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REGULATION OF LOCAL AND REGIONAL RAILROADS: A NATIONAL SURVEY OF PERSPECTIVES AND PRACTICE

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INTRODUCTION

One of the fastest growing sectors of the transportation industry is regional and local railroads. This growth is largely explained by the important function shortline carriers serve in the origination and termination of transporting agricultural and natural resource commodities. In addition, local and regional railroads have fulfilled the void created by Class I carriers divesting themselves of low-density lines. Much of the transformation of low-density lines from Class I carriers to shortline carriers is attributed to operational inefficiencies experienced by Class I carriers ("Regulation of Local and Regional Railroads: A National Survey of Perspectives and Practice," Tolliver, Thoms and Casavant, 1993).

Shortline carriers are quite different than Class I railroads in operating scope, economics of operation and financial resources. Yet, in many areas the same regulations essentially apply to both types of railroads. A large portion of the initial federal and state regulatory legislation was designed for large, Class I carriers and thus designed to fit their economic and operating characteristics. Hence, there has seemingly been an attempt to retrofit an existing set of regulations to the shortline sector of the railroad industry. Economic regulations are aimed primarily at rates, surcharges, routes and abandonments. However, many shortlines operate under track and leasing agreements (from Class I carriers), and do not publish rates. Also since most shortline carriers operate within the boundaries of a single state, county, or industrial park, interstate regulation seems inappropriate. Given the dichotomy emerging in the U. S. railroad industry between shortline and Class I railroads it is conceivable that regulations derived from history may not appropriately fit the railroad

system of the present and future. Accordingly, the evaluation of structure, purpose and effectiveness of regulations may differ significantly from the perspective of the regulator versus the regulated.

OBJECTIVES

The study reported in this paper evaluates the perspectives on, and practice of economic, safety and institutional regulation of local and regional shortline railroads in the U.S. Specific objectives are to:

1. Determine the perceived extent and effect of regulation from the perspectives of the regulated shortline railroads versus the state regulatory agencies.
2. Determine the characteristics of railroads that are related to the alternative perspectives on regulation or to the differences between regulators and railroads.

REVIEW OF SHORTLINE MOVEMENT

American railroads were the first major industrial corporations in the U.S., contributing to much of the country's urban geographical shape (for a detailed review of the development of shortlines and the legal framework, see Tolliver, Thoms and Casavant). The Interstate Commerce Commission (ICC) was the first administrative agency in charge of regulating railroads, which initially had a monopoly on public transportation. The primary purpose of the ICC was to address the concerns of passengers, shippers and state regulators faced with a transportation monopoly. However, in the early 20th century the introduction of the electric interurban railway along with the automobile and airplane facilitated the breakup of the railroads' transportation monopoly. In an effort to adjust to a changing transportation industry, many of the large Class I railroads sought to consolidate resources and merge. However, many of the mergers and consolidations during the sixties led to several disastrous bankruptcies in the seventies. As a result, there is no true transcontinental railroad (except for Amtrak) in operation in the U.S. today. Rather, there are four major railroad systems in the west and three in the east. This led to the move of several large carriers to spin off feeder and branchlines into regional or shortline railroads or go to full railline abandonment.

Shortline and regional railroads typically experience less expensive terminal operations and are usually free of many restrictive union agreements (Tolliver, Thoms and Casavant, 1993). Also shortlines have local management and are able to work well with area shippers for traffic that the larger railroads tended

to overlook. The growth of the shortline and regional railroads was also enhanced by the Regional Rail Reorganization Act of 1973 which gave the secretary of transportation the authority to designate which lines of bankrupt or defunct railroads would be offered to local communities to be run by a designated operator.

SHORTLINE RAILROADS AND THE LAW

There are a wide range of regulatory powers which influence shortline railroads. For example, the ICC retains jurisdiction over rates as well as construction and abandonment authority. No railroad can extend its lines, construct new lines or acquire an existing line without a certificate of public convenience and necessity from the ICC. The ICC also has plenary jurisdiction over rail abandonments.

Labor relations on all railroads are under the jurisdiction of the National Mediation Board. The Railroad Retirement System covers benefits and pension rights for railroad employees and the Federal Employers' Liability Act deals with industrial accidents over the rails. The Department of Transportation has extensive jurisdiction over rail safety, including track inspection and the licensing of engineers through the Federal Railroad Administration. In addition, some states maintain some authority over rail safety when it does not conflict with the federal program. Finally, bankruptcy courts have jurisdiction over the reorganization and liquidation of debtor railroads' estates. States often regulate construction, new formations and abandonments of railroads.

STUDY PROCEDURE

The primary data used for analysis in this study were obtained from two national mail surveys of shortline railroads and state regulatory agencies. Questionnaires structured to elicit the desired information were sent to a list, obtained from the American Shortline Railroad Association, containing most of the known firms operating shortline railroads in the United States, as well as the expected regulatory agencies in each state.

The questionnaires were designed to generate specific information on facts and perspectives. Specific questions for the shortline railroad questionnaire and the state regulator questionnaire were as similar as possible to provide the ability to compare and contrast perspectives on state regulation.

The questionnaires contained both objective and subjective queries. The first three sections of both questionnaires dealt with objective questions concerning (1) economic, (2) safety and (3) institutional regulation respectively. For each

section, respondents were asked to indicate the extent of regulation, problems associated with regulation, and desired changes in regulatory control. Specific questions for economic regulation dealt with intrastate rates, sizing of the firm, and labor issues. Questions concerning safety regulation consisted of areas such as construction, operation, alcohol, drug abuse, etc. Specific questions for institutional regulation dealt with areas such as financial, insurance, reporting, planning and rail passenger concerns. The last section of both questionnaires was basically subjective in nature, designed to elicit major concerns or issues.

Completed responses were received from 91 shortline railroads after two mailings of the questionnaire. The initial mailing list included 480 shortline railroads, thus around a 20% response rate was achieved after the two mailings.

Completed questionnaires were received from 47 of the 50 states, after the initial mailing and follow up phone calls to reach the nonresponding states. The other three states agencies promised responses, but were not received.

GENERAL FINDINGS

Perspectives of State Regulators

States indicated they had a strong responsibility towards shortline railroads. Sixty-four percent of the states had obtained certification to regulate under section 214 of the Staggers Rail Act of 1980, and they still had and were using that authority. Within the certification, 82% included shortline railroads in that regulatory responsibility.

The degree of economic regulation by states reveals a bit of a split personality. As indicated in Table 1, about half of the states regulate some of the intrastate rates while half of them do not. States have generally had few cases or rulings involving intrastate rates, except for fuel adjustment surcharges where 11% of the states have experienced cases or rulings over the past five years. Also 13% of the states indicated they would favor more regulation associated with general rate increases, otherwise 91% were satisfied with the current level of regulation.

States regulated sizing of the firm less but had more cases or rulings over the past five years associated with entry, abandonment, etc. Also, a larger percentage of states indicated a desired increase in regulation associated with sizing of the firm. Very few states regulated labor issues or had any problems over the past five years.

In general, states had not been very active in economic regulation and were quite happy with the existing level of regulatory effort. About 25% of the states did express interest in increasing their authority over mergers, abandonments, etc.

A wide variation in the amount of state regulation for the different safety issues is revealed in Table 2. Few states regulated crew training while 94%, 82% and 79% regulated grade crossing, grade separation and track inspections. Overall more states have experienced cases or rulings associated with safety regulations than with economic regulations. However, the majority of states indicated the existing degree of regulation was preferred for safety issues, although some concern was expressed for hazardous materials.

Table 1. Perceptions of Economic Regulation, State Responses, by Percentage.

Regulatory Item	State Regulation		Cases or Rulings Over Past 5 Yrs.		Desired Changes in Regulation Control			
	Yes	No	Yes	No	Same	More	Less	Eliminate
Intrastate Rates								
General Rate Increase	50	50	4	96	79	13	0	8
Inflation Rate Increase	51	49	4	96	87	4	0	9
Fuel Adjustment Surcharge	44	56	11	89	87	4	0	9
Rate Bureau	41	59	7	93	91	0	0	9
Damage Complaints	44	56	0	100	91	0	0	9
Contract Rates	49	51	7	93	91	0	0	9
Sizing of the Firm								
Entry								
-New Formation	32	68	30	70	82	18	0	0
-Line Purchase	44	56	16	84	83	17	0	0
-New Line Instructions	29	71	19	81	73	27	0	0
Mergers	24	76	8	92	76	24	0	0
Abandonments	63	37	56	44	73	27	0	0
Operating Authority	43	57	30	70	71	29	0	0
Trackage Rights	24	76	12	88	81	19	0	0
Directed Service Orders	25	75	0	100	90	10	0	0
Labor Issues								
Labor Protection	19	81	4	96	96	4	0	0
Craft Lines	3	97	0	100	96	4	0	0
Wage Rates	4	96	0	100	100	0	0	0
Maintaining Service								
Station	63	37	54	46	89	11	0	0
Stationmaster	49	52	42	58	88	12	0	0

Table 2. Perceptions of Safety Regulation, State Responses, by Percentage.

Regulatory Item	State Regulation		Cases or Rulings Over Past 5 Yrs.		Desired Changes in Regulation Control			
	Yes	No	Yes	No	Same	More	Less	Eliminate
Safety Areas								
Construction	56	44	39	61	93	7	0	0
Crew Training	9	91	4	96	96	4	0	0
Fire Guards	30	70	25	75	92	4	0	4
Grade Crossing	94	6	74	26	89	11	0	0
Grade Separation	82	18	57	43	92	8	0	0
Underpass Clearance	68	32	54	46	96	4	0	0
Track Inspection	79	21	58	42	83	17	0	0
Equipment Inspection	61	39	42	58	86	14	0	0
Operation Inspection	44	56	28	72	79	21	0	0
Signal and Train Control	41	59	20	80	81	19	0	0
Hazardous Materials	59	41	40	60	74	26	0	0
Alcohol and Drug Abuse	38	62	25	75	82	18	0	0

There were few states that regulated securities and insurance, but a large percentage of states regulated the other institutional variables in Table 3. There also was a high percentage of states who had experienced cases or rulings over the past five years for reporting, planning and passenger service. However, the majority of states were satisfied with the existing level of regulation or wanted more, with only 5% desiring less regulation for reporting.

Table 3. Perceptions of Institutional Regulation, State Responses, by Percentage.

Regulatory Item	State Regulation		Cases or Rulings Over Past 5 Yrs.		Desired Changes in Regulation Control			
	Yes	No	Yes	No	Same	More	Less	Eliminate
Institutional Issues								
Construction	48	52	20	80	94	6	0	0
Securities	20	80	5	95	94	6	0	0
Insurance	20	80	10	90	85	15	0	0
Reporting	81	19	36	64	75	20	5	0
Planning	68	32	32	68	94	6	0	0
Passenger Service	55	45	32	68	80	20	0	0

Perspectives of Shortline Railroads

It was desired to determine any differences in the perspectives of shortline railroads versus the state regulators. The responses from shortline railroads concerning economic regulations, analogous to the state responses in Table 1, are displayed in Table 4. Shortline railroads felt considerably less state

regulation for intrastate rates existed with much higher percentages in the "no" column for state regulation. Also, the shortline railroads experienced generally less problems with economic regulation over the past 5 years than state regulators reported. Perhaps the most noticeable difference, however, is that more shortline railroads are dissatisfied with the existing level of regulation and desire either less regulation or elimination.

Table 4. Perceptions of Economic Regulation, Shortline Railroad Responses, by Percentage.

Regulatory Item	State Regulation		You've Had Problems With These Regulations over the Past 5 Yrs.		Desired Changes in Regulation Control			
	Yes	No	Yes	No	Same	More	Less	Eliminate
Intrastate Rates								
General Rate Increase	15	85	6	94	45	3	16	36
Inflation Rate Increase	11	89	9	91	46	5	11	38
Fuel Adjustment Surcharge	19	81	9	91	46	4	11	39
Rate Bureau	7	93	6	94	52	2	8	38
Damage Complaints	3	97	8	92	53	4	10	33
Contract Rates	10	90	3	97	53	2	10	35
Sizing of the Firm								
Entry								
-New Formation	49	51	2	98	67	2	12	19
-Line Purchase	51	49	3	97	60	0	17	23
-New Line Instructions	48	52	3	97	60	0	17	23
Mergers	43	57	0	100	60	0	19	21
Abandonments	55	45	6	94	65	2	14	19
Operating Authority	50	50	2	98	62	0	19	19
Trackage Rights	27	73	5	95	60	4	17	19
Directed Service Orders	18	82	0	100	67	0	9	24
Labor Issues								
Labor Protection	15	85	2	98	74	2	9	15
Craft Lines	7	93	4	96	74	2	9	15
Wage Rates	9	91	2	98	76	0	7	17
Maintaining Service								
Station	30	70	9	91	68	0	15	17
Stationmaster	14	86	4	96	70	0	13	17

There was also significant divergence between the shortline and state perspectives concerning safety regulation. Comparing Table 2 and Table 5 reveals more agreement between shortline railroads and state regulators concerning safety, rather than economic, regulation, but shortlines indicated less problems concerning safety regulation than state regulators. Also, shortlines generally preferred less regulation than the states with a fairly high percentage of shortlines preferring elimination of safety-related regulations.

Comparison of Tables 3 and 6 reveals similar analogies for institutional regulation.

Table 5. Perceptions of Safety Regulation, Shortline Railroad Responses, by Percentage.

Regulatory Item	State Regulation		You've Had Problems With These Regulations over the Past 5 Yrs.		Desired Changes in Regulation Control			
	Yes	No	Yes	No	Same	More	Less	Eliminate
Safety Areas								
Construction	49	51	3	97	54	2	18	26
Crew Training	24	76	9	91	52	4	15	29
Fire Guards	25	75	3	97	57	2	9	32
Grade Crossing	89	11	17	83	45	6	25	24
Grade Separation	73	27	8	92	49	4	20	27
Underpass Clearance	75	25	2	98	54	4	10	32
Track Inspection	75	25	23	77	39	3	22	36
Equipment Inspection	52	48	16	84	43	2	19	36
Operation Inspection	45	55	14	86	51	2	16	31
Signal and Train Control	43	57	8	92	54	4	20	22
Hazardous Materials	53	47	9	91	52	7	20	21
Alcohol and Drug Abuse	29	71	3	97	57	5	14	24

Table 6. Perceptions of Institutional Regulation, Shortline Railroad Responses, by Percentage.

Regulatory Item	State Regulation		You've Had Problems With These Regulations over the Past 5 Yrs.		Desired Changes in Regulation Control			
	Yes	No	Yes	No	Same	More	Less	Eliminate
Institutional Issues								
Construction	43	57	9	91	56	2	13	29
Securities	50	50	2	98	63	2	7	28
Insurance	40	60	2	98	63	5	11	21
Reporting	13	87	0	100	46	4	20	30
Planning	58	42	10	90	57	10	10	23
Passenger Service	58	42	5	95	56	7	7	30

STATISTICAL RELATIONSHIPS

In order to obtain greater understanding about what influences the occurrence of problems associated with regulation for both state agencies and shortline railroads, selected variables were chosen and analyzed in a multiple regression framework. More specifically, the occurrence of problems associated with regulation for a shortline railroad is considered to be a function of certain

descriptive variables which characterize features about the railroad such as size, age and type of railroad. Likewise, the occurrence of cases or rulings associated with regulation for a state regulator is considered to be a function of certain descriptive variables characterizing the railroads in that state. Hence, the statistical analysis is divided into two separate sections. The first section examines the causal relationships between descriptive characteristics of shortline railroads and problems associated with economic, safety and institutional regulations. The second section examines a similar relationship between descriptive characteristics of the railroads in an entire state and problems with regulation.

Data

The data employed in the current analysis were derived from two principal sources. The measure of problems associated with regulation for both state regulators and shortline railroads was obtained from the previously described mail survey. This value represents the dependent variable and is measured as either "0" or "1" for "no" or "yes" problems associated with regulation over the past five years. The explanatory variables corresponding to the shortline railroad responses were derived from the 1992 edition of *Profiles of U.S. Railroads* published by the Association of American Railroads. Hence, the response of a particular shortline railroad is associated with information specific to that railroad.

The explanatory variables corresponding to the state regulators responses (the independent variables) are also derived from the *Profiles of American Railroads*, but with some minor manipulation. The *Profiles* database contains descriptive statistics for all railroads in the U.S., but not on a per state basis. However, the *Profiles* database does list all of the different states each railroad company operates in. Thus, the explanatory variables corresponding to the state responses were derived by taking all railroads which operate in a given state, weighting the variables for each railroad within the state by a proportionality factor, and summing across all railroads in the state. The proportionality factor for each railroad depends upon the number of states the railroad operates in and assumes an equal distribution among the states. While there is no reason to believe that the resources or variables for given railroad are evenly distributed across the states which it operates in, this procedure was used as an approximation due to limited data availability.

The total number of observations for each of the shortline and regulator regressions can be calculated by multiplying the number of questions or responses associated with economic, safety or institutional regulation by the total number of shortline or regulator respondents. For example, the economic

model for shortline railroads has 1729 observations, which is calculated by multiplying 19 questions times 91 shortline respondents.

Model Description for Shortline Railroads

The model used to associate the shortline railroads' regulatory problems to the descriptive characteristics of the railroad is specified as follows:

$$\begin{aligned} \text{Economic Model} \quad \text{SRPWR}_{\text{ECON}} &= a + b_0\text{EMP} + b_1\text{YRS} + b_2\text{MLS} + b_3\text{LTH} \\ &+ b_4\text{CAR} + b_5\text{PRV} + b_6\text{SHP} + b_7\text{SL} + b_8\text{LOCR} \\ &+ b_9\text{LOCL} + b_{10}\text{REG} + e \\ \text{Safety Model} \quad \text{SRPWR}_{\text{SAFE}} &= a + b_0\text{EMP} + b_1\text{YRS} + b_2\text{MLS} + b_3\text{LTH} \\ &+ b_4\text{CAR} + b_5\text{PRV} + b_6\text{SHP} + b_7\text{SL} + b_8\text{LOCR} \\ &+ b_9\text{LOCL} + b_{10}\text{REG} + e \\ \text{Institutional Model} \quad \text{SRPWR}_{\text{INST}} &= a + b_0\text{EMP} + b_1\text{YRS} + b_2\text{MLS} + b_3\text{LTH} \\ &+ b_4\text{CAR} + b_5\text{PRV} + b_6\text{SHP} + b_7\text{SL} + b_8\text{LOCR} \\ &+ b_9\text{LOCL} + b_{10}\text{REG} + e \end{aligned}$$

Variables used in the three models are explained in Table 7.

The first five independent variables are descriptive of the age and size of the railroad. The next four independent variables are classification of different types of owners. The last two variables are two different classifications of railroad type.

Given that the dependent variable is discrete and not continuous, then the typical procedure of ordinary least squares is inappropriate. The procedure used in this analysis is a probit nonlinear estimation technique. While the parameter estimates of this procedure can have somewhat different meanings, the model is not being used for predictive purposes. Rather, the current analysis attempts to determine the significance of relationships for different variables.

Independent variables which are indicative of firm size are expected to be inversely related to problems associated with regulation. Generally, larger firms possess greater management and information capabilities which should minimize any violations or infractions involving state or federal regulation. The age of firms is also expected to be inversely related with problems associated with regulation since older, more established firms, by their own existence, have proven their ability to adhere to or survive regulations. Railroads which are owned by different types of owners generally have no a priori expectation concerning the type of relationship with regulation. However, one would expect that railroads which are owned by state and local

Table 7. Dependent and Independent Variables for Shortline Railroad Regressions.

Abbreviation	Description	Units
Dependent Variables:		
SRPWR _{ECON}	Problems associated with economic regulation {0 = no, 1 = yes}	0 or 1
SRPWR _{SAFE}	Problems associated with safety regulation {0 = no, 1 = yes}	0 or 1
SRPWR _{DNST}	Problems associated with institutional regulation {0 = no, 1 = yes}	0 or 1
Independent Variables:		
EMP	The number of employees employed by the railroad	#
YRS	The number of years the railroad had been in operation	#
MLS	The total miles of road operated by the railroad	miles
LTH	The average distance in miles that each loaded car is hauled	miles
CAR	The total number of revenue freight carried carloads	units
PRV	A railroad which is owned by private investors	0 or 1
SHP	A railroad which is owned by a company which ships at least 50% of their rail traffic	0 or 1
SL	A railroad which is owned by the state or local government	0 or 1
LOCR	A railroad which is owned by a local railroad company	0 or 1
LOCL	Type of railroad which is neither class I or regional and provides mostly line-haul service	0 or 1
REG	Type of railroad which is neither class I or local and operates 350 miles of road or more and/or earns revenue of 40 million or more	0 or 1

*All indicator variables for yes or no responses are coded 0 = no, 1 = yes.

government would have an inverse relationship with regulation problems due to information access and availability.

Regression results for the three models of shortline railroads are presented in Table 8. One interesting conclusion from the economic and safety models is the lack of significance of variables associated with the size of railroads. Employees, miles of road, average length of haul and number of carloads variables are all not significant at the 5% level, implying size is not a factor in explaining problems associated with economic and safety regulation. However, two of the size variables are significant in the institutional model suggesting that problems due to institutional regulations are significantly influenced by length of haul and number of carloads. The sign for length of haul is positive while number of carloads is negative. Hence, the longer the average length of haul, the greater problems associated with institutional regulation, whereas the opposite holds for number of carloads. This seems completely logical, since longer hauls results in movement through more states

which implies increased and varying regulatory requirements for railroads. The number of carloads is more of an indication of amount of traffic and could reasonably be isolated to a relatively small geographic area, resulting in less exposure to regulations or simply a relationship between size of firm and less regulatory hassles.

Table 8. Estimated Coefficients and T-Values for Shortline Railroad Models.

Variables	— Economic Model —		— Safety Model —		— Institutional Model —	
	Estimated Coefficients	T-Value	Estimated Coefficients	T-Value	Estimated Coefficients	T-Value
Employees	0.0044368	1.0158	0.0009564	0.1975	0.00938	0.9389
Years	-0.0060068	-2.0889*	-0.005732	-2.33*	0.000934	0.2562
Miles of Road	-0.0019906	-1.1002	0.0006091	0.38179	0.000222	0.00788
Avg. Length of Haul	0.0025058	0.71159	0.003475	1.115	0.02170	3.264*
Number of Carloads	-0.0000074	-1.2237	-0.0000224	-1.424	-0.000084	-2.252*
Private Ownership	0.45167	1.4930	-0.11399	-0.4414	0.4734	0.86596
Shipper Ownership	-0.27680	-0.60708	0.41897	1.4995	0.0166	0.02405
State/Local Ownership	0.83842	2.4186*	0.31692	0.95703	0.6672	1.0701
Local Ownership	-4.9435	-0.00206	-5.4149	-0.0065	-5.119	-0.0038
Local Type of Railroad	-0.25912	-1.6993	0.26410	1.816	-0.22959	-0.9049
Regional Type of Railroad	0.85776	1.0411	0.49872	0.87375	-0.0082	-0.006
Intercept	-1.8284	-5.9617*	-1.344	-5.1591*	-2.074	-3.451*

* Represents coefficients which are statistically significant at the 95% level.

The variable years are significant with a negative sign for both economic and safety models which supports the contention that older, more established railroads experience less problems associated with these types of regulation. Of the three variables differentiating the type of ownership, only state and local ownership is significant in the economic model. However, the sign of the estimated coefficient is positive which indicates state and locally owned railroads are more likely to experience problems associated with economic regulation. This seems counter intuitive since a railroad which is owned by the state should be intensely aware of state and federal regulation, and the repercussions from violation but could also reflect the initially unclear regulatory status of these state and local railroads. The two variables measuring railroad type were insignificant for all three models. The estimated R²'s for each of the three models of shortline railroads ranges from 0.012 to 0.063. This is a small amount of variation being explained by the independent variables. However, given the range of factors which could influence problems associated with regulation, and the cross-sectional nature of the analysis, it is not entirely implausible to experience values this low.

Model Description for State Regulators Responses

The three models used to associate the state regulators perceptions to the descriptive characteristics of the railroad in their state is similar to the one for shortline railroads, with a few minor modifications. The models are specified as follows.

Economic Model	$RPWR_{ECON} = a + b_0EMP + b_1YRS + b_2MLS + b_3LTH + b_4CAR + b_5FIRMS + e$
Safety Model	$RPWR_{SAFE} = a + b_0EMP + b_1YRS + b_2MLS + b_3LTH + b_4CAR + b_5FIRMS + e$
Institutional Model	$RPWR_{INST} = a + b_0EMP + b_1YRS + b_2MLS + b_3LTH + b_4CAR + b_5FIRMS + e$

The description of variables used in the three models for state responses is provided in Table 9.

Table 9. Dependent and Independent Variables for State Regulator Regressions.

Abbreviation	Description	Units
Dependent Variables:		
$RPWR_{ECON}$	Problems associated with economic regulation for state regulators {0 = no, 1 = yes}	0 or 1
$RPWR_{SAFE}$	Problems associated with safety regulation for state regulators {0 = no, 1 = yes}	0 or 1
$RPWR_{INST}$	Problems associated with institutional regulation for state regulators {0 = no, 1 = yes}	0 or 1
Independent Variables:		
EMP	The average number of employees employed by all railroads operating in the state	#
YRS	The average age in years that railroads in the state have been in operation	#
MLS	The average miles of road operated in the state	miles
LTH	The average distance in miles that each loaded car is hauled in the state	miles
CAR	The average number of revenue freight carried carloads in the state	cars
FIRMS	The total number of railroads which operate in the state	#

The variables employees, years, miles, length and carloads have similar interpretations as in the previous model description except here the values are

on a state level. Therefore, a positive relationship is expected for all size variables except years which should exhibit an inverse relationship with regulation problems by the same argument as before. The one additional variable is firms which is the total number of railroads which operate in the state. One would expect a positive relationship with this variable since the larger the number of railroads in the state, the higher the likelihood the state regulator has experienced problems associated with regulation.

As expected, the number of firms is statistically significant for all three models, as displayed in Table 10. However, size-related variables such as employees, miles of road, average length of haul and number of carloads were not significant indicating no relationship between the size of railroads in the state and problems with regulation for regulators. The variable years is also significant for all three models, but with a positive relationship. Thus the older the average age of railroads in the state, the more problems with regulation. While this may seem counter intuitive, and completely opposite from the shortline regression results, it may reflect the states institutional memory concerning problems with older, more well-known railroads.

Table 10. Estimated Coefficients and T-Values for State Regulator Models.

Variables	--- Economic Model ---		--- Safety Model ---		--- Institutional Model ---	
	Estimated Coefficients	T-Value	Estimated Coefficients	T-Value	Estimated Coefficients	T-Value
Employees	-0.00136	-1.6525	-0.00157	-1.3058	-0.00108	-0.4599
Years	0.02516	4.7394*	0.03026	3.778*	0.03659	2.1355*
Miles of Road	0.00212	1.5196	0.00224	1.1439	0.00201	0.49098
Avg. Length of Haul	0.00738	1.0285	0.00335	.34324	-0.00904	-0.41208
Number of Carloads	0.0000044	0.32693	0.00000001	-.00589	0.0000192	0.57690
Number of Firms	0.0130	2.812*	0.01717	2.4334*	0.02553	2.2416*
Intercept	-2.2873	-8.0141*	-1.864	-4.7115*	-2.8414	-3.553*

*Represents coefficients which are statistically significant at the 95% level.

SUMMARY AND CONCLUSIONS

The perceptions concerning regulation vary significantly from that of shortline railroads and state regulators. However some of the results on attitudes are to be expected since much of the differences in perceptions are embodied in the inherent conflict between the goals of effective regulation and the business goals of firms. Firms, when offered regulatory change, often went for a decrease in regulatory control while state regulators opted for an increase in control, as revealed in the general findings. Perhaps more alarming, however,

is the differences in perceptions as to what areas are under state regulation and which are not.

The statistical analysis also revealed some unexpected relationships between variables. There was little difference in the significance of variables across the regulatory categories of economic, safety and institutional regulations reflecting consistency in perspectives for the different types of regulation. Also, the variables reflecting the size characteristics of railroads was not significant for shortline railroads and state regulators indicating size is not a significant determinate of regulation problems. The age of firms was significant for both shortline railroads and state regulators. However, the nature of the relationship was different for each. The inverse relationship between the age of the firm and regulation problems for shortline railroads is indicative of the learning curve that exists for shortline railroads concerning regulations. The positive relationship between the age of firms and regulation problems for state regulators is more symptomatic of the lingering institutional memory of state regulators of older firms.

The misconceptions or conflicts do outline a need for a form of technology transfer where the technology being transferred is regulatory information, definitions and implementation. Resources are needed in regulatory agencies, based on this study, for educational efforts, not necessarily regulatory enforcement. Such educational transfer can occur productively in both directions between regulator and railroad.