

# Study of Competition in the Railroad Industry and Analysis of Proposals that Might Enhance Competition



**Final Report**

*November 2008*

# Outline

- ❑ Project background
- ❑ Railroad economics
- ❑ Trends in rates and market power
- ❑ Railroad productivity and costs
- ❑ Railroad revenue sufficiency
- ❑ Shipper captivity
- ❑ Capacity and service quality
- ❑ Economic analysis of policy proposals
- ❑ Future directions

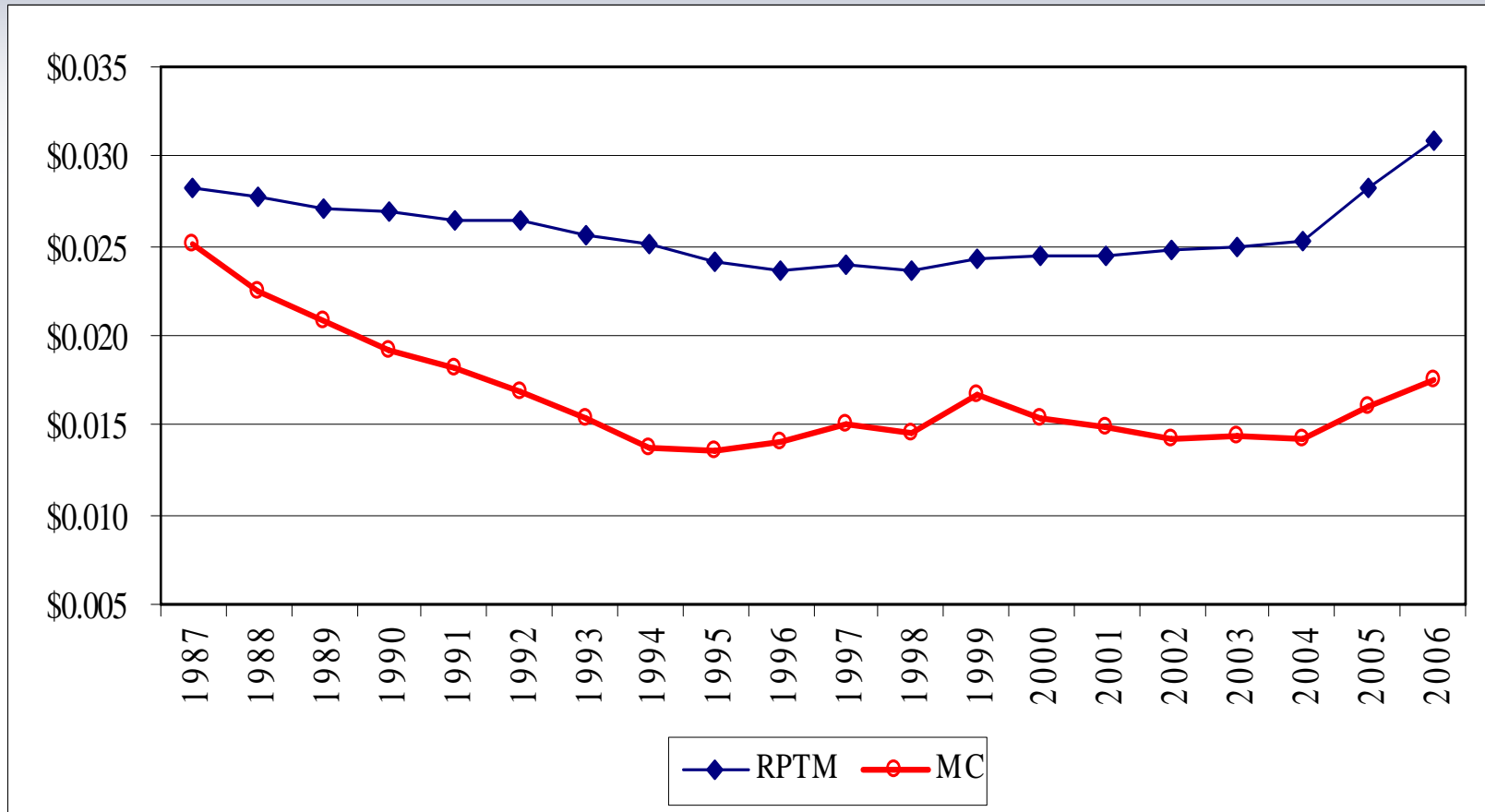
# Project Background

- ❑ The Christensen Associates team was selected by the STB to perform an independent study of competitive issues in the U.S. freight railroad industry, including
  - Competition and captivity
  - Capacity and service quality issues
  - Economic analysis of policy proposals
  
- ❑ Two research phases
  - Gather stakeholder input to assist in formulating research plan
  - Quantitative research

# Railroad Economics

- ❑ Economies of density and fixed costs require pricing above marginal cost to cover total costs
  - Economies of density – costs fall as traffic over network increases
- ❑ By definition, price above marginal cost is the exercise of market power, but exercise does not imply abuse
- ❑ Railroads use differential pricing to recover their total costs
  - Different commodity groups face different markups of rates over marginal costs

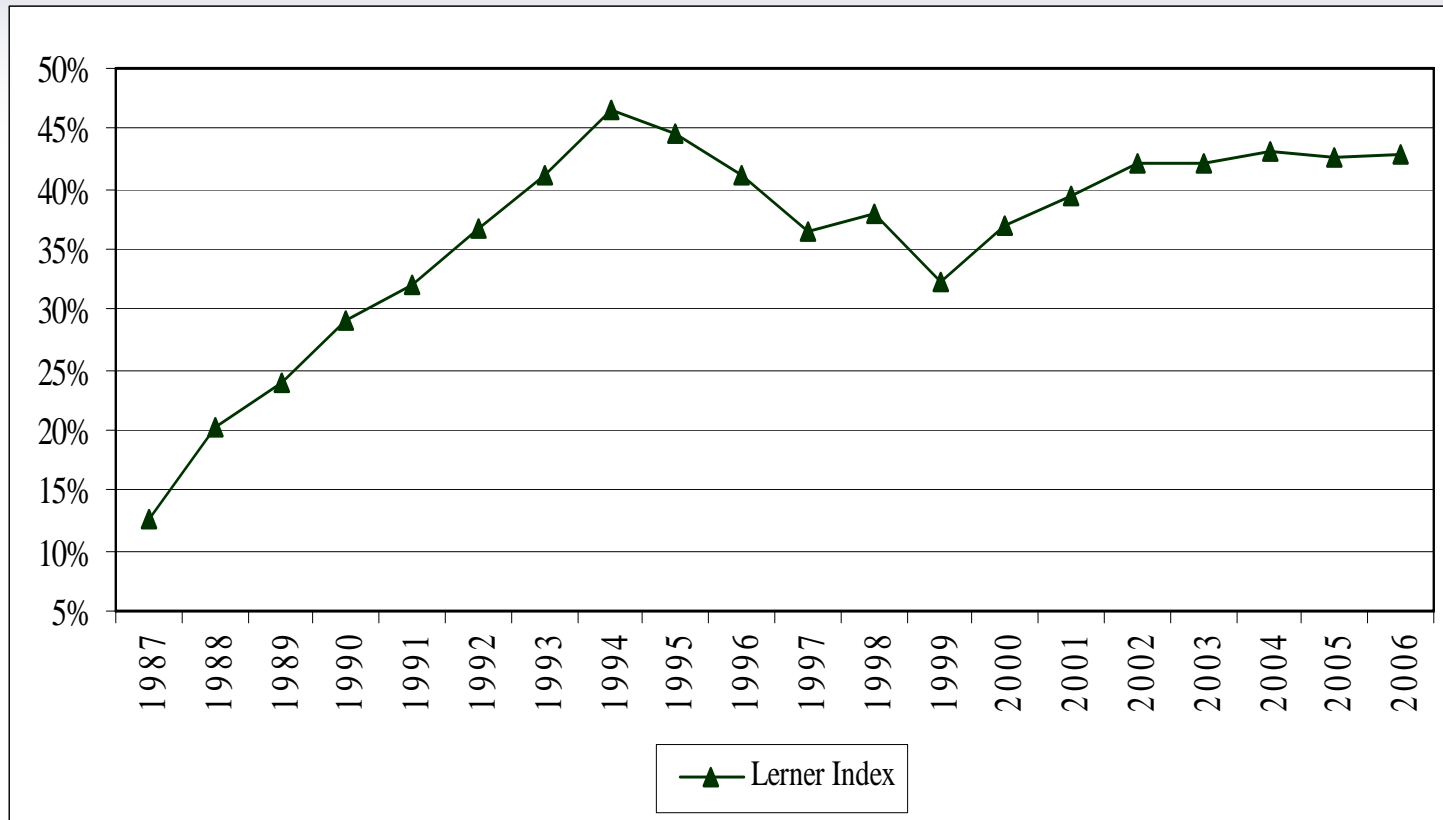
# Railroad Market Power – Margin Between RPTM and MC



# Trends in Railroad Rates and Market Power

- ❑ Recent years' rate increases due to declining productivity growth and increasing costs, not increased exercise of market power
- ❑ Market power index relatively flat in recent years
  - $LMI = (RPTM - MC) / RPTM$
- ❑ Market power increased most when both MC and RPTM falling

# Railroad Market Power – Lerner Index

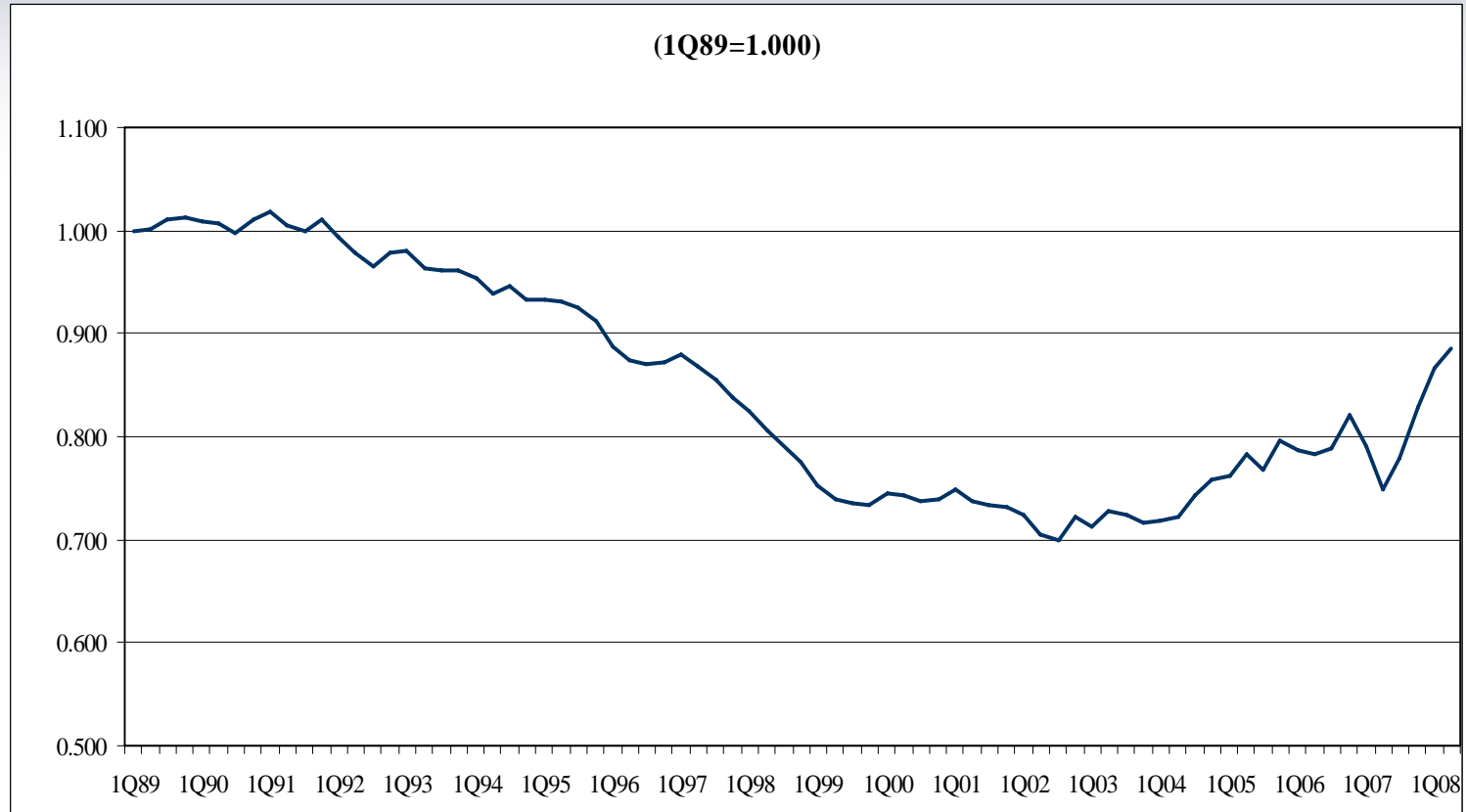


# Railroad Productivity and Costs

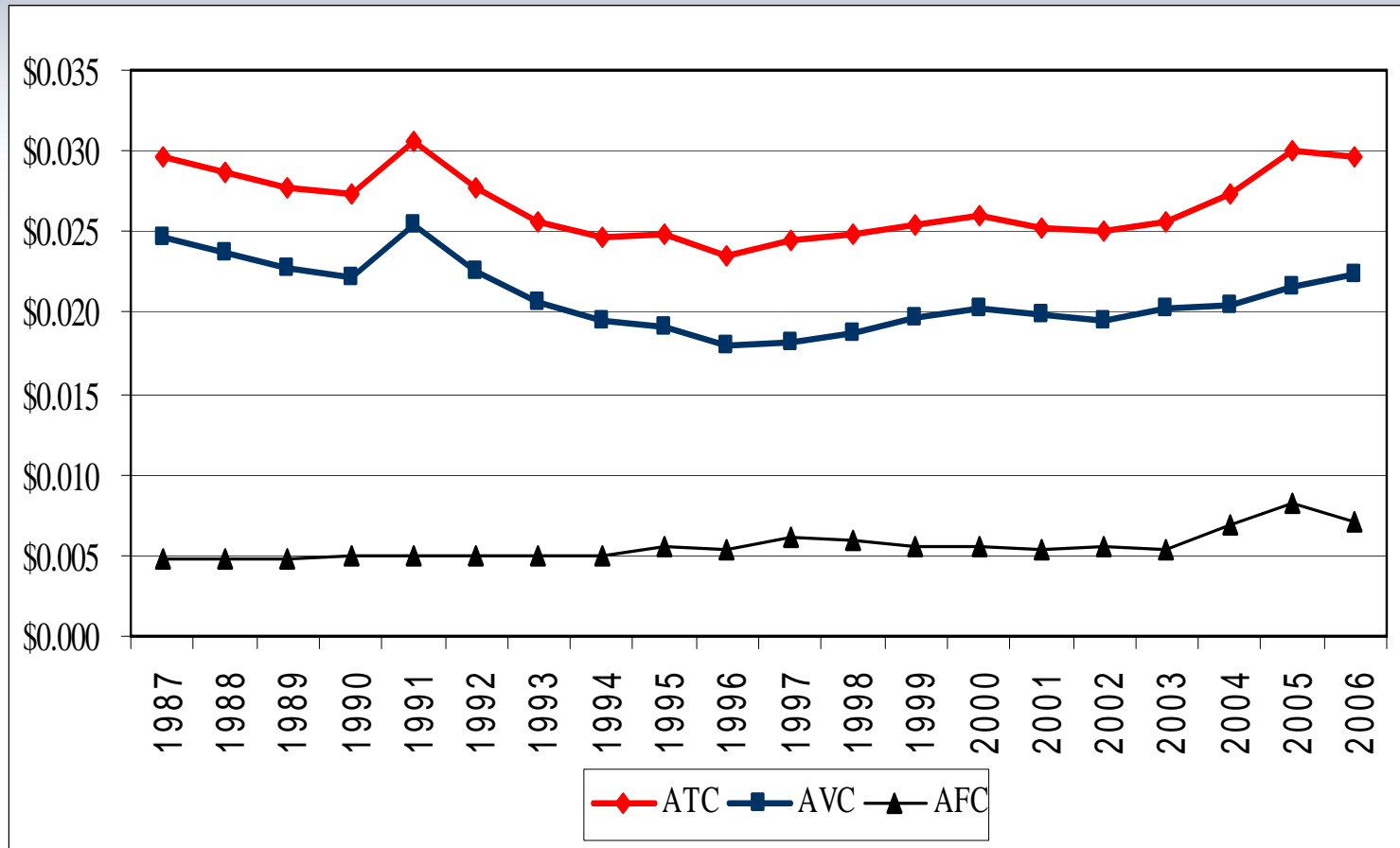
- ❑ Recent declines in productivity growth and increases in input price growth
  - Less ability for railroads to absorb cost increases
  - Reflected in upturn in RCAF-A
- ❑ Increases in average and marginal costs in recent years
  - “Spike” in fixed costs
  - Increases in marginal and variable costs
  - Differences in marginal costs by commodity and over time



# Productivity-Adjusted Input Prices – RCAF-A



# Railroad Average Costs



# Recent Trends in Commodity Rates

- ❑ Rates and markups over marginal cost vary by commodity groups and within groups
  - Relatively larger markups for agricultural commodities
- ❑ Some ability by shippers to adjust to counteract increases
  - e.g., length of haul, car loadings
  - But what are adjustment costs?
  - However, not all shippers can adjust
- ❑ Data problems with intermodal
  - Most lumped into STCC 46, Misc. Mixed Shipments

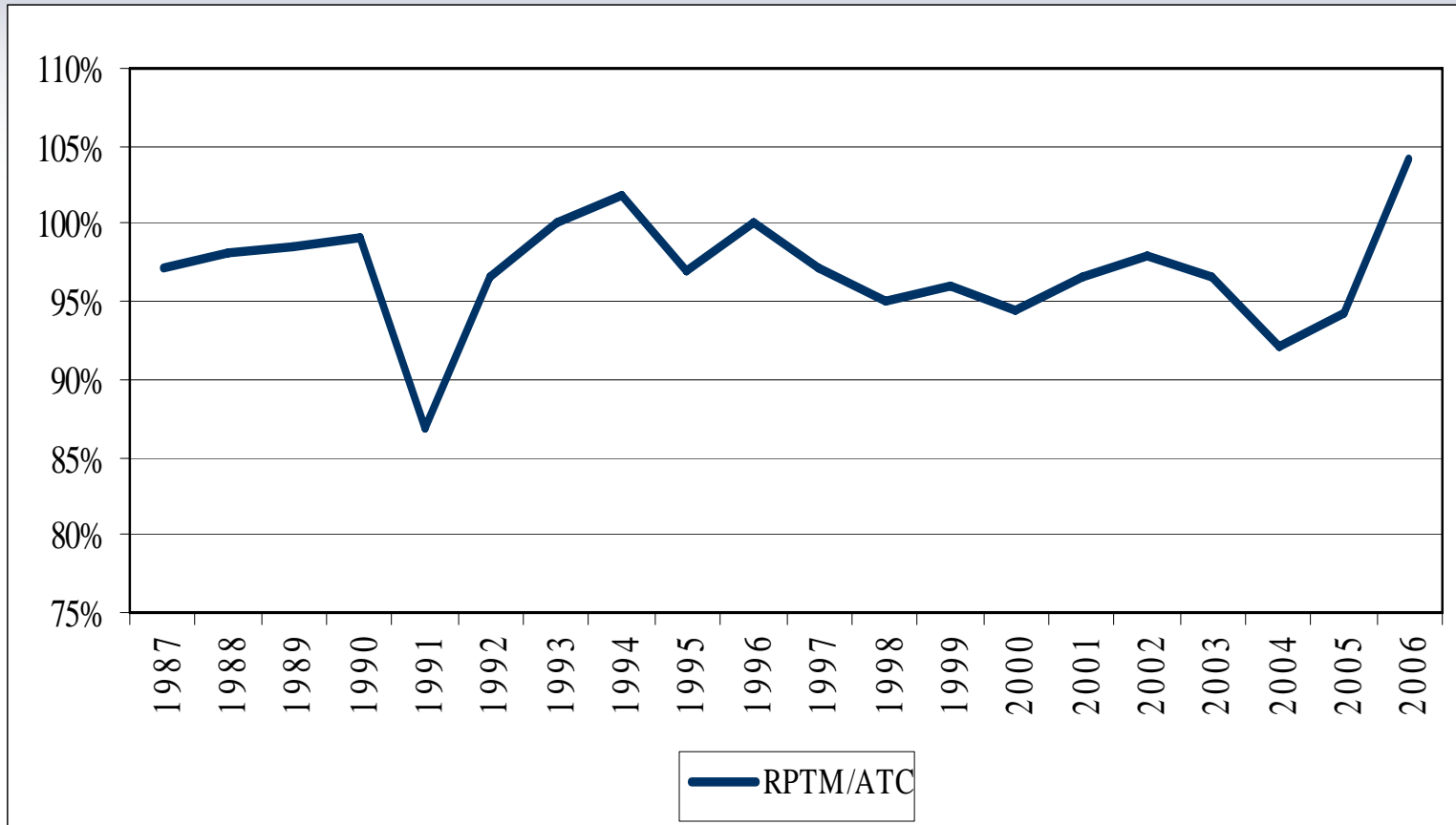
# Estimated Marginal Costs and Markups by Commodity

Commodity	LMI		Adjusted MC (2000 Q1 cents)	
	2001-2003	2004-2006	2001-2003	2004-2006
Farm Products (Aggregate)	0.61	0.61	0.9	0.9
Barley	0.68	0.75	0.7	0.6
Corn	0.71	0.73	0.7	0.6
Wheat	0.67	0.71	0.8	0.7
Soybeans	0.63	0.58	0.9	1.0
Metallic Ores	0.46	0.51	2.1	2.3
Coal	0.41	0.41	1.1	1.1
Non-metallic Minerals	0.52	0.39	1.8	2.2
Food Products	0.59	0.60	1.2	1.2
Lumber & Wood Products	0.64	0.63	1.4	1.4
Chemicals	0.63	0.59	1.6	1.6
Petroleum & Coal Products	0.64	0.60	1.6	1.5
Clay, Concrete, Glass, & Stone	0.60	0.60	1.7	1.8
Primary Metal Products	0.59	0.59	1.8	2.1
Transportation Equipment	0.55	0.51	5.1	5.4
Intermodal (COFC/TOFC)	-0.36	-0.35	4.3	4.5

# Railroad Revenue Sufficiency

- ❑ Revenue sufficiency measure =  $RPTM/ATC$
- ❑ For most years of study (1987-2006) Class I's do not appear to be earning above normal profit
  - Results vary by railroad
  - Does 2006 indicate start of new trend?
- ❑ Consistent with financial market assessment
  - e.g., P/E ratios, EPS
  - Financial performance similar to electric utilities

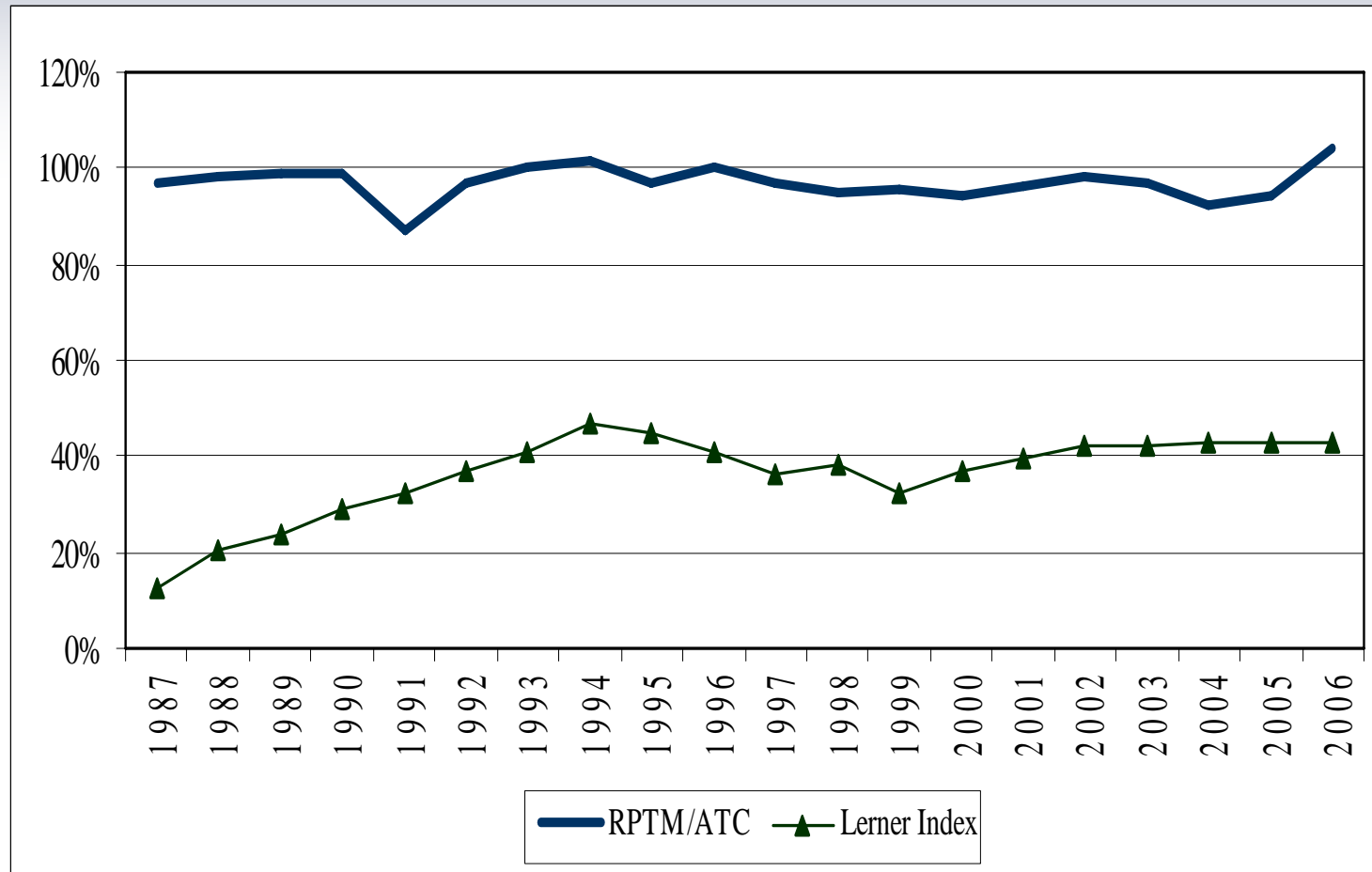
# Railroad Revenue Sufficiency: RPTM/ATC



# Railroad Revenue Sufficiency and Market Power

- ❑ No increase in exercise of market power in recent years as revenue sufficiency improved
- ❑ Greatest increases in market power occurred in late 1980s and early 1990s when industry mostly below and trying to achieve revenue sufficiency levels

# Railroad Revenue Sufficiency and Market Power





# Shipper Captivity

- ❑ Within commodity groups, shippers with no or limited transportation options pay more than shippers with same shipment characteristics and better transportation alternatives
- ❑ R/VC is weakly correlated with market structure factors that affect shipper captivity
  - Not a reliable indicator of market dominance
  - Instances of “relative captivity” when  $R/VC < 180$
  - Percent of R/VC below 100 often greater than percent above 300

# Percent Tons and Ton-Miles by R/VC Category

Percent of Tons by R/VC Category					
Period	R/VC < 100 Percent	R/VC between 100 and 180 Percent	R/VC between 180 and 300 Percent	R/VC > 300 Percent	Subtotal R/VC > 180 Percent
2000-2001	14%	44%	31%	12%	43%
2005-2006	14%	42%	27%	17%	44%

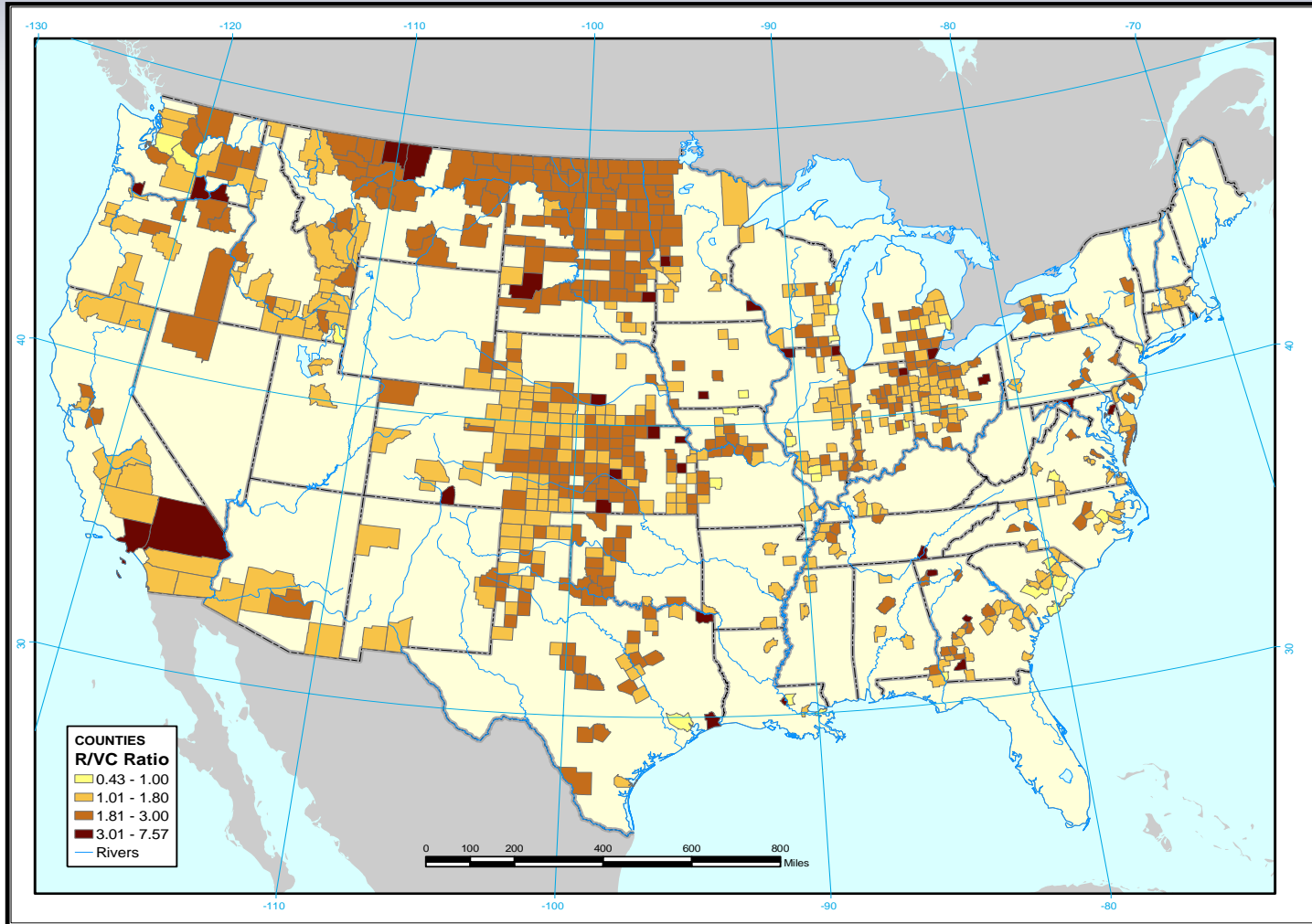
Percent of Ton-Miles by R/VC Category					
Period	R/VC < 100 Percent	R/VC between 100 and 180 Percent	R/VC between 180 and 300 Percent	R/VC > 300 Percent	Subtotal R/VC > 180 Percent
2000-2001	19%	51%	25%	5%	30%
2005-2006	20%	51%	21%	9%	29%

# Correlation of R/VC with Market Factors

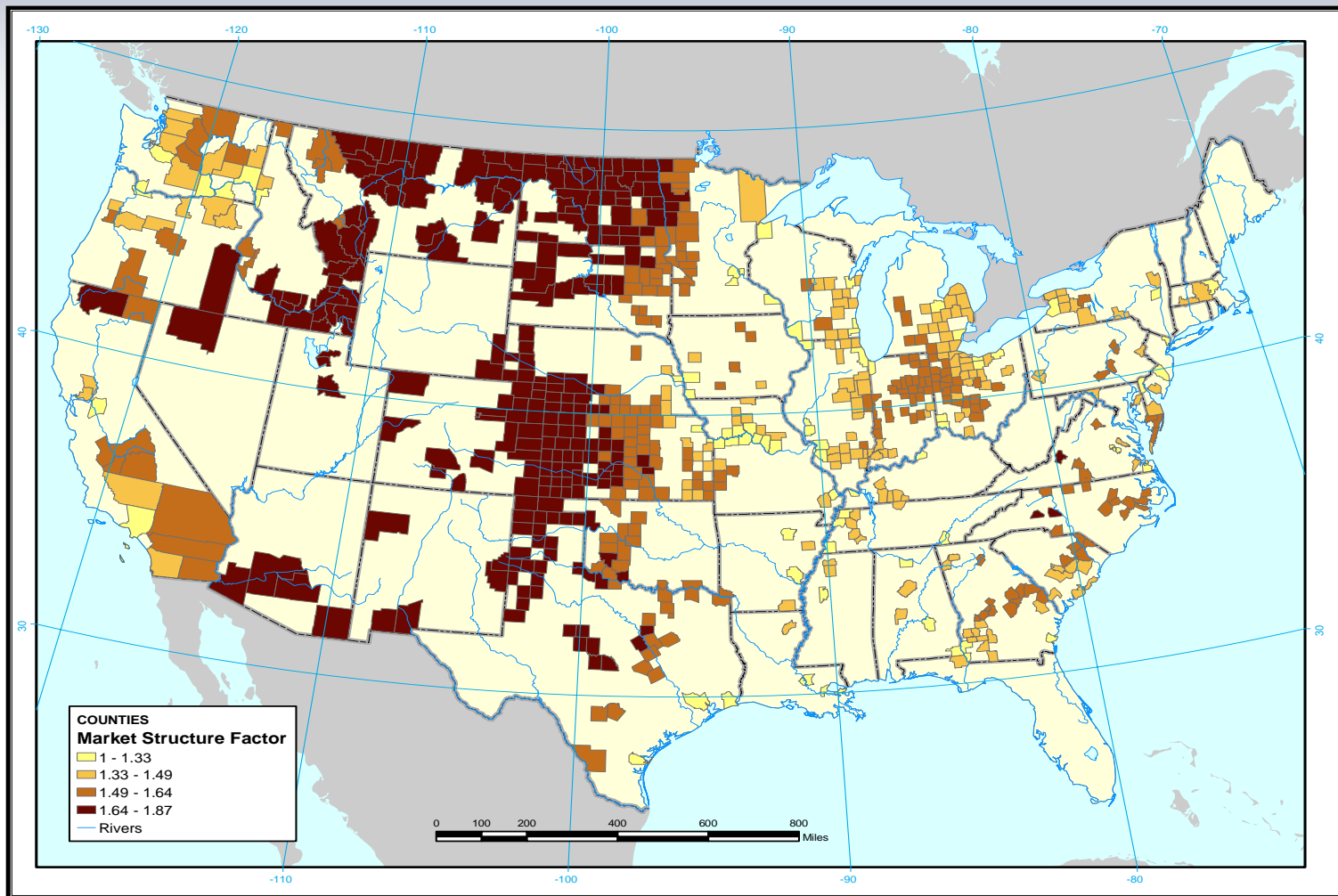
Correlation Coefficient with R/VC Ratio

Commodity Group	RPTM	Distance to Water (Origin)	Distance to Water (Destination)	Railroad Competition at Origin	Railroad Competition at Destination	Econometric Market Structure Shifter
Chemicals	0.18	-0.03	-0.01	-0.07	0.01	0.06
Coal	0.61	-0.26	0.03	-0.25	-0.13	0.05
Corn	0.23	-0.01	0.09	0.00	-0.06	0.07
Intermodal	0.12	-0.06	0.13	-0.04	-0.20	0.21
Transportation	0.16	-0.18	-0.18	-0.05	-0.02	-0.10
Wheat	0.44	0.09	-0.04	-0.05	-0.02	0.08

# R/V/C Averages by County - Wheat



# Market Structure and Rates - Wheat



# Capacity Constraints

- ❑ Capacity “tightness” due to localized congestion and constraints
  - Similar to performance of other network industries
  - Econometric and engineering studies say overall networks not constrained
- ❑ No evidence of connection between capacity and increased exercise of market power
  - No overall changes in railroad markups during periods of “tightness,” but some redistribution
- ❑ Capacity lumpiness – hard to achieve optimality
- ❑ Future projections must be viewed cautiously

# Capacity Investment

- ❑ Investment has increased in both nominal and real terms in recent years
- ❑ Investment is relatively constant percent of industry revenues
  - Still high relative to other industries, but down somewhat from 1990s – period of high “capex”
  - Similar to electric utilities

# Service Quality

- ❑ RPM Train speed data used as proxy
  - These data are a rough, aggregate proxy
- ❑ Service performance declines in 2003-2005 period linked to terminal congestion
- ❑ Speed and variability by commodity
  - Variability typically greatest for coal and grains, lowest for intermodal
- ❑ Better data needed



# Economic Analysis of Policy Proposals

- ❑ Circumstances (as of 2006) imply providing relief to certain groups will likely result in increases for other shippers or threaten railroad viability
  - Caveat – does 2006 represent a new trend?
- ❑ Incremental policies have greater likelihood of resolving shipper issues with lower risk of adverse consequences. For example,
  - Reciprocal switching, terminal agreements
  - Improvements in STB procedures
  - Possibility of encouraging competitive response and expanding “size of pie”
- ❑ Some shippers will not benefit from greater competition – continued oversight necessary

# Economic Impact of Open Access Proposals

	<b>Reciprocal Switching</b>	<b>Bottleneck Rates</b>	<b>Terminal Agreements</b>	<b>Trackage Rights</b>
Economies of Density	Potential gains	Gains unlikely	Potential gains	Potential gains
Length-of-Haul Economies	Small loss	Potentially large loss	No gain to small gain	No gain to small gain
Vertical Economies	Small loss	Potentially large loss	Small loss	Potentially large loss
Investment Incentives	Small effect	Potentially large effect	Small effect	Potentially large effect
Railroad Profitability	Small effect	Potentially large effect	Small effect	Potentially large effect
Coordination Costs	Small to moderate	Small to moderate	Small to moderate	Potentially large
Competitive Response	Most likely	Least likely	Most likely	Somewhat likely
Shipper Gains	Most likely	Least likely	Most likely	Somewhat likely

# Future Directions

- ❑ Captivity and effective competition
- ❑ Disaggregate analysis of service quality
- ❑ Disaggregate analysis of capacity issues
- ❑ Cost shifting
- ❑ Fuel surcharges
- ❑ Class II and III issues
- ❑ Critical evaluation of demand growth projections
- ❑ Access to railroads