percent of the soybean shipments. Sorghum is the only grain for which the sample shippers used railroads more than motor carriers. For the four grains combined, railroads account for 45.6 percent of the

shipments and trucks 54.4 percent. Sample Kansas grain shippers received 75 percent of their fertilizer deliveries by motor carrier.

3. The sample Iowa non-grain shippers as a group employed railroads and motor carriers about equally for inbound freight in 1991. However, they utilized motor carriers much more than railroads for outbound freight shipments.

4. Although the total number and types of inbound commodities received by Kansas non-grain shippers via railroad and motor carrier are similar, the amounts received are substantially different. Two-thirds of the sample shippers received 50 percent or more of their total 1991 inbound freight by motor carrier.

5. The sample Kansas non-grain shippers as a group ship much more outbound freight by truck than railroad. In 1991, 70 percent of the sample shippers reported that they used motor carriers to ship 50 percent or more of their total outbound freight.

6. Kansas short lines have the minority market share for all four types of traffic analyzed in this study.

7. Both grain and non-grain shippers ranked the transportation rate as the most important determinant in their choice of transportation mode. However, the grain shippers ranked market access and weekly service as the second and third most important determinants, whereas the non-grain shippers selected delivery time and dependability of delivery time.

8. Statistical analysis reveals that grain and non-grain shippers place emphasis on different price-service factors in making modal selections.

9. When the sample is divided between Iowa and Kansas shippers, both groups selected the same top three modal choice determinants--the transportation rate, market access, and delivery time.

10. According to statistical analysis, there is relatively little difference in the emphasis placed on various mode choice determinants by sample shippers in Iowa and Kansas.

CHAPTER 4

IOWA AND KANSAS SHORT LINE RAILROADS

In this section of the report, we discuss the short lines railroads analyzed in our study. The sample includes 12 line haul short lines headquartered in the states of Iowa and Kansas. Executives of these railroads were interviewed by a member of the research team and the executives also completed detailed questionnaires. In this chapter, we discuss the general characteristics of the sample short lines including employment, mileage, previous Class I railroad owners, year of creation, connections to other railroads, and government assistance. Also included are discussions of the railroads' traffic characteristics, equipment, and financial performance.

General Description of Iowa Short Lines

Table 16 displays some of the general characteristics of the Iowa sample short lines. The largest railroad in the Iowa sample is the Chicago, Central & Pacific (CCP). The CCP has 465 employees and a 780 mile system. The main line terminates in the west at Sioux City, Iowa; transits the Mississippi River at Dubuque, Iowa, and terminates in the east at Chicago. There is also a large branch extending from Ft. Dodge, Iowa, to Omaha/Council Bluffs. The CCP system was purchased from Illinois Central for $75 million and the railroad began operations on December 24, 1985. The CCP has connections to nine different railroads at nine locations in Iowa and connections to 24 different railroads (including numerous switching railroads) at eight locations in Illinois. It also has a connection to the Burlington Northern (BN) in Omaha, Nebraska. The CCP has received financial assistance from the federal government and the state of Iowa.

The other regional railroad in the Iowa sample is the Iowa Interstate Railroad (IAIS) which has 190 employees and a 567 mile system. Its main line extends from Omaha on the west, across central Iowa to the Quad Cities on the Mississippi River, and terminates in Chicago. The IAIS operates over the tracks of the CSX Railroad from Bureau, Illinois, to Chicago under a trackage rights agreement. The IAIS operates four branchlines in Iowa that run from Hancock to Oakland (five miles), Atlantic to Audubon (24 miles), Pella to Altoona (36 miles), and Milan to Rock Island, Illinois (11 miles). It also operates a branchline from Bureau, Illinois, to Peoria, Illinois (46 miles). The IAIS system was purchased from the bankrupt Rock Island Railroad in October 1984 for $31 million by Heartland Rail Corporation, a shipper owned company. The Iowa Interstate Railroad operates the railroad and is 80

Table 16
Iowa Short Line Railroads

Short Line Railroad	Former Class I Railroad	Employment	Mileage	First Year of Operation
Chicago, Central & Pacific Railroad	Illinois Central	465	780	1985
Iowa Interstate Railroad, Ltd.	Rock Island	190	567	1984
Iowa Northern Railway Co.	Rock Island	38	143	1984
Cedar Rapids & Iowa City Railway	None	76	52	1904
Keokuk Junction Railway	Santa Fe	21	127*	1981
Cedar River Railroad**		8	124	1992

* 90 miles consists of trackage rights on the Toledo, Peoria & Western Railway from La Harpe, Illinois, to Peoria, Illinois.

** The Cedar River Railroad was formerly the Cedar Valley Railroad. In 1991, the Cedar River Railroad was acquired by the Chicago, Central & Pacific Railroad.

percent owned by Heartland, whose two largest shareholders are Maytag Corporation and Iowa Power and Light. The IAIS has connections to six railroads in Omaha/Council Bluffs, and to six railroads among three other Iowa locations (Davenport, Des Moines, and Iowa City). It also has connections to 15 different railroads (several of which are switching railroads) among five Illinois locations. Heartland Rail Corporation and IAIS have received financial assistance from the states of Iowa and Illinois as well as the federal government.

The Iowa Northern Railway (IANR) has 38 employees and operates a 143 mile system, consisting of a main line from Cedar Rapids to Manly, Iowa, and a branchline from Vinton to Dysart, Iowa. The system was purchased from the bankrupt Rock Island Railroad in July 1984 for $5.4 million. The IANR operates the railroad for INRC, Inc., a company owned by the grain elevators on the line. The IANR has connections to three railroads in Cedar Rapids, one each in Manly and Nora Springs, and two in Waterloo. The railroad received financial assistance from the state of Iowa and the federal government.

The Cedar Rapids & Iowa City Railway (CRANDIC) has 76 employees and began operating its 52 mile system in 1904. The system consists of a 31 mile branchline from Cedar Rapids to Hills, Iowa, and a 21 mile branch from Cedar Rapids to Middle Amana, Iowa. The CRANDIC has direct connections to CCP, IANR and Chicago and Northwestern (CNW) at Cedar Rapids, and IAIS at Iowa City. It also has an operating agreement that provides access to all IAIS connections.

The Keokuk Junction Railway (KJR) has 21 employees and operates a 28 mile line from Keokuk, Iowa, to La Harpe, Illinois, and a five mile line from Hamilton, Illinois, to Warsaw, Illinois. It acquired these lines from the Santa Fe Railroad and began operations in September 1981. KJR also has trackage rights on the Toledo, Peoria and Western Railway (TPW) from La Harpe, Illinois, to Peoria, Illinois. KJR has direct connections to the Burlington Northern Railroad (BN) in Keokuk, to CNW in Sommer, Illinois, and the TPW in La Harpe. It has indirect connections to nine railroads in the Peoria area. The railroad has received financial assistance from the state of Illinois.

The Cedar River Railroad has eight employees and operates a 124 mile system extending north from Waterloo, Iowa, to Glenville, Minnesota. The Cedar River Railroad (CRR) has connections to the CCP in Waterloo and to the Soo Line Railroad (Soo) in Charles City, Iowa. In Minnesota, CRR has connections to the Soo in Lyle and to the CNW in Glenville. The CRR was formerly the Cedar Valley Railroad which ceased operation in May 1991. The CCP acquired the newly organized CRR in December 1991. The CCP received a loan from the state of Iowa to finance the purchase of CRR.

General Description of Kansas Short Lines

Table 17 contains some of the general characteristics of the Kansas sample short lines. The largest railroad in the Kansas sample is the Kyle Railroad, which has 108 employees and operates a 778 mile system. It has 683 miles of line in Kansas which generally parallel the northwest and north central border of Kansas, as well as 95 miles of line from the Kansas western border to Limon, Colorado. The Kyle operates 320 miles of its system in Kansas under a lease-purchase agreement with the Mid-States Port Authority (MSPA). The MSPA was created by state statute in April 1980 to provide rail service to shippers located in the northwest and north central Kansas counties affected by the Rock Island Railroad bankruptcy. The Kyle began operating these lines in February 1982 under a 25 year lease with an option to buy the lines for $1 at the expiration of the lease. This part of the Kyle runs from Clay Center, Kansas, in the east to the Kansas-Colorado border.

In June 1991, the Kyle began leasing 347 miles in Kansas from the Union Pacific System. These lines are located just south of the MSPA lines and consist of the following branches:

Frankfort to Stockton	172 miles
Downs to Lenora	85 miles
Jamestown to Burr Oak	33 miles
Beloit to Solomon	57 miles

The Kyle also owns 16 miles of track in Kansas which it purchased from Missouri Pacific Railroad.

Table 17
Kansas Short Line Railroads

Short Line Railroad	Former Class I Railroad	Employment	Mileage	First Year of Operation
Kyle Railroad	Rock Island	108	778	1982*
Kansas Southwestern Railway	Union Pacific System	29	302	1991
South Kansas & Oklahoma Railroad	Santa Fe	24	286	1990
Southeast Kansas Railroad Co.	Union Pacific System	25	140	1987
Northeast Kansas & Missouri	Union Pacific System	7	113	1990
Garden City Western Railway	Santa Fe	4	45	1916**

* Kyle Railroad began operating former Rock Island Railroad lines in 1982 under lease from the Mid States Port Authority. In 1991, it began leasing 347 miles from Union Pacific System.

** The Garden City Western Railway began in 1916 and purchased the Garden City Northern from Santa Fe Railroad in 1989.

In Kansas, the Kyle has connections to the Union Pacific System at Colby and Salina; to the Santa Fe at Courtland, Osborne, and Concordia; and to the Burlington Northern at Norton. In Colorado, it connects with the Union Pacific system at Limon.

The lines operated by the Kyle for MSPA were purchased and rehabilitated with an $18 million loan to MSPA from the Federal Railroad Administration (FRA) and guaranteed by the state of Kansas. The MSPA also issued $1 million in revenue bonds and it obtained federal funds under the Local Rail Service Assistance (LRSA) program for track improvement and rehabilitation.

The Kansas Southwestern Railway (KSW) has 29 employees and began operating its 302 mile system in April 1991 under a lease agreement with the Union Pacific System. The KSW is composed of the following Kansas branches.

Hutchinson to Wichita	47 miles
Wichita to Hardtner	96 miles
Conway Springs to Radium	97 miles
Olcott to Iuka	20 miles
Sterling to Geneseo	23 miles
Hutchinson to Sterling (trackage rights)	19 miles

The KSW has connections to the Union Pacific System in Geneseo and Wichita, Kansas. It connects with the Santa Fe in Hutchinson and Wichita and to the Southern Pacific in Hutchinson. KSW can connect to the Burlington Northern via the Union Pacific System in Wichita.

The South Kansas and Oklahoma Railroad has 24 employees and operates a 286 mile system in Kansas and Oklahoma. SKO began operations in December 1990 on tracks purchased from the Santa Fe. The SKO system consists of the following branches:

Coffeyville, Kansas to Iola, Kansas	63 miles
Chanute, Kansas to Wellington, Kansas	120 miles
Cherryvale, Kansas to Tulsa and Catoosa, Oklahoma	103 miles

The SKO has connections to the Santa Fe at Wellington and Winfield, Kansas, and Tulsa, Oklahoma. It has connections with the Union Pacific System at Coffeyville, Fredonia, and Winfield, Kansas, as well as Tulsa, Oklahoma. SKO connects with the Burlington Northern in Fredonia, Kansas, and Tulsa, Oklahoma.

The SKO received no state or federal financial assistance in acquiring its system.

The Southeast Kansas Railroad Company (SEK) has 25 employees and operates a 140 mile system in Kansas, Missouri, and Oklahoma. It acquired its tracks from the Union Pacific System and began operations in April 1987. The SEK system consists of the following branches:

Dewey, Oklahoma to Nevada, Missouri	105 miles
Tulsa, Oklahoma to Barnsdall, Oklahoma	35 miles

The SEK has connections to the Union Pacific System at Chetopa and Coffeyville, Kansas, as well as Nevada, Missouri. It connects with Kansas City Southern Railroad (KCS) at Pittsburg, Kansas, and Burlington Northern (BN) at Cherokee, Kansas. The SEK also connects with SKO in Coffeyville, Kansas.

The SEK received no state or federal financial assistance in acquiring its system.

The Northeast Kansas and Missouri (NEKM) is a division of Mid-Michigan, a subsidiary of Rail Tex Inc. of San Antonio, Texas. The NEKM has seven employees and operates a 113 mile system that extends from St. Joseph, Missouri, on the eastern end to Upland, Kansas, on the western side. Five of the 113 miles are trackage rights from Upland to Marysville, Kansas. The NEKM began operations on February 26, 1990 on tracks leased from the Union Pacific System. It has connections with the Union Pacific System at Marysville and Hiawatha, Kansas, as well as St. Joseph, Missouri. NEKM connects with the Burlington Northern and Santa Fe via the Union Pacific System at St. Joseph. The NEKM received federal financial assistance for track rehabilitation through the LRSA program.

The Garden City Western Railway (GCW) has four employees and operates a 45 mile system that consists of the following two branches.

Garden City, Kansas to Wolf, Kansas	14 miles
Garden City, Kansas to Shallow Water, Kansas	31 miles

The western segment of GCW from Garden City to Wolf was founded in 1916. The northern segment, formerly known as the Garden City Northern, was acquired from the Santa Fe in 1989. In May 1991, the ICC approved the merger of the Garden City Northern with the Garden City Western, effective September 1, 1991. The merged railroad is owned by the Garden City Cooperative. The GCW has a connection with Santa Fe in Garden City, Kansas. It received some financial assistance from the state of Kansas for track rehabilitation.

Iowa Short Line Traffic Characteristics

Table 18 contains the percentage distributions of 1991 carloadings of Iowa sample short lines by type of traffic. To preserve confidentiality, the railroads are identified alphabetically (A through F). The ordering of the Iowa railroads in Table 18 is different from Table 16. An examination of Table 18 reveals wide variation in the traffic of sample Iowa short lines. Railroads A, C, and D have relatively high percentages of local traffic while railroads B and F have none. A reasonable percentage of local traffic can be beneficial since it allows a railroad to have better control of its equipment, higher utilization of equipment, and frequent, faster service for its shippers.

Railroads A, D, and F have relatively low percentages of received traffic compared to Railroads B, C, and E. The percentage of forwarded traffic ranges from a low of 2 percent for Railroad A to a high of 93 percent for Railroad F. All the sample Iowa short lines have relatively low percentages of bridged traffic except Railroad A. A low percentage of bridged traffic may mean that the railroad doesn't have friendly connections to other railroads or that other railroads are employing routes that do not include the short line.

There are also wide variations in the ratio of local and forwarded traffic to received traffic as indicated below.

Railroad A	8.0	Railroad D	10.6
Railroad B	1.0	Railroad E	1.8
Railroad C	2.1	Railroad F	15.2

Railroads B, C, and E have low ratios compared to the other railroads. In general, balance between inbound and outbound traffic (as indicated by a low ratio) is beneficial since it tends to reduce costs per carload.

Table 18
1991 Carloadings of Iowa Short Lines
Percent Distribution by Type of Traffic

Railroad	Percent, Local Traffic	Percent, Fowarded Traffic	Percent, Received Traffic	Percent, Bridged Traffic
A	55	2	7	36
B	0	50	48	2
C	45	15	28	13
D	43	31	7	4
E	14	50	36	0
F	0	93	6	1

Local Traffic: Carloads originated and terminated on the railroad's system
Forwarded Traffic: Carloads originated on the railroad's system and forwarded to another carrier
Received Traffic: Carloads received from another carrier and terminated on the railroad's system
Bridged Traffic: Traffic received from another carrier and forwarded to another carrier

Another factor with an important impact on costs is traffic density as measured by carloads per net mile of road (all miles in the railroad's system except trackage rights). The 1991 traffic densities for the Iowa sample short lines are as follows:

Railroad A	67.2	Railroad D	113.8
Railroad B	321.1	Railroad E	140.6
Railroad C	129.2	Railroad F	56.3

As the data indicate, Railroads A and F have traffic densities that are substantially less than 100 carloads per net mile of road. Railroads C, D, and E have densities in the 114-140 range while Railroad B's density is substantially larger than the other sample Iowa short lines.

Table 19 displays the percentages of total 1991 carloadings of Iowa short lines accounted for by the top three commodity groups. As the data indicate, the top three commodity groups account for at least 70 percent of total 1991 carloadings for each of the sample railroads except Railroad D. Grain is the most important commodity for four of the six railroads. Food and Kindred Products (20) is among the top three commodity groups for four of the six railroads. Other important commodities for the sample short lines include the following:

Coal (11)	Chemicals and Allied Products (28)
Non-Electrical Machinery (35)	Electrical Machinery (36)
Transportation Equipment (37)	TOFC/COFC (includes many types of manufactured goods)
Hazardous Waste (48)	

Table 19
1991 Percentages of Total Carloadings Accounted for by
the Top Three Commodities
Iowa Short Line Railroads

Railroad A	Grain (01)	56
	Chemicals and Allied Products (28)	16
	Non-Electrical Machinery (35)	11
	Top 3 Commodities	83
Railroad B	Coal (11)	39
	Food and Kindred Products (20)	35
	Hazardous Materials (48)	13
	Top 3 Commodities	87
Railroad C	Grain (01)	32
	Coal (11)	28
	Food and Kindred Products (20)	11
	Top 3 Commodities	71
Railroad D	Grain (01)	18
	TOFC/COFC	10
	Electrical Machinery (36)	9
	Top 3 Commodities	37
Railroad E	Food and Kindred Products (20)	35
	Grain (01)	33
	Transportation Equipment (37)	12
	Top 3 Commodities	80
Railroad F	Grain (01)	92
	Chemicals and Allied Products (28)	3
	Food and Kindred Products (20)	2
	Top 3 Commodities	97

Numbers in parentheses following commodity names are Standard Transportation Commodity Code (STCC) numbers.

Kansas Short Line Traffic Characteristics

Table 20 displays the percentage distributions of 1991 carloadings of Kansas sample short lines by type of traffic. To preserve confidentiality, the railroads are identified alphabetically (A through F). The ordering of the Kansas railroads in Table 20 is different from Table 17. The railroads in the Kansas sample are more homogeneous than the Iowa short lines with respect to type of traffic. Perhaps the most notable aspect is the absence of local traffic on the Kansas short lines. Three of them have no local traffic and the other three have only minimal amounts. With the exception of Railroad D, the percentages of bridged traffic are also quite small (zero to 7 percent). With the exception of Railroad B, the majority of the traffic on the Kansas short lines is forwarded traffic (66 to 81 percent) with most of the remainder being received traffic.

The above traffic pattern is reflected in the ratios of local and forwarded traffic to received traffic as indicated below.

Railroad A	4.6	Railroad D	20.4
Railroad B	0.9	Railroad E	3.2
Railroad C	3.0	Railroad F	2.8

Railroad B has the best balance of inbound and outbound movements with a ratio of 0.9. The ratios of Railroads A, C, E, and F cluster between 2.8 and 4.6. The ratio for Railroad D is artificially high since it has a very low percent of received traffic but a comparatively high percent of bridged traffic.

Table 20
1991 Carloadings of Kansas Short Lines
Percent Distribution by Type of Traffic

Railroad	Percent, Local Traffic	Percent, Fowarded Traffic	Percent, Received Traffic	Percent, Bridged Traffic
A	0	81	18	1
B	0	46	54	0
C	2	68	23	7
D	0	66	3	30
E	1	75	24	0
F	2	70	25	3

Local Traffic: Carloads originated and terminated on the railroad's system
Forwarded Traffic: Carloads originated on the railroad's system and forwarded to another carrier
Received Traffic: Carloads received from another carrier and terminated on the railroad's system
Bridged Traffic: Traffic received from another carrier and forwarded to another carrier

The traffic densities (carloads per net mile of road) of the Kansas sample short lines for 1991 are as follows:

Railroad A	53.6	Railroad D	36.4
Railroad B	66.9	Railroad E	24.3
Railroad C	83.2	Railroad F	53.1

The traffic densities are low compared to the sample Iowa short lines. As the above data indicate, none of the Kansas short lines has a traffic density figure above 100 carloads per net mile of road. In contrast, four of the six Iowa railroads have densities above 100 carloads.

Table 21 contains the percentages of total 1991 carloadings of Kansas short lines accounted for by the top three commodity groups. The top three commodities account for over 90 percent of the total carloadings of Railroads B, C, and E, and 61 to 66 percent for Railroads A, D, and F. The percentage for Railroad D is actually higher than 61 percent but the lack of detail on carloadings by commodity precluded calculation of the percentage.

Grain (01) is the most important commodity on three of the six railroads and is ranked second on a fourth short line. Petroleum Products (29) is ranked among the top three commodities on four of the six short lines. Other important products include the following:

Coal (11)
Food and Kindred Products (20)
Stone, Clay, Glass and Concrete Products (32)
Non-Metallic Minerals (14)
Chemicals and Allied Products (28)
Primary Metal Products (33)

Iowa Short Line Equipment

Table 22 displays the 1991 locomotives and rail cars of sample Iowa short lines. As the data in the table indicate, with the exception of the Iowa Interstate Railroad (IAIS), Iowa short lines own most of their locomotives. For the group as a whole, 73 percent of the 156 locomotives are owned by the short lines, and 27 percent are leased. In contrast, most of the nearly 3,200 rail cars are leased, with the Chicago, Central & Pacific Railroad (CCP) accounting for 2,000 of the total. For the group as a whole, 82 percent of the rail cars are leased and 18 percent are owned with the CCP accounting for most of them.

The questionnaire completed by the short lines contained the question, "how dependent are you on connecting Class I railroads for locomotives?" All of the sample short lines replied that they are not dependent on Class I railroads for locomotives. The short lines were asked the same question with respect to rail cars. One of the railroads stated that it is very dependent on Class I railroads for rail cars

and three short lines said they are somewhat dependent. Only one short line said it was not dependent on Class I railroads for rail cars. The sample railroads were asked if they have trouble obtaining the equipment they need during peak demand periods such as grain harvest. One of the railroads replied "all of the time" and another said "some of the time." The other sample short lines replied "none of the time."

Table 21
1991 Percentages of Total Carloadings Accounted for by
the Top Three Commodities
Kansas Short Line Railroads

Railroad A	Coal (11)	35
	Primary Metal Products (33)	16
	Petroleum Products (29)	15
	Top 3 Commodities	66
Railroad B	Food and Kindred Products (20)	40
	Grain (01)	32
	Chemicals and Allied Products (28)	28
	Top 3 Commodities	100
Railroad C	Grain (01)	48
	Chemicals and Allied Products (28)	41
	Petroleum Products (29)	4
	Top 3 Commodities	93
Railroad D	Grain (01)	61
	No available data for other commodities	
Railroad E	Grain (01)	72
	Stone, Clay, Glass and Concrete Products (32)	12
	Petroleum Products (29)	9
	Top 3 Commodities	93
Railroad F	Non-Metallic Minerals (14)	29
	Food and Kindred Products (20)	24
	Petroleum Products (29)	11
	Top 3 Commodities	64

Numbers in parentheses following commodity names are Standard Transportation Commodity Code numbers.

Table 22
Locomotives and Rail Cars of Iowa Short Line Railroads
1991

	Locomotives		Rail Cars	
Chicago Central and Pacific Railroad	Owned Leased Total	90 5 95	Owned Leased Total	500 2,000 2,500
Iowa Interstate Railroad	Owned Leased Total	1 35 36	Owned Leased Total	24 297 321
Iowa Northern Railway	Owned Leased Total	6 1 7	Owned Leased Total	0 62 62
Cedar Rapids & Iowa City Railway	Owned Leased Total	13 0 13	Owned Leased Total	65 165 230
Keokuk Junction Railway	Owned Leased Total	4 1 5	Owned Leased Total	2 84 86
All Six Short Lines	Owned Leased Total	114 42 156	Owned Leased Total	591 2,608 3,199

Kansas Short Line Equipment

Table 23 displays the 1991 number of locomotives and rail cars of sample Kansas short lines. The table indicates that the railroads own most of their locomotives. Only the Kansas Southwestern Railway (KSW) and the South Kansas & Oklahoma Railroad (SKO) lease locomotives and the KSW leases power only during grain harvests. The six railroads combined own 54 of their 62 (87 percent) locomotives. However, the situation with respect to rail cars is exactly the opposite as nearly all the cars are leased. The six railroads combined own only 26 rail cars and 24 of those are owned by the Kyle Railroad. The SKO and the SEK own one ar each and the other three sample short lines own no rail cars. All of the leased cars are leased by only two of the six short lines, the Kyle Railroad and the Northeast Kansas & Missouri Railroad (NEKM). Thus the KSW and the Garden City Western Railway (GCW) do not own or lease any rail cars, while the SKO and SEK own one rail car each and lease no cars. These four railroads are totally dependent on Class I railroads for rail cars. The six railroads

Table 23
Locomotives and Rail Cars of Kansas Short Line Railroads
1991

	Locomotives		Rail Cars	
Kyle Railroad	Owned Leased Total	28 0 28	Owned Leased Total	24 465 489
Kansas Southwestern Railway	Owned Leased (during grain harvests) Total	7 4 11	Owned Leased Total	0 0 0
South Kansas & Oklahoma Railroad	Owned Leased Total	7 4 11	Owned Leased Total	1 0 1
Southeast Kansas Railroad	Owned Leased Total	7 0 7	Owned Leased Total	1 0 1
Northeast Kansas & Missouri Railroad	Owned Leased Total	2 0 2	Owned Leased Total	0 107 107
Garden City Western Railway	Owned Leased Total	3 0 3	Owned Leased Total	0 0 0
All Six Short Lines	Owned Leased Total	54 8 62	Owned Leased Total	26 572 598

combined leased 572 of their 598 (96 percent) rail cars. Thus, as in Iowa, Kansas sample short lines own most of their locomotives but lease most of their rail cars.

The sample Kansas short lines were asked the question "how dependent are you on connecting Class I railroads for locomotives?" All six replied that they are not dependent. However, four of the six short lines said they are very dependent on connecting Class I railroads for rail cars and the other two railroads declared that they are somewhat dependent. The short lines were also asked the question, "do you have trouble obtaining the equipment you need during peak demand periods such as grain harvest?" Four of the six railroads checked the response "all of the time" and the other two short lines indicated "some of the time."

Thus, neither the short lines in Kansas or Iowa are dependent on Class I railroads for locomotives, but do depend on them for rail cars. The sample short lines in Kansas appear to have more difficulty than Iowa short lines in obtaining rail cars during peak periods.

Financial Performance of Iowa Short Line Railroads

Table 24 contains net income from continuing operations of sample Iowa short lines during the 1986-1991 interval. The data in the table indicates wide variation in the financial performance of Iowa short lines. Three of the railroads (B, C, and E) have consistently positive net income and three (A, D, and F) have consistently negative results. Railroads B and E earned positive net income in all six years of the sample period, although Railroad B's average net income per year of $3.16 million is much larger than Railroad E's average of $66.7 thousand. Railroad C has positive net income in four of the six years and achieved an average net income per year of $283 thousand. None of the other three railroads earned positive net income in more than one year of the six year period. Although Railroads A and F accumulated negative net income during the period of $3.9 million and $1.25 million respectively, these figures were modest compared to Railroad D's nearly $15 million of negative net income.

Financial Performance of Kansas Short Line Railroads

Table 25 displays net income from continuing operations of sample Kansas short lines for various years between 1985 and 1991. There is less financial data for Kansas short lines because several of them have only recently begun operations. Also there is no consistent source of publicly available financial information for Kansas short lines. Of the five railroads for which some financial information is available, four had positive net income in every year of the sample data. The average net income per year of these railroads is as follows:

Railroad A	$259.7 thousand
Railroad B	$51.1 thousand
Railroad C	$373.1 thousand
Railroad E	$1 million

As the above data indicate, average annual net income varies from $51.1 thousand to $1 million. Railroad D is the only sample short line with negative net income, which averaged -$148.2 thousand. However, the second year loss was 44 percent less than the first year loss.

Table 24
Net Income From Continuing Operations
Iowa Short Line Railroads
1986-1991

Railroad	Number of Years Net Income is Positive	Number of Years Net Income is Negative	Accumulated Positive or Negative Net Income
A	1	5	-$3.9 million
B	6	0	$19.0 million
C	4	2	$1.7 million
D	0	6	-$14.8 million
E	6	0	$0.4 million
F*	1	4	-$1.25 million

* Only five years of financial data are available.

Source: Financial data obtained primarily from issues of Iowa Department of Transportation, Annual Report for Class II and III Railroads

Table 25
Net Income From Continuing Operations
Kansas Short Line Railroads
Various Years

Railroad	Number of Years in Which Net Income is Positive	Number of Years in Which Net Income is Negative	Accumulated Positive or Negative Net Income
A	2	0	$519.3 thousand
B	5	0	$255.3 thousand
C	1	0	$373.1 thousand
D	0	2	-$296.4 thousand
E	7	0	$7.1 million
F*	No financial data available		

Source: Annual reports filed by the railroads to the Kansas Department of Revenue.

Summary

The most important points discovered in this chapter are as follows:

1. Among the sample Iowa short lines, there is substantial variation in the following traffic characteristics.
   Local, Forwarded, Received, and Bridged Traffic
   The Ratio of Local and Forwarded Traffic to Received Traffic
   Carloads Per Net Mile of Road

2. In general, the top three commodity groups account for a large majority of the total carloadings of Iowa sample short lines. Grain is the most important commodity for four of the six railroads. Food and Kindred Products (20) is one of the top three commodity groups for four of the six Iowa railroads.

3. The railroads in the Kansas sample are more homogeneous than the Iowa short lines with respect to the percentages of local, forwarded, received, and bridged traffic.

4. The majority of the traffic on the Kansas sample short lines is forwarded traffic with most of the remainder being received traffic. There is little or no local traffic on the Kansas short lines.

5. Traffic densities (carloads per net mile of road) of the Kansas sample short lines are low compared to the Iowa short lines. None of the Kansas short lines has a traffic density figure above 100 carloads per net mile of road. In contrast, four of the six Iowa railroads have densities in excess of 100 carloads.

6. The top three commodity groups account for a large majority of the total carloadings of sample Kansas short lines. Grain is the most important commodity of three of the six Kansas railroads and is ranked second on another short line. Petroleum Products (29) is ranked among the top three commodity groups on four of the six short lines.

7. Both the Iowa and Kansas sample short lines own most of their locomotives but lease most of their rail cars.

8. The sample short lines in Kansas and Iowa are not dependent on Class I railroads for locomotives, but do depend on them for rail cars. The sample short lines in Kansas appear to have more difficulty than Iowa short lines in obtaining rail cars during peak periods.

9. There is wide variation in the financial performance of sample Iowa short lines during the 1986-1991 period. Three of the six railroads achieved consistently positive net income from continuing operations and three railroads experienced consistently negative results.

10. Of the five sample Kansas short lines for which some financial information is available, four achieved positive net income from continuing operations in every year of the sample data, drawn from various years in the 1985-1991 interval.

CHAPTER 5

SHIPPER EVALUATION OF SHORT LINE RAILROADS

Introduction

Two of the principal objectives of this research are (1) determine if short line railroads are a viable transportation alternative in rural areas and (2) identify the key factors that determine short line success or failure. One way to accomplish these objectives is to obtain shipper opinion regarding the actual transportation performance of short lines. Each of the 264 shippers in the study was given the opportunity to express their opinion of the prices and service of their short line. These opinions were obtained through personal interviews of each shipper and detailed questionnaires completed by the shippers. Each shipper was asked to give its short line a rating on several price and service characteristics using a five category Likert scale that ranges from very good to very poor. The shippers were also requested to compare the prices and service offered by their short line to that of their previous Class I railroad and to motor carriers. These comparisons were made using a five category Likert scale ranging from much better to much worse. For comparison purposes, the sample is divided into Iowa and Kansas shippers and into grain and non-grain shippers. The latter group are manufacturing and public utility firms that receive and/or ship freight via short line railroad.

Shipper Evaluation of the Prices and Service of Short Line Railroads

The shippers were asked to evaluate the inbound and outbound rates (prices) of their short line as well as their railroad's performance on several service parameters defined as follows:

Market Access (outbound) -- the number and type of profitable markets that can be served by the shipper with available transportation carriers.

Inbound Freight Service -- the number of origins from which inbound freight is received. This refers either to inbound freight that is resold or inbound freight that is a component part of the company's product.

Transit Time -- the number of days that it takes the carrier to deliver freight from the origin to the destination.

Dependability of Transit Time -- the ability of the carrier to consistently achieve the same transit time.

Frequency of Service -- the number of times per week that the carrier is willing and able to provide transportation service.

Loss and Damage Record -- the number of shipments per year that are lost or damaged while in the carrier's possession.

Shipment Tracing Capability -- the ability of the carrier to inform the shipper of the location of a shipment at any given time.

Billing Procedures -- carrier practices regarding the payment of freight bills.

On-time Car Delivery -- placement of rail cars by the carrier within the time frame specified by the shipper.

Equipment and Track Quality -- the general condition of carrier's rail cars and track.

Rail Car Supply During Peak Periods -- refers to ability of carrier to supply rail cars in sufficient quantity within the time frame requested by the shipper during harvest or other peak periods.

Table 26 contains the grain and non-grain shipper evaluations of the 12 Iowa and Kansas line haul short lines in our sample. A review of the table indicates that nearly 50 percent of the grain shippers ranked the Outbound Rates of their short line as good or very good as opposed to only 13.2 percent that gave their railroad a poor or very poor rating. With respect to Inbound Rates, almost 44 percent of the grain shippers gave their railroad a good or very good rating compared to only 11.2 percent that ranked their short line's Inbound Rates as poor or very poor. A much higher percentage of the grain shippers rated their short line's service performance as good or very good compared to the percentage that gave a poor or very poor rating. This was true for every service characteristic in the questionnaire. Of all the rate and service characteristics evaluated by the grain shippers, they are most divided on their short line's Rail Car Supply During Peak Periods. Nearly 39 percent rated their short line's performance as good or very good, but about 31 percent said their short line is poor or very poor.

Table 26 also contains the non-grain shipper evaluations of the price and service performance of their short lines. With regard to Outbound Rates, nearly 59 percent of the shippers rated their short line as good or very good compared to only 17.4 percent giving a poor or very poor rating. On Inbound Rates, the corresponding percentages are 56.9 and 8.6. As is the case with grain shippers, a much greater percentage of the non-grain shippers rated the service performance of their short line as good or very good compared to the percentage that gave a poor or very poor rating.

Table 27 contains the mean rating of the grain and non-grain shippers for each of the price and service characteristics of their short line. The shippers were asked to express their opinions by selecting a response from a five category Likert scale. The possible responses are the short line is (a) very good, (b) good, (c) fair, (d) poor, and (e) very poor. A number is assigned to each of the above responses, ranging from 1.0 for very good to 5.0 for very poor. In this report, if the mean rating for a given rate

Table 26
Shipper Ratings of Iowa and Kansas Short Line Railroads
by Shipper Type (Percents)

The numbers in the following table are the percentages of shippers who responded in the five alternative categories to the general question:

My current railroad is:

Rates on Outbound Freight

	Very Good	Good	Fair	Poor	Very Poor
Grain Shippers	10.2	39.4	37.2	11.0	2.2
Non-Grain Shippers	8.7	50.0	23.9	10.9	6.5

Rates on Inbound Freight

	Very Good	Good	Fair	Poor	Very Poor
Grain Shippers	6.3	37.5	45.0	7.5	3.7
Non-Grain Shippers	3.5	53.4	34.5	6.9	1.7

Market Access (Outbound)

	Very Good	Good	Fair	Poor	Very Poor
Grain Shippers	11.0	48.5	30.9	8.1	1.5
Non-Grain Shippers	7.3	52.7	21.8	14.6	3.6

Inbound Freight Service

	Very Good	Good	Fair	Poor	Very Poor
Grain Shippers	7.2	42.2	39.8	9.6	1.2
Non-Grain Shippers	5.3	50.0	34.2	7.9	2.6

Transit Time For Outbound Freight

	Very Good	Good	Fair	Poor	Very Poor
Grain Shippers	11.5	55.4	26.2	5.4	1.5
Non-Grain Shippers	18.5	33.3	31.5	11.1	5.6

Transit Time For Inbound Freight

	Very Good	Good	Fair	Poor	Very Poor
Grain Shippers	8.9	39.2	41.8	8.9	1.3
Non-Grain Shippers	6.8	44.6	28.4	18.9	1.3

Dependability of Transit Time For Outbound Freight

	Very Good	Good	Fair	Poor	Very Poor
Grain Shippers	13.2	51.9	24.8	8.5	1.6
Non-Grain Shippers	16.7	31.5	42.6	5.6	3.7

Dependability of Transit Time For Inbound Freight

	Very Good	Good	Fair	Poor	Very Poor
Grain Shippers	10.4	35.1	42.9	10.4	1.3
Non-Grain Shippers	8.1	41.9	33.8	12.2	4.0

Frequency of Service For Outbound Freight

	Very Good	Good	Fair	Poor	Very Poor
Grain Shippers	20.6	48.8	23.7	6.1	0.8
Non-Grain Shippers	27.3	34.5	27.3	7.3	3.6

Frequency of Service For Inbound Freight

	Very Good	Good	Fair	Poor	Very Poor
Grain Shippers	16.0	48.2	27.2	7.4	1.2
Non-Grain Shippers	21.6	39.2	29.7	9.5	0

Loss and Damage Record

	Very Good	Good	Fair	Poor	Very Poor
Grain Shippers	15.6	56.6	24.6	3.3	0
Non-Grain Shippers	24.3	43.2	29.7	2.7	0

Shipment Tracing Capability

	Very Good	Good	Fair	Poor	Very Poor
Grain Shippers	7.3	63.7	21.8	4.0	3.2
Non-Grain Shippers	21.7	48.2	24.1	6.0	0

Billing Procedures

	Very Good	Good	Fair	Poor	Very Poor
Grain Shippers	14.5	61.3	19.4	4.8	0
Non-Grain Shippers	18.6	44.3	28.6	4.3	4.3

On-Time Car Delivery

	Very Good	Good	Fair	Poor	Very Poor
Grain Shippers	20.3	50.0	20.3	7.8	1.6
Non-Grain Shippers	17.4	29.1	38.4	7.0	8.1

Quality of Rail Cars

	Very Good	Good	Fair	Poor	Very Poor
Grain Shippers	6.1	51.5	30.3	10.6	1.5
Non-Grain Shippers	12.9	42.9	32.9	7.1	4.3

Quality of the Rail Track

	Very Good	Good	Fair	Poor	Very Poor
Grain Shippers	5.8	34.3	34.3	16.1	9.5
Non-Grain Shippers	9.2	44.8	34.5	8.1	3.4

Rail Car Supply During Peak Periods

	Very Good	Good	Fair	Poor	Very Poor
Grain Shippers	7.3	31.6	30.2	22.8	8.1
Non-Grain Shippers	7.9	47.6	30.2	11.1	3.2

or service characteristic is less than 3.0, it is interpreted to mean that shippers think the short line's performance is better than fair. If the mean rating is greater than 3.0 (the midpoint of the Likert scale), the short line's performance is interpreted as worse than fair. Since every mean in Table 27 is less than 3.0, it can be concluded that grain and non-grain shippers rate their short line's performance as better than fair on all evaluated rate and service characteristics. The service characteristics receiving the best performance ratings (i.e., lowest mean values) from the grain shippers are Billing Procedures, Loss and Damage Record, and Frequency of Service for Outbound Freight. The service characteristics receiving the worst ratings (i.e., highest mean values) are Rail Car Supply During Peak Periods, and Quality of the Rail Track. For non-grain shippers, the service characteristics with the lowest mean rating are Loss and Damage Record, and Shipment Tracing Capability, while Transit Time for Inbound Freight, and Dependability of Transit Time for Inbound Freight received the worst performance ratings.

The *t* statistics in Table 27 are employed to test for statistically significant differences in the shipper mean ratings of the various price and service characteristics. The only service characteristics with statistically significant differences in mean rating are On-Time Car Delivery, Quality of the Rail Track, and Rail Car Supply During Peak Periods. On the first of these characteristics, the grain shippers gave their short lines a better performance rating than the non-grain shippers. The opposite is true for the latter two service characteristics.

In general, there are few significant differences in the mean price and service ratings of the two groups of shippers. Both the grain and non-grain shippers generally approve of the price and service performance of their short line railroads.

Table 28 contains evaluations of short line railroad prices and service when the shipper sample is divided into Iowa and Kansas shipper groups. Nearly 63 percent of the Iowa shippers indicated their short lines are offering good or very good Outbound Rates. Only 13.2 percent of the shippers gave their short lines a poor or very poor ranking on Outbound Rates. With respect to Inbound Rates, about 44 percent of the Iowa shippers rated their short lines as good or very good compared to only 6.5 percent who said their railroads are poor or very poor. The Iowa shippers also approve of the service performance of their short lines. For every service characteristic evaluated, the percentage of shippers who rate their short line's performance as good or very good is substantially greater than the percentage of shippers who rate their railroad's performance as poor or very poor.

The Kansas shipper evaluations of short line prices and service closely parallel those of the Iowa shippers. However, the Kansas shippers are somewhat divided in their opinions of short line Quality of the Rail Track. The percentage of Kansas shippers bestowing a good or very good evaluation on their

Table 27
Shipper Mean Ratings of Iowa and Kansas Short Line Railroads
Grain and Non-Grain Shippers

Rate or Service Characteristic	Grain Shipper Mean**	Non-Grain Shipper Mean**	*t* Statistic
Rates on Outbound Freight	2.555	2.565	0.06
Rates on Inbound Freight	2.650	2.500	1.09
Market Access (Outbound)	2.404	2.545	0.95
Inbound Freight Service	2.554	2.526	0.21
Transit Time For Outbound Freight	2.300	2.519	1.33
Transit Time For Inbound Freight	2.544	2.635	0.64
Dependability of Transit Time For Outbound Freight	2.333	2.481	0.97
Dependability of Transit Time For Inbound Freight	2.571	2.621	0.34
Frequency of Service For Outbound Freight	2.176	2.255	0.49
Frequency of Service For Inbound Freight	2.296	2.270	0.18
Loss and Damage Record	2.156	2.108	0.42
Shipment Tracing Capability	2.322	2.145	1.53
Billing Procedures	2.145	2.314	1.27
On-Time Car Delivery	2.203	2.593	2.71*
Quality of Rail Cars	2.500	2.471	0.21
Quality of the Rail Track	2.891	2.517	2.83*
Rail Car Supply During Peak Periods	2.926	2.540	2.62*

* Statistically significant at .000 to .050 level.
**Means are the mean responses of the two shipper groups to the following five category Likert scale.

The short line is:

Very Good	1.0
Good	2.0
Fair	3.0
Poor	4.0
Very Poor	5.0

Table 28
Shipper Ratings of Iowa and Kansas Short Line Railroads
by State (Percents)

The numbers in the following table are the percentages of shippers who responded in the five alternative categories to the general question:

My current railroad is:

Rates on Outbound Freight

	Very Good	Good	Fair	Poor	Very Poor
Iowa Shippers	13.2	49.4	24.2	9.9	3.3
Kansas Shippers	6.5	34.8	43.5	12.0	3.3

Rates on Inbound Freight

	Very Good	Good	Fair	Poor	Very Poor
Iowa Shippers	5.2	39.0	49.3	5.2	1.3
Kansas Shippers	4.9	50.8	29.5	9.8	4.9

Market Access (Outbound)

	Very Good	Good	Fair	Poor	Very Poor
Iowa Shippers	10.4	41.7	34.4	10.4	3.1
Kansas Shippers	9.5	57.9	22.1	9.5	1.0

Inbound Freight Service

	Very Good	Good	Fair	Poor	Very Poor
Iowa Shippers	3.5	40.7	45.4	8.1	2.3
Kansas Shippers	9.6	52.0	27.4	9.6	1.4

Transit Time For Outbound Freight

	Very Good	Good	Fair	Poor	Very Poor
Iowa Shippers	13.0	53.3	25.0	7.6	1.1
Kansas Shippers	14.1	44.6	30.4	6.5	4.4

Transit Time For Inbound Freight

	Very Good	Good	Fair	Poor	Very Poor
Iowa Shippers	4.8	41.7	38.1	14.3	1.2
Kansas Shippers	11.6	42.0	31.9	13.0	1.5

Dependability of Transit Time For Outbound Freight

	Very Good	Good	Fair	Poor	Very Poor
Iowa Shippers	13.2	51.6	29.7	3.3	2.2
Kansas Shippers	15.2	40.2	30.4	12.0	2.2

Dependability of Transit Time For Inbound Freight

	Very Good	Good	Fair	Poor	Very Poor
Iowa Shippers	3.6	38.1	45.2	11.9	1.2
Kansas Shippers	16.4	38.8	29.9	10.4	4.5

Frequency of Service For Outbound Freight

	Very Good	Good	Fair	Poor	Very Poor
Iowa Shippers	20.2	48.9	22.3	6.4	2.1
Kansas Shippers	25.0	40.2	27.2	6.5	1.1

Frequency of Service For Inbound Freight

	Very Good	Good	Fair	Poor	Very Poor
Iowa Shippers	9.4	49.4	32.9	7.1	1.2
Kansas Shippers	30.0	37.1	22.9	10.0	0

Loss and Damage Record

	Very Good	Good	Fair	Poor	Very Poor
Iowa Shippers	9.9	55.0	32.4	2.7	0
Kansas Shippers	30.6	47.1	18.8	3.5	0

Shipment Tracing Capability

	Very Good	Good	Fair	Poor	Very Poor
Iowa Shippers	9.3	62.0	22.2	2.8	3.7
Kansas Shippers	17.2	52.5	23.2	7.1	0

Billing Procedures

	Very Good	Good	Fair	Poor	Very Poor
Iowa Shippers	9.7	62.1	24.3	2.9	1.0
Kansas Shippers	23.1	47.2	20.9	6.6	2.2

On-Time Car Delivery

	Very Good	Good	Fair	Poor	Very Poor
Iowa Shippers	17.9	45.3	26.4	6.6	3.8
Kansas Shippers	20.4	38.0	28.7	8.3	4.6

Quality of Rail Cars

	Very Good	Good	Fair	Poor	Very Poor
Iowa Shippers	4.8	45.7	35.2	12.4	1.9
Kansas Shippers	12.4	51.5	26.8	6.2	3.1

Quality of the Rail Track

	Very Good	Good	Fair	Poor	Very Poor
Iowa Shippers	7.8	45.7	32.8	9.5	4.3
Kansas Shippers	6.5	30.6	36.1	16.7	10.2

Rail Car Supply During Peak Periods

	Very Good	Good	Fair	Poor	Very Poor
Iowa Shippers	4.8	42.3	33.7	16.3	2.9
Kansas Shippers	10.5	30.5	26.3	22.1	10.5

railroad is 37.1 percent but nearly 27 percent rated their railroad as poor or very poor. The Kansas shippers are also somewhat ambivalent regarding their evaluation of short line Rail Car Supply During Peak Periods. The percentage of shippers giving their short line a good or very good rating is 41 percent, but nearly 33 percent give their railroad a poor or very poor rating.

Table 29 displays the mean Iowa and Kansas shipper ratings of various short line rate and service characteristics. Every mean in the table is less than 3.0, indicating better than fair performance on all the evaluated price and service parameters. The Iowa shippers gave their short lines especially good marks for Frequency of Service for Outbound Freight, and Billing Procedures. However, they were less impressed with short line performance on Rail Car Supply During Peak Periods, and Dependability of Transit Time for Inbound Freight. The Kansas shippers gave a high level of approval to their short lines for Loss and Damage Record, and Frequency of Service for Inbound Freight. However, they were lukewarm in their praise of short line Quality of the Rail Track, and Rail Car Supply During Peak Periods.

As indicated by the data in Table 29, there are relatively few cases of statistically significant differences in the mean price and service ratings of Iowa and Kansas shippers. The four price and service characteristics with statistically significant differences in mean ratings are as follows:

Rates on Outbound Freight
Loss and Damage Record
Quality of Rail Cars
Quality of the Rail Track

The Iowa shippers gave their short lines more favorable ratings than the Kansas shippers for the first and last service characteristic in the above list, while the reverse is true for the other two service parameters.

The above data indicates that both the Kansas and Iowa shipper groups have a relatively favorable opinion of the price and service offerings of their short line railroads. Also the two shipper groups have comparatively few significant differences in the mean ratings of individual price and service characteristics of their railroads.

Shipper Comparison of the Prices and Service of Short Line Railroads to that of Their Previous Class I Railroads

One of the principal arguments in favor of short line railroads is that they are able to provide a better price-service package than Class I railroads to shippers located on rural branch lines. To evaluate this hypothesis, the shippers were asked to compare the price and service performance of their current

Table 29
Shipper Mean Ratings of Iowa and Kansas Short Line Railroads
Iowa and Kansas Shippers

Rate or Service Characteristic	Iowa Shipper Mean**	Kansas Shipper Mean**	*t* Statistic
Rates on Outbound Freight	2.407	2.707	2.21*
Rates on Inbound Freight	2.584	2.590	0.04
Market Access (Outbound)	2.542	2.347	1.53
Inbound Freight Service	2.651	2.411	1.85
Transit Time For Outbound Freight	2.304	2.424	0.90
Transit Time For Inbound Freight	2.655	2.507	1.03
Dependability of Transit Time For Outbound Freight	2.297	2.456	1.21
Dependability of Transit Time For Inbound Freight	2.690	2.478	1.40
Frequency of Service For Outbound Freight	2.213	2.185	0.21
Frequency of Service For Inbound Freight	2.412	2.128	1.96
Loss and Damage Record	2.279	1.952	3.02*
Shipment Tracing Capability	2.296	2.202	0.83
Billing Procedures	2.233	2.176	0.48
On-Time Car Delivery	2.330	2.389	0.42
Quality of Rail Cars	2.609	2.361	2.04*
Quality of the Rail Track	2.569	2.935	2.73*
Rail Car Supply During Peak Periods	2.702	2.916	1.43

* Statistically significant at .000 to .050 level.
**Means are the mean responses of the two shipper groups to the following five category Likert scale.

The short line is:

Very Good	1.0
Good	2.0
Fair	3.0
Poor	4.0
Very Poor	5.0

short line railroad to that of their predecessor Class I railroad. In making the comparisons, the shippers were asked to indicate their opinion by selecting a response from a five category Likert scale. The response reveals whether the current short line railroad is (a) much better, (b) better, (c) same, (d) worse, or (e) much worse than the predecessor Class I railroad with regard to a given rate or service characteristic. A number is assigned to each of the above responses, ranging from 1.0 for much better to 5.0 for much worse. In this report, if the mean shipper rating for a given rate or service characteristic is less than 3.0, it is interpreted to mean that the shippers think the short line performance is better than predecessor Class I railroads. If the mean rating is greater than 3.0, the opposite interpretation applies. The survey results for the grain and non-grain shippers are displayed in Table 30.

After several personal interviews of Kansas shippers, we decided to modify the form of the shipper questionnaire. The initial version asked the respondents to compare the rates and market access of their current short line to that of their predecessor Class I railroad. The revised version asked the shippers to make comparisons for both Inbound and Outbound Rates as well as Outbound Market Access, and Inbound Freight Service. Thus, the comparisons of Transportation Rate, and Market Access (the first two comparisons in Table 30) were made only by the Kansas shippers who completed the initial version of the questionnaire.

In all the price and service characteristics evaluated, the percentage of the grain shippers that rated their short line better or much better than the previous Class I railroad exceeded the percentage of shippers that rated their short line worse or much worse. However, for many of the evaluated rate and service characteristics, a majority of the grain shippers said there is no difference between the two railroads. The survey results for the non-grain shippers parallel those of the grain shippers.

A clear picture of shipper views regarding the relative price and service performance of short lines and predecessor Class I railroads emerges from an examination of Table 31. The table contains the grain and non-grain shipper mean ratings for each of the evaluated rate and service characteristics. With one exception, all the mean ratings in Table 31 are less than 3.0. This means that both shipper groups rate short lines as better than previous Class I railroads on nearly every rate and service parameter.

The grain shippers gave their short lines the widest margin of superiority (i.e., lowest mean rating) over their previous Class I railroad on On-Time Delivery of Rail Cars, and Frequency of Service for Outbound Freight. The grain shippers observed the least difference (i.e., highest mean rating) between the two types of railroads on Rates on Inbound Freight, and Market Access (Outbound).

The mean ratings of the non-grain shippers are higher than those of the grain shippers on nearly every evaluated rate and service characteristic. This means the non-grain shippers observed less difference between their short line and the previous Class I railroad. The non-grain shippers gave

Table 30
Comparison of Transportation Prices and Service by Shipper Type
Current Short Line Railroad vs. Previous Class I Railroad (Percents)

The numbers in the following table are the percentages of shippers who responded in the five alternative categories to the general question:

Compared to my previous railroad, my current railroad is:

Transportation Rates (Kansas Only)

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	5.5	14.6	72.7	3.6	3.6
Non-Grain Shippers	7.7	23.1	57.7	11.5	0

Market Access (Kansas Only)

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	5.6	18.5	74.1	0	1.8
Non-Grain Shippers	0	7.1	89.3	3.6	0

Rates on Outbound Freight

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	17.1	29.0	44.7	6.6	2.6
Non-Grain Shippers	10.5	47.4	26.3	10.5	5.3

Rates on Inbound Freight

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	0	21.2	71.2	3.8	3.8
Non-Grain Shippers	13.0	39.1	26.1	17.4	4.4

Market Access (Outbound)

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	4.0	18.4	61.8	14.5	1.3
Non-Grain Shippers	0	13.6	72.7	9.1	4.6

Inbound Freight Service

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	3.5	21.1	64.9	8.8	1.7
Non-Grain Shippers	3.6	42.9	42.9	7.1	3.6

Transit Time For Outbound Freight

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	11.4	31.7	52.0	4.1	0.8
Non-Grain Shippers	2.6	29.0	50.0	15.8	2.6

Transit Time For Inbound Freight

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	7.0	29.1	57.0	5.8	1.2
Non-Grain Shippers	8.3	37.5	33.3	18.8	2.1

Dependability of Transit Time For Outbound Freight

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	12.1	41.1	42.7	2.4	1.6
Non-Grain Shippers	2.5	35.0	50.0	10.0	2.5

Dependability of Transit Time For Inbound Freight

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	18.8	29.4	41.2	7.1	3.5
Non-Grain Shippers	7.3	31.7	48.8	9.8	2.4

Frequency of Service For Outbound Freight

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	24.8	31.8	31.8	7.8	3.9
Non-Grain Shippers	7.7	28.2	46.2	15.4	2.6

Frequency of Service For Inbound Freight

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	14.0	26.9	50.5	6.5	2.2
Non-Grain Shippers	8.2	28.6	42.9	16.3	4.0

Loss and Damage Record

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	7.3	24.4	66.7	0.8	0.8
Non-Grain Shippers	3.9	21.6	68.6	5.9	0

Shipment Tracing Capability

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	4.3	24.8	67.5	2.6	0.8
Non-Grain Shippers	8.6	19.0	60.3	10.3	1.7

Billing Procedures

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	7.2	37.6	52.8	1.6	0.8
Non-Grain Shippers	5.7	15.1	64.2	11.3	3.8

On-Time Car Delivery

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	18.9	43.3	30.7	6.3	0.8
Non-Grain Shippers	10.2	42.4	23.7	20.3	3.4

Quality of Rail Cars

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	5.6	30.9	55.6	6.3	1.6
Non-Grain Shippers	2.0	13.7	70.6	13.7	0

Quality of the Rail Track

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	11.9	23.8	50.0	13.5	0.8
Non-Grain Shippers	5.3	21.1	56.1	10.5	7.0

Rail Car Supply During Peak Periods

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	16.1	31.5	40.3	8.1	4.0
Non-Grain Shippers	4.4	20.0	57.8	15.6	2.2

Table 31
Shipper Mean Comparison of Transportation Prices and Service
of Iowa and Kansas Short Lines to That of Previous Class I Railroads
Grain and Non-Grain Shippers

Rate or Service Characteristic	Grain Shipper Mean**	Non-Grain Shipper Mean**	*t* Statistic
Transportation Rates (Kansas Only)	2.854	2.731	0.68
Market Access (Kansas Only)	2.741	2.964	2.06*
Rates on Outbound Freight	2.486	2.526	0.15
Rates on Inbound Freight	2.903	2.609	1.22
Market Access (Outbound)	2.908	3.045	0.85
Inbound Freight Service	2.842	2.643	1.10
Transit Time For Outbound Freight	2.512	2.868	2.39*
Transit Time For Inbound Freight	2.651	2.687	0.23
Dependability of Transit Time For Outbound Freight	2.403	2.750	2.44*
Dependability of Transit Time For Inbound Freight	2.471	2.683	1.24
Frequency of Service For Outbound Freight	2.341	2.769	2.49*
Frequency of Service For Inbound Freight	2.559	2.796	1.44
Loss and Damage Record	2.634	2.765	1.24
Shipment Tracing Capability	2.709	2.776	0.54
Billing Procedures	2.512	2.925	3.26*
On-Time Car Delivery	2.268	2.644	2.43*
Quality of Rail Cars	2.675	2.961	2.67*
Quality of the Rail Track	2.675	2.930	1.78
Rail Car Supply During Peak Periods	2.524	2.911	2.62*

* Statistically significant at .000 to .050 level.
**Means are the mean responses of the two shipper groups to the following five category Likert scale.

The short line is:

Much Better	1.0
Better	2.0
Same	3.0
Worse	4.0
Much Worse	5.0

respective mean ratings of 2.53 and 2.61 to Rates on Outbound Freight, and Rates on Inbound Freight. However, six of the evaluated rate and service characteristics have a mean rating between 2.9 and 3.0, indicating virtually no difference in the performance of short lines and predecessor Class I railroads.

According to the *t* statistics in Table 31, there is a statistically significant difference in the mean ratings of grain and non-grain shippers for the following rate and service characteristics.

Market Access (Kansas Only)
Transit Time for Outbound Freight
Dependability of Transit Time For Outbound Freight
Frequency of Service for Outbound Freight
Billing Procedures
On-Time Car Delivery
Quality of Rail Cars
Rail Car Supply During Peak Periods

In each of the above listed cases, the mean rating of the grain shippers is less than that of the non-grain shippers.

In summary, both shipper groups rated the price and service performance of their short line as better than that previously provided by their Class I railroad. However, the grain shippers observed a greater improvement than the non-grain shippers.

Table 32 contains data comparing the rates and service of short line railroads to that of predecessor Class I railroads when the sample is divided into Iowa and Kansas shipper groups. For every rate and service characteristic evaluated, the percentage of Iowa shippers who rated their short line better or much better than the previous railroad was greater than the percentage who rated their short line worse or much worse. The same generalization is true for the Kansas shippers.

Table 33 displays the Iowa and Kansas shipper mean ratings of short line rates and service relative to previous Class I railroads. Every mean in the table is less than 3.0, meaning that Iowa and Kansas shippers rate their short line's price and service as better than their previous Class I railroads. For Iowa shippers, the largest difference between short line and Class I railroad performance occurred on Rates on Outbound Freight (mean rating of 2.37) and Dependability of Transit Time for Outbound Freight (mean rating of 2.38). The least difference in performance occurred on Market Access (Outbound), and Quality of Rail Cars, with respective mean ratings of 2.94 and 2.90.

According to the Kansas shippers, short lines achieved the greatest superiority over predecessor Class I railroads in On-Time Car Delivery (mean rating of 2.37) and Frequency of Service of Outbound Freight (mean rating of 2.43). The least difference in the performance of the two types of railroads occurred in Market Access (Outbound), and Rates on Inbound Freight with respective mean ratings of 2.93 and 2.86.

Table 32
Comparison of Transportation Prices and Service by State
Current Short Line Railroad vs. Previous Class I Railroad (Percents)

The numbers in the following table are the percentages of shippers who responded in the five alternative categories to the general question:

Compared to my previous railroad, my current railroad is:

Rates on Outbound Freight

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	20.9	40.3	23.9	10.4	4.5
Kansas Shippers	3.6	14.3	82.1	0	0

Rates on Inbound Freight

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	3.8	35.8	43.4	11.3	5.7
Kansas Shippers	4.6	4.5	90.9	0	0

Market Access (Outbound)

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	4.3	20.0	55.7	17.1	2.9
Kansas Shippers	0	10.7	85.7	3.6	0

Inbound Freight Service

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	1.7	32.2	52.5	10.2	3.4
Kansas Shippers	7.7	19.2	69.2	3.9	0

Transit Time For Outbound Freight

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	15.4	36.9	36.9	7.7	3.1
Kansas Shippers	5.2	27.1	61.5	6.20	0

Transit Time For Inbound Freight

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	7.0	35.1	40.4	14.0	3.5
Kansas Shippers	7.8	29.9	54.5	7.8	0

Dependability of Transit Time For Outbound Freight

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	12.3	49.2	30.8	3.1	4.6
Kansas Shippers	8.1	33.3	53.5	5.1	0

Dependability of Transit Time For Inbound Freight

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	5.3	38.6	45.6	7.0	3.5
Kansas Shippers	23.2	23.2	42.0	8.7	2.9

Frequency of Service For Outbound Freight

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	16.4	38.8	31.3	9.0	4.5
Kansas Shippers	23.8	25.7	37.6	9.9	3.0

Frequency of Service For Inbound Freight

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	5.2	31.0	44.8	13.8	5.2
Kansas Shippers	16.7	25.0	50.0	7.1	1.2

Loss and Damage Record

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	10.0	32.9	51.4	4.3	1.4
Kansas Shippers	3.8	17.3	77.9	1.0	0

Shipment Tracing Capability

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	8.2	21.9	61.6	6.9	1.4
Kansas Shippers	3.9	23.5	67.7	3.9	1.0

Billing Procedures

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	5.5	37.0	50.7	5.5	1.4
Kansas Shippers	7.6	26.7	60.0	3.8	1.9

On-Time Car Delivery

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	15.8	48.7	18.4	13.2	3.9
Kansas Shippers	16.4	39.1	35.4	9.1	0

Quality of Rail Cars

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	2.7	23.0	58.1	13.5	2.7
Kansas Shippers	5.8	28.2	61.2	4.8	0

Quality of the Rail Track

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	16.9	22.1	46.7	11.7	2.6
Kansas Shippers	4.7	23.6	55.7	13.2	2.8

Rail Car Supply During Peak Periods

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	6.7	30.7	40.0	17.3	5.3
Kansas Shippers	18.1	26.6	48.9	4.3	2.1

Table 33
Shipper Mean Comparison of Transportation Prices and Service
of Iowa and Kansas Short Lines to That of Previous Class I Railroads
Iowa and Kansas Shippers

Rate or Service Characteristic	Iowa Shipper Mean**	Kansas Shipper Mean**	*t* Statistic
Rates on Outbound Freight	2.373	2.786	2.56*
Rates on Inbound Freight	2.792	2.864	0.45
Market Access (Outbound)	2.943	2.929	0.12
Inbound Freight Service	2.814	2.692	0.73
Transit Time For Outbound Freight	2.462	2.688	1.65
Transit Time For Inbound Freight	2.719	2.623	0.65
Dependability of Transit Time For Outbound Freight	2.385	2.555	1.27
Dependability of Transit Time For Inbound Freight	2.649	2.449	1.20
Frequency of Service For Outbound Freight	2.463	2.426	0.23
Frequency of Service For Inbound Freight	2.828	2.512	2.03*
Loss and Damage Record	2.543	2.760	2.01*
Shipment Tracing Capability	2.712	2.745	0.30
Billing Procedures	2.603	2.657	0.48
On-Time Car Delivery	2.408	2.372	0.24
Quality of Rail Cars	2.905	2.650	2.31*
Quality of the Rail Track	2.610	2.858	1.81
Rail Car Supply During Peak Periods	2.840	2.457	2.61*

* Statistically significant at .000 to .050 level.
**Means are the mean responses of the two shipper groups to the following five category Likert scale.

The short line is:

Much Better	1.0
Better	2.0
Same	3.0
Worse	4.0
Much Worse	5.0

The *t* statistics in Table 33 indicate statistically significant differences in the mean ratings of Iowa and Kansas shippers for the following rate and service characteristics.

Rates on Outbound Freight
Frequency of Service for Inbound Freight
Loss and Damage Record
Quality of Rail Cars
Rail Car Supply During Peak Periods

The Iowa shippers mean rating was significantly lower (i.e., higher opinion of the short lines) than the Kansas shippers rating for Rates on Outbound Freight, and Loss and Damage Record. Kansas shippers had a significantly higher opinion of short line performance (relative to previous Class I railroads) than Iowa shippers on the other three service characteristics in the above list.

In summary, shippers located on Kansas and Iowa short lines believe they are getting better rates and service from their current short line railroads than they received from their previous Class I railroads. The extent of improvement varies by rate and service characteristic. There are statistically significant differences in opinions of shipper groups regarding how much better the short line's performance is compared to the predecessor railroad. However, the above analysis leaves little doubt that the shippers think their short lines provide better railroad transportation than they received before.

This conclusion is supported by other data from the survey. For example, one of the criticisms of short line railroads is that they limit the number of markets that can be served by rail without interlining to another railroad. According to the critics, the resulting joint rates often make the short line uncompetitive. To determine the possible extent of this problem, we asked the shippers if they lost access to any markets or inbound freight origins when their Class I railroad was replaced by their current short line railroad. Only about 10 percent of the total shipper sample reported a loss in access after the change in rail service. We also asked the shippers if they gained access to any new markets or inbound freight origins after their Class I railroad was replaced by their current short line. Approximately 18 percent reported a gain in access. Thus, there is no evidence that short line rail service restricts shipper options on either inbound or outbound movements.

This conclusion is supported by other evidence from the shipper survey. We asked the shippers if the amount they ship by rail changed after the Class I railroad service was replaced by their current short line railroad. Of the total shipper sample, about 38 percent said they are shipping more or much more by rail, approximately 49 percent are shipping the same amount, and only about 14 percent said they are shipping less or much less by rail. This data is consistent with the conclusion that short line rates and service are better than that previously supplied by Class I railroads.

Shipper Comparison of Prices and Service of Short Line Railroads to that of Motor Carriers

Thus far, the analysis in this chapter has revealed that shippers have a generally high regard for the rate and service performance of their short lines and that their short lines provide better rail transportation than they previously received from Class I railroads. However, to further evaluate the hypothesis that short lines are a viable transportation option for rural shippers, we asked the shippers to compare the rates and service of their short lines to that of motor carriers. In making the comparisons, the shippers were asked to indicate their opinion by selecting a response from a five category Likert scale. The possible responses are the short line railroad is (a) much better, (b) better, (c) same, (d) worse, or (e) much worse than motor carriers with regard to a given rate or service characteristic. A number is assigned to each of the above responses, ranging from 1.0 for much better to 5.0 for much worse. Thus, if the mean rating for a given rate or service characteristic is less than 3.0 (the midpoint of the Likert scale), it is interpreted to mean that the shippers feel the short line performance is better than motor carriers. If the mean rating is greater than 3.0, the opposite interpretation applies.

Table 34 displays the rate and service comparisons of short line railroads to motor carriers by grain and non-grain shipper groups. As with Table 30, the comparisons of Transportation Rate and Market Access (the first two comparisons in Table 34) were made only by the Kansas shippers who completed the initial version of the questionnaire.

The grain and non-grain shippers have a generally favorable opinion of short line Inbound and Outbound Rates compared to that of motor carriers. The percentage of grain and non-grain shippers rating the short line as better or much better than motor carriers is much higher than the percentage who rated the short line worse or much worse. However, the grain and non-grain shippers had a much less favorable opinion of short line performance on several service characteristics. The percentage of shippers who rated the short line as worse or much worse than motor carriers is higher than the percentage who rated the railroad better or much better on the following service characteristics.

Market Access (Outbound)
Transit Time For Outbound Freight
Transit Time For Inbound Freight
Dependability of Transit Time For Outbound Freight
Dependability of Transit Time For Inbound Freight
Frequency of Service For Outbound Freight
Frequency of Service For Inbound Freight

Table 35 contains the grain and non-grain shipper mean ratings of short line rate and service performance relative to that of motor carriers. According to the grain shippers, the short lines posted their best performance (relative to motor carriers) on Inbound and Outbound Rates which had respective

mean ratings of 2.64 and 2.60. Short line performance is least impressive on Transit Time For Inbound Freight (mean rating of 3.4), and Frequency of Service For Inbound Freight (mean rating of 3.24). The grain shippers rate their short lines as better than motor carriers on 9 of the 15 price and service characteristics listed in Table 35. Two service characteristics, Dependability of Transit Time For Outbound Freight and Frequency of Service For Outbound Freight, have respective mean ratings of 2.96 and 3.06. This indicates that grain shippers see little difference in the performance of their short lines and that of motor carriers in these two areas.

Like the grain shippers, the non-grain shippers think the short lines perform best (relative to motor carriers) on Inbound and Outbound Rates which had respective mean ratings of 2.60 and 2.59. The non-grain shippers are least impressed with short line performance on Transit Time For Outbound Freight (mean rating of 3.91), and Transit Time For Inbound Freight (mean rating of 3.77). The non-grain shippers rate motor carriers as better than their short lines on 9 of the 15 price and service characteristics listed in Table 35. An additional three service characteristics have mean ratings between 2.96 and 3.00, indicating very little difference in non-grain shipper evaluation of the performance of short lines and motor carriers in these areas.

Table 35 data indicate that grain shippers have a higher opinion of short line rate and service performance (compared to motor carriers) than do non-grain shippers. Of the 15 evaluated rate and service characteristics in Table 35, 10 have statistically significant differences in mean ratings. The grain shipper mean is less than the non-grain shipper mean in all 10 cases.

In summary, the grain and non-grain shippers rate their short lines as better than motor carriers on rates, but motor carriers are rated better than short lines on service characteristics related to transit time, dependability of transit time, and frequency of service.

Table 36 displays the comparison of rates and service of short line railroads to that of motor carriers when the sample is divided into Iowa and Kansas shipper groups. The percentage of Iowa shippers who rated short line Inbound and Outbound Rates better or much better than motor carriers is much higher than the percentage who rated short lines as worse or much worse. However, for several service characteristics, the percentage of Iowa shippers that rated short line performance as worse or much worse than motor carriers is higher than the percentage who rated the short line as better or much better. The service characteristics that are in this category include the following:

Market Access (Outbound)
Inbound Freight Service
Transit Time For Outbound Freight
Transit Time For Inbound Freight
Dependability of Transit Time For Inbound Freight
Frequency of Service For Inbound Freight

Table 34
Comparison of Transportation Prices and Service by Shipper Type
Current Short Line Railroad vs. Motor Carriers (Percents)

The numbers in the following table are the percentages of shippers who responded in the five alternative categories to the general question:

Compared to motor carriers, my current railroad is:

Transportation Rates (Kansas Only)

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	5.0	56.7	10.0	25.0	3.3
Non-Grain Shippers	9.7	54.8	19.4	16.1	0

Market Access (Kansas Only)

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	11.5	29.5	34.4	21.3	3.3
Non-Grain Shippers	3.0	3.0	48.5	27.3	18.2

Rates on Outbound Freight

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	18.0	34.8	21.4	21.4	4.5
Non-Grain Shippers	5.9	58.8	11.8	17.6	5.9

Rates on Inbound Freight

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	9.7	38.7	30.7	19.3	1.6
Non-Grain Shippers	6.7	53.3	17.8	17.8	4.4

Market Access (Outbound)

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	13.3	23.3	24.4	37.8	1.1
Non-Grain Shippers	2.8	8.3	30.6	44.4	13.9

Inbound Freight Service

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	6.5	25.8	41.9	25.8	0
Non-Grain Shippers	4.1	18.4	28.6	40.8	8.2

Transit Time For Outbound Freight

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	8.3	17.9	24.8	44.8	4.1
Non-Grain Shippers	0	8.6	15.5	51.7	24.1

Transit Time For Inbound Freight

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	3.0	13.0	28.0	53.0	3.0
Non-Grain Shippers	1.3	12.0	16.0	49.3	21.3

Dependability of Transit Time For Outbound Freight

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	7.7	20.3	41.3	29.4	1.4
Non-Grain Shippers	0	10.3	29.3	50.0	10.3

Dependability of Transit Time For Inbound Freight

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	2.0	12.2	45.9	39.8	0
Non-Grain Shippers	2.7	12.0	26.7	44.0	14.7

Frequency of Service For Outbound Freight

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	5.6	22.9	34.0	34.7	2.8
Non-Grain Shippers	1.8	3.5	56.1	24.6	14.0

Frequency of Service For Inbound Freight

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	1.0	14.1	45.5	38.4	1.0
Non-Grain Shippers	2.5	10.1	50.6	25.3	11.4

Loss and Damage Record

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	4.4	13.1	74.5	7.3	0.7
Non-Grain Shippers	1.2	18.8	62.5	15.0	2.5

Shipment Tracing Capability

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	1.5	27.0	62.8	8.0	0.7
Non-Grain Shippers	1.2	19.3	59.0	19.3	1.2

Billing Procedures

	Much Better	Better	Same	Worse	Much Worse
Grain Shippers	4.2	26.8	58.4	9.2	1.4
Non-Grain Shippers	1.3	14.5	75.0	5.3	3.9

Table 35
Shipper Mean Comparison of Transportation Prices and Service
of Iowa and Kansas Short Lines to That of Motor Carriers
Grain and Non-Grain Shippers

Rate or Service Characteristic	Grain Shipper Mean**	Non-Grain Shipper Mean**	*t* Statistic
Transportation Rates (Kansas Only)	2.650	2.419	1.12
Market Access (Kansas Only)	2.754	3.545	3.77*
Rates on Outbound Freight	2.596	2.588	0.03
Rates on Inbound Freight	2.645	2.600	0.23
Market Access (Outbound)	2.900	3.583	3.52*
Inbound Freight Service	2.871	3.306	2.40*
Transit Time For Outbound Freight	3.186	3.914	5.09*
Transit Time For Inbound Freight	3.400	3.773	2.64*
Dependability of Transit Time For Outbound Freight	2.965	3.603	4.83*
Dependability of Transit Time For Inbound Freight	3.235	3.560	2.40*
Frequency of Service For Outbound Freight	3.063	3.456	2.86*
Frequency of Service For Inbound Freight	3.242	3.329	0.69
Loss and Damage Record	2.869	2.988	1.25
Shipment Tracing Capability	2.796	3.000	2.18*
Billing Procedures	2.768	2.961	2.01*

* Statistically significant at .000 to .050 level.
**Means are the mean responses of the two shipper groups to the following five category Likert scale.

The short line is:

Much Better	1.0
Better	2.0
Same	3.0
Worse	4.0
Much Worse	5.0

Table 36
Comparison of Transportation Prices and Service by State
Current Short Line Railroad vs. Motor Carriers (Percents)

The numbers in the following table are the percentages of shippers who responded in the five alternative categories to the general question:

Compared to motor carriers, my current railroad is:

Rates on Outbound Freight

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	19.4	47.3	17.2	12.9	3.2
Kansas Shippers	0	23.3	23.3	43.3	10.0

Rates on Inbound Freight

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	9.6	49.4	19.3	18.1	3.6
Kansas Shippers	4.2	29.2	45.8	20.8	0

Market Access (Outbound)

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	13.7	23.2	25.3	31.6	6.3
Kansas Shippers	0	6.5	29.0	64.5	0

Inbound Freight Service

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	7.0	22.1	32.6	33.7	4.6
Kansas Shippers	0	24.0	48.0	28.0	0

Transit Time For Outbound Freight

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	12.0	20.6	22.8	37.0	7.6
Kansas Shippers	0.9	10.8	21.6	55.0	11.7

Transit Time For Inbound Freight

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	4.8	18.1	20.5	48.2	8.4
Kansas Shippers	0	7.6	25.0	54.4	13.0

Dependability of Transit Time For Outbound Freight

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	10.9	23.9	31.5	29.4	4.3
Kansas Shippers	0.9	11.9	43.1	40.4	3.7

Dependability of Transit Time For Inbound Freight

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	4.8	15.7	34.9	39.8	4.8
Kansas Shippers	0	8.9	40.0	43.3	7.8

Frequency of Service For Outbound Freight

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	9.8	19.6	44.6	20.6	5.4
Kansas Shippers	0	15.6	36.7	41.3	6.4

Frequency of Service For Inbound Freight

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	3.5	14.0	52.3	24.4	5.8
Kansas Shippers	0	10.9	43.5	40.2	5.4

Loss and Damage Record

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	2.9	18.6	64.1	11.5	2.9
Kansas Shippers	3.5	12.3	75.4	8.8	0

Shipment Tracing Capability

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	1.0	27.6	57.1	12.4	1.9
Kansas Shippers	1.7	20.9	65.2	12.2	0

Billing Procedures

	Much Better	Better	Same	Worse	Much Worse
Iowa Shippers	2.9	24.3	65.1	5.8	1.9
Kansas Shippers	3.5	20.9	63.5	9.6	2.6

The survey results for the Kansas shippers are similar to those of the Iowa group. The percentage of shippers that rated short line's Inbound and Outbound Rates as better or much better than those of motor carriers is substantially larger than the percentage who rated the short line as worse or much worse. However, for all eight service characteristics involving access, transit time, dependability of transit time, and frequency of service; the percentage of shippers rating the short line's performance as worse or much worse than motor carriers is greatly exceeded by the percentage who rated the short line as better or much better.

Table 37 displays the Iowa and Kansas shipper mean ratings of short line rate and service performance (relative to motor carriers). The Iowa shippers rated short line Outbound and Inbound Rates (mean ratings of 2.33 and 2.57 respectively) as better than those of motor carriers. They also rated short line performance on Shipment Tracing Capability (mean rating of 2.87), and Billing Procedures (mean rating of 2.80) as better than that of motor carriers. The Iowa shippers rated short line performance as worse than motor carriers on Transit Time For Inbound Freight, Dependability of Transit Time For Inbound Freight, and Frequency of Service for Inbound Freight with respective mean ratings of 3.37, 3.24, and 3.15. The mean ratings of Iowa shippers for six other service characteristics are between 2.92 and 3.08, indicating that Iowa shippers perceive little difference in the performance of their short lines and that of motor carriers in these areas.

Kansas shippers rated their short line's performance as better than motor carriers for Rates on Inbound Freight, Loss and Damage Record, Shipment Tracing Capability, and Billing Procedures, which have respective mean ratings of 2.83, 2.89, 2.88, and 2.87. Short line and motor carrier performance on Inbound Freight Service is rated about the same. For the remaining eight price and service characteristics, Kansas shippers rated short lines as worse than motor carriers.

The *t* statistics in Table 37 reveal statistically significant differences in the mean ratings of Iowa and Kansas shippers for the following rate and service characteristics.

Rates on Outbound Freight
Market Access (Outbound)
Transit Time For Outbound Freight
Transit Time For Inbound Freight
Dependability of Transit Time For Outbound Freight
Dependability of Transit Time For Inbound Freight
Frequency of Service For Outbound Freight
Frequency of Service For Inbound Freight

The data in Table 37 indicate that the Iowa shippers have a significantly more favorable view of the performance of their short lines relative to motor carriers. The mean rating of the Iowa shipper group is significantly less than that of the Kansas shippers for all eight of the service characteristics listed above.

Table 37
Shipper Mean Comparison of Transportation Prices and Service
of Iowa and Kansas Short Lines to That of Motor Carriers
Iowa and Kansas Shippers

Rate or Service Characteristic	Iowa Shipper Mean**	Kansas Shipper Mean**	*t* Statistic
Rates on Outbound Freight	2.333	3.400	5.16*
Rates on Inbound Freight	2.566	2.833	1.33
Market Access (Outbound)	2.937	3.581	3.94*
Inbound Freight Service	3.069	3.040	0.16
Transit Time For Outbound Freight	3.076	3.658	3.97*
Transit Time For Inbound Freight	3.373	3.728	2.54*
Dependability of Transit Time For Outbound Freight	2.924	3.339	3.10*
Dependability of Transit Time For Inbound Freight	3.241	3.500	1.97*
Frequency of Service For Outbound Freight	2.924	3.385	3.51*
Frequency of Service For Inbound Freight	3.151	3.402	2.06*
Loss and Damage Record	2.932	2.895	0.41
Shipment Tracing Capability	2.867	2.878	0.13
Billing Procedures	2.796	2.869	0.77

* Statistically significant at .000 to .050 level.
**Means are the mean responses of the two shipper groups to the following five category Likert scale. The short line is:

Much Better	1.0
Better	2.0
Same	3.0
Worse	4.0
Much Worse	5.0

In summary, the Iowa and Kansas shipper groups indicate that their short lines performed better than motor carriers on rates (except for Kansas shipper comparison of Rates on Outbound Freight). Both shipper groups also rated short lines as better than motor carriers on Loss and Damage Record, Shipment Tracing Capability, and Billing Procedures. However, both shipper groups said that short line performance is, in general, worse than motor carriers on service characteristics related to access, transit time, dependability of transit time, and frequency of service. The Iowa shipper group is more impressed with the rate and service performance of their short lines (relative to motor carriers) than the Kansas shippers are with their railroads.

Transportation Mode Preferences of Shippers

At this point in the analysis, we have evaluated several data sets that relate to the hypothesis that short lines are a viable transportation alternative for rural shippers. We have analyzed the ratings of short line rates and service by shippers located on Iowa and Kansas short lines. We have studied shipper comparisons of short line rates and service to that provided by predecessor Class I railroads and by motor carriers. The general conclusion of these analyses is that the sample shippers regard short line railroads as a viable transportation option for inbound and outbound freight.

To further strengthen this conclusion, we end this chapter with the survey results of the final section of the shipper questionnaire. The final section includes the following question.

> Taking all the service characteristics into consideration, which type of transportation carrier do you prefer?

According to the freight modal selection literature, different shippers have different trade-offs of price and service. In general, shippers will pay more for higher quality service, but how much more varies by shipper. Thus, it is possible that modal preferences can change if the shipper is considering both rates and service. So the final section of the questionnaire also includes the following question.

> Taking rates and service into consideration, which of the following modes of transportation do you prefer?

The survey results for these two questions are displayed in Table 38. When service characteristics are the modal choice criteria, nearly 43 percent of the Iowa shippers prefer short line railroads. About 26 percent prefer motor carriers and only 15 percent prefer Class I railroads. Grain shippers also strongly endorsed short line railroad service as 45.3 percent of them selected short lines as the best service mode. About 30 percent of the grain shippers prefer motor carrier service and less than 13 percent prefer Class I railroads.

Kansas shippers and non-grain shippers prefer motor carrier service. About 47 percent of the Kansas shippers prefer the service of motor carriers, 31 percent prefer short lines, and less than nine percent prefer Class I railroads. Motor carrier service is the choice of nearly 48 percent of the non-grain shippers, followed by short line railroads with 22 percent and Class I railroads, 10 percent.

The shippers that preferred the service of short lines emphasized the personalized service of short lines as one of the reasons for their preference. The shippers stated that the personalized service manifests itself in several different forms. For example, some shippers said that short lines are concerned with providing high quality service to the small shipper. Others said that short lines have the ability to work with individual shippers and connecting carriers to reach more markets and solve transportation problems quickly. Others pointed out that short line railroads are locally operated and the top officers are located close to shippers. Thus, short lines are able to understand the transportation problems of their shippers. Other shippers noted the personal relationship they have with short line personnel and the shippers know which person to contact at the railroad to get answers for various transportation problems.

In addition to personal service, the shippers that prefer short line service cited several advantages of shipping by rail that are not unique to short lines. For example, the grain shippers mentioned the opportunity to obtain origin grades for grain that allowed them to select the best market for a given grain shipment. Other advantages of rail shipment include faster payment, less paperwork, less congestion during peak periods, and the efficiency of shipping large volumes.

The shippers who prefer the service of motor carriers emphasized the faster delivery times of motor carriers, especially for short hauls. The shippers also frequently mentioned that motor carrier pickup, delivery, and transit times are also more dependable than alternative modes. Some shippers practicing JIT inventory management said they prefer trucks because they are faster and more dependable than railroads. Other shippers mentioned that motor carriers are able to provide door-to-door service to more locations than railroads. Some other reasons for motor carrier service preference include better equipment availability and less need for advance notice of intent to ship products.

Direct access to more markets than short line railroads is the primary reason shippers gave for preferring Class I railroad service. Other reasons given by shippers who prefer Class I rail service include ability to provide more equipment than short lines and the ability to supply equipment in better condition than that of short lines.

Table 38 also contains the modal preferences of the sample shippers when the modal choice criteria include both rates and service. The primary impact of including rates (prices) in the analysis is to reduce the percentage of shippers who prefer motor carriers. This occurred in all four shipper groups as shown below.

Table 38
Transportation Mode Preferences of Shippers
(Percents)

The numbers in this part of the table are the percents of the shipper sample that expressed a modal preference in response to the following question.

Taking all the service characteristics into consideration, which type of transportation carrier do you think provides the best overall service?

	Short Line Railroad	Class I Railroad	Motor Carriers	Indifferent	No Opinion	Other*
Iowa Shippers	42.6	15.0	25.8	8.3	3.3	5.0
Kansas Shippers	31.1	8.9	46.6	3.0	1.5	8.9
	Short Line Railroad	Class I Railroad	Motor Carriers	Indifferent	No Opinion	Other*
Grain Shippers	45.3	12.6	30.2	5.0	1.3	5.6
Non-Grain Shippers	21.9	10.4	47.9	6.3	4.2	9.3

The numbers in the next part of the table are the percents of the shipper sample that expressed a modal preference in response to the following question.

Taking rates and service into consideration, which of the following modes of transportation do you prefer?

	Short Line Railroad	Class I Railroad	Motor Carriers	Indifferent	No Opinion	Other*
Iowa Shippers	42.5	18.3	22.5	10.0	2.5	4.2
Kansas Shippers	32.9	11.2	35.8	8.2	3.7	8.2
	Short Line Railroad	Class I Railroad	Motor Carriers	Indifferent	No Opinion	Other*
Grain Shippers	47.2	13.8	21.4	8.8	3.1	5.7
Non-Grain Shippers	21.1	15.8	43.2	9.5	3.1	7.3

* The other category primarily includes shippers who expressed a preference for more than one mode of transportation.

Percent of Shippers that Prefer Motor Carriers

	(1) Rates and Service	(2) Service Only	(3) (1) - (2) Difference
Iowa Shippers	22.5	25.8	- 3.3
Kansas Shippers	35.8	46.6	-10.8
Grain Shippers	21.4	30.2	- 8.8
Non-Grain Shippers	43.2	47.9	- 4.7

Despite the reduction in the percentage of shippers that prefer motor carriers, the addition of rates to the selection criteria does not change the preferred mode of any shipper group. The Iowa and grain shipper groups still strongly prefer short line railroads and the non-grain shippers heavily endorse motor carriers. When rates are combined with service for modal selection, Kansas shippers narrowly prefer motor carriers (35.8 percent) to short line railroads (32.9 percent).

As one would expect, the reasons for shipper mode preferences on the basis of rates and service include many of the same service factors that are cited in the service only preference analysis. Shippers who prefer short lines also mentioned that short line rates are lower than motor carrier rates, especially for longer hauls. They also said that the relatively low labor costs of short lines allows them to charge lower rates than Class I railroads. Many grain shippers said they prefer short lines because their relatively lower rates allow them to receive a higher price for their grain.

The shippers that prefer the rates and service of motor carriers cite the lower rates of motor carriers, especially on short hauls. Thus, grain shippers located close to their primary markets are able to receive a higher price for their grain by employing motor carriers.

The shippers that prefer Class I railroad rates and service cite the lower prices of a Class I only, long haul movement compared to a joint short line and Class I railroad long haul movement. They also mention that since Class I railroads have direct access to more markets than short lines, the Class I railroad can offer lower rates to these markets due to less interlining.

Summary

This chapter began with the statement of the hypothesis that short line railroads are a viable transportation alternative for rural area shippers. The various statistical analyses of this chapter indicate that most of the shippers located on Iowa and Kansas line haul short lines regard them as equal to or better than alternative types of transportation. The admiration of short lines is certainly not universal.

Shippers requiring fast delivery times and frequent service regard motor carriers as a superior alternative to short line or Class I railroads. Some shippers expressed concern about the long term financial survival of their short lines. This is a legitimate concern and the analyses in this chapter do not directly address the question of the long term ability of short lines to profitably supply capital intensive transportation service. However, the analyses in this chapter do indicate broad based shipper support for short line railroads.

Specific findings in this chapter include the following:

1. Shippers located on Iowa and Kansas short lines approve of the price and service performance of their short line railroads. This is true whether the sample is divided into grain vs. non-grain or Iowa vs. Kansas shipper groups. There are few statistically significant differences in the mean price and service ratings of these shipper groups.

2. Both the grain and the non-grain shippers rated the price and service performance of their short line as better than that previously provided by their Class I railroad. However, the grain shippers observed a greater improvement than the non-grain shippers.

3. When the sample is divided into Iowa and Kansas shipper groups, both groups rated the price and service performance of their short line as better than that previously provided by their Class I railroad. There are statistically significant differences in opinions of the two shipper groups regarding how much better the short line's performance is compared to the predecessor railroad.

4. Only about 10 percent of the total shipper sample reported a loss in access to markets or inbound freight origins after the Class I railroad was replaced by the short line. In contrast, approximately 18 percent of the shipper sample reported a gain in access to markets or inbound freight origins. Thus, there is no evidence that short line rail service restricts shipper options on either inbound or outbound freight movements.

5. After Class I railroad service was replaced by short line rail service, about 38 percent of the total shipper sample said they are shipping more or much more by rail, 49 percent are shipping the same amount, and only about 14 percent said they are shipping less or much less by rail.

6. The grain and non-grain shipper groups think the short lines perform best (relative to motor carriers) on rates, but both groups rate short lines as generally worse than motor carriers on service characteristics related to transit time, dependability of transit time, and frequency of service.

7. The grain shippers have a higher opinion of short line rate and service performance (relative to motor carriers) than do non-grain shippers.

8. The Iowa and Kansas shipper groups revealed that their short lines performed better than motor carriers on inbound and outbound rates (except for Kansas shipper comparison of Rates on Outbound Freight). However, both shipper groups indicated that short line performance is, in general, worse than motor carriers on service characteristics related to access, transit time, dependability of transit time, and frequency of service. The Iowa shipper group is more impressed with the rate and service performance of their short lines (relative to motor carriers) than the Kansas shippers are with their railroads.

9. When the sample shippers are asked to select the transportation mode that provides the best service, the Iowa and grain shipper groups select short line railroads and the Kansas and non-grain groups prefer motor carriers.

10. When the sample shippers are requested to select the transportation mode that provides the best combination of rates and service, the impact is to reduce the percentage that prefer motor carriers. However, the addition of rates to the selection criteria does not change the preferred mode of any shipper group.

CHAPTER 6

PROFILE OF A SUCCESSFUL SHORT LINE RAILROAD

One of the primary objectives of this study is to develop a profile of a successful short line railroad, where success is defined as long run profitability. We obtained the ingredients of a successful short line through personal interviews of executives of Iowa and Kansas line haul short lines as well as through detailed questionnaires completed by these executives. We also received input from personal interviews of shippers located on Iowa and Kansas short lines. Personal interviews of administrators of the Iowa DOT short line financial assistance programs also contributed to the development of the profile.

Keys to Profitability--Views of Short Line Railroad Executives

With the exception of one railroad, personal interviews were conducted with the top executive officers of each of the 12 Iowa and Kansas short lines in the study. In these interviews, the executives stressed the importance of adequate traffic density for profitable operation of a short line. According to the executives, adequate traffic density could be achieved in several different ways. One alternative is through a highly diversified traffic base of different commodities. Another possibility is through a traffic base of relatively few commodities which have high and stable traffic levels. A third alternative is a traffic base composed of a few major commodities whose traffic cycles offset each other, resulting in traffic density stability on an annual basis. One executive said that excessive reliance on seasonal traffic, such as grain, has a negative effect on profitability.

The executives heavily emphasized the contribution to profitability of a skilled, innovative labor force that has prior experience in the rail industry. The management team must have prior experience in railroad operations and marketing and be able to balance cost control with a level of track maintenance that will facilitate good service to shippers.

According to the short line executives, the relationship of the short line to Class I railroads is a key determinant of profitability. One aspect of this is friendly connections to more than one Class I railroad. Multiple connections increase shipper access to additional markets or inbound freight origins which increases short line traffic density. Connections to more than one Class I railroad also gives the short line access to more rail cars and the ability to supply more rail service. Multiple Class I railroad connections tend to increase the bargaining power of the short line with regard to negotiating favorable revenue splits on joint movements, lower switching charges, and reduced car hire fees.

The short line executives emphasized the need to secure certain commitments from Class I railroads at the time of purchase or lease when the short line is in a good bargaining position. These commitments include guaranteed access to Class I overhead traffic, provision of an adequate number of Class I rail cars, and the right of the short line to establish its own prices for local traffic. These commitments are vital to profitability since Class I overhead is a large part of the traffic base of many short lines, the short line loses business to alternative modes without adequate car supply, and the short line needs the ability to set prices that will attract traffic to the railroad.

Since short lines are dependent on Class I railroads to originate their inbound traffic and deliver their outbound commodities, the short line executives stressed the importance of developing a good relationship with connecting Class I railroads. This will aid the short line in attracting more traffic and increases profits. In a similar vein, the executives said that short line operators should never purchase or lease a line from a Class I railroad that is not interested in a long term feeder relationship that benefits both railroads. A Class I railroad that is only interested in a one-time cash infusion is less likely to cooperate on matters that are vital to short line profitability such as rail car supply, fair revenue splits on joint movements, overhead traffic, and market access.

The short line executives emphasized the significance of several financial matters for the long run profitability of the railroad. They stressed the importance of not paying too much for the line if it is purchased from another railroad. The purchase price should be geared to conservative estimates of traffic and revenue. If the short line management is too optimistic, the actual cash flow will not be sufficient to service the debt, ultimately resulting in insolvency.

They said that the short line must begin operations with the appropriate capitalization. This allows management to acquire the correct number and type of locomotives and immediately address track quality problems associated with deferred maintenance by the previous owner. If the short line accomplishes this, it can offer high quality service that will attract traffic. If under-financed, cash flow and service quality problems that eventually lead to failure.

The short line executives are somewhat divided on the benefits of owning the line as opposed to leasing. The proponents of leasing point to lower debt service benefits. Critics of leasing claim they avoid the inherent problems of control that arise through over-dependence upon Cklass I railroads. Leasing agreements often restrict the short line's ability to expand via connections to other Class I systems. Also, the leasing Class I railroad may require the short line to adopt the Class I's prices which may be uncompetitive and fail to capitalize on the lower cost structure of the short line.

The executives agree that state financial assistance is important to the survival and expansion of the short line railroad industry. In the absence of state guarantees, lenders are reluctant to loan money

to short lines for the purpose of rehabilitating track. If the railroad is unable to repay the loan, the lender's only recourse is to sell an illiquid asset. Salvage value of the rail track is rarely equal to the rehabilitation loan. And since short line railroads are an inherently small risky enterprise, lenders are not likely to extend credit in the absence of state guarantees.

State guarantees shift the risk of non-payment from the lender to the taxpayer. Hence, the state must determine if the applicant has a reasonable opportunity to succeed. The state should also make its credit guarantee contingent on the applicant providing rail service as opposed to acquiring the tracks and then selling them for salvage value.

In the detailed questionnaires completed by executives of short line railroads, they were asked to prioritize several potential ingredients for a profitable short line railroad. From the choices displayed in Table 39, each of the executives expressed their views by ranking the three most important determinants of short line profitability in order of importance (i.e., first, second, and third most important).

Table 39 shows that the short line executives ranked Adequate Traffic Levels as the most important determinant of short line profitability. It received more first place "votes" than any other determinant and also the most executives ranking it as one of the three most important determinants. Other determinants receiving support as one of the three most important profitability determinants include Access to More Than One Connecting Carrier, Adequate Track Quality, and Reasonable Purchase Price.

The executives also offered some observations on the reasons for short line failure. Some of these cannot be controlled by the short line such as the loss of a major shipper who either goes out of business, relocates, or begins using other transportation carriers. Other events beyond the control of the short line that can lead to failure are disasters such as floods that destroy many bridges and track miles that have to be completely replaced. Another example is the loss of Class I overhead traffic.

The executives also detailed reasons for failure that can be controlled by the short line. The one most frequently cited by the executives is an ill-conceived business plan which overestimates revenue and understates costs. As a result, the short line pays too much for the line and the principal and interest payments cannot be paid from the available cash flow. The executives noted that profitable short lines can become unprofitable if they fail to re-invest the cash flow of the railroad from the first several years of profitability in track maintenance and rehabilitation. The executives said the freight carrying short lines can become unprofitable if they try to operate passenger or tourist trains which nearly always lose money.

Table 39
Ranking of the Determinants of Short Line Railroad Profitability
Executives of Short Line Railroads*

Profitability Determinant	First in Importance	Second in Importance	Third in Importance	Total
Strong Shipper Support	0	3	0	3
Adequate Track Quality	0	1	3	4
Reasonable Purchase Price	1	2	1	4
Adequate Traffic Levels	5	0	1	6
Ship Many Different Commodities	2	0	0	2
Access to More Than One Connecting Carrier	1	0	4	5
State Financial Assistance	0	0	1	1
Ability to Compete With Motor Carriers	0	1	0	1
Experienced Management	2	1	0	3
Reliance on Equity Financing	0	0	0	0
Access to Own Equipment	1	2	0	3
Cooperation From Connecting Railroads on Joint Rates and Revenue Splits	0	1	1	2

* Numbers in the table are the number of short line railroad executives giving the various importance ranks to the given profitability determinants.

Keys to Profitability -- Views of the Short Line Railroad Shippers

In personal interviews, shippers located on Iowa and Kansas line haul short lines expressed their opinions regarding the major variables influencing short line profitability. Many of the factors suggested by the shippers mirror those that emerged from interviews with the short line railroad executives. However, the shippers had many original ideas as well.

Like the short line executives, the shippers stressed the importance of adequate traffic density for short line profitability. According to most shippers, adequate traffic density can best be achieved through a high, stable, non-seasonal traffic base that minimizes excess capacity on an annual basis. The shippers also emphasized that potential short line operators should conduct a very careful analysis of potential traffic before acquiring a line. This would include obtaining answers to questions such as:

1. Who is the competition and what are their strengths and weaknesses?
2. How much and what types of traffic can be diverted from motor carriers to the short line?
3. How much and what types of traffic can be diverted from the short line to motor carriers?

Shippers emphasized the importance of high quality management to the financial success of short lines. The top officers of the short line should have extensive experience in the operating departments of other railroads. However, the marketing department should be composed of people who have extensive knowledge of and experience in the commodity markets of the firms on the short line. This will help the marketing department understand the transportation problems of shippers and devise solutions to those problems. The shippers also noted that the offices of the chief executives of the railroad should be close to the location of the shippers, not in a remote location such as Chicago. Proximity will facilitate the understanding of shipper needs and lead to more traffic and higher profitability.

The shippers stressed the importance of track quality to the success of the short line. The railroad should invest the capital necessary to achieve the desired track quality as soon as possible after acquisition of the line. Only by doing this will the short line be able to provide the level of service that will attract more traffic from the shippers on the line as well as additional overhead traffic.

According to the shippers, the long run profitability of short line railroads depends heavily on their relationship to Class I railroads. Before leasing or purchasing a line from a Class I railroad, potential short line operators need to obtain certain guarantees from the Class I railroad while the short line is in a relatively strong bargaining position. These guarantees are critical to the survival of short lines and include rail car supply, overhead traffic, and fair revenue splits on joint movements. Shippers on Kansas short lines were interviewed in the late winter and spring of 1992. A severe rail car shortage occurred during that period and many Kansas shippers complained that their short line was unable to provide service because of lack of access to Class I rail cars.

The shippers emphasized that short line profitability requires friendly connections to more than one Class I railroad. Multiple connections mean access to more markets and rail cars which lead to higher traffic levels and profits. However, the existence of multiple Class I railroad connections doesn't guarantee this result. The short line and the Class I railroad need to work together to develop a competitive joint rate that will benefit both railroads. Several shippers indicated that they are denied access to markets because the high switching charges levied by Class I railroads cause their short line to be uncompetitive.

Given the above points, many shippers have concluded that short line profitability requires the cooperation of Class I railroads. Regardless of the quality of short line service and willingness to innovate, short lines that connect to uncooperative Class I railroads will not survive. Uncooperative Class I railroads can deny market access through demanding high switching charges, failing to supply equipment, diverting overhead traffic to other carriers, charging unfair revenue splits on joint movements, and requiring excessively high car hire fees. In contrast, a Class I railroad can almost assure short line

profitability by cooperating on the above matters. Short lines have to build a good business relationship with their connecting Class I railroads because they deliver their traffic to markets and from inbound freight origins as well as supply the short line with overhead traffic and rail cars.

The shippers mentioned several financial variables that relate to the long run profitability of short line railroads. Like the short line railroad executives, the shippers mentioned the importance of not paying too much for the line. The purchase price should reflect conservative estimates of traffic, revenue, and expense so that actual cash flow is sufficient to pay interest and principal. Likewise, the shippers emphasized the need for the short line to have adequate initial capital to support track rehabilitations and equipment demands. Failure to do this leads to substandard service, loss of traffic, and insolvency.

Many of the Iowa shippers said that long run short line profitability is predicated on shipper traffic volume guarantees and equity investment in the short line. This gives the shippers a direct financial interest in the survival of the short line and triggers a mutually beneficial sequence of decisions. If all the shippers are pledged to support the short line, then all are assured of rail service in the long run. Thus, they will be more likely to continue to invest in their facilities on the short line which will further increase the traffic density and profitability of the railroad.

The shippers had several comments on the relationship of state policies to short line economic viability. They said that state financial assistance is important for the survival of short lines, many of which are chronically underfinanced. They also said the state could form a low cost short line insurance plan to insure against catastrophic events that destroy short line assets. The shippers noted that the long run profitability of a short line depends on the growth and profitability of the firms located on the line. Thus, states can assist short lines with a favorable business climate and aggressive recruitment of new firms.

Keys to Profitability -- Views of Iowa Department of Transportation Officials

The state of Iowa is one of the leaders in innovative short line assistance programs. In 1974, the Iowa legislature created the Iowa Rail Assistance Program, which has a track rehabilitation component and an economic development program. The track rehabilitation program provides state funds for rail branchlines with less than five million gross ton miles per year and to improve main lines, switching yards, and rail sidings. The economic development component is intended to assist the creation of new jobs or the retention of jobs that may be lost to other states. State funds can be used to construct a new rail spur or siding required by a firm or to rehabilitate an existing siding or spur for increased or renewed rail use. Approved projects may receive grants, and/or loans for up to 80 percent of the project's cost.

The Iowa Railroad Assistance Program pledged $23 million for 45 contracts to rehabilitate 1529 miles of branchlines. This leveraged $27 million of federal funds, $35 million from shippers and $43 million in Class I railroad funds for a total of $128 million.

The state of Iowa has another short line assistance program, the Iowa Railroad Finance Authority (IRFA), funded by an interest free loan from the state. IRFA may participate in the acquisition, rehabilitation, construction, refinancing, extension, replacement, repair or leasing of any railway facility, except railroad cars.

IRFA funded 8 projects to preserve/upgrade 757 miles of track. In these projects, $18.5 million in IRFA funds were used to leverage $19.9 million in shipper and railroad funds. In addition, 16 miles of rail line have been rehabilitated on three projects at a total cost of $510,000 which used $405,000 in IRFA loans to leverage $105,000 in shipper and railroad funds.

In summary, the two Iowa railroad assistance programs have preserved rail service on 2,300 miles of the Iowa railroad network. Administrators of these programs at the Iowa Department of Transportation (IDOT) have many years of experience in evaluating requests by short line railroads for state financial assistance. Thus, they have developed several criteria for a profitable short line project that minimizes risk to state funds. Many of these criteria coincide with those suggested by short line railroad executives and shippers.

IDOT officials affirm the need for state financial assistance for short line railroads. The benefits and costs of each proposal for state funding are estimated and only those projects with the most favorable benefit-cost ratios are funded. IDOT officials indicate that even though the rail projects are an economically efficient use of resources (benefits > costs), most, if not all, of the projects would never occur if they had to rely entirely on private financing. Banks are unwilling to lend money for track rehabilitation without a state guarantee because short line operation is risky and the collateral is an illiquid asset. Short lines need a lender willing to make long term loans at low interest rates, a function the state provides.

The business plans of potential short lines must be based on realistic estimates of traffic, revenue, operating expense, and track maintenance expense. The plans must consider existing and potential competition, deferred track maintenance by the previous owner, and the potential for retrieving business lost to other carriers. Too much optimism is a prescription for continuing the fiscal problems associated with poor service and low traffice density.

State financed short line projects require equity investment by both the shippers and the railroad. This is very important since all parties have a financial interest in the success of the railroad. The shippers will use the railroad and reinvest money in their facilities on the line. The management of the

railroad will be motivated to provide the shippers with superior service at competitive prices.

IDOT officials stressed that short line railroads need to be appropriately capitalized at the start of operations. This will allow the railroad to obtain the appropriate types and amounts of equipment and immediately attend to deferred track maintenance. If this isn't done soon after acquisition, the railroad will be unable to attract overhead traffic or sufficient business from the shippers on their rail line to operate profitably. Thus, each short line receiving state assistance is contractually obligated to invest a minimum of $6 to $10 thousand annually in track maintenance.

IDOT officials emphasized that the management team of the short line must have experience in railroad operations, engineering, marketing, and finance.

According to IDOT officials, multiple connections to Class I railroads is crucial to short line profitability. The larger the number of "friendly" connections, the better the market access of the short line. Since short lines are heavily dependent on Class I railroads for rail cars and market access, they must negotiate terms with connecting Class I railroads that are essential to the short line's survival. Prior to acquisition or leasing, the short line must negotiate reasonable switching charges to assure market access, a guaranteed supply of rail cars, fair revenue splits on joint movements, the right to establish their own local rates, and access to Class I railroad overhead traffic. In other words, a feeder relationship needs to be developed that benefits both railroads.

IDOT officials emphasized that short line railroad profitability requires a diversified traffic base. Dependence on a single large shipper or industry directly links the survival of the short line to the fortunes of a single shipper or industry. Also, short line profitability will be enhanced by a traffic base that includes some higher valued commodities that generate higher railroad revenue.

IDOT officials stressed the need to help new short line railroads move up the "learning curve" faster. This could be done by state provision of a list of railroad equipment suppliers, retired railroad executives, short line railroad consulting firms, and providers of railroad engineering services.

Summary

Based on the input of short line railroad executives, shippers located on short lines, and IDOT officials, the following profile of a profitable short line railroad can be specified (no particular priority is implied).

Traffic Components

1. Adequate traffic density.
2. Stable, non-seasonal traffic to minimize excess capacity.
3. Diversified traffic base to avoid the risk of market downturns in individual industries.
4. Traffic base includes some high valued products that will generate higher rail revenue per carload.

Management and Labor Components

1. Motivated, skilled, flexible employees and management with extensive prior experience in the rail industry.
2. Management team should include people skilled in railroad operations, marketing, and finance.
3. The marketing department should include people with a good understanding of the markets of the firms on the rail line.
4. The management of the short line should have their home office located close to the shippers on the rail line.
5. Good management control of railroad costs.

Relationship to Class I Railroads

1. Multiple connections to different Class I railroads.
2. Guaranteed access to Class I overhead traffic and rail cars.
3. Reasonable switching charges with Class I railroads to maximize market access and inbound freight sources for the short line's shippers.
4. Short line sets local rates for movements on its own system.
5. Develop a feeder relationship with Class I railroads that benefits both railroads.

Financial Components

1. Equity investment by both the shippers and the railroad.
2. Realistic business plan based on conservative estimates of short line traffic, revenue, and expenses coupled with rigorous analysis of the strengths and weaknesses of actual and potential competitors.
3. The purchase price of the line should be based on conservative estimates of expected traffic, revenue, deferred maintenance expense, and operating expense. Paying a reasonable price for the line insures that principal and interest payments can be serviced by actual cash flow.
4. The short line should be appropriately capitalized at the beginning of its operation, permitting the railroad to make needed investments in equipment and track quality.
5. To rehabilitate track, short lines need long term loans at low interest rates that can be accomplished through loans or grants from the state or state guarantees of bank loans.

Track Quality Component

1. The short line needs to invest in track quality as soon after line acquisition as possible so that it can provide high quality service and attract traffic.

State Assistance Components

1. Provide financial assistance to short line railroads.
2. Furnish short lines with information regarding sources of engineering services, economic consulting services, railroad equipment suppliers, and retired railroad executives willing to give management advice.
3. Promote economic development through provision of an entrepreneurial business climate and aggressive recruitment of new business firms.
4. State financed insurance plan to protect short line assets from catastrophic events.

To be profitable in the long run, short lines do not need to have all the components in the profile. Weaknesses in some areas can be offset by unusual strengths in other areas. However, a profitable short line probably needs to have a majority of the components in each of the major areas of the profile. According to short line executives, adequate traffic density and a diversified traffic base are particularly essential.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

This study has the following three objectives:

1. Determine if short line railroads are a viable transportation alternative to abandonment.
2. Identify the key factors that determine short line success or failure.
3. Compile a profile of a successful short line railroad to help guide the allocation of state financial assistance.

The objectives of the study were achieved through personal interviews of 264 shippers located on 12 line haul short line railroads in the states of Iowa and Kansas. Personal interviews were conducted with executives of the 12 short lines and with administrators of short line financial assistance programs at the Iowa Department of Transportation (IDOT). The shippers and the short line executives also completed detailed questionnaires. The questionnaires and personal interviews of the shippers reveal the strengths and weaknesses of short line railroads and thus indicate if the users of short lines regard them as a viable transportation alternative. The shipper questionnaires divulge their use of short line railroads relative to competing modes and compare the rates and service of short lines to the shipper's previous Class I railroad and to motor carriers. The shipper questionnaires also indicate whether they prefer short lines, Class I railroads, or motor carriers as their primary carrier and the reasons for their preference.

Objectives 2 and 3 were accomplished through personal interviews of Iowa and Kansas short line executives, the shippers located on these railroads, and officials of IDOT that administer the Iowa short line financial assistance programs. Additional information for the profile was obtained from the detailed questionnaires completed by the short line executives.

Conclusions

The study identifies the criteria that shippers regard as most important in their selection of a particular mode of transportation. Shipper use of a particular mode, and thus its economic viability, depends on the ability of the mode to satisfy these criteria.

Both the grain and non-grain shippers ranked the transportation rate as the most important determinant in their choice of transportation mode. However, the grain shippers ranked market access and weekly service as the second and third most important determinants, whereas the non-grain shippers

selected delivery time and dependability of delivery time. Thus, since grain and non-grain shippers place emphasis on different price-service factors in making modal selections, they will tend to prefer different modes if the available modes have different abilities to meet the selection criteria of a particular shipper group.

Apparently the Iowa short lines are doing a better job than other modes of satisfying the mode selection criteria of Iowa grain shippers that are located on the sample short line railroads. In 1991, the Iowa grain shippers in our sample moved 77 percent of their combined corn and soybean shipments by short line and received 53.5 percent of their fertilizer tonnage by short line. In contrast, the sample Kansas grain shippers employ motor carriers more than short lines for outbound grain shipment and inbound fertilizer receipts. In 1991, the sample Kansas grain shippers moved 46 percent of their grain shipments by railroad and 54 percent via motor carrier. They also received 75 percent of their fertilizer tonnage by motor carrier.

Evidently, short lines and motor carriers are performing equally well in terms of satisfying the inbound freight mode selection criteria of Iowa non-grain shippers located on sample Iowa short lines. The sample Iowa non-grain shippers as a group employed railroads and motor carriers about equally for inbound freight in 1991. However, they utilized motor carriers much more than railroads for outbound freight shipments.

Motor carriers appear to be performing better than railroads on the mode selection criteria of sample Kansas non-grain shippers located on sample short line railroads. Two-thirds of the sample shippers received 50 percent or more of their 1991 inbound freight by motor carrier and 70 percent of the sample shippers reported that they used motor carriers to ship 50 percent or more of their 1991 outbound freight.

It is not known why the Iowa short lines appear to meet the mode selection criteria of shippers better than Kansas short lines. One hypothesis is that three of the six sample Kansas short lines were formed after 1989, whereas only one of the six Iowa short lines fits this criteria. Therefore, the Kansas short lines as a group are not as experienced as the Iowa short lines. An alternative hypothesis is that the Iowa short lines and Class I railroads have developed more mutually beneficial feeder relationships than is the case in Kansas. A third alternative hypothesis is that the acute Class I rail car shortage in Kansas during the fall of 1991 and winter of 1992 may have caused many sample Kansas grain shippers to employ motor carriers even though they may have preferred to ship by rail.

Shipper evaluation of the price and service performance of their short lines is an alternative method of measuring the economic viability of short line railroads. If the shippers view short lines as providing a competitive transportation service (relative to other carriers), it can be inferred that they have

a viable role in the transportation market. To test this hypothesis, sample shippers were requested to evaluate the price and service performance of their short lines, independent of the performance of other modes. The shippers also compared the price and service performance of their short lines to the performance of their previous Class I railroads and to that of motor carriers. All three evaluations revealed broad based shipper support for short line railroads.

In the evaluation of short line price and service (independent of that of other modes), shippers located on Iowa and Kansas short lines indicated general approval of their short line railroads. This is true whether the sample is divided into grain vs. non-grain or Iowa vs. Kansas shipper groups.

In the comparison of short line price and service to that of their previous Class I railroads, both the grain and non-grain shippers rated the short line as better than the previous Class I railroad. However, the grain shippers observed a greater improvement in rates and service from their short lines than did the non-grain shippers. When the sample is divided into Iowa and Kansas shipper groups, both groups rated the price and service performance of their short lines as better than that provided by their previous Class I railroad. However, there are statistically significant differences in opinions of the Kansas and Iowa shipper groups regarding how much better the short line performance is compared to the predecessor railroad.

Other evidence from the shipper questionnaires indicates that shippers on Iowa and Kansas short lines view their short lines more favorably than their previous Class I railroad. For example, only 10 percent of the total shipper sample reported a loss in access to markets or inbound freight origins after the Class I railroad was replaced by the short line. In contrast, 18 percent of the shipper sample reported a gain in access to markets or inbound freight origins. The other 72 percent of the sample reported no change. Thus, there is no evidence that short line rail service restricts shipper options on either inbound or outbound freight movements.

The shipper questionnaires contain other statistical data that are consistent with the results of the short line vs. previous Class I railroad comparison. For example, after Class I railroad service was replaced by short line rail service, 38 percent of the total shipper sample said they are shipping more or much more by rail, 49 percent said they are shipping the same amount, and only 14 percent said they are shipping less or much less by rail.

The shippers located on Iowa and Kansas short line railroads also compared the price and service performance of their short lines to that of motor carriers. Both the grain and non-grain shipper groups think short lines perform best (relative to motor carriers) on rates, but they rate short lines as worse than motor carriers on service characteristics related to transit time, dependability of transit time, and frequency of service. This result implies that short lines can increase their market share by improving in these areas.

In general, the grain shippers have a higher opinion of short line rate and service performance (relative to motor carriers) than do the non-grain shippers.

The Iowa and Kansas shipper groups revealed that their short lines performed better than motor carriers on inbound and outbound rates (except for Kansas shipper comparison of Rates on Outbound Freight). However, both shipper groups indicated that short line performance is worse than motor carriers on service characteristics related to access, transit time, dependability of transit time, and frequency of service. These are the service areas that short lines need to improve if they want to raise their market share.

The short line vs. motor carrier comparison of rates and service revealed that the Iowa shipper group is more impressed with the rate and service performance of their short lines (relative to motor carriers) than the Kansas shippers are with their railroads.

In summary, the above evaluations and comparisons indicate that the shippers regard the rates and service of short lines as equal to or better than that provided by other types of transportation. Of course, there are exceptions to this conclusion. Shippers requiring fast delivery times and frequent service regard motor carriers as a superior alternative to either short line or Class I railroads. However, the shipper opinion analysis reveals broad based shipper support for short line railroads.

The hypothesis of economically viable short lines is reinforced by other information obtained from the shipper questionnaires. To assess the ability of short lines to compete with other modes, the shippers were asked to select the mode that they feel provides the best service. The mode receiving the largest percentage of "votes" from the Iowa and grain shipper groups is short line railroads. In contrast, motor carriers received the most "votes" from the Kansas and non-grain shipper groups. This result is consistent with the actual use of motor carriers and short lines by the various shipper groups.

For the shippers who prefer the service of short lines, the most frequently cited reason for their preference is the high quality service geared to the transportation needs of the individual shipper. The grain shippers that prefer the service of short line railroads cited a number of rail shipment advantages for grain that are not unique to short lines. Class I railroads also have those advantages but since the sample shippers are located on short lines, they attributed these to short lines. These advantages include the following:

1. The opportunity to obtain origin grades for grain that allow the shipper to select the best market for a given grain shipment.

2. Faster payment with rail shipments compared to motor carrier shipments.

3. Less paperwork with rail shipments due to the larger railroad shipment sizes.

4. Less congestion around the grain elevator during harvest periods.

5. The efficiency of shipping much larger volumes by railroad.

6. The ability to ship a large amount of grain more quickly by railroad compared to motor carriers.

The shippers who prefer motor carrier service frequently cited the fast delivery times, especially for short hauls, as one of the major reasons for their preference. They also mentioned other reasons such as dependable pick-up, delivery, and transit times and the ability to provide door-to-door service to more locations than railroads. Manufacturing firms practicing Just-in-Time (JIT) inventory management techniques cited their need for fast, dependable, small order size motor carrier service. Other reasons for preferring motor carrier service include better equipment availability and the ability to ship products with little advance notice to the carrier.

The shippers who expressed a preference for Class I railroad service cited several service advantages of Class I railroads relative to short line railroads. These include the following:

1. Class I railroads have direct access to more markets than short line railroads.
2. Class I railroads are able to supply more equipment than short line railroads.
3. Class I railroad equipment is of higher quality than short line equipment.

The shippers were also requested to select the transportation mode that provides the best combination of rates and service. When the choice criteria are changed in this way, the impact is to reduce the percentage of shippers that prefer motor carriers. However, the addition of rates to the selection criteria does not change the preferred mode of any shipper group.

When the entire shipper sample is considered and the mode selection criteria is service, the number of shippers preferring short line railroads or motor carriers is virtually identical. If the selection criteria are rates and service, the number of shippers that prefer short lines substantially exceeds the number that prefer motor carriers. This reaffirms the conclusion that shippers regard short lines as a viable transportation alternative.

As one would expect, the reasons for shipper mode preference on the basis of rates and service include many of the service factors cited by shippers when the mode selection is based solely on service. Thus, only the rate related reasons for shipper mode preferences are mentioned here.

Shippers who prefer the rates and service of short lines mentioned the low rates (relative to motor carriers) for longer haul shipments. Shippers also stated that short line rates are lower than Class I rail rates due to lower labor costs. Grain shippers prefer to employ railroads for longer haul shipments because the low rates allow them to receive a higher price for their grain.

Shippers who prefer motor carriers when the mode choice criteria are rates and service mentioned the low motor carrier rates for short haul movements as the primary reason for their preference. Grain shippers located close to their primary markets employ motor carriers since the low motor carrier rates for short hauls allow them to realize a higher price for their grain.

The shippers who prefer Class I railroad rates and service mentioned some rate advantages of Class I railroads (relative to short line railroads) as the major reasons for their preference. Based on their experiences, these shippers noted that the rates for Class I railroad only movements are lower than joint Class I railroad-short line movements because of the switching charges reflected in joint rates. These shippers also said that since Class I railroads have direct access to more markets than short lines, the Class I railroad can offer lower rates to more markets due to less interlining.

The above discussion indicates that various shippers prefer different modes, because of their different transportation requirements. The transportation modes offer different price-service characteristics and individual shippers select the modes that deliver what the individual shipper regards as important. Since the important mode selection criteria varies by individual shipper, and the transportation modes offer different price-service attributes, it implies that each mode has a role to play in the transportation system.

Each mode has comparative advantages and disadvantages. For example, short line railroads are able to provide personalized service to each shipper on their lines because they have small number of shippers. Grain shippers strongly endorse short lines because of the rail transport advantages for moving grain in large volumes over long distances. Short lines are able to offer lower rates than Class I railroads because they have lower labor costs. If the short line's advantages coincide with the shipper's most important modal selection criteria, the shipper will select the short line.

However, short line railroads also have disadvantages relative to Class I railroads. For example, Class I railroads have direct access to more markets than short lines simply because the Class I railroad serves a large area while short lines serve small areas. The Class I railroads can provide more and newer equipment than short line railroads because the Class I railroad serves more customers and has better access to capital. Many short lines have very little local traffic and rely on Class I railroads to deliver their inbound and outbound freight. Since the short line must interline its traffic with other railroads, its rates may be higher than the corresponding Class I railroad rate that involves no interlining. If the Class I railroad's comparative advantages correspond with the shipper's most significant modal selection criteria, the shipper will prefer the Class I railroad.

Motor carriers have comparative advantages relative to both Class I and short line railroads. These include faster delivery times, more dependable transit times, door-to-door service to more locations, and

lower prices for short haul movements. Shippers that regard these advantages as important to their logistics systems will select motor carriers.

The reasons given by shippers to explain their modal preferences suggest ways in which short line and Class I railroads could cooperate for their mutual benefit. For example, short lines can feed more rail traffic to Class I railroads through high quality, personalized service. The Class I railroads can broaden market access for short line railroads by setting competitive joint rates.

In summary, the different transportation requirements of shippers and the different comparative advantages of transportation firms mean that all the modes have a role in the transportation market. Thus, short line railroads are an economically viable transportation alternative.

A profile of a successful (profitable) short line railroad was obtained through personal interviews of executives of Iowa and Kansas short line railroads, shippers located on these railroads, and administrators of the state of Iowa railroad financial assistance programs. The profile is comprised of the following six components:

Traffic
Management and Labor
Relationship to Class I Railroads
Finance
Track Quality
State Assistance

The short line executives, shippers, and IDOT officials emphasized the importance of adequate traffic density for profitable short line operation. Also the traffic base should be stable, non-seasonal, diversified, and contain some high value products.

Short line profitability requires skilled, motivated, flexible employees and management with extensive prior experience in the rail industry. The management team should include people with skills in railroad operations, marketing, and finance and who carefully control costs.

Short line profitability is heavily dependent on the relationship of short lines to Class I railroads. Short lines need guaranteed access to Class I overhead traffic and rail cars as well as reasonable switching charges with Class I railroads to maximize short line market access and inbound freight sources. If a line is leased from a Class I railroad, the short line must be allowed to set its own local rates. Short line profitability is also directly related to multiple connections with different Class I railroads.

The purchase price of the line should be based on a rigorous business plan built on realistic estimates of revenue, traffic, operating expense, and deferred maintenance expense. The short line must be properly capitalized at the beginning of its operation and if track rehabilitation is necessary it must be

financed with long term loans at low interest rates, possibly by state guarantees of bank loans. Equity investment in the short line by both the shippers and the railroad is also desirable.

The short line needs to invest in track quality as soon after line acquisition as possible so that it can provide high quality service and attract traffic.

In addition to financial assistance, states can assist short line profitability in other ways. They can furnish short lines with information such as suppliers of railroad equipment and engineering services, suppliers of short line railroad consulting services, and names of retired railroad executives willing to provide management advice. States can also assist short lines by promoting economic development.

Recommendations

The short line industry is likely to grow in the future. The Santa Fe and Union Pacific plan to spinoff 9,700 miles of track between them during the 1990-95 period and Southern Pacific has announced plans to spinoff 3,000 miles of its system to short line operators in 1993. Most, if not all, of this track will have to be rehabilitated by the short lines. However, private lending institutions are unlikely to lend the required funds since they view short line railroads as risky ventures and the collateral of the loan (the tracks) is an illiquid asset. If the necessary financing fails to occur, the lines will be abandoned. The federal government is unlikely to underwrite the potential growth of short lines as the Local Rail Service Assistance (LRSA) program is capable of funding only a small fraction of the industry's potential growth. Thus, the individual states will be forced to choose between abandonment and financial assistance of short line railroads.

The railroad financial assistance programs of the state of Iowa have much to recommend them as a model for other states to follow. Between 1974 and 1991, the state of Iowa has funded 65 railroad assistance projects that preserved service on 2,300 miles of the Iowa railroad system. The state has utilized $42.5 million of its money to leverage $105.9 million in federal government, shipper, and railroad funds.

The rail financial assistance programs of Iowa have a good mix of alternative types of assistance that include grants, loans and economic development projects.

There is also a great deal of flexibility in the types of projects that are eligible for state assistance. For example, the track rehabilitation component of the Iowa Rail Assistance Program provides funds to rehabilitate branchlines with less than five million gross ton miles per year as well as funds to improve main lines, switching yards, and sidings. The economic development component of the program has funds

to construct a new rail spur or siding necessary to an industry, or to rehabilitate an existing siding or spur for increased or renewed rail use.

The Iowa Rail Finance Authority (IRFA) also has a great deal of flexibility regarding the types of rail projects it can fund. IRFA can participate in the acquisition, rehabilitation, construction, refinancing, extension, replacement, repair, or leasing of almost any rail facility. Railway facilities eligible for assistance are defined as any land, structures, fixtures, buildings, and equipment necessary or useful in providing rail transportation, with the exception of railroad cars.

The state of Iowa prioritizes requests for financial assistance by benefit-cost ratio. The business plans submitted by applicants are rigorously examined to assure realism in estimates of revenue and expense. Administrators of the Iowa rail assistance programs also examine the background of the management of potential short lines, insisting that they have extensive prior experience in the rail industry.

Rail projects funded by Iowa financial assistance programs require equity investment by both the railroad and the shippers on the line. The railroad is more likely to succeed if the state, the railroad, and the shippers have a financial interest in its success. Also to help assure the survival of short lines, the state of Iowa requires recipients of its assistance to annually invest $6 to $10 thousand in track maintenance.

The state of Iowa assures the safety of its rail assistance funds by retaining control of the assets in case the short line operator fails. If this occurs, the state has the assets and can hire new management to operate the railroad.

Administrators of Iowa rail assistance programs continually monitor the performance of railroads receiving state funds and requires detailed annual reports containing traffic, financial, and operating data.

Although the Iowa short line assistance programs have been successful, short line performance might be enhanced by close coordination between IDOT programs and other state and private agencies whose objective is to promote economic development in rural areas.

Executives of short line railroads recommended that the federal government and the states consider some policy changes that could help short line railroads to lower their costs. Many executives said they have to comply with the same federal safety and environmental regulation as the Class I railroads. Since they are much smaller than Class I railroads, the same regulatory standards produce relatively greater cost burden on short lines. Thus, some regulatory relief may be warranted. Also, short line executives said they have to bear the costs of maintaining rail-highway crossings, though, in their view, highway traffic causes most of the maintenance problems. Thus, states should consider paying some of the costs of maintaining rail-highway crossings.

Short line executives recommended that states consider grants for short line track rehabilitation. Some executives said that they are reluctant to borrow more money and thus state loan guarantees for track rehabilitation are of limited usefulness. The executives argue that states spend billions of dollars on highways and that grants for track rehabilitation would help "level the playing field."

One of the major concerns of shortline executives as well as grain shippers located on short lines is the long run supply of rail hopper cars. The grain car fleet is declining and since short lines are dependent on Class I railroads for rail cars, the ability of short lines to supply service to their grain shippers is threatened by this trend. Thus, states should consider leasing grain hopper cars and sub-lease them to short lines in their state.

Final Thoughts

This study has demonstrated that short lines are an economically viable transportation alternative. In addition, the report has specified the ingredients of a successful short line railroad and offered recommendations regarding the role that states have in preserving the short line rail service option. However, neither this study nor any other can foresee the long term financial survivability of short line railroads as an industry. Many questions remain such as:

- Will short line railroads be able to attract the necessary capital to replace worn out track and structures?
- Will Class I railroads help or hinder the long term profitability of short lines?
- Will the short line industry evolve into a few large holding companies who are able to diversify risk and provide capital?

Perhaps the short line industry will evolve as all the other industries in a market economy. The well managed firms will prosper while the poorly managed will fail.

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APPENDIX A

QUESTIONNAIRE FOR GRAIN SHIPPERS LOCATED ON IOWA AND KANSAS SHORT LINE RAILROADS

Part A: GRAIN RECEIPTS

Please provide grain receipts from farmers for the three year period 1989-1991. If there is more than one elevator station in the company, simply provide grain receipts for all the elevators in the company as a single total. If possible, provide grain receipts on a calendar year basis. If not possible, please specify your fiscal year.

Grain Receipts
(Bushels)

Year	Wheat	Corn	Sorghum	Soybeans
1989				
1990				
1991				

Part B: FERTILIZER RECEIPTS AND GRAIN SHIPMENTS

Please provide rail and truck outbound grain shipments and inbound fertilizer receipts for the three year period 1989-1991. If there is more than one elevator station in the company, simply provide grain receipts for all the elevators in the company as a single total. If possible, provide data on a calendar year basis. If not possible, please specify your fiscal year.

Outbound Wheat-Bushels

Year	Rail	Truck
1989		
1990		
1991		

Outbound Sorghum-Bushels

Year	Rail	Truck
1989		
1990		
1991		

Outbound Corn-Bushels

Year	Rail	Truck
1989		
1990		
1991		

Outbound Soybeans-Bushels

Year	Rail	Truck
1989		
1990		
1991		

Inbound Fertilizer-Tons

Year	Rail	Truck
1989		
1990		
1991		

Part C: CURRENT GRAIN DESTINATIONS AND FERTILIZER ORIGINS

Please list the most important destinations (markets) for your grain shipments during the last 12 months. Also estimate the percent shipped by rail and truck to each destination market. List the most important origins for fertilizer and the percent delivered by rail and truck. If there is more than one elevator in the company it isn't necessary to provide this data for each elevator individually. Each row should add up to 100 percent.

Outbound Wheat
Current Markets (Previous 12 months)

Markets	Percent Shipped by Rail	Percent Shipped by Truck
1.		
2.		
3.		
4.		
5.		

Outbound Sorghum
Current Markets (Previous 12 months)

Markets	Percent Shipped by Rail	Percent Shipped by Truck
1.		
2.		
3.		
4.		
5.		

Outbound Corn
Current Markets (Previous 12 months)

Markets	Percent Shipped by Rail	Percent Shipped by Truck
1.		
2.		
3.		
4.		
5.		

Outbound Soybeans
Current Markets (Previous 12 months)

Markets	Percent Shipped by Rail	Percent Shipped by Truck
1.		
2.		
3.		
4.		
5.		

Inbound Fertilizer
Current Origins

Origins	Percent Received by Rail	Percent Received by Truck
1.		
2.		
3.		
4.		
5.		

Part D: RAIL SERVICE QUESTIONS

1. On what date did your current railroad begin serving your location?

2. What railroad(s) served your location prior to your current railroad? List all previous railroads, including changes of ownership that you are aware of.

3. What type of railroad served your location before the present railroad? Check one of the following:

   Short Line Railroad _____
   Class I Railroad _____
   No Rail Service _____

4. Does your current railroad provide access to any new markets or inbound freight origins that your previous railroad did not serve? If so, please describe.

5. Did you lose access to any markets or inbound freight origins when your former railroad was replaced by the current one? If so, please describe.

6. When your railroad changed from the previous carrier to the current carrier, how did the amount of your rail shipments change? Check one of the following:

   With the current carrier, I ship:
   Much More by Rail _____
   More by Rail _____
   Same _____
   Less by Rail _____
   Much Less by Rail _____

7. Referring to the previous question, why is this the case?

8. Did your company ship freight under a contract with your previous railroad? Check one of the following:

Yes _____
No _____

9. Does your company ship freight under a contract with your current railroad? Check one of the following:

Yes _____
No _____

10. When you ship or receive by rail, how many cars do you typically ship or receive at one time?

Cars shipped _____ Cars received _____

11. How often does your current railroad pick up or deliver rail cars? Check one of the following:

On Demand _____
Every Day _____
Three to Four Times Per Week _____
Two Times Per Week _____
Once a Week _____
Other (specify) _____

12. How often did your previous railroad pick up or deliver rail cars? Check one of the following:

On Demand _____
Every Day _____
Three to Four Times Per Week _____
Two Times Per Week _____
Once a Week _____
Other (specify) _____

13. If rail service became unavailable to you, how much would the profits of your firm be reduced? Check the one that best applies.

No impact _____
Less than 10 percent reduction _____
Between 10 percent and 25 percent reduction _____
Between 25 percent and 50 percent reduction _____
More than 50 percent reduction _____

14. If the firm's profits would be seriously reduced by a loss of rail service, what would be the firm's most likely reaction? Check the one that best applies.

Stay at the same location _____
Consider moving to a location with rail service _____
Definitely move to a location with rail service _____
Other (Explain) _____

Part E: CARRIER CHOICE QUESTIONS

Below is a list of transportation carrier characteristics that may influence your selection of one type of transport carrier over another (i.e. railroad or truck). Rank these characteristics from the most important to the least important. The most important is Number 1 and the least important is Number 8. ***Only one characteristic can be ranked Number 1, and only one characteristic can be ranked Number 2, etc.***

Transportation Characteristic	Importance Rank
The transportation rate	_____
Ability to ship to many markets	_____
Amount of time required to deliver my freight from origin to destination	_____
Predictability of the time it takes to ship my freight to destination	_____
The amount of weekly service provided by the carrier	_____
Lost or damaged goods	_____
Shipment tracing capability	_____
Billing procedures	_____

DEFINITIONS OF TRANSPORTATION SERVICE TO BE USED IN ANSWERING PARTS F, G, & H.

Market Access (outbound) - the number and type of profitable markets that can be served by the shipper with available transportation carriers.

Inbound Freight Service - the number of origins from which inbound freight is received. This refers either to inbound freight that is resold or inbound freight that is a component part of the company's product.

Transit Time - the number of days that it takes the carrier to deliver freight from the origin to the destination.

Dependability of Transit Time - the ability of the carrier to consistently achieve the same transit time.

Frequency of Service - the number of times per week that the carrier is willing and able to provide transportation service.

Loss and Damage Record - the number of shipments per year that are lost or damaged while in the carrier's possession.

Shipment Tracing Capability - the ability of the carrier to inform the shipper of the location of a shipment at any given time.

Billing Procedures - carrier practices regarding the payment of freight bills.

On-time Car Delivery - placement of rail cars by the carrier within the time frame specified by the shipper.

Equipment and Track Quality - the general condition of carrier's rail cars and track.

Rail Car Supply During Peak Periods - refers to ability of carrier to supply rail cars in sufficient quantity within the time frame requested by the shipper during harvest or other peak periods.

Part F: RATE AND SERVICE COMPARISON OF CURRENT RAILROAD TO PREVIOUS RAILROAD

If you or someone in the firm has had experience with both the current and previous railroad, compare your current railroad's rate and service characteristics to that of your previous railroad carrier.

Rate or Service Characteristic	Compared to my previous railroad, my current railroad is: much better	better	same	worse	much worse	NA
1. Rates on **outbound** freight	1	2	3	4	5	0
2. Rates on **inbound** freight	1	2	3	4	5	0
3. Market access (**outbound**)	1	2	3	4	5	0
4. **Inbound** freight service	1	2	3	4	5	0
5. Transit time for **outbound** freight	1	2	3	4	5	0
6. Transit time for **inbound** freight	1	2	3	4	5	0
7. Dependability of transit time for **outbound** freight	1	2	3	4	5	0
8. Dependability of transit time for **inbound** freight	1	2	3	4	5	0
9. Frequency of service for **outbound** freight	1	2	3	4	5	0
10. Frequency of service for **inbound** freight	1	2	3	4	5	0
11. Loss and damage record	1	2	3	4	5	0
12. Shipment tracing capability	1	2	3	4	5	0
13. Billing procedures	1	2	3	4	5	0
14. On-time car delivery	1	2	3	4	5	0
15. Quality of rail cars	1	2	3	4	5	0
16. Quality of the rail track	1	2	3	4	5	0
17. Rail car supply during peak periods	1	2	3	4	5	0

NA - not applicable

Part G: RATE AND SERVICE COMPARISON OF CURRENT RAILROAD TO MOTOR CARRIERS

The following questions ask you to compare the rates and service of your current railroad relative to motor carriers. In other words, is your current railroad better or worse than motor carriers. In answering the questions regarding service, please use the same definitions of service provided above.

Compare your current railroad's rate and service characteristics to that of motor carriers.

	Compared to motor carriers, my current railroad is:					
Rate or Service Characteristic	much better	better	same	worse	much worse	NA
1. Rates on **outbound** freight	1	2	3	4	5	0
2. Rates on **inbound** freight	1	2	3	4	5	0
3. Market access (**outbound**)	1	2	3	4	5	0
4. **Inbound** freight service	1	2	3	4	5	0
5. Transit time for **outbound** freight	1	2	3	4	5	0
6. Transit time for **inbound** freight	1	2	3	4	5	0
7. Dependability of transit time for **outbound** freight	1	2	3	4	5	0
8. Dependability of transit time for **inbound** freight	1	2	3	4	5	0
9. Frequency of service for **outbound** freight	1	2	3	4	5	0
10. Frequency of service for **inbound** freight	1	2	3	4	5	0
11. Loss and damage record	1	2	3	4	5	0
12. Shipment tracing capability	1	2	3	4	5	0
13. Billing procedures	1	2	3	4	5	0

NA - not applicable

Part H: RATE AND SERVICE CHARACTERISTICS OF CURRENT RAILROAD

Evaluate your current railroad's rate and service characteristics. In answering the questions regarding service, please use the same definitions of service provided above.

Rate or Service Characteristic	My current railroad is: very good	good	fair	poor	very poor	NA
1. Rates on **outbound** freight	1	2	3	4	5	0
2. Rates on **inbound** freight	1	2	3	4	5	0
3. Market access (**outbound**)	1	2	3	4	5	0
4. **Inbound** freight service	1	2	3	4	5	0
5. Transit time for **outbound** freight	1	2	3	4	5	0
6. Transit time for **inbound** freight	1	2	3	4	5	0
7. Dependability of transit time for **outbound** freight	1	2	3	4	5	0
8. Dependability of transit time for **inbound** freight	1	2	3	4	5	0
9. Frequency of service for **outbound** freight	1	2	3	4	5	0
10. Frequency of service for **inbound** freight	1	2	3	4	5	0
11. Loss and damage record	1	2	3	4	5	0
12. Shipment tracing capability	1	2	3	4	5	0
13. Billing procedures	1	2	3	4	5	0
14. On-time car delivery	1	2	3	4	5	0
15. Quality of rail cars	1	2	3	4	5	0
16. Quality of the rail track	1	2	3	4	5	0
17. Rail car supply during peak periods	1	2	3	4	5	0

NA - not applicable

Part I: SUMMARY QUESTIONS

In the following section you are asked which mode of transportation you feel provides the best service and why you think they are able to provide superior service. You are also asked which mode of transportation you prefer and the reasons for the preference.

1. Taking all the service characteristics into consideration which type of transportation carrier do you think provides the best overall service. Check one of the following:

Short Line Railroads	_____
Class I Railroads	_____
Motor Carriers	_____
Indifferent	_____
No Opinion	_____

2. If you have a preference in the preceding question, please explain the main reasons for your preference.

3. Taking rates and service into consideration, which of the following modes of transportation do you prefer. Check one of the following:

Prefer Short Line Railroads	_____
Prefer Class I Railroads	_____
Prefer Truck	_____
Indifferent	_____
No Opinion	_____

4. If you have a preference in the preceding question, please explain the main reasons for your preference.

5. Please make other comments on the back.

APPENDIX B

QUESTIONNAIRE FOR NON-GRAIN SHIPPERS LOCATED ON IOWA AND KANSAS SHORT LINE RAILROADS

Part A: INBOUND AND OUTBOUND FREIGHT

1. Name the most important commodities that arrive at your plant by inbound freight.

2. What percentage of your 1991 total inbound freight arrived at your location by the following types of transportation?

	Percentage
Short Line Railroad	_____
Class I Railroad	_____
Joint Short Line - Class I Railroad	_____
Motor Carrier	_____
Other (Name)	_____

3. What are the most important commodities shipped from your location via outbound freight?

4. What percentage of your 1991 total outbound freight left your location by the following types of transportation?

	Percentage
Short Line Railroad	_____
Class I Railroad	_____
Joint Short Line - Class I Railroad	_____
Motor Carrier	_____
Other (Name)	_____

Part B: OUTBOUND FREIGHT DESTINATIONS AND INBOUND FREIGHT ORIGINS

Please list the most important destinations (markets) for your outbound freight during the last 12 months. Also estimate the percent shipped by rail and truck to **EACH** destination market. List the most important origins for inbound freight and the percent delivered by rail and truck (last 12 months). Each row should add up to 100 percent.

Outbound Freight
Current Markets (Previous 12 months)

Markets	Percent Shipped by Rail	Percent Shipped by Truck	Percent Shipped Other
1.			
2.			
3.			
4.			
5.			

Inbound Freight
Current Origins (Previous 12 months)

Markets	Percent Received by Rail	Percent Received by Truck	Percent Received Other
1.			
2.			
3.			
4.			
5.			

Part C: RAIL SERVICE QUESTIONS

1. On what date did your current railroad begin serving your location?

2. What railroad(s) served your location prior to your current railroad? List all previous railroads, including changes of ownership that you are aware of.

3. What type of railroad served your location before the present railroad? Check one of the following:

   Short Line Railroad _____
   Class I Railroad _____
   No Rail Service _____

4. Does your current railroad provide access to any new markets or inbound freight origins that your previous railroad did not serve? If so, please describe.

5. Did you lose access to any markets or inbound freight origins when your former railroad was replaced by the current one? If so, please describe.

6. When your railroad changed from the previous carrier to the current carrier, how did the amount of your rail shipments change? Check one of the following:
   With the current carrier, I ship:

   Much More by Rail _____
   More by Rail _____
   Same _____
   Less by Rail _____
   Much Less by Rail _____

7. Referring to the previous question, why is this the case?

8. Did your company ship freight under a contract with your <u>previous</u> railroad? Check one of the following:
   Yes _____
   No _____

9. Does your company ship freight under a contract with your <u>current</u> railroad? Check one of the following:
   Yes _____
   No _____

10. When you ship or receive by rail, how many cars do you typically ship or receive at one time?

    Cars shipped _____ Cars received _____

11. How often does your <u>current</u> railroad pick up or deliver rail cars? Check one of the following:

    On Demand _____
    Every Day _____
    Three to Four Times Per Week _____
    Two Times Per Week _____
    Once a Week _____
    Other (specify) _____

12. How often did your previous railroad pick up or deliver rail cars? Check one of the following:

On Demand	_____
Every Day	_____
Three to Four Times Per Week	_____
Two Times Per Week	_____
Once a Week	_____
Other (specify)	_____

13. If rail service became unavailable to you, how much would the profits of your firm be reduced? Check the one that best applies.

No impact	_____
Less than 10 percent reduction	_____
Between 10 percent and 25 percent reduction	_____
Between 25 percent and 50 percent reduction	_____
More than 50 percent reduction	_____

14. If the firm's profits would be seriously reduced by a loss of rail service, what would be the firm's most likely reaction? Check the one that best applies.

Stay at the same location	_____
Consider moving to a location with rail service	_____
Definitely move to a location with rail service	_____
Other (Explain)	_____

Part D: CARRIER CHOICE QUESTIONS

Below is a list of transportation carrier characteristics that may influence your selection of one type of transport carrier over another (i.e. railroad or truck). Rank these characteristics from the most important to the least important. The most important is Number 1 and the least important is Number 8. ***Only one characteristic can be ranked Number 1, and only one characteristic can be ranked Number 2, etc.***

Transportation Characteristic	Importance Rank
The transportation rate	_____
Ability to ship to many markets	_____
Amount of time required to deliver my freight from origin to destination	_____
Predictability of the time it takes to ship my freight to destination	_____
The amount of weekly service provided by the carrier	_____
Lost or damaged goods	_____
Shipment tracing capability	_____
Billing procedures	_____

DEFINITIONS OF TRANSPORTATION SERVICE TO BE USED IN ANSWERING PARTS E, F, & G.

Market Access (outbound) - the number and type of profitable markets that can be served by the shipper with available transportation carriers.

Inbound Freight Service - the number of origins from which inbound freight is received. This refers either to inbound freight that is resold or inbound freight that is a component part of the company's product.

Transit Time - the number of days that it takes the carrier to deliver freight from the origin to the destination.

Dependability of Transit Time - the ability of the carrier to consistently achieve the same transit time.

Frequency of Service - the number of times per week that the carrier is willing and able to provide transportation service.

Loss and Damage Record - the number of shipments per year that are lost or damaged while in the carrier's possession.

Shipment Tracing Capability - the ability of the carrier to inform the shipper of the location of a shipment at any given time.

Billing Procedures - carrier practices regarding the payment of freight bills.

On-time Car Delivery - placement of rail cars by the carrier within the time frame specified by the shipper.

Equipment and Track Quality - the general condition of carrier's rail cars and track.

Rail Car Supply During Peak Periods - refers to ability of carrier to supply rail cars in sufficient quantity within the time frame requested by the shipper during harvest or other peak periods.

Part E: RATE AND SERVICE COMPARISON OF CURRENT RAILROAD TO PREVIOUS RAILROAD
If you or someone in the firm has had experience with both the current and previous railroad, compare your current railroad's rate and service characteristics to that of your previous railroad carrier.

	Compared to my previous railroad, my current railroad is:					
Rate or Service Characteristic	much better	better	same	worse	much worse	NA
1. Rates on **outbound** freight	1	2	3	4	5	0
2. Rates on **inbound** freight	1	2	3	4	5	0
3. Market access (**outbound**)	1	2	3	4	5	0
4. **Inbound** freight service	1	2	3	4	5	0
5. Transit time for **outbound** freight	1	2	3	4	5	0
6. Transit time for **inbound** freight	1	2	3	4	5	0
7. Dependability of transit time for **outbound** freight	1	2	3	4	5	0
8. Dependability of transit time for **inbound** freight	1	2	3	4	5	0
9. Frequency of service for **outbound** freight	1	2	3	4	5	0
10. Frequency of service for **inbound** freight	1	2	3	4	5	0
11. Loss and damage record	1	2	3	4	5	0
12. Shipment tracing capability	1	2	3	4	5	0
13. Billing procedures	1	2	3	4	5	0
14. On-time car delivery	1	2	3	4	5	0
15. Quality of rail cars	1	2	3	4	5	0
16. Quality of the rail track	1	2	3	4	5	0
17. Rail car supply during peak periods	1	2	3	4	5	0

Part F: RATE AND SERVICE COMPARISON OF CURRENT RAILROAD TO MOTOR CARRIERS

The following questions ask you to compare the rates and service of your current railroad relative to motor carriers. In other words, is your current railroad better or worse than motor carriers. In answering the questions regarding service, please use the same definitions of service provided above.

Compare your current railroad's rate and service characteristics to that of motor carriers.

Rate or Service Characteristic	Compared to motor carriers, my current railroad is: much better	better	same	worse	much worse	NA
1. Rates on **outbound** freight	1	2	3	4	5	0
2. Rates on **inbound** freight	1	2	3	4	5	0
3. Market access (**outbound**)	1	2	3	4	5	0
4. **Inbound** freight service	1	2	3	4	5	0
5. Transit time for **outbound** freight	1	2	3	4	5	0
6. Transit time for **inbound** freight	1	2	3	4	5	0
7. Dependability of transit time for **outbound** freight	1	2	3	4	5	0
8. Dependability of transit time for **inbound** freight	1	2	3	4	5	0
9. Frequency of service for **outbound** freight	1	2	3	4	5	0
10. Frequency of service for **inbound** freight	1	2	3	4	5	0
11. Loss and damage record	1	2	3	4	5	0
12. Shipment tracing capability	1	2	3	4	5	0
13. Billing procedures	1	2	3	4	5	0

NA - not applicable

Part G: RATE AND SERVICE CHARACTERISTICS OF CURRENT RAILROAD

Evaluate your current railroad's rate and service characteristics. In answering the questions regarding service, please use the same definitions of service provided above.

Rate or Service Characteristic	My current railroad is: very good	good	fair	poor	very poor	NA
1. Rates on **outbound** freight	1	2	3	4	5	0
2. Rates on **inbound** freight	1	2	3	4	5	0
3. Market access (**outbound**)	1	2	3	4	5	0
4. **Inbound** freight service	1	2	3	4	5	0
5. Transit time for **outbound** freight	1	2	3	4	5	0
6. Transit time for **inbound** freight	1	2	3	4	5	0
7. Dependability of transit time for **outbound** freight	1	2	3	4	5	0
8. Dependability of transit time for **inbound** freight	1	2	3	4	5	0
9. Frequency of service for **outbound** freight	1	2	3	4	5	0
10. Frequency of service for **inbound** freight	1	2	3	4	5	0
11. Loss and damage record	1	2	3	4	5	0
12. Shipment tracing capability	1	2	3	4	5	0
13. Billing procedures	1	2	3	4	5	0
14. On-time car delivery	1	2	3	4	5	0
15. Quality of rail cars	1	2	3	4	5	0
16. Quality of the rail track	1	2	3	4	5	0
17. Rail car supply during peak periods	1	2	3	4	5	0

NA - not applicable

Part H: SUMMARY QUESTIONS

In the following section you are asked which mode of transportation you feel provides the best service and why you think they are able to provide superior service. You are also asked which mode of transportation you prefer and the reasons for the preference.

1. Taking all the service characteristics into consideration which type of transportation carrier do you think provides the best overall service. Check one of the following:

Short Line Railroads	_____
Class I Railroads	_____
Motor Carriers	_____
Indifferent	_____
No Opinion	_____

2. If you have a preference in the preceding question, please explain the main reasons for your preference.

3. Taking rates and service into consideration, which of the following modes of transportation do you prefer. Check one of the following:

Prefer Short Line Railroads	_____
Prefer Class I Railroads	_____
Prefer Truck	_____
Indifferent	_____
No Opinion	_____

4. If you have a preference in the preceding question, please explain the main reasons for your preference.

5. Please make other comments on the back.

APPENDIX C

QUESTIONNAIRE FOR EXECUTIVES OF IOWA AND KANSAS SHORT LINE RAIROADS

Part A: GENERAL QUESTIONS

1. When did your company buy, lease, or begin operating the short line?

2. How many people are employed full time by the short line?

3. Does your company own, lease, or operate the short line?

4. What is the current number of route miles of your short line? Have there been any changes in the number of route miles you operate? If so, please describe the changes.

5. From what railroad or other party did you buy or lease the short line? If your company only operates the line for another party, who is the owner?

6. Please list all previous owners or lessees of the short line that you are aware of.

7. If you own the short line, what was the purchase price?

8. List all the railroads that your short line has connections with. List the junction location for each connection.

9. Did your short line receive any <u>state</u> government assistance? If so, please describe the assistance.

10. Did your short line receive any <u>federal</u> government assistance? If so, please describe the assistance.

Part B. TRAFFIC

In answering the following questions regarding traffic on your short line, please use the following traffic class definitions.

Originated - Traffic that originates on your railroad and terminates on another railroad

Terminated - Traffic that originates on another railroad and terminates on your railroad

Local - Traffic that originates and terminates on your railroad

Overhead - Traffic handled by your railroad but which originates and terminates on other railroads

1. List all the commodities <u>originated</u> by your short line

2. For the commodities listed in the previous question, please provide the number of carloads for <u>each</u> commodity for the following <u>calendar</u> years. <u>Attach separate sheet if there are more than 4 originated commodities</u>.

Originated Carloads

<u>Year</u>	Commodity Name	Commodity Name	Commodity Name	Commodity Name
1991				
1990				
1989				
1988				
1987				

3. List all the commodities <u>terminated</u> by your short line.

4. For the commodities listed in the preceding question, please provide the number of carloads for each commodity for the following calendar years. Attach separate sheet if there are more than four terminated commodities.

Terminated Carloads

Year	Commodity Name	Commodity Name	Commodity Name	Commodity Name
1991				
1990				
1989				
1988				
1987				

5. List all the local commodities handled by your short line.

6. For the commodities listed in the previous question, please provide the number of carloads for each commodity for the following calendar years.
Attach separate sheet if there are more than four local commodities.

Local Carloads

Year	Commodity Name	Commodity Name	Commodity Name	Commodity Name
1991				
1990				
1989				
1988				
1987				

7. List all the overhead commodities handled by your short line.

8. For the commodities listed in the previous question, please provide the number of carloads for each commodity for the following calendar years.
Attach separate sheet if there are more than four overhead commodities.

Overhead Carloads

Year	Commodity Name	Commodity Name	Commodity Name	Commodity Name
1991				
1990				
1989				
1988				
1987				

Part C: EQUIPMENT

1. How many locomotives does your short line own? Please list the number of locomotives by the following types:

GP 7 _____
CF 7 _____
GP 9 _____
Other (specify) _____

2. How many locomotives does your short line lease? From whom do you lease locomotives?

3. How many rail cars does your short line own? Please give the number of cars by type of rail car.

4. How many rail cars does your short line lease? From whom do you lease rail cars?

5. How dependent are you on connecting Class I railroads for locomotives? Check one of the following:

Very Dependent _____
Somewhat Dependent _____
Not Dependent _____

6. How dependent are you on connecting Class I railroads for rail cars? Check one of the following:

Very Dependent _____
Somewhat Dependent _____
Not Dependent _____

7. If your short line is dependent on other Class I railroads for locomotives and rail cars, do you have trouble obtaining the equipment you need during peak demand periods such as grain harvest? Check one of the following:

All of the time _____
Some of the time _____
None of the time _____

8. How much money have you invested to maintain and/or rehabilitate the rail tracks and road bed on your short line?

9. If your short line owns rail cars or locomotives, do you perform your own equipment maintenance? If not, who does it?

Part D. MARKETS AND COMPETITION

1. How dependent are you on connecting Class I railroads to reach the principal markets that you serve? Check one of the following:

Very Dependent _____
Somewhat Dependent _____
Not Dependent _____

2. Do you have difficulty obtaining fair revenue divisions from connecting Class I railroads on joint movements? Check one of the following:

All of the time _____
Some of the time _____
None of the time _____

USE THE DEFINITIONS OF ORIGINATED, TERMINATED, LOCAL AND OVERHEAD TRAFFIC IN PART B TO ANSWER THE FOLLOWING QUESTIONS:

3. With respect to your originated traffic, which of the following does your short line compete against? Check all that apply.

Motor Carriers _____
Class I Railroads _____
Short Line Railroads _____
Water Carriers _____
Other (Specify) _____
None of the above _____

4. In the preceding question, if your short line has competition, which commodities are subject to competition?

5. With respect to your terminated traffic, which of the following does your short line compete against? Check all that apply.

Motor Carriers _____
Class I Railroads _____
Short Line Railroads _____
Water Carriers _____
Other (Specify) _____
None of the above _____

6. In the preceding question, if your short line has competition, which commodities are subject to competition?

7. With respect to your local traffic, which of the following does your short line compete against? Check all that apply.

Motor Carriers _____
Class I Railroads _____
Short Line Railroads _____
Water Carriers _____
Other (Specify) _____
None of the above _____

8. In the preceding question, if your short line has competition, which commodities are subject to competition?

9. With respect to your overhead traffic, which of the following does your short line compete against. Check all that apply.

Motor Carriers _____
Class I Railroads _____
Short Line Railroads _____
Water Carriers _____
Other (Specify) _____
None of the above _____

10. In the preceding question, if your short line has competition, which commodities are subject to competition?

Part E. FINANCIAL INFORMATION

Please provide the requested financial information for your short line on a calendar year basis. If the information is not available on a calendar year basis, please specify the fiscal year to which the data apply. Please provide as much of the requested information as possible.

	1991	1990	1989	1988
Operating Revenue				
Operating Expense				
Total Assets				
Total Debt				
Cash Flow				
Pre-Tax Earnings				
Retained Earnings				
Profit (Loss)				

Part F. SHORT LINE SUCCESS PROFILE

1. Below are listed several potential ingredients for a profitable short line railroad. From the choices given, select what you feel to be the three most important determinants of success (profits). Put 1 next to the most important, 2 next to the second most important and 3 next to the third most important.

Strong Shipper Support _____
Adequate Track Quality _____
Reasonable Purchase Price _____
Adequate Traffic Levels _____
Ship Many Different Commodities _____
Access to More Than One Connecting Carrier _____
State Financial Assistance _____
Ability to Compete With Motor Carriers _____
Experienced Management _____
Reliance on Equity Financing _____
Access to Own Equipment _____
Cooperation From Connecting Railroads on Joint Rates and Revenue Splits _____

2. If the above list omits something you feel is important to short line profitability, please explain and discuss in detail.