



Balhoff
& Williams, LLC

Understanding the Benefits/Risks of the FCC's Quantile Regression Analysis

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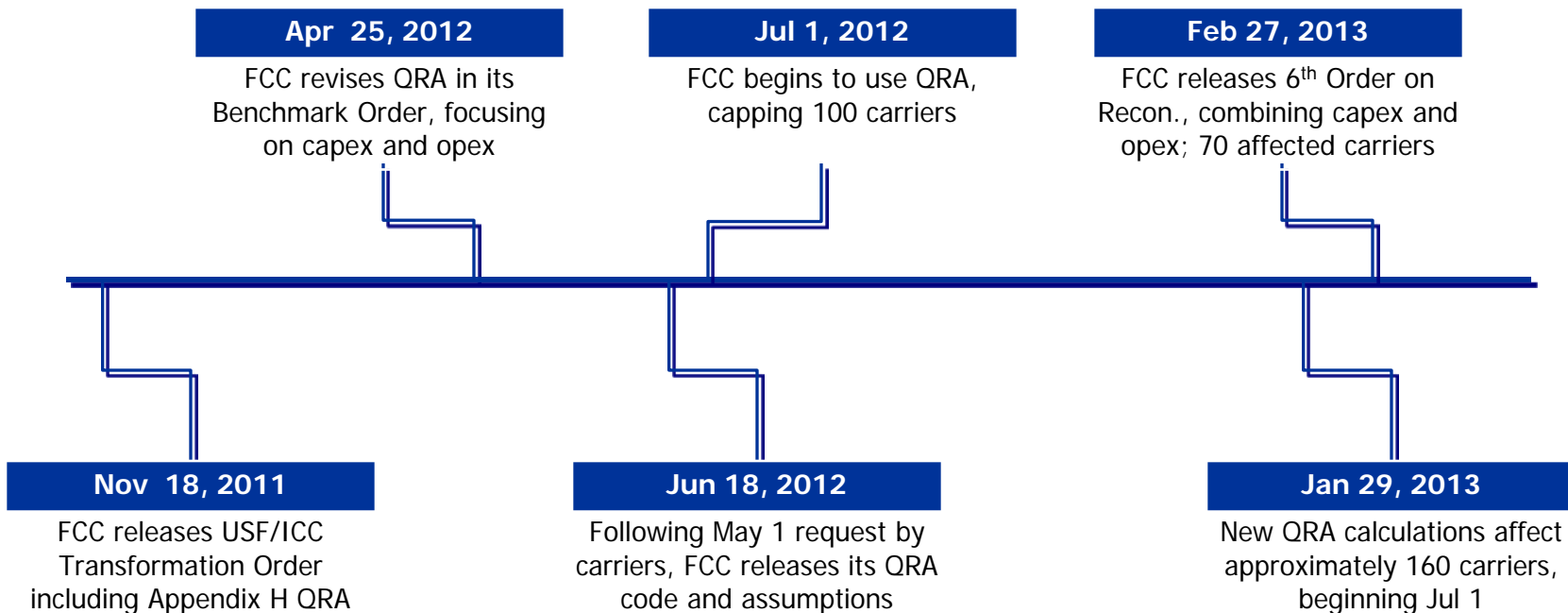
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Presentation to Rural Broadband Alliance

March 6, 2013

- Preliminary housekeeping remarks
 - Questions by chat
 - Constructive outcomes
- Purpose of this presentation
 - Provide background on FCC's QRA
 - Explain White Paper
 - Disciplined rebuilding of FCC's QRA
 - Findings
 - Recommendations

Background on FCC's QRA



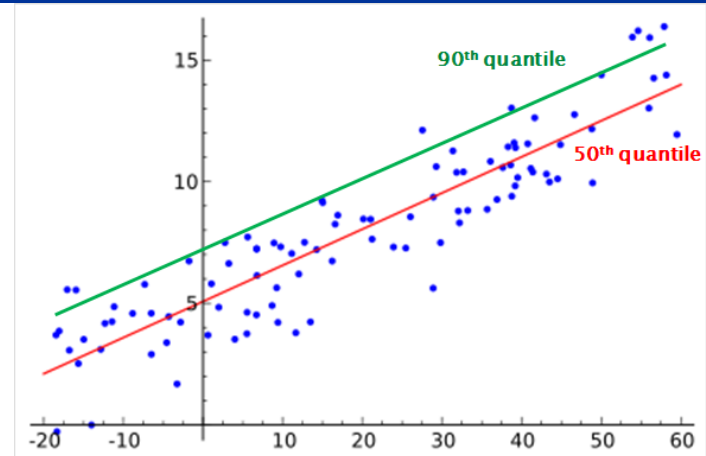
- Approximately 726 small rural rate-of-return (ROR) carriers across the United States
- High cost loop funds capped for 100 small carriers beginning in July 2012, reallocating approximately \$94 million (4.6% of total ROR funding and 2% of total USF)
- High cost loop funds capped for about 160/70 carriers beginning in July 2013
- FCC's concern is that certain carriers might be spending without proper restraint
 - QRA identifies top 10% of opex/capex costs on the basis of 16 variables chosen by FCC
 - Funds are reallocated to other small carriers

Explaining the FCC's QRA

Regression Analyses

- Regressions use independent variable(s) (e.g., # lines, road miles, etc.) to “predict” dependent variable(s) (e.g., costs)
- Output is a linear equation
- “Goodness of fit” estimates success (R^2 of 0.67 explains 67% of the output)
- Quantile generates a line with some percentage of output values below the line

Quantile Regression



FCC's Choice of Sixteen Variables to “Predict” Capital and Operating Expenditures

- Scale (4 variables): number of loops, road miles, number of road crossings, number of study areas under common control in the state
- Age of Plant (1 variable): percentage of undepreciated plant
- Customer Dispersion (3 variables): customer density, number of exchanges in the study area, percentage of households in urban areas
- Geographic factors
 - Construction difficulty (3): soil difficulty, percentage of bedrock, and frost index (“climate”)
 - Geography (5 variables): percentage of study area on tribal land, percentage of study area on national park land, and regional location (Alaska, Midwest, and Northeast)

Rebuilding the FCC's QRA

Audit independent Variables

- Compile FCC's data sources
- Reproduce development of independent variables
- Validate source data
- Test the outcomes

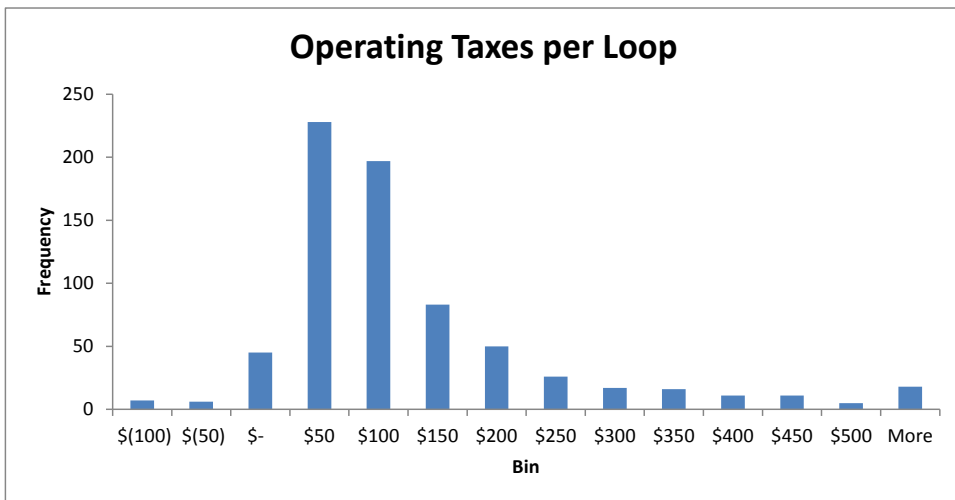
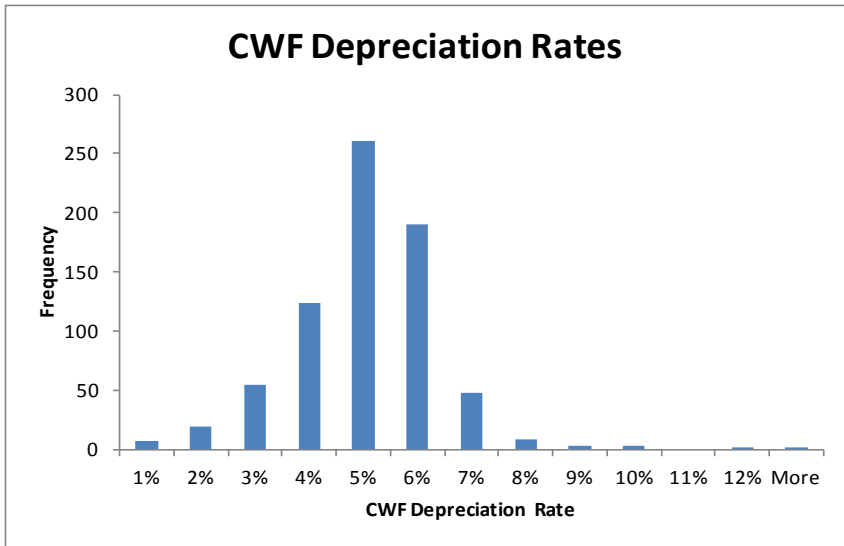
Analyze relationships and QRA

- Reproduce the QRA's outcomes
- Analyze the dependent variables (capex and opex)
- Analyze the independent variables (16 from previous slide)

Retest QRA using other assumptions

- Tested overall model to verify consistency with original
- Tested modifications to evaluate alternative outcomes

Non-Comparable/Arbitrary



- Multiple examples of non-comparable / arbitrary data included in the dependent variables (capex and opex) make the QRA's predictions theoretically flawed
 - Capex is defined in terms of depreciation which varies across the industry because states determine depreciation rates
 - See cable-and-wire-facility depreciation rates; COE depreciation rates are 2%-15%
 - Two carriers with same assets and road crossings, but 4% v. 6% depreciation rates would have depreciation expense of \$1,600 and \$2,400 per crossing, respectively
 - Opex costs contain non-comparable / arbitrary data, including operating taxes over which the companies have no control (is a carrier incurring "excessive" costs when it is simply meeting government obligations that vary across carriers?)
 - PA has 9.99% state tax while NV is 0%
 - Cooperatives can pay few/no taxes while a private company may be paying 39%
 - Our alternative QRA generated generally better results by excluding operating taxes

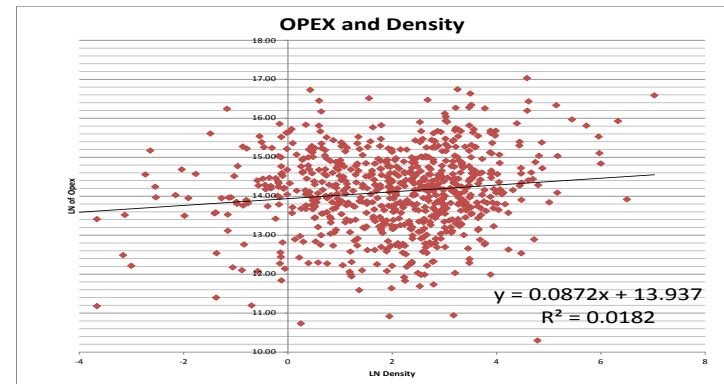
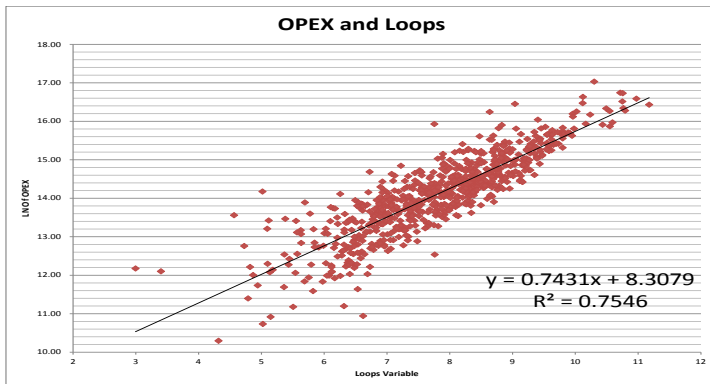
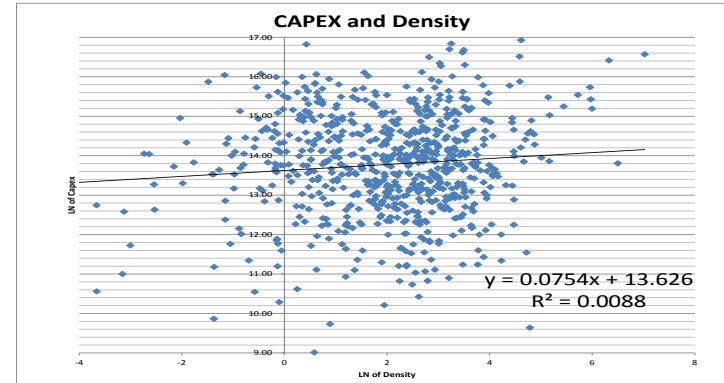
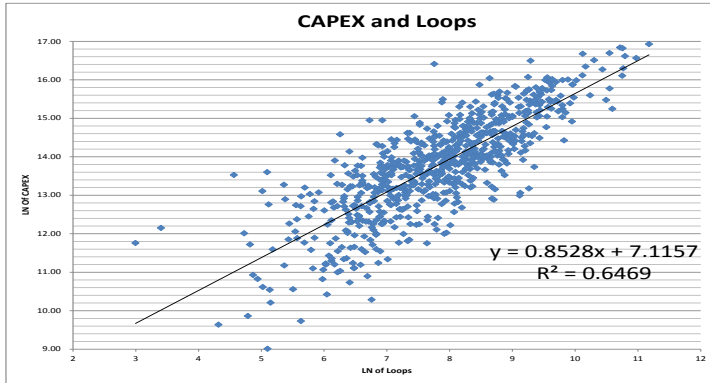
- Problems with the definitions of the dependent variables (non comparable)
- Fourteen of sixteen independent variables have significant problems
 - Use of inaccurate or outdated data
 - Questionable or demonstrably flawed assumptions
 - Weak or no cost causation
 - Obvious errors in the results the variables generate
 - Too few source-data points for statistical reliance
 - Low predictive values

■ Omissions

- Broadband deployment levels
- Extreme weather
- Aerial v. buried plant
- Lumpy investment cycles
- Topography

Independent Variable	Inaccurate / Outdated Data	Flawed Assumptions	Lack of Cost Causation	Obvious Error in Result	Too Few Data Points	Very Low Prediction (R ² < .02)
Loops (access lines)						
Road Miles	✓					
Road Crossings	✓					
Study Areas						
% Undepreciated Plant				✓		✓
Customer Density	✓					✓
Exchanges						
% Urban Households	✓	✓			✓	
Soil Construction Difficulty	✓		✓			✓
% Bedrock	✓	✓				✓
Climate			✓			
% Tribal Land			✓		✓	✓
% National Parkland			✓		✓	✓
Alaska			✓	✓	✓	✓
Midwest			✓			
Northeast			✓		✓	

Illustrating Poor Predictability



- The loop variable (two graphics to the left) generated the QRA's highest R^2
- A total of four of the sixteen independent variables had "fits" above 0.1023
- Nine of the variables returned "fits" of 0.0352 or lower for both capex and opex
- Twelve of the 32 (capex graphs and opex graphs) had "fits" below 0.010
- R^2 for capex and opex using all variables was 0.67 and 0.62, respectively

Larger Public Policy Issues

- The reform is to ensure accountable broadband deployment and service
 - USF is already capped at \$4.5 billion
 - QRA redirects about 2% of overall fund, without human review, assuming accuracy
 - Nominal purpose is to protect against excessive expenditures
- Statutory purpose in the Telecommunications Act of 1996, Section 254
 - “Specific, predictable and sufficient Federal and State mechanisms to preserve and advance universal service”
 - USF reform in 2001 was based on work of Joint Board and its duly assigned Rural Task Force
 - RTF performed the only industry-wide study of rural carriers (White Paper 2 in January 2000)
 - RTF found substantial diversity between rural and non-rural carriers, and *among* rural carriers
 - RTF recommendation was implemented by FCC to use a modified “embedded cost” approach because of the problem in modeling the industry
 - No other study has been performed to overturn the RTF findings regarding “substantial diversity”
- FCC articulated a new goal of broadband deployment in unserved and underserved regions
 - White Paper authors’ clients indicate that QRA apparently has chilled high-cost investment
 - The two major lenders report sharply lower infrastructure investment in 2012 (no new infrastructure loans by CoBank, and only 11.6% of appropriated RUS funds were obligated)
 - National Telecommunications Cooperative Association reports a 2013 survey in which 69% of respondent small rural carriers are stopping or cutting investments because of the new “reforms”
 - In spite of the FCC’s public headlines, rural wireline broadband investment is slowing or stopping
 - The company behaviors are inconsistent with the FCC’s rhetoric/representations

- QRA should be modified to correct demonstrable weaknesses
 - The opex and capex calculations should be combined into a single output
 - Improved data sources should be identified and used
 - Uncontrollable costs, such as taxes, should not be employed in the QRA
 - Depreciation expense should not be used as a proxy for capital investment
 - Geographic variables should be replaced with truly cost-causative variables
 - Other variables should be added to accommodate, among other things ...
 - Percentage of plant that is broadband capable,
 - Transition periods from legacy voice network to broadband network,
 - Severe weather factors that prompt a carrier to bury plant or possibly elevate plant to ensure that electronics are above flood levels, and
 - Extraordinary delivery and installation costs in remote locations
- The QRA should be used as a tool to trigger evaluation of costs that appear high, rather than as an automatic disallowance of certain costs
- An interdisciplinary committee should be established to advise state commissions or the FCC or USAC, as appropriate



QUESTIONS

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- Vincent H. Wiemer is a Principal and founder at Alexicon Consulting, a management consulting firm that provides financial, regulatory, and advisory services to the independent telecommunications industry. Mr. Wiemer's practice concentrates on financial modeling, strategic planning, regulatory impact analysis, and business development for his clients. He is a popular industry speaker and has presented such diverse topics as metrics, effective communications, incentives, and personal accountability among others. Prior to working in the telecommunications industry, Mr. Wiemer provided public accounting and consulting services to a spectrum of industries including energy providers, government agencies, and major hotel chains. Mr. Wiemer has a bachelor's degree in business administration from the University of Tulsa and earned his Certified Public Accountant license in Oklahoma.



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- Michael J. Balhoff, CFA, is a Senior Partner and co-founder at Charlesmead Advisors, LLC, and is Managing Partner at Balhoff & Williams, LLC, a professional services firm that provides financial-regulatory consulting and advisory services to companies, investors and policymakers in the communications and energy industries. Charlesmead Advisors is an investment banking firm that provides financial advisory services, including valuation as well as merger and acquisition services to telecommunications companies. Before founding the Charlesmead and the predecessor firm to Balhoff & Williams, Mr. Balhoff headed the Technology and Telecommunications Equity Research Group at Legg Mason and, in the final seven of his sixteen years as a senior analyst at Legg Mason, he covered equities in the incumbent local exchange carrier industry. Prior to joining Legg Mason in 1989, Mr. Balhoff taught at the graduate and undergraduate levels. Mr. Balhoff has a doctorate in Canon Law and four master's degrees, including an MBA—concentration finance—from the University of Maryland. He is a CFA charterholder and is a member of the Baltimore Security Analysts Society. Mr. Balhoff has been named in six annual awards as a Wall Street Journal All-Star Analyst for his recommendations on the Telecommunications industry. His coverage of telecommunications, and especially rural telecommunications, was named by Institutional Investor magazine as the top telecommunications boutique in the country in 2003.