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

Summary of Key Findings of the Christensen STB Studies

Presented to
TRB Committee for a Study of Freight Rail Transportation and Regulation

January 10, 2014
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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
  - Impetus was GAO question of whether there had been abuse of market power by railroads

- Our original November 2008 report used data through 2006

- In 2010, we updated our report with data through 2008
  - The basic findings and conclusions from our original study remain
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
  - Almost all firms exercise market power
- Railroads use differential pricing to recover their total costs - how competitive markets work
  - Different commodity groups and shippers face different markups of rates over marginal costs
  - Captive shippers protected by the regulatory process
Overall, rates have been increasing since 2004, with steep increases in 2008.

What are the reasons for this? Our analysis concluded that:

- Recent years’ rate increases due to declining productivity growth and increasing costs, not increased exercise of market power.
- Input costs increased faster than productivity growth, resulting in unit cost increases.
- Increases in fuel prices drove the input cost increases.
Railroad Productivity and Input Costs

- The STB’s rail cost adjustment factor (RCAF) provides measures of productivity and input costs
  - RCAF-U: RCAF unadjusted for productivity gains, a measure of input prices
  - PAF: the RCAF productivity adjustment factor
  - RCAF-A: RCAF adjusted for productivity gains, a measure of unit costs

- Recent declines in productivity growth (PAF) and increases in input price growth (RCAF-U) translate into unit cost increases (RCAF-A)
  - Less ability for railroads to absorb cost increases

- Timing of RCAF-A increases coincident with rate increases
Railroad Costs and Productivity

1989-2009

RCAF-U

- 2.7%
- 2.1%

PAF

- 3.9%
- 3.8%
- 4.7%
- 2.0%

RCAF-A

- 1.9%
- 1.0%
- 2.6%

Legend:

- IQ89-4Q09
- 1Q89-3Q02
- 3Q02-4Q09
RCAF-A Measure of Unit Costs
1989-2008

(1Q89=1.000)
Comparison of Railroad Prices and Costs

- Increases in average and marginal costs in recent years
  - Our estimates are consistent with the RCAF cost and productivity trends
  - Differences in marginal costs by commodity and over time
- Marginal costs have been increasing faster than prices in recent years
  - Aggregate prices represented by revenue per ton-mile (RPTM)
## Changes in Real RPTM and Cost Variables

<table>
<thead>
<tr>
<th></th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue Per Ton-Mile</strong></td>
<td>-0.90%</td>
<td>-1.16%</td>
<td>-1.29%</td>
<td>8.26%</td>
<td>5.73%</td>
<td>1.89%</td>
<td>9.48%</td>
</tr>
<tr>
<td><strong>Marginal Cost</strong></td>
<td>-2.15%</td>
<td>2.27%</td>
<td>-1.54%</td>
<td>11.18%</td>
<td>6.80%</td>
<td>9.59%</td>
<td>16.51%</td>
</tr>
<tr>
<td><strong>Average Variable Cost</strong></td>
<td>-3.09%</td>
<td>1.45%</td>
<td>-1.72%</td>
<td>2.40%</td>
<td>0.63%</td>
<td>1.85%</td>
<td>7.97%</td>
</tr>
<tr>
<td><strong>Average Fixed Cost</strong></td>
<td>-0.37%</td>
<td>-3.43%</td>
<td>22.76%</td>
<td>17.08%</td>
<td>-17.45%</td>
<td>12.84%</td>
<td>5.36%</td>
</tr>
<tr>
<td><strong>Average Total Cost</strong></td>
<td>-2.52%</td>
<td>0.41%</td>
<td>3.32%</td>
<td>5.99%</td>
<td>-4.25%</td>
<td>4.41%</td>
<td>7.31%</td>
</tr>
</tbody>
</table>
Railroad Revenue Sufficiency

- Revenue sufficiency, our measure of railroad profitability = RPTM/ATC
  - RPTM = revenue per ton-mile
  - ATC = average total costs (includes return on equity)
- RPTM/ATC = 100% means “normal” profits earned, no excess or monopoly profits
- For most years of study (1987-2008) Class I’s did not earn a normal profit, let alone above a normal profit
- Profitability has improved, but not to an excess
  - Around or slightly greater than 100% in more recent years, achieving a goal of Staggers Act
  - Results vary by railroad
  - No persistent excess profits
Railroad Revenue Sufficiency and Market Power

- Railroad industry marginal cost has been increasing at a faster average annual rate than railroad revenue per ton-mile
  - Consequently, the measure of railroad market power—the markup of price over marginal cost—has been decreasing
  - Greatest increases in market power occurred in late 1980s and early 1990s when industry mostly below and trying to achieve revenue sufficiency levels

- 2007 and 2008 Carload Waybill Sample data show lower shares of tons and ton-miles moving at rates exceeding 180 percent of URCS variable cost (i.e., R/VC) than in 2005 and 2006
Industry Markup Ratio and Revenue Sufficiency

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## Ton-Miles by R/VC Category

<table>
<thead>
<tr>
<th>Period</th>
<th>R/VC &lt; 100 Percent</th>
<th>R/VC Between 100 and 180 Percent</th>
<th>R/VC Between 180 and 300 Percent</th>
<th>R/VC &gt; 300 Percent</th>
<th>Subtotal R/VC &gt; 180 Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001-2002</td>
<td>22%</td>
<td>56%</td>
<td>19%</td>
<td>2%</td>
<td>21%</td>
</tr>
<tr>
<td>2003-2004</td>
<td>21%</td>
<td>57%</td>
<td>17%</td>
<td>5%</td>
<td>22%</td>
</tr>
<tr>
<td>2005-2006</td>
<td>29%</td>
<td>52%</td>
<td>16%</td>
<td>4%</td>
<td>20%</td>
</tr>
<tr>
<td>2007</td>
<td>33%</td>
<td>50%</td>
<td>15%</td>
<td>2%</td>
<td>17%</td>
</tr>
<tr>
<td>2008</td>
<td>34%</td>
<td>49%</td>
<td>14%</td>
<td>3%</td>
<td>17%</td>
</tr>
</tbody>
</table>

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Trends in Commodity Rates

- Percentage increases in revenue per ton-mile have not been uniform across commodities
  - Coal and chemicals experiencing above average increases for 2007-2008

- Markups over marginal cost vary by commodity groups and within groups
  - Relatively larger markups for agricultural commodities

- In general, commodity markups declining over time
  - Reflects the fact that costs rising faster than prices
Trends in Real Revenue per Ton-Mile by Commodity

% Change from 2001 RPTM

-15%  -10%  -5%  0%  5%  10%  15%  20%

Chemicals  Coal  Corn  Intermodal  Wheat  Industry RPTM

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## Markup Indexes by Commodity

<table>
<thead>
<tr>
<th>Commodity Group</th>
<th>LMI 2001-03</th>
<th>LMI 2004-06</th>
<th>LMI 2007-08</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Farm Products</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farm Products</td>
<td>0.55</td>
<td>0.54</td>
<td>0.45</td>
</tr>
<tr>
<td>Barley</td>
<td>0.68</td>
<td>0.69</td>
<td>0.50</td>
</tr>
<tr>
<td>Corn</td>
<td>0.68</td>
<td>0.68</td>
<td>0.62</td>
</tr>
<tr>
<td>Wheat</td>
<td>0.64</td>
<td>0.68</td>
<td>0.58</td>
</tr>
<tr>
<td>Soybeans</td>
<td>0.56</td>
<td>0.56</td>
<td>0.47</td>
</tr>
<tr>
<td><strong>Metallic Ores</strong></td>
<td>0.32</td>
<td>0.26</td>
<td>0.36</td>
</tr>
<tr>
<td><strong>Coal</strong></td>
<td>0.31</td>
<td>0.35</td>
<td>0.25</td>
</tr>
<tr>
<td><strong>Nonmetallic Minerals</strong></td>
<td>0.41</td>
<td>0.27</td>
<td>0.44</td>
</tr>
<tr>
<td><strong>Food Products</strong></td>
<td>0.50</td>
<td>0.48</td>
<td>0.40</td>
</tr>
<tr>
<td><strong>Lumber or Wood Products</strong></td>
<td>0.54</td>
<td>0.53</td>
<td>0.36</td>
</tr>
<tr>
<td><strong>Chemicals</strong></td>
<td>0.55</td>
<td>0.47</td>
<td>0.45</td>
</tr>
<tr>
<td><strong>Petroleum or Coal Products</strong></td>
<td>0.55</td>
<td>0.56</td>
<td>0.52</td>
</tr>
<tr>
<td><strong>Clay, Concrete, Glass, or Stone Products</strong></td>
<td>0.51</td>
<td>0.51</td>
<td>0.43</td>
</tr>
<tr>
<td><strong>Primary Metal Products</strong></td>
<td>0.44</td>
<td>0.42</td>
<td>0.41</td>
</tr>
<tr>
<td><strong>Transportation Equipment</strong></td>
<td>0.38</td>
<td>0.25</td>
<td>0.20</td>
</tr>
</tbody>
</table>
Our directive was to analyze, not advocate potential policy changes

- Analysis was based on economic efficiency considerations

We analyzed major policy changes proposed around the time of the study, including

- Bottleneck rates
- Trackage rights
- Terminal agreements
- Reciprocal switching
“Incremental Policies”
- Relatively less costly in terms of efficiency losses
- In absolute terms, costs may exceed benefits of incremental policy changes

“Devil is in the Details”
- Major detail often not addressed is access rates – our analysis assumed rates that would result from voluntary negotiations
- Operational issues were not explicitly considered – could be considered an efficiency cost

“Pushing on a Balloon”
- Stakeholder winners and losers
  - Shippers vs. railroads
  - Shippers vs. shippers
Conclusions

- The impetus of our study was the GAO question of whether there had been an abuse of market power by the railroads
  - Our answer was no
- Rates steadily increased between 2004-08
  - Mixed results by commodity
- Since 2004, input costs increased faster than productivity, leading to unit cost increases
  - Most commodity markups have decreased despite rate increases
- Industry has been approximately revenue sufficient in recent years, no persistent excess profits
- Staggers Act has worked well for both shippers and railroads