

Railroad Competition and Wheat Rates

Michael W. Babcock

JEL Classifications: L92, O18, Q2

Keywords: Railroads, Transportation, Wheat

Railroads are important for transporting agricultural commodities from producing regions to domestic processing locations and export ports. These shipments involve large scale movements of low value, bulk commodities over long distances and thus rail service is virtually the only cost effective shipping alternative available. U.S. Department of Agriculture (USDA), Agricultural Marketing Service (2015) reports that railroads transported 83% of Montana and 80% of North Dakota grain and oilseeds during the crop marketing years from 2009 to 2012. Though not as critical as for Montana and North Dakota, rail transportation is significant for many other states producing grain and oilseeds. The corresponding percentages for South Dakota, Minnesota, Kansas, Oklahoma, Idaho, and Washington were 39%, 35%, 34%, 46%, 30%, and 31%, respectively.

U.S. Wheat Production Location Largely Determines Mode of Transport

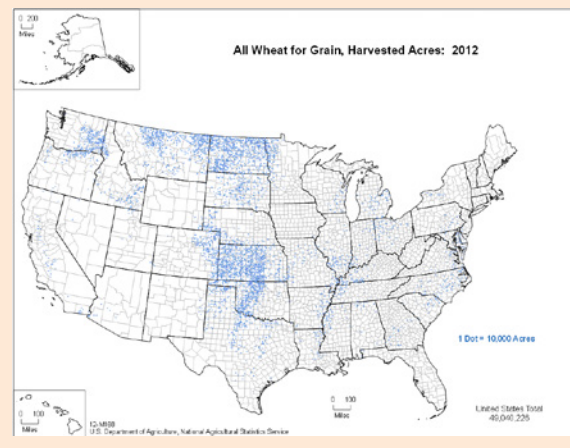
Wheat production in the United States is generally concentrated in some of the most sparsely populated areas of the country (Figure 1). The reliance of wheat shippers on rail transport is higher than the percentages for all grain and soybeans. For example, Montana ships nearly 100% of its wheat by rail.

According to USDA research, 9 of the top 10 wheat producing states are more than 150 miles from barge transportation on the Mississippi and Columbia Rivers which provides the most significant competition to railroads for long distance movements of wheat to export ports (Harbor, 2000). The average distances to barge loading locations for

the nine largest wheat producing states are 206.2 miles for Idaho, 219.9 miles for Kansas, 128.8 miles for Minnesota, 364.6 miles for Montana, 381.9 miles for North Dakota, 186.4 miles for Oklahoma, 214.8 miles for South Dakota, 276.7 miles for Texas, and 57.4 miles for Washington.

Wheat shippers in the central and northern plains states simply have no cost effective transportation alternative to railroads. Wheat produced in these areas move long distances to domestic processing and consumption locations or to export ports. Wheat shippers in these areas do not have direct access to barge loading locations and truck transport provide no competition for these movements. In contrast, transport of grain produced in more eastern regions has little reliance on rail transportation. For example,

Figure 1



the significance of barge competition for rail transport of grain is indicated by the percent of grain shipped by rail for states bordering the Mississippi River: 14%, 16%, 32%, and 6% for Iowa, Missouri, Illinois, and Arkansas, respectively (USDA, 2015).

The Rail System and Competition

The Class I railroad system of today was formed to take advantage of the long haul cost advantages of railroads relative to other types of transport. The Class I system of today was formed by railroad mergers occurring since 1980. For example, there were 40 railroads designated as Class I in 1980 but today there are only seven. The Regional (Class II) and Local (Class III) railroads are bridge carriers for the Class I railroads. However, depending on the railroad network, Class II and III railroads may contribute to competition among Class I railroads. For example, in North Dakota, the Dakota, Missouri Valley and Western (DMVW) is an affiliate of the Canadian Pacific (CP) but it serves areas of the state that the BNSF Railway does also, but not the CP. Thus DMVW competes with BNSF for these wheat shipments. Also, in North Dakota, the Red River Valley, and Western is an affiliate of BNSF but serves many areas of the

state where there is a strong CP presence. Thus RRVW competes with CP for these shipments. Thus the Class II and III railroads compete on behalf of their affiliate Class I railroad.

The Staggers Act of 1980 contained provisions that make railroad abandonment easier. As a result many miles of branch line serving rural areas were abandoned. However, the Class I railroads also sold branch lines to short-line (Class II and III) railroads. As a result the number of short-lines boomed in the 1980s and the 1990s. Between 1980 and 1999, 332 short-lines were created, operating 41,448 miles of track. Some of these short-lines are still “stand-alone” companies, but many have been absorbed by large firms that own and operate several short-lines under a common ownership.

Short-lines have several advantages that have enabled them to successfully serve rural areas. These advantages include lower labor costs than Class I railroads and the ability to more likely be able to operate low traffic density lines profitably. Since they have a relatively small number of shippers, short-lines are able to provide superior shipper service. Also short-lines reduce the number of truck shipments resulting in less highway maintenance and rehabilitation costs in rural areas.

The Class I railroads serving wheat areas are the Union Pacific (UP) and the Burlington Northern Santa Fe (BNSF). Table 1 displays the railroad network in the nine major wheat producing states.

As the data in Table 1 indicate, Class I railroads dominate the rail networks of these states, accounting for 58% to 87% of the rail mileage, but in six of the nine states, Class II and III railroads account for 35% to 42% of the railroad network.

Further insight can be gained regarding the degree of competition between Class I railroads by examining railroad mileage of each of the Class I railroads in each of the nine major wheat producing states.

The data indicate that some states have potentially more competition among Class I railroads than others. States dominated by one Class I railroad include Idaho (UP), Montana (BNSF), North Dakota (BNSF), and Washington (BNSF), while Kansas, Minnesota, Oklahoma, and Texas have relative balance between the mileages of at least two Class I railroads. Thus, the latter group would be expected to have more competition and thus lower railroad wheat transport prices.

In an early study to determine the preferences of over 300 shippers using short-line railroads in Kansas and Iowa, shippers were asked to rate the performance of their short-line railroad on 17 price-service characteristics relative to their previous Class I railroad and motor carriers (Babcock et al., 2010). It was found that grain shippers prefer short-line railroads while non-grain shippers prefer motor carriers. However, when the entire shipper sample is considered, more shippers prefer short-lines than any other type of transport. Short-line profitability is related to carloads per mile of mainline track, railroads to which a short-line connects, railroad firms operated by a parent firm, and gross miles of mainline track operated

Table 1: Railroad Mileage by State and Class, 2013

State	Class I	Percent of Total	Class II, III	Percent of Total	Total
Idaho	995	58.20%	714	41.8	1,709
Kansas	2,790	59.5	1,896	40.5	4,686
Minnesota	4,634	83	951	17	5,585
Montana	2,139	65	1,153	35	3,292
North Dakota	2,064	63.2	1,204	36.8	3,268
Oklahoma	2,360	64.9	1,274	35.1	3,634
South Dakota	1,487	80.5	361	19.5	1,848
Texas	12,173	87.2	1,783	12.8	13,953
Washington	2,165	64.1	1,215	35.9	3,380

Source: State Departments of Transportation

Table 2: Class I Railroad Mileage by State, 2013

State	BNSF	% of Total	UP	% of Total	KCS	% of Total	CN	% of Total	CP	% of Total	Total
Idaho	118	11.90%	877	88.10%	-	-	-	-	-	-	995
Kansas	1,237	44.3	1,535	55	18	0.6	-	-	-	-	2,790
Minnesota	1,686	36.4	665	14.4	-	-	479	10.3	1,804	38.9	4,634
Montana	2,003	94.1	125	5.9	-	-	-	-	-	-	2,128
North Dakota	1,714	78.1	-	-	-	-	-	-	482	21.9	2,196
Oklahoma	1,037	43.9	1,173	49.7	150	6.4	-	-	-	-	2,360
South Dakota	889	59.8	-	-	-	-	-	-	598	40.2	1,487
Texas	4,929	40.5	6,336	52	908	7.5	-	-	-	-	12,173
Washington	1,633	75.4	532	24.6	-	-	-	-	-	-	2,165

Source: State Departments of Transportation

by the short-line (Prater and Babcock, 1998).

Historically, North Dakota and Montana have had the highest railroad wheat transport prices (rates). However, recent evidence from USDA is inconclusive on whether Montana and North Dakota rail wheat rates are higher and have increased faster than other states. In the 1988-2007 period Prater et al., (2010) found that in the case of rail revenue per ton, Montana and North Dakota had the smallest increases of the 10 grain producing states evaluated. Iowa, Nebraska, South Dakota, and Kansas had the largest increases. For revenue per ton mile, Colorado, Kansas, Indiana, and Missouri had the largest increases while Montana and North Dakota had the smallest increases. In fact, North Dakota rail revenue per ton-mile actually decreased during the 1988-2007 period.

For revenue/variable cost ratios (R/V) the states with the largest increases were Kansas, Missouri, Colorado, and Nebraska. Montana's ratio remained virtually unchanged. North Dakota and Indiana had the lowest increases in R/V ratios for the 1988-2007 period. USDA reported that Montana had the 7th lowest and North Dakota the 8th lowest average grain and oilseed rates per ton-mile in the 2006-2010 period for 36 states.

A recent 2014 study by Babcock, McKamey, and Gayle addressed the issues of railroad competition and its effect on railroad prices for North Dakota, Montana, and Kansas wheat using rigorous statistical techniques. Since Kansas has two Class I railroads of approximately equal size while North Dakota has one, the authors were able to examine if competition among rail lines is stronger in Kansas, leading to lower Kansas rail wheat prices than North Dakota and Montana rail wheat prices. The authors found for North Dakota—but not Montana—that the railroad average wheat rate per ton-mile were higher than the average Kansas wheat rates due to greater rail competition in Kansas.

Future Impacts from Structural Change in Rail Transport

Since the price received by producers is approximately the destination price minus the price at the origin, if railroads raise their prices, the price received by producers is correspondingly reduced. The lower prices have a direct effect on farm income, reducing crop receipts. An USDA study of the rail service disruption that occurred in the Upper Midwest in 2014 concluded that transportation cost increases for corn, wheat, and soybeans from the Upper Midwest to the

Pacific Northwest ports and the Gulf of Mexico ports could have depressed local crop prices on average by between \$0.11 per bushel to as much as \$0.18 per bushel in 2014 (USDA-AMS, 2015).

Over the last 25 years, railroads have been gradually shifting the cost of wheat transport to rail car leasing companies and shippers. In 1990, railroads owned 63% of the rail cars and car leasing companies and shippers owned 37%. By 2013, the railroads owned 35% of the rail cars and the shippers and rail car leasing companies owned 65%. How this shift in risk within the supply chain will affect U.S. grain producers and U.S. competitiveness, will be evident in the coming years.

For More Information

Babcock, M.W., M. Prater, J. Morrill, and E. R. Russell. 2010. "Competitiveness of Short Line Railroads." *Journal of the Transportation Research Forum* 34(3): 111-132.

Babcock, M.W., M. McKamey, and P. Gayle. 2014. "State Variation in Railroad Wheat Rates." *Journal of the Transportation Research Forum* 53(3): 83-100.

Harbor, A.L. 2000. "Competition in the U.S. Railroad Industry: Implications for Corn, Wheat, and Soybean Shipments." Paper presented at the 2008 Transportation Research Forum Annual Meeting, Fort Worth, Texas, March.

Prater, M.W., and M. W. Babcock. 1998. "Grain Dependent Short Line Railroad Profitability: An Operating Cash Flow Approach." *Transportation Journal* 38(2): 18-31.

Prater, M., K. Casavant, E. Jessup, B. Blanton, P. Bahizi, D. Nibarger, and I. Weingram. 2010. "Rail Competition Changes Since the Staggers Act." *Journal of the Transportation Research Forum* 49(3): 111-132.

U.S. Department of Agriculture, Agricultural Marketing Service (USDA-AMS). 2015. *Rail Service Challenges in the Upper Midwest: Implications for Agricultural Sectors – Preliminary Analysis of the 2013-2014 Situation*, January. Available online: http://www.usda.gov/oce/economics/papers/Rail_Service_Challenges_in_the_Upper_Midwest.pdf

Michael W. Babcock (mwb@k-state.edu) is Professor, Department of Economics, Kansas State University, Manhattan, KS.