Revised May 18, 2010

Advanced Workshop in Regulation and Competition

29th Annual Eastern Conference

Skytop Lodge, Skytop, Pennsylvania, May 19-21, 2010

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- Policy and Regulatory Issues
- Postal and Telecommunications
- Market Structure & RTOs
- Performance & Reliability
- Demand Response

Who should attend:

- Industry Economists, Attorneys and Consultants
- Marketing and Regulatory Managers
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Dinner Speakers:
Gene Del Polito, President, Association for Postal Commerce

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WEDNESDAY, MAY 19, 2010

3:00 - 4:00 Registration ***Pine Room***

4:00 - 6:00 Welcome to Conference: Michael A. Crew ***West Laurel Room***

Todd Schatzki: Evolving Issues in Revenue Decoupling

Karl A. McDermott: Regulatory Risk: A More Comprehensive Examination and Empirical Test

6:00 - 7:00 Cocktail Hour ***East South Porch***

7:00 – 9:00 Dinner & Keynote Speech: **Gene Del Polito,** President, Association for Postal Commerce ***West Windsor***

THURSDAY, MAY 20, 2010

8:00 - 9:40 **Concurrent Sessions**

DEMAND MANAGEMENT ***West Laurel Room***

Chair: William Deehan
Discussants: Lee Huffman
Hung-po Chao: Demand Response in Restructured Wholesale Electricity Markets
James E. Cochell: Estimating a Demand Response Supply Curve
Ahmad Faruqui & Sanem Sergici: Does Dynamic Pricing Work in the Mid-Atlantic Region? - Econometric Analysis of Experimental Data

POSTAL PRICING ***Library***

Chair: Robert Curry
Discussants: Lawrence G. Buc & Tobias Katzschmann
JP Klingenberg & Matthew Robinson: Postal Product Innovation: Strategy and Regulatory Tools
Rand Costich: Auctioning Postage Discounts

9:40 - 10:00 Coffee Break

10:00 - 11:55 **Concurrent Sessions**

CARBON MARKETS ***West Laurel Room***

Chair: Dale G. Schoenberger
Discussants: David Lamont
Timothy J. Brennan: The Challenges of Climate for Energy Markets
Alan E. Finder: A Scenario for a Future Electric Utility Industry in a Carbon-Constrained World
Aleksandr Rudkevich & Pablo A. Ruiz: Carbon Offsets of Renewable Resources and Energy Conservation Measures in Power Systems

COMPETITION & REGULATION ***Library***

Chair: Peter Jacobson
Discussants: Jeff L. Colvin & Antoinette Crowder
Annegret Groebel & Tobias Katzschmann: Full Market Opening in Europe and New Regulatory Challenges Ahead? – The German Experience
Michael A. Crew & Paul Kleindorfer: Postal Regulation under FMO and Intermodal Competition
Margaret Cigno & William C. Miller: USPS Profit-Sharing Through Profit Centers: Incentives for Increasing Efficiency

11:55 - 1:00 Lunch ***South Windsor***

1:00 - 2:30 **Concurrent Sessions**

REGULATORY TRANSFORMATION ***West Laurel Room***

Chair: Pauline Ahern
Discussants: Alan E. Finder & Tom Frantz
Eric Ackerman & John Caldwell: Economic and Regulatory Implications of the Smart Grid
Joseph Cavicchi: Economics and Regulation of Large Scale Renewable Resource Electricity System Transmission Additions
Peter A. Soyka: Greenhouse Gas Management - Are U.S. Public Energy and Utility Companies Ready?

UNIVERSAL SERVICE OBLIGATIONS ***Library***

Chair: Stephen De Matteo
Discussants: Victor Glass & Tobias Katzschmann
Shoshana Grove, Margaret Cigno & John Waller: Leveraging Posts' First and Last Mile Networks to Fund Universal Service Obligations
Edward S. Pearsall & Charles L. Trozzo: Evaluating the Effects of Reductions in the Quality of Postal Service
Kirk Kaneer, Renee Sheehy & Anthony Yezer: US Postal Service Retail Facilities: The Location and Size Problem

THURSDAY, MAY 20, 2010 (CONTINUED)

2:30 - 4:00 **Concurrent Sessions**

RISK MANAGEMENT ***West Laurel Room***

Chair: Howard Spinner
Discussants: Kathleen King & James Cater
Kevin F. Forbes, Marco Stampini & Ernest M. Zampelli: Do Higher Wind Power Penetration Levels Pose a Challenge to Electric Power Reliability? Evidence from the ERCOT Power Grid in Texas
Richard Michelfelder, Pauline Ahern, Dylan D'Ascendis & Frank Hanley: Estimating the Cost of Common Equity Capital for Public Utilities with the Consumption Asset Pricing Model
Dominik Schober, Stephan Schaeffler & Christoph Weber: Implicit Discrimination in Quality Regulation: Risk Premium Variation due to Size and Age Distribution of Electricity Networks

NEW DIRECTIONS ***Library***

Chair: Robert Czerwinski
Discussants: Lawrence G. Buc & A. Thomas Bozzo
Michael Ravnitzky: Offering Sensor Network Services Using the Postal Delivery Vehicle Fleet: Assessing Opportunities, Challenges, and Implications
Menahem Spiegel: Pricing of Network Services in the Presence of USO and Demand Variations
S. Gori, P. Sardoni, L. Pintsov & A. Obrea: Toward Smart Postal Network

4:00 Exercise Break

6:00 - 7:00 Cocktail Hour ***East South Porch***

7:00 – 9:00 Dinner & Research and Policy Agenda: **Michael A. Crew, Bryan Lee & Leon Pintsov** ***West Windsor Room***

FRIDAY, MAY 21, 2010

8:45 - 10:30 **Concurrent Sessions**

TELECOM ***West Laurel Room***

Chair: Saikat Sen
Discussants: Menahem Spiegel
Timothy J. Brennan: Net Neutrality or Minimum Standards: Network Effects vs. Market Power Justifications
Christiaan Hogendorn: Spillovers and Network Neutrality
David L. Waring: Market and Policy Aspects of U.S. Broadband Diffusion

CAPACITY PRICING ***East Laurel Room***

Chair: Richard Stevie
Discussants: Lee Huffman & Kiwan Lee
Lide Li & Guidong Zhu: The Valuation and Hedging of Zonal Load Following Contracts
James F. Wilson: Forward Capacity Market CONEfusion
Tim Mount, Alberto Lamadrid & Surin Maneevitjit: How Integrating Wind Power into an Electric Grid Affects the Economic Value of Transmission Lines

10:30 - 11:00 Coffee Break

Panel

11:00-12:30

SMART GRID ***East Laurel Room***

Moderator: **James D. Reitzes**
Hung-po Chao, Director, Market Strategy and Analysis, ISO New England, Inc.
Andrew Kleit, Professor of Energy and Environmental Economics, Pennsylvania State University
Bryan Lee, Director, Policy Development, Exelon Corporation
Sanem Sergici, Associate, The Brattle Group
Sheldon Switzer, Manager, DSM Evaluation, Measurement and Verification, Baltimore Gas & Electric Company

12:30 – 12:35 Concluding Remarks – Michael A. Crew

12:35– Lunch ***South Windsor Room***

SPEAKERS DISCUSSANTS & CHAIRS

Eric Ackerman, Director, Alternative Regulation, Edison Electric Institute
Pauline M. Ahern, Principal, AUS Consultants
A. Thomas Bozzo, Vice President, Christensen Associates
Timothy J. Brennan, Professor of Policy & Economics, University of Maryland Baltimore County & Senior Fellow, Resources for the Future
Lawrence G. Buc, President, SLS Consulting
John Caldwell, Director of Economics, Edison Electric Institute
James Cater, Director – Power Supply, Central Vermont Public Service
Joseph Cavicchi, Senior Vice President, Compass Lexecon
Hung-po Chao, Director, Market Strategy and Analysis, ISO New England, Inc.
James E. Cochell, Lead Analytic Researcher, Duke Energy
Jeff L. Colvin, Manager-Finance, United States Postal Service
E. Rand Costich, Attorney, Office of General Counsel, U.S. Postal Regulatory Comm.
Michael A. Crew, Director and CRRI Professor of Regulatory Economics, Rutgers University
Antoinette Crowder, Principal, Eagle Analytics LLC
Robert Curry, Vice President Business Development & Sales, Siemens Energy & Automation, Inc.
Robert Czerwinski, Senior Management Consultant, NGI Solutions, LLC
William Deehan, Vice President - Power Planning & Regulatory Affairs, Central Vermont Public Service Corporation
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Lide Li, Power Team, Exelon Corporation
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Karl A. McDermott, Ameren Professor of Government and Business, University of Illinois-Springfield & Special Consultant, NERA Economic Consulting
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29th ANNUAL EASTERN CONFERENCE

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Regulatory Risk: A More Comprehensive Examination and Empirical Test

By

Karl A. McDermott
Ameren Professor of Business and Government
University of Illinois –Springfield
December 1, 2009

Abstract

The concept of regulatory risk has been a topic of much debate since the inception of regulation. A renewed interest has arisen with the development and application of revenue decoupling, trackers, riders and other regulatory instruments being adopted by state commissions. The purpose of this paper is to reexamine the subject of regulatory risk which while treated extensively in the regulatory literature has often been couched in terms of narrower concerns regarding specific actions such as Fuel Adjustment Clause (FAC) adoption, Construction Work in Progress (CWIP) versus Allowance for Funds Used During Construction (AFUDC) and other timely issues. The difficulty is that the capital market prices risk in its entirety including interest rate and inflation movements, technology risks, policy risks such as environmental rule changes, as well as the risks associated with any particular regulatory policy position. Moreover, the regulatory commission can take different positions on any number of critical aspects of regulatory policy. It is for this very reason that Wall Street has employed legions of analysts to comb through the entrails of every regulatory decision and speculate on their implications for risks to cash flow and profits.

The question taken up in this essay then is: Can we develop a comprehensive enough model of the regulatory process to legitimately estimate the risk implications of specific policy positions of regulatory commissions? The paper will review the past literature on regulatory risk, construct a potential framework for estimating the policy implications for risk of alternative regulatory measures and present some preliminary empirical results.

Evolving Issues in Revenue Decoupling

Todd Schatzki
Analysis Group, Inc.

Many factors have led policymakers and regulators to increase efforts to address regulatory and market failures to achievement of cost-effective energy efficiency. Among the tools being used to achieve this goal is revenue decoupling, which aims to reduce a regulated utility's financial disincentive to implementing programs and practices that reduce its sales (the so-called "throughput incentive").

In this paper, we address several important issues arising in the implementation of revenue decoupling. In particular, while revenue decoupling is an important tool to addressing the throughput incentive, it also has broader ratemaking implications: for example, absent adjustments, revenue decoupling sets revenues at a fixed level which can be insufficient to cover costs in an environment of rising costs. Revenue adjustments in common decoupling approaches (e.g., per-customer revenue requirements) often have little relationship to actual changes in costs, thus raising the likelihood of frequent rate cases and administrative inefficiency. We show that a number of other mechanisms (e.g., indexing) more effectively track costs, while still achieving traditional ratemaking objectives and the objectives of productive efficiency. We also discuss recent ratemaking proposals consistent with these mechanisms.

We also address issues bearing upon the implications of revenue decoupling for customers, particularly in an environment with high and volatile commodity prices. These issues are important in light of on-going policy discussions regarding the role of regulated utilities in promoting adoption of cost-effective energy efficiency measures. We also assess differences in the customers charges typically introduced under revenue decoupling relative to commodity charges (which are typically not included under decoupling mechanisms). And we consider the impacts of revenue decoupling on total customers bills, rate and bill volatility, and the distribution of risk between customers and the utility. Rate and bill impacts are considered through several approaches, including an empirical assessment and simulations.

Hung-Po Chao

Abstract

Demand Response in Restructured Wholesale Electricity Markets

Dynamic pricing with price-responsive demand is essential for the success of a smart grid. We show that demand response programs based on an administrative customer baseline run the risk of causing inefficient price formation and thus impede efficient dynamic pricing. Fundamentally, this is because consumers do not own the amount of energy sold as demand reduction when the amount is estimated from an administrative customer baseline calculated from historical consumption levels. Demand subscription, by establishing a contract-based baseline for each retail customer that participates in demand response programs in the wholesale market, achieves efficient demand management that enables dynamic pricing for general consumer benefits.

Jim Cochell
Estimating a Demand Response Supply Curve

Duke Energy Carolinas (DEC) has several customers, some quite large, enrolled in its day-ahead hourly pricing program, also known as the HP tariff. A question of interest to DEC planners and system operators is how much change in load will be observed for a given change in one of more of the 24 hourly prices?

The hourly prices customer s see on the HP rate consist of two charges: an energy charge and a rationing charge. On most days the rationing charge is zero. However, on certain days, typically when system capacity is tight, these rationing charges may be non-zero. Higher prices for an hour with rationing charges lead to changes in usage for that hour and possibly for other hours in the day. Because the changes in consumption are linked across all hours of the day we must employ an estimation method which accounts for all hours in the day. Building on earlier work[1], this paper uses a Generalized McFadden (GM) approach to estimate the price responses. In response to comments received on the earlier paper the current analysis incorporates inter-day effects. It also allows customers' responses to vary at different price levels.

The GM model is fit to each customer for each summer the customer is on the rate, which may be as many as sixteen summers. The estimates that result from this modeling are specific to the customer and summer, e.g. customer #1 in the summer of 2004. These estimated parameters become the dependent variables in an analysis that spans customers and summers. The results of this analysis are used to develop the final model used to predict price responses.

[1] Taylor, T., et al. 2005. "24/7 Hourly Response to Electricity Real-Time Pricing with up to Eight Summers of Experience" *Journal of Regulatory Economics*, 27:3 235 – 262.

Does Dynamic Pricing Work in the Mid-Atlantic Region? - Econometric Analysis of Experimental Data

(Abstract)

Ahmad Faruqui and Sanem Sergici
The Brattle Group

Contact Information
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Principal
The Brattle Group
353 Sacramento Street, Suite 1141
San Francisco, CA 94111
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The Baltimore Gas & Electric Company (BGE) undertook a dynamic pricing pilot program in the summers of 2008 and 2009 and tested customers' price responsiveness to different dynamic pricing options in conjunction with several enabling technologies.

The *Summer 2008 Smart Energy Pricing (SEP) pilot program* tested critical peak pricing (CPP) and peak time rebate (PTR) tariffs on over a thousand residential customers in combination with two technologies, an in-home display known as the Energy Orb and a switch for cycling central air conditioners. Two levels of PTR were offered and a single level of the CPP tariff. These customers served as the treatment group and their usages were measured not only during the pilot period but also during several prior months. The remaining customers in the pilot stayed on the standard tariff and served as a control group. Hourly usage was recorded for customers in both groups during the pilot to determine if the treatment group used less during the more expensive periods. The *Summer 2009 SEP pilot program* was similar to the SEP 2008 pilot program in nature with one exception: it only tested the PTR tariff in combination with and without enabling technologies.

Postal Product Innovation: Strategy and Regulatory Tools

JP Klingenberg and Matthew Robinson
Postal Regulatory Commission

The decrease in mail volume across postal operators worldwide has increased the impetus for product innovation. The impending liberalization of the postal sector in the European Union and the new price cap regulation in the United States provide the market forces to encourage and allow innovation to occur. This paper will examine why market developments dictate that the dominant firm should innovate, what potential new products will leverage network capabilities to successfully compete for market share, and what tools postal regulators will need to be prepared for these changes.

The one notable source of postal pricing innovation that has driven new volume is worksharing. As the upstream market has matured into the 21st century, upstream letter competitors are specializing in accessing the postal network at the final phase, prepared for the delivery point sequencing of mail. Operators should look to develop intelligent pricing categories that maximize delivered volume by encouraging efficient private upstream sortation. Such pricing categories may include the following products: destination entry First-Class (reserved) bulk letter mail, electronic hybrid single piece mail, and route-specific access.

Postal Operators with a Universal Service Obligation and perilous fiscal situations must follow the lead of private corporations in times of recession and increased competition by focusing on their core competencies. In the postal arena, this is the "last mile" of delivery, regardless of regulatory regime. In the case of liberalized delivery, the cream skimming and postal economies of scale models (Cohen et al) for delivery costs across a range of volumes will be used to quantify the cost advantages in delivery available to the incumbent. These cost and network advantages should be leveraged by offering new products such as destination entry First-Class and route-specific access pricing.

In the case of operators subject to a price cap regime, a game theory model will be used to show why backward weighted price indices offer significant incentive to innovate and where new products may be needed (specifically looking at the worksharing required to realize the benefits of the Flats Sequencing Sorter). From a regulatory standpoint, it is important to have in place a price cap mechanism that allows the introduction of innovative products while preserving the appropriate limits on price increases. A price index that relies on historical volumes (i.e., backward-weighted) is best suited for a product suite that is stable over time. This paper will quantify the potential distortion of backward-weighted indices that can result from changes in product offerings that affect a significant portion of volume. Further, it will analyze the design and potential profitability of selected new products.

Regulators need tools to ensure that the introduction of low-priced products does not ultimately result in excessive increases in the prices of existing products. This paper will examine existing regulatory mechanisms designed to protect full service or reserved offerings, and suggest potential improvements and alternative mechanisms.

Abstract for the 18th Conference on Postal and Delivery Economics

"Auctioning Postage Discounts"

Rand Costich
US Postal Regulatory Commission

This paper designs an auction of postage discounts intended to replace the Postal Service's approach to granting volume discounts. During the period 2002-2008, the Postal Service negotiated such discounts with a few large mailers. In 2009 the Postal Service offered volume discounts to any mailer that met minimum volume limits and whose historical volume trend met certain conditions. The negotiated contracts took the form of multipart tariffs. These contracts met with significant criticism from the Postal Regulatory Commission (see, e.g., Robinson, Cigno, and Klingenberg). The primary problem was the risk that the Postal Service would pay discounts for mail that would have been sent "anyhow" at higher, public tariff rates.

The basic idea of the auction design is to maximize Postal Service profit from volume discounts. Bidders design multipart tariffs for themselves. A multipart tariff can be expressed mathematically as an expenditure function (or outlay schedule) showing the total expenditure for a given quantity (see, e.g., Panzar, p. 11). The slope of an expenditure function at a given quantity equals the marginal price for that quantity. Bidders would submit the expenditure function associated with their custom-designed tariffs as a sealed bid. Winners would obtain a quantity/expenditure pair from their bids (a pay-as-bid or "first-price" multi-unit auction). Bidders are expected to be bidding for their own account, although quantities won would be transferable. The auction thus has both private- and common-value aspects. The Postal Service would set a limit bid.

The design is intended to leverage the Postal Service's monopoly power as well as to collect the option value of the discounts, thus generating greater profit than one-on-one negotiations. The auction would be repeated periodically except during periods when the Postal Service is strained—e.g., pre-Christmas. This type of auction has similarities to US Treasury auctions and wholesale electricity auctions. However, the use of expenditure functions as bids is new. According to testimony at the PRC, mailers should be viewed as determining their quantities mailed directly from a profit analysis rather than through a derived demand curve and its associated elasticity (*e.g.,* Epp, pp. 6-9). Expenditure/quantity pairs would be more familiar to mailers than the price/quantity pairs used as bids for bonds or electricity.

Auctions would help the Postal Service overcome the informational disadvantage it faces in one-to-one negotiations, as bidders would have to anticipate not only the Postal Service's reserve bid, but also the bids of other contestants. Auctions can be subject to collusion among bidders, lack of bidder participation, and winner selection ambiguity. The paper addresses each of these problems. The winner selection problem is solved with an algorithm.

References

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Panzar, John C., "Testimony," PRC Docket No. MC2002-2, January 16, 2003; http://www.prc.gov/Docs/36/36738/JCP-T-1.pdf

Robinson, Matthew H., Margaret M. Cigno, and J.P. Klingenberg, "Negotiated Volume Discounts in a Regulated Post," in Michael A. Crew and Paul R. Kleindorfer (eds),*Competition and Regulation in the Postal and Delivery Sector*, Edward Elgar 2008.

The Challenges of Climate for Energy Markets

Timothy J. Brennan

Professor, Public Policy and Economics, UMBC
Senior Fellow, Resources for the Future

December, 2009

Submitted for the CRRI 2009 Advanced Workshop in Regulatory Economics
29th Annual Eastern Conference, May 19-21, 2010

Abstract

Climate change has become prominent if not dominant in debates over the design and regulation of energy markets. Smart grid policies, originally intended to reduce the need for infrequently used and thus relatively expensive peak-power units, are being justified as a way to mitigate greenhouse gas (GHG) emissions, either by reducing demand or as adaptations to variability of non-fossil fuel power sources, such as wind and solar. For these reasons, the perspective of an industrial organization economist, focusing on the efficiency of markets, the likelihood of market failure, and the effects of methods to regulate prices and organization structure, may be useful.

One can take advantage of this perspective to challenge some of the often-implicit presumptions in the climate and energy efficiency policy conversation. After doing so with a "quiz," I discuss six of the challenges that climate change raises for energy markets from an economic perspective:

- Cap-and-trade vs. taxes
- Non-price regulations
- Energy efficiency policies
- Mitigation vs. adaptation
- Trade effects
- Transmission planning

I then turn to two issues in the climate discussion that affect not how to face obligations to deal with climate change, but how to determine the scale of those obligations:

- The "fat tails" problem
- Discounting

I conclude with some thoughts on whether environmental preferences can or should be framed in terms of aggregated willingness to pay for climate improvements.

RFF Working Paper 09-32 available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1471325

Abstract: A Scenario for a Future Electric Utility Industry in a Carbon-constrained World

Author: Dr. Alan E. Finder, KPMG

In this paper, the author posits a scenario for the Electric Utility Industry's future state in which.

- Carbon constraints limit the future usefulness of coal plants extant in 2010
- Renewable and natural gas generation are the principal bridge technologies
- Storage and efficiency programs are alternative resources
- Smaller-scale fuel cells are the frontier technology
- Widespread deployment of SmartGrid technologies allows for improved efficiency of transmission and distribution networks with two-way communication of real-time information to end users

Within that scenario for a future state of the industry, on a conceptual level the paper explores:

- Potential value propositions for an industry based initially on central station generation and in future on a combination of distributed storage, tailored efficiency programs and renewable and hydrogen-based generation
- Regulatory adaptations in the posited future state, including
  - Tailored supply portfolios of storage, efficiency controls, real-time information and "conventional" energy with differentiation for levels of reliability and quality
  - Forward-looking incremental or marginal cost based pricing including returns on capital
  - Alternative mechanisms for controlling monopoly profit with returns to technological innovation
  - Consultative approaches to resolving disputes in price control regimes

Return of protection from political influence on regulatory decision-making (restoration of the promise of independent regulatory commissions)

Carbon Offsets of Renewable Resources and Energy Conservation Measures in Power Systems

Aleksandr Rudkevich and Pablo A. Ruiz
Charles River Associates
John Hancock Tower
200 Clarendon Street, T-33
Boston, MA 02116

ABSTRACT

The paper will elaborate on the economic properties of the concept of locational marginal carbon intensity in networked power systems first presented in [1] and on a method of decomposing the carbon footprint of the electrical grid between individual generating units, transmission facilities and end users on a real time basis introduced in [2].
The paper will report on the results of applying this theory to a detailed chronological simulation analysis of the Eastern Interconnection system using the GE MAPS model. Simulations conducted by the authors identify temporal, regional and locational differences in the magnitude of carbon offsets generated by a geographically scattered sample of renewable generating resources and energy conservation measures.

The paper will discuss major policy implications of this simulation analysis based on the comparison of the prevailing design of Renewable Energy Standards targeting the amount of energy generated by renewable resources with the alternative design setting the target based on the level of carbon offsets.

Finally, the paper will explore important insights into the impact of transmission constraints on carbon offsets based on the theory developed in [1,2] and on presented simulation results.

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"Full Market Opening in Europe and new regulatory challenges ahead? – the German experience"

Dr. Annegret Groebel and Tobias Katzschmann, Federal Network Agency

The year 2010 will be a milestone for the postal sector, especially in Europe. Most of the Member States are facing the crucial phase of implementing the 3rd Postal Directive by the end of 2010 and are already preparing for Full Market Opening (FMO). Moreover, at the eve of FMO in Europe the postal sector is undergoing fundamental structural change due to declining mail volumes through increasing substitution from electronic mail but at the same time also experiences the development of new promising electronic and hybrid postal products. Both developments will impact on market definition and competition.

Against this background this paper examines at the initial stage the completed gradual FMO liberalisation process in Germany since 1998 which includes analysing the most recent data of the development of the postal sector. The paper will evaluate the regulatory strategy applied by RegTP/BNetzA as well as the various sector specific regulatory measures in place to promote competition and will assess its effectiveness in practice. Furthermore, this paper describes external factors outside the sphere of the regulator such as the introduction of minimum wages and the currently applied VAT exemption for the incumbent Deutsche Post AG (to cover the US costs), and evaluates the implications of this on market development and competition.

At a subsequent stage this paper addresses the question if there is a need for sector specific regulation of the newly developing electronic and hybrid postal markets from a basic economic view point or if the application of general competition law is sufficient in this case. For this purpose the paper starts with the definition of the relevant market. Secondly, it will investigate the question if the characteristics, which justify the current sector specific regulation of postal markets such as structural market entry barriers, bottleneck resources and leverage effects can also be identified when incumbent postal operators offer services in these new electronic and hybrid postal markets and the role these factors may play for competition. Thirdly, this paper provides an analysis if the answer to this question is influenced by and depending on the regulatory strategy in place (end-to-end competition vs. worksharing model).

This paper is being presented in the midst of the crucial implementation phase of the 3rd Postal Directive and will provide practical regulatory information and lessons learnt important for all Member States and the stakeholders concerned. Furthermore, the question of sector specific regulation for the newly developing electronic and hybrid postal markets is not only of interest for Member States imposing the Directive and setting up their national regulatory framework but also for postal operators requesting legal certainty regarding the conditions for their products and services.

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ABSTRACT
"Postal Regulation under FMO and Intermodal Competition"

M. A. Crew
P. R. Kleindorfer

Over the past decade Universal Service Providers (USPs) have become increasingly regulated as their reserved areas have been reduced or eliminated. Indeed, some USPs have already seen their reserved area completely eliminated, and all of the USPs in the EU are scheduled to lose their reserved areas as postal markets are opened up to competition (FMO) in 2011 and 2013. USPs will continue to be required to provide universal service as FMO envisages the retention of the Universal Service Obligation (USO). In addition, there is no sign of reduced regulation to accompany FMO. The situation is clearly paradoxical in that, as postal markets are opened up to competition, regulation is not on the wane but continues to thrive, which is more than can be said for the postal sector. The paradox is usually justified on the grounds that regulation is needed to protect nascent entry from the USP, which is thought to have considerable residual market power. Another justification is the need to safeguard the USO, thereby offering some protection for small customers. Neither of these justifications is particularly strong. Indeed, the current policy of postal regulation combined with FMO and a continuing USO is questionable. It ignores the basic realities of competition from intermodal competition already facing the postal sector. Despite this reality, abandoning the current path and eliminating regulation entirely seems highly unlikely. So, this paper will assume FMO along with a USO, but will examine possible forms that regulation might take in an era of declining demand for traditional mail products.

The paper will address regulatory policies employed in the postal sector primarily in the EU but will also refer to policies elsewhere including the US. It will also draw lessons from other sectors, especially telecommunications. Paradoxically, while telecommunications regulation normally provides few insights into postal regulation, in this case the mistakes made in telecommunications may yield some lessons. A case in point is the misguided attempt to introduce competition into traditional wire line telephony, especially as embodied in the Telecommunications Act of 1996 in the US. What is now apparent is that technology was changing so rapidly that intermodal competition from wireless and broadband was much more important than regulation of the natural monopoly in traditional wire line (the local loop).

The situation in the postal sector is significantly different in that it does not have a natural monopoly arising from transactions specific investment. So, unlike traditional telephony, competition has long been feasible except for one major problem – the USO. This has been a problem from the very beginning of the policy debate on FMO. Since then there has been a gradual attempt to introduce competition and manage the process through regulation. The direction regulation has taken has been problematical and the whole process has been oblivious to the lesson of telecommunications, namely, the importance of intermodal competition. In telecommunications intermodal competition meant that while traditional telephony was a natural monopoly, the monopoly was worth less and less over time. The pie became so much smaller that it was hardly worth fighting over. However, old style TELCOs were able to enter the business created by the new technologies of wireless and broadband. In the US and the EU, these technologies were minimally regulated compared to traditional telephony. So interest in introducing head-on competition in traditional telephony waned and regulation became less important because of inter-modal competition. The implications of this example have been lost in the implementation of postal polices. The charge to FMO and increased regulation has continued with government and regulators apparently oblivious to the rapidly declining pie they are attempting to share out. In addition, the big difference is that while the new technologies offered new opportunities to TELCOs, because they could build on their traditional technological platform, the same does not apply to the postal sector. Parcels and banking are highly competitive, but they offer nothing like the growth provided by wireless and broadband. So, USPs have (arguably) a greater public mission than TELCOs and yet have a serious problem of declining demand not faced by TELCOs.

This paper will address the implications for regulation of the three fundamental forces shaping the future of the postal sector: FMO, intermodal (electronic) competition and the preservation of the USO. It will review the objectives of regulation in this context. Under serious intermodal competition, the threat from abuse of market power is diminished even without FMO. Indeed, the issue is whether head-on competition has become somewhat irrelevant now that the powerful forces of intermodal competition are unleashed. The size of the postal pie, just like the traditional telephony pie, has shrunk. The implications of the shrinking pie for regulation and for the postal sector will be examined. In particular, the paper will examine the impact of scale economies which, under declining demand, lead to further shrinking the pie. The type of questions that will be addressed include:

1. What are the options available in the postal sector to maintain USO under conditions of falling demand and how does FMO and traditional regulation facilitate or hinder implementing these options? The options include increasing single-piece rates, increasing flexibility in pricing response, exploiting scope economies across different lines of business (eRetailing), exploiting network synergies (financial services) and more radical diversification.
2. Developing a more radical approach to regulation and governance, which implies, *inter alia*, the need for improved ability to manage inputs and respond to major stakeholders, including labor. Changes in governance also include the possibility of privatization.
3. New models of regulation and governance that recognize and come to grips with the tensions of declining demand and intermodal competition.

The basic thrust of the paper is to examine design principles for a new regulatory governance framework that encourages cost

efficiency and product innovation in the sector as a whole, while recognizing the fundamental changes that are occurring and the need to support the valuation and accomplishment of continuing public mission(s) of the postal sector.

Abstract

USPS Profit-Sharing Through Profit Centers: Incentives for Increasing Efficiency

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The United States Postal Service has experienced record-setting losses over the past few years. These losses have been fueled by the inability of the Postal Service to decrease operating expenses quickly enough to offset revenue loss due to volume declines. The problem might be aggravated by a fundamental institutional constraint. There is a well developed body of literature indicating serious agency problems with large, commercial enterprises relying on hierarchical organizational forms. However, with the Postal Service, the problem is even more acute. As a public enterprise, the Postal Service lacks a clear profit motive because it has no residual claimants. Theoretically, taxpayers are the claimants because the Postal Service was initially capitalized with appropriated funds. However, there is no clearly designated agent acting on behalf of the taxpayers. Therefore, effectively, any profit incentive is entirely lost and with the consequential effect that the Postal Service does not face the same pressure to cut costs and become more efficient as private sector businesses do, when facing similar circumstances.

As an alternative, past research has suggested converting stakeholders in public enterprises to pseudo residual claimants through the creation of profit-sharing mechanisms for the benefit of these stakeholders (Crew and Kleindorfer 2008). Our proposed paper adopts this concept and shows how financial incentives to increase efficiency can be created system-wide for the benefit of Postal Service managers and workers. In particular, we will describe how a decentralized (plant-level) method of profit sharing provides an effective means for substantially reducing the free rider problem that might otherwise persist through more traditional centralized approaches. Decentralized profit-sharing can induce a pervasive change in culture within the Postal Service through plant-level financial incentives. Employees at all levels are motivated to adopt cooperative planning and work methods to increase cost efficiency. To address the decentralized profit-sharing scheme in more detail, our paper will be divided into two parts.

First, we will investigate requirements for instituting plant-level profit measurement capabilities. We envision profit measurement at each plant according to a system where each plant is credited with revenues and costs according to mail received from mailers and other postal plants, and mail processed and delivered. Transfer pricing techniques can be used to generate facility-level financial transactions imputing values to all mail flows between facilities. We expect that all or most of the imputed values would be market values, based on the implicit rates charged, net of discounts, for mail entering the system at different locations. Along with a description of key issues, we will provide a generic, system-level representation of how market-based revenues costs and profits would be estimated by location.

The second portion of our paper will address the issue of how a plant- level, profit-sharing mechanism might work so as to induce surplus producing results through cooperative action between workers and managers. Apart from decentralizing the overall profit-sharing arrangement, a key ingredient of the mechanism, influencing the actual results achieved, are the share ratios used to divide the total profit increment between management and workers. Initially, we assume that managers and workers agree to distribute incremental profits at their plants according to annual share ratios, established before the start of each year.

There are equity-efficiency trade-offs, implied by such agreements, that are worth examining. In reaching particular agreements, sufficient differences in bargaining power, might easily cause one side to extract a high enough share of the total increment, such that the other party has no incentive to exert added effort. This type of suboptimal result can be avoided, possibly, through the imposition of system-wide upper and lower limits for the share ratios. However, we perceive at least one disadvantage to this approach at this stage. There may be a substantial number of locations where inducing effort from both sides calls for marked differences in the share ratios in order to provide one party sufficient incentive to exert added effort. The other party can “afford” a lower ratio because of little added effort required to generate a major portion of the incremental profit. In these cases, if the feasible shares lie outside the imposed system level “band”, then suboptimal results might prevail. We will investigate these issues; provide examples of likely cases; and reach an assessment as to when system-wide profit sharing bands might improve economic efficiency.

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Economic and Regulatory Implications of the Smart Grid

Dr. John Caldwell and Eric Ackerman, EEI

As its very name implies, the "Smart Grid" is, or rather will be, a complex network. But complex systems have special properties that are rarely discussed in the context of Smart Grid discussions. Such systems evolve at least as much from "the bottom up" (through innovation, trial and error, and adaptation – among several independent sources) as from "the top down (i.e., through a fixed, holistic central plan). Its elements interact in ways that produce benefits not attributed to any individual component, and which truly make the value of the "whole greater than the sum of its parts." But the emergence of a complex network like the Smart Grid will be highly problematic within the confines of the traditional electric utility planning paradigm, in which every major capital addition must be cost-justified in terms of criteria such as "used and useful" and net customer benefit that must be linked to each specific item. Furthermore, many of the components in this network may be introduced by government planners and entrepreneurs outside of the regulated utility system. Can "new wine" be poured into "old bottles," or will the fundamental incompatibility of the planning paradigms existing among electric utilities, government planners, and entrepreneurs make the Smart Grid an impossible dream? This is the question addressed in this paper.

Part A (authored by John Caldwell) will describe the characteristics of the Smart Grid as an emergent complex system, and the unique challenges that such a system will present for planning and the building of business cases. Part B (authored by Eric Ackerman) will consider how regulation needs to change to facilitate the development of this complex system.

Together these parts will comprise a summary of the fundamental paradigm shift that must occur within the electricity industry for a transition to smart grid to occur.

Joseph Cavicchi

Abstract Proposal
CRRI Eastern Conference

Economics and Regulation of Large Scale Renewable Resource Electricity System Transmission Additions

During recent years there has been considerable interest in expanding the U.S. high voltage transmission system to accommodate renewable energy resources. Numerous large scale transmission projects have been proposed to accommodate renewable resources—in particular wind resources. At the same time there is ongoing debate regarding how these large scale projects are best planned, and considerable effort and discussion focused on how to allocate the costs of these projects across the users of the electricity system. However, important considerations regarding which transmission projects are most economical, and how these projects' costs will impact the delivered price of renewable energy, are often not central to the debate. This paper will evaluate both how transmission projects will impact the delivered price of renewable energy and the regulatory frameworks that exist for evaluating projects' costs and benefits.

Because renewable electricity projects are primarily driven by state standards specifying minimum quantities of electricity to be sourced from renewable resources annually, the cost premiums associated with the supply are not always transparent. Many states' standards increase slowly year-to-year and initially it is often existing or local sources of supply that are meeting the standards. As standards increase, or if a national standard were enacted, there will likely be regional shortages of renewable resources. This could require that resources be sourced from distant locations. The increased cost associated with sourcing from distant supplies, dependent on distance and utilization of proposed transmission lines, is not trivial. It is likely these costs will be more and more scrutinized as proposed projects begin being debated. Will higher price levels will be acceptable to buyers? Can we assume buyers can directly bear these increased costs or will potentially inequitable allocations or federal subsidies be necessary?

At the same time end user costs are often unknown, there tends to be little policy which specifies how competing transmission projects will be evaluated. In many cases existing transmission owners simply are proposing large scale projects driven by strong federal incentives to add transmission. However, there are non-utility companies trying to compete against incumbent transmission owners claiming that the projects can be built more cheaply. The proposed projects all have different impacts on the electricity system and generally are not needed for reliability. Determining which projects will be endorsed is not straight-forward. Can there be a clearly defined approach by which competing projects are evaluated? Will new entrants really be able to compete?

The answers to these questions will be important to the ongoing efforts to integrate more renewable resources in the U.S. and this paper will provide a thorough empirical evaluation of both the costs and approaches being considering for determining which transmission facilities may be constructed.

Abstract: Greenhouse Gas Management-Are U.S. Public Energy and Utility Companies Ready?

Author: Peter A. Soyka, Soyka & Company, LLC

Risks posed by greenhouse gas (GHG) emissions are now a topic of everyday conversation, and their effective management has been of concern for at least several years, not least within government regulatory agencies and the boardrooms of major corporations. Indeed, concerns about the potentially serious effects that climate-related risks could pose to corporations of many types have been repeatedly expressed by both individual shareholders and major institutional investors.

In response to the growing importance of the climate change issue and its potentially serious impacts on corporate assets, future revenue streams, and financial risk profiles, it would seem reasonable to assume that major U.S. publicly traded firms of all types would have taken steps during the past several years to evaluate their potential exposure to this issue. Thoughtful examination would suggest that both changes in climate and possible new regulatory controls on GHG emissions would be of interest, and that responsible executives would take appropriate actions to actively manage any significant business or financial risks to their firms. This presumption seems especially sound in the case of electric utility, oil and gas, and other companies that are highly reliant on businesses with a significant GHG emissions footprint.

This paper will present the results of new research on the extent to which publicly traded U.S. electric utility and other energy-related firms have taken tangible steps to manage their exposure to climate change and its implications. It will show that, contrary to expectations, most U.S. firms have not taken such steps, and when and where they have, they generally are not sufficient to provide adequate assurance to their owners (shareholders) or the general public that climate-related risks are fully understood, being acted upon, and are under control. The research will be based upon a comprehensive review of data reported to the U.S. Securities and Exchange Commission, posted on company web sites, and otherwise developed and released by each company in the Russell 1000 index. Particular emphasis will be placed on the companies in the electric power and related sectors, and results developed for these sectors will be compared and contrasted with those describing the larger population of major U.S. firms.

Abstract for the 18th Conference on Postal and Delivery Economics

"Leveraging Posts' First and Last Mile Networks to Fund Universal Service Obligations"

Grove, Shoshana; Cigno, Margaret; and Waller, John — PRC

The network of world Posts has unique economic, environmental and social capabilities at the first and last mile that are a key factor in global economic and geo-political development. These intrinsic capabilities are not only necessary for global commerce, communications and cultural development; they can also be effectively leveraged to fund universal service obligations when combined with public initiatives and private partnerships. The primary objective of the paper is to determine how incumbent Posts can leverage first and last mile package delivery networks to help fund their universal service obligations and increase overall social benefit; where the Posts have an advantage and where competition for delivery is likely to continue. The analysis will cover unit cost advantage based on package characteristics such as size, weight, density, origin and destination (I'm not sure we should include this in the abstract, this is not something the incumbent necessarily has because it's the incumbent). We will also compare qualitative, quantitative, environmental and social benefit differences of the respective carriers using empirical data gathered from company financial reporting and customer survey instruments.

We will make a comparison of what labor cost differences must be to equalize the private carrier's advantages in urban, suburban and rural areas as well as the break points where the advantage of the Post's may diminish due to the size or weight of packages so that carrier delivery becomes more like special route delivery. Our research analysis will also serve to find the break points and possible best combination of Post and competitor in logistics.

In this paper we will examine how providing affordable and universal coverage stimulates and or supports the global economies and how having a single carrier at the last mile answers environmental concerns. On a macro scale, we will examine trends and look at current and historical data on first and last mile volume, revenue, pricing, costs, environmental impacts and socio-economic benefits for the Posts and for the commercial carriers. We will provide data on the economic and environmental differences between online activities enhanced by first and last mile services of the Posts compared with current models that are built around traditional hub and spoke distribution centers and brick and mortar retail. We will provide survey data and secondary research comparing the qualitative differences between the Posts and the private carriers including service guarantees, public perception and opinion, value proposition, security, time-in-transit and reliability.

As environmental concerns increase, there is a growing understanding that direct-to-consumer shipping is more economically efficient and more carbon neutral than the traditional direct to retail models. The advantages of direct-to-consumer shipping over traditional models include: consumer choice, manufacturer's ability to expand their reach, speed to market, just-in-time inventory and inventory reductions, and the ability to locate manufacturing and distribution facilities to optimize transportation, facility costs and labor markets. The online marketplace will expand as merchants, manufacturers, business partners and governments recognize the social and environmental benefits of online shopping and as developing countries seek to improve their standard of living through the acquisition of a broad selection of consumer goods and services at lower costs. The existing network of Post's can provide the infrastructure for both public and private economic growth. Pending legislation in the United States around using the Postal Service fleet as a proving ground for vehicle electrification and to help jump-start the nation's electric grid is just one example of how the Post's first and last mile advantage can be utilized for social and economic benefit.

The competitive strengths and weaknesses of the Posts at the first mile will also be explored and analyzed as it pertains to supporting the universal service obligation. As online shopping becomes more prevalent, there will be an increased need to return merchandise. In the U.S. the Commercial Carriers, FedEx and UPS make use of the Postal Service for both last-mile delivery and first-mile pickup of returns and acceptance of returns at local Post Offices. Even for items purchased at retail, the online return process produces significantly less carbon than the alternative.

There is also a growing need to make it easier to retrieve environmental waste from the household for safe destruction. These include product recalls, expired or recalled medicines, e-trash, ink-jet cartridges, cell phones and more. The Posts are able to provide unique social and economic value in this area. Since they are at the door, they can provide an easier and more economical alternative to traditional disposal methods that are negatively impacting the global environment. We will explore the economics of these initiatives and whether they can be revenue generating or revenue neutral.

Expanding consumer markets overseas are influencing small business development in rural and under-developed areas. As the world supply chains expands, there will be an expanding need for the ubiquitous first and last mile services of the posts to rural and remote areas – for communications, marketing, fulfillment and returns. The infrastructure supported by Posts allows for manufacturing centers to change as supply, demand and labor markets fluctuate globally, or to respond to economic crisis and climate changes.

The Posts enable developing economies to participate in world markets through more efficient manufacturing, marketing and order delivery. Commercial shippers, printers, logistics providers and other business partners rely on the posts since they are the only providers that serve every market in every country. Other providers such as commercial carriers do not have the critical mass and economies of scale to provide this vital infrastructure and therefore rely heavily on the posts for the first and last mile.

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Universal Postal Union: Greening the Posts

Abstract of Proposed Paper
Title: Evaluating the Effects of Reductions in the Quality of Postal Service
Authors: Edward S Pearsall and Charles L. Trozzo

As mail volumes have contracted during the global recession, national posts have increasingly explored responses that would cut costs by reducing the quality of service. Most notably, a number of recent studies have estimated the savings from reducing the frequency of delivery for the U.S. Postal Service (USPS) and for several European posts. Virtually all of these studies juxtapose conjectures regarding the demand effects of the proposed reductions with quantitative models to estimate the impact on cost. In this paper we show how econometric demand models can also be adapted to the task of statistically estimating the effects on mail volumes of changes in the qualitative aspects of postal service.

Our method relies on a previous finding by Fenster *et al* (2006) that the US postal tariff can be accurately represented by a hedonic price equation econometrically fitted over the entire range of US mail service categories. The price equation relates US postal rates to indexes of several qualitative properties of the mail, including the time to delivery. Such a price equation enables us to convert changes in the indexed qualitative properties of the mail into equivalent changes in postal rates. The demand effects of the rate changes can then be estimated using any fitted econometric demand model that relates postal volumes to rates. This method for estimating the demand effects of reductions in service quality should be feasible, not only for USPS, but for any national post whose tariff can be represented by a hedonic price equation, and whose volumes have been fitted econometrically to demand equations.

We demonstrate our method by re-estimating the demand and cost effects of various reductions in the frequency of residential and business deliveries by USPS. Our results tend to confirm assumptions by others that the demand effects of eliminating USPS' Saturday deliveries would be small – in the order of 1 or 2 percent for most categories of mail. Furthermore, our predictions of the cost savings to USPS fall in the lower range of estimates made by others – about $2.5 billion per year.

US Postal Service Retail Facilities: The Location and Size Problem

-by *Kirk Kaneer*, Renee Sheehy*, and Dr. Tony Yezer**

Abstract

The Postal Service operates a vast retail network of more than 36,000 locations, bringing in about $14 billion in annual revenue from the sale of postage and other retail services. This network reflects historic patterns and is not optimized for current conditions. We plan to develop an analytical framework for optimizing the Postal Service's retail network. Such a framework can be particularly useful as the Postal Service seeks to consolidate retail facilities as it can provide objective criteria for evaluating retail needs.

This paper plans to present an econometric model of postal retail demand and analyses of the windows, facility space, and staffing needed to meet that demand. The analysis will seek to optimize net retail revenue, defined as revenue less facility and labor costs, per square mile. Retail revenue for a particular facility/area can be estimated using demographic and business data and the distance between retail facilities. We also plan to calculate the number of windows needed to serve demand, the space cost per facility, and the labor costs to provide retail window services. These analyses can be combined to estimate the optimum number and staffing of retail facilities in a particular area and the optimum distance between them.

The results of our analysis hope to show that an optimized, efficient retail network could allow the Postal Service to provide equal or even better retail service at much lower cost.

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Please note: this paper reflects the opinions of the authors only and not their respective organizations.

Do Higher Wind Power Penetration Levels Pose a Challenge to Electric Power Reliability? : Evidence from the ERCOT Power Grid in Texas

Kevin F. Forbes
Marco Stampini
Ernest M. Zampelli ♣

There exists broad political support for increasing substantially the share of electricity generation from wind energy. However, the output of wind generation plants is inherently variable with upward dispatch by the system operator not being possible. Some also contend that wind energy production is difficult to forecast accurately. Thus, it seems prudent to consider the potential consequences of increased wind energy penetration on the reliability of the power grid since avoidance of the high societal costs of blackouts requires that the amount of power generation in a balancing authority area match exactly, on a near-instantaneous basis, the system load, net of losses and interchange with other balancing authority areas.

The paper focuses on the ERCOT power grid in Texas where wind power accounted for approximately five percent of generation in 2008. An example of the challenge that wind energy poses for power grid reliability is ERCOT's implementation of Step Two of its Emergency Electric Curtailment Plan on 26 February 2008 in response to a drop in system frequency.

The paper assesses the effect of higher wind energy penetration levels on system reliability with an econometric analysis of the effect of wind power's variability on the deployment of ancillary services and balancing power. The sample spans the time period from 1 October 2008 through 31 October 2009. Preliminary results indicate that changes in wind energy production from one fifteen minute market period to the next are largely offset by changes in the dispatch of regulation power.

Additionally, the preliminary analysis of ERCOT's balancing market suggests that wind energy production is indeed difficult to forecast accurately on a day-ahead basis and that the errors in the day-ahead wind energy forecasts have significant implications for the balancing market. Final results are expected to be of interest to energy analysts, system operators, and regulators.

Abstract for the 18th Conference on Postal and Delivery Economics

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Estimating the Cost of Common Equity Capital for Public Utilities with the Consumption Asset Pricing Model

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Abstract

The regulatory process for setting the allowed cost of capital for a public utility typically involves the application of the DCF and the CAPM. This paper applies a general yet simple consumption-based asset pricing model of the risk-return relationship for additional evidence on estimating the cost of common equity and the allowed rate of return for a public utility. Using a GARCH-M estimation method, the results of the consumption asset pricing model risk-return relationship for public utilities are robust. The results show that utility stocks do not hedge against downturns in the business cycle as well as providing stable *ex ante* conditional volatility and risk premium estimates for estimating the cost of common equity capital for public utilities.

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Keywords: public utilities, cost of capital, GARCH, consumption asset pricing model
JEL Codes: G12, L94, L95

Implicit discrimination in Quality Regulation: Risk Premium Variation due to Size and Age Distribution of Electricity Networks

By Stephan Schaeffler; Schober, Dominik; Weber, Christoph

Evidence has repeatedly shown that at the introduction stage of incentive regulation investment may be hampered by strong incentives to save costs. Consequently, investment or quality regulation is necessary to guarantee socially efficient investment. Precisely the latter, quality regulation, can bear discrimination potential when network operators are heterogenous with respect to certain characteristics. Two such relevant characteristics are the size (e.g. km cable length, n° of circuit breakers, n° of transformers, etc.) and the age distribution of an electricity network. These imply structural disadvantages. Not only older networks suffer from a higher number of component failures and thus outages and correspondingly will exhibit lower quality indices. But also risk exposure is higher due to greater variation in expected quality indices, since stochasticity in the failure behavior is larger for older and smaller networks. Since capital lenders and shareholders not only price systematic risk[1] (e.g. Stulz 1984, Froot and Stein 1998), such network operators will face higher capital cost and thus face discrimination.

Short-run adjustment of the two characteristics is quite difficult: The adjustment of network size implies the search for an efficient scale of production, which can only be influenced over years. The modification of the age distribution of assets requires overcoming several bottlenecks such as financial liquidity, infrastructural restrictions (e.g. planning and building permissions) or workforce capacity restrictions. The aim of the article is hence to assess theoretically and empirically possible discrimination potentials resulting from different firm size and network age in connection with quality regulation both in terms of expected total cost and total cost variance.

Abstract for the 18th Conference on Postal and Delivery Economics
Offering Sensor Network Services Using the Postal Delivery Vehicle Fleet:
Assessing Opportunities, Challenges and Implications

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Postal Regulatory Commission*

Postal service providers world-wide are seeking additional revenue sources as mail volumes decline and electronic communications increase. This paper proposes a class of revenue-generating services for postal service providers, particularly incumbent operators carrying a universal service obligation. Customers can be offered the opportunity to lease a receptacle on postal delivery trucks to permit ready installation of a standardized sensor package module. The sensor(s) can be of any suitable type. The postal service can earn revenue by leasing access to use of the sensor platform, or alternately by marketing data collected by specified sensors. The paper explores the concept's opportunities, challenges and implications by evaluating the merits of the applications and identifying the existence of competing alternatives.

This concept builds on the postal service's intrinsic ubiquity -- its reaching nearly everywhere nearly every day. Because postal delivery reflects human activity, postal delivery routes cover most of the landscape, and the trucks traverse those routes daily. Postal routes in the real world seem tailor-made for a sensing network – the existing routes likely resemble the structure of an efficient mobile sensor network designed from scratch. The proposed system would not require additional labor hours or route diversions and can be designed to avoid adding to the drivers' workload any tasks that would distract them from their primary delivery function.

Sensors at fixed locations are often handicapped by intrinsic functional and geographic limitations. In contrast, a mobile sensor network can provide tightly interlaced fine-grained coverage across a broad area. A network of mobile sensors can reach nearly everywhere in the country, yet also can achieve a high degree of geographic specificity and selectivity, for example targeting routes near specific industrial facilities, neighborhoods or critical infrastructure points, depending upon customer needs.

Sensing applications considered within the paper include:

- Chemical/Biological/Radiological Detection for Homeland Security
- Air Quality and Environmental Assessment and Molecular Sensing
- Gas Leak Detection
- Meteorological Data Collection
- Road Condition Assessment
- Broadcasting and Wireless Signal Coverage Measurement
- Law Enforcement Applications
- Biological Surveys
- Noise Level Profiling
- Photo Imaging
- Earthquake Sensing
- Pest Control
- Other Scientific Measurements

The paper weighs the value of these services with respect to various criteria including:

- The Needs of the Nation
- Compatibility with the Primary Obligations of the Postal Function
- Technical Feasibility
- Economic Value, Cost and Revenue Potential
- Identification of the Customer Base
- Revenue Potential
- Ability to Piggyback Multiple Sensors and Accommodate Multiple Customers
- Public Perception and Societal Acceptance
- Civil Liberties and Privacy Concerns
- Legal Risks

The paper identifies the general requirements for system design and operation, including the collection, management and transmission of collected data. Data can be recorded and provided continuously, intermittently or upon predetermined trigger points, or once daily. Data can be used to trigger alerts/alarms.

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* The views expressed in this abstract are those of the author and do not necessarily represent the opinions of the Postal Regulatory Commission.

Such a system provides for substantial flexibility in deploying the sensors. Concepts described include accumulating or averaging data over time to establish a baseline or to locate irregular phenomena, adapting the deployment and use of sensors based on the data received, and accommodating multiple sensors on the same vehicle platform. Sensors at fixed post office locations could supplement mobile sensor coverage.

Additionally, the paper describes the need for careful oversight arising from potential civil liberties concerns. In some cases, there may be public or employee discomfort over certain uses, and thus there is a discussion of whether those uses are consistent with the underlying role and obligations of a postal service.

In short, this paper outlines a new way for postal operators to earn additional revenue by offering to public and private customers useful measurement services that would not otherwise be available at reasonable cost.

This paper would be of interest to postal operators and regulators, government officials, scientists and engineers, and a wide range of potential commercial and governmental customers.

"Pricing of Network Services in the Presence of USO and Demand Variations"

Abstracts Submitted for the EC and/or WC and/or Postal Conference

By

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Most the attention in the discussion of the Universal Service Obligation (USO) was given to the supply and cost side aspects of the problem. This paper examines the impact of demand variations on the pricing and on the welfare derived from the postal network product. Adopting the traditional view regarding demand variations (i.e., demand differences) across groups of users and/or locations, this paper analyzes the impact of demand variation across time. In its simplest version, the model considered in this paper assumes the traditional two unequal locations (markets) where one location is characterized by low delivery costs and the other by high delivery costs. The USO constraint is expressed by a required uniform (single) price across locations. The market structures considered are I: The single monopoly price II: The single breakeven price. The simple example of time dependent demand variation is the recession, where the local demand for the network product falls. This drop in demand might be symmetric across locations or of different magnitudes at different locations. These changes in the demand will affect the uniform USO price in different ways which depends on the relative magnitude of the drop in the demand as well as on the market structure.

"Toward Smart Postal Network"

Abstract for 18th Conference on Postal and Delivery Economics, June 2-5, 2010

Submitted for consideration by S. Gori (Bristol Business School, Poste Italiane), P. Sardoni (Poste Italiane), L. Pintsov (Pitney Bowes) and Obrea A. (Pitney Bowes)

Smart electric grids are hot topic. The interpretation of the term "smart" ranges from more reliable, flexible, convenient and safer power transmission to intelligent meters that automatically send readings and control domestic appliances. Smart grid is expected to be capable of managing the intermittent surges of electricity from a large and widespread number of small power sources such as wind turbines and solar panels. More sophisticated technology will allow a smooth flow of energy in and out homes and businesses, balancing supply and demand for power more efficiently. It is also expected that the smart grid will reduce the need for expensive backup capacity, thus it will reduce the cost of electricity and encourage optimal consumption. Postal networks are also undergoing fundamental change. They clearly need to be reinvented since their traditional products and their delivery methods are rapidly becoming obsolete for the electronic age. Considering "smart" properties of electric grid, can they be projected onto the postal sector? Can we envision a smart postal network and understand its basic organizational and technological components? If the answer is yes, what would it encompass and what would it mean for consumers, postal service providers and regulators?

The paper compares smart electric and postal networks and identifies similarities and differences between them. Because (by definition) the characteristic "smart" almost always implies adaptive and effective use of information, both networks are distinguished from their not so smart cousins by how they use all relevant information. The key consideration for both networks is how relevant information within the network is collected, processed and acted upon. The concept of "smart" electric meters can be extended to postal network in the sense that metering usage can be active (i.e. equipped with the ability to control both production and consumption aspects of mail). The similarity may also be limited because postal and electric grids are quite different in their purpose, design, and operations. The postal and electric networks fundamentally differ in the products that they deliver to their customers. While electricity is a commodity product, postal products are becoming increasingly differentiated. A critical requirement for the electric network is "smart" balancing act between supply and demand complicated by the difficulties of effective storage for electrical energy, while postal network faces a painful transition into digital world where majority of communications are not carried by printed media resulting in significant decline in demand for traditional postal "bread and butter" products. Understanding similarities and differences between smart grids will help to articulate clear and constructive vision for the future of networked industries as well as to identify their mutually beneficial technological, operational and governance components.

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Net Neutrality or Minimum Standards: Network Effects vs. Market Power Justifications

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December, 2009

Submitted for the CRRI 2009 Advanced Workshop in Regulatory Economics
29th Annual Eastern Conference, May 19-21, 2010

Abstract

Today's leading telecommunications policy controversy is "network neutrality" (NN). NN may be defined as a requirement that all Internet service providers (ISPs) treat each data packet identically. Many of the arguments from NN's advocates appeal to ISP's will deny a fair shake to the next garage-based innovator or capriciously deny service to those whose content it doesn't like, for example, cutting off access to a union's website during a labor dispute. Most of the arguments in favor of net neutrality, however, rely on market power. Absent regulations, ISPs will favor one supplier's content over another's. Consumers can typically choose from at most two providers of high speed broadband wireline services (cable television and telco DSL or fiber-optics), and that wireless services lack comparable speed or capacity.

Opponents of net neutrality claim that ISPs need to be able to discriminate in packet handling to manage congestion and latency to maintain quality of real-time services while peer-to-peer file sharing exhausts capacity. Other arguments take issue with the market power premise or its consequences. Some suggest either that two is enough for competitive conduct, or that wireless is part of the market. Even if an ISP has market power, limiting content penalizes it by reducing demand.

The purpose here is to divorce the NN argument from market power. A rationale draws on the universal service argument justifying subsidies of voice service. For the internet, the network effect is not across end users, but content providers. The value of a website depends on the ability of other content providers to rely that links to it will operate. This argument applies even if there are numerous ISPs, where market power is not a concern. It suggests, however, not NN, but minimum quality standards, leaving ISPs relatively free to manage congestion and offer premium latency-free service.

Christiaan Hogendorn
Spillovers and Network Neutrality

Proposals for network neutrality are usually justified at least in part based on positive spillovers and externalities related to an "open" Internet. Almost everyone would agree that the Internet generates a great many positive benefits throughout the economy, but there is much less agreement as to whether these benefits are "spillovers" or "externalities" in an economic sense. This essay examines three sources of benefits from the Internet and evaluates whether they could be in fact threatened by private, potentially non-neutral behavior by ISPs. First, the Internet is a general purpose technology, with a wide range of applications throughout the economy. Second, the Internet, as the name suggests, is a network of networks, which means that network effects are rampant throughout all Internet-associated products. Third, the Internet is an innovation-spawning technology, so that almost all of its content is rapidly changing and developing, adding new value. The essay evaluates whether each of these is a externality and whether each causes a market failure that is ameliorated by a neutral environment.

MARKET AND POLICY ASPECTS OF U.S. BROADBAND DIFFUSION

DAVE WARING

Wired broadband access is a relatively recent development of the telecommunications network, made possible by new technologies. In less than a decade broadband has displaced dial-up modems for accessing the Internet, reading email, making phone calls, and other new applications such as downloading videos. This paper examines the diffusion of broadband in the U.S., describing forces of supply and demand, delineating externalities generated by a modern broadband network, and examining the impact of recent and emerging broadband policies.

In the U.S. the deployment of broadband has been primarily left to market forces. Because broadband is acknowledged to be critically important for economic and social reasons, and because the U.S. is lagging in broadband availability, much attention has been given to whether policy mechanisms should be applied to accelerate deployment. Because of the heavy investment required to build a broadband network, there are significant barriers to entry that can deter new competitors. There may be areas where provision of broadband is simply unprofitable. Although prices have declined, many citizens still cannot afford the monthly subscription fees. These realities create equity issues, commonly referred to as the "digital divide."

The Stimulus Act of 2009 included billions of dollars to increase broadband deployment to unserved and underserved communities. This policy is often justified in part by the social benefits that come about through increased broadband connectivity. Potential positive externalities attributable to widespread broadband availability have been studied in the literature, although somewhat unevenly. This literature is reviewed, including "network effects" that positively impact economic growth and productivity, as well as more focused benefits in the areas of education, healthcare, and the environment. Quantitative assessment of these benefits is a first step toward conducting a comprehensive cost benefit analysis, to determine the potential impact of policy that promotes broadband.

The Valuation and Hedging of Zonal Load Following Contracts

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Abstract

In today's load market, how to accurately valuate the load following price is an important task for all participators. As government-imposed price caps will be removed, pricing and risk management become more complicated for the utilities. In this paper we study the load and power price relationship between the main hub and a zonal area and discuss the most important factors affecting the fair value of the load following premium. We formulate the relationship mathematically and verify it with historical data.

In Li[2006] we studied the load following premium, its pricing and risk, for a main hub. However, most load contracts are related to zonal or local areas. To be able to effectively manage the zonal load following risk with tradable main hub products, it is important for us to know the relationship between load following price of a main hub and that of a zone. We find that the ratio of load following premium of a zone over that of the associated main hub is mainly determined by a few factors such as standard deviation of the basis (the difference between zonal price and main hub price) and main hub price, and correlations between them. By viewing basis as "virtual" prices, we formulate the zonal load following premium as weighted average of load following premium of main hub and basis. We also look at the impact of natural gas price to zonal load following prices as gas price affects local congestions.

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Forward Capacity Market CONEfusion

Draft, May 2010

James F. Wilson [1]

Abstract

Some Regional Transmission Organizations (RTOs) in the U.S. operate administrative "capacity markets" to create incentives to build and maintain electric generation and demand response capacity. These mechanisms are established out of concern that desired levels of capacity and reliability would not be achieved without them. In two instances – the PJM RTO's Reliability Pricing Model ("RPM") and ISO New England's Forward Capacity Market ("FCM") – capacity obligations are imposed and auctions are held three years forward of the delivery year, allowing proposed new power plants not yet under construction to participate in the auctions.

The forward capacity market designs, and expectations for how they would operate, reflected the industry circumstances at the time of their design (the 2003 to 2005 period) and also theories about how the auctions would play out. In particular, it was widely expected that the sponsors of new capacity would (or should) offer their potential projects at prices based on "Net CONE": the levelized cost to build the plant (the Cost of New Entry, or "CONE") net of anticipated earnings in wholesale energy and ancillary services markets. This assumption also led to expectations that the resulting capacity prices would be stable near Net CONE levels. There were also hopes that the capacity auction process would identify the most attractive alternatives for new capacity from among competing proposals for new generation, demand response, and transmission.

The forward capacity markets have not operated as expected; prices have generally been volatile (except when administratively constrained) and have trended lower than the expected levels with an excess of offered capacity, except in smaller zones. Changing industry circumstances explain some of the differences. In addition, some of the theories upon which the designs were based have been disproven. The notion that developers of new capacity would offer their projects based on Net CONE was not grounded in economics, and results from the forward capacity markets have proven it to be incorrect. This also invalidates the expectations for the level and stability of auction prices, and the auctions' significance to new resource decision-making.

This paper reviews the expectations for the forward capacity markets and the recent reality, discussing the reasons results have differed from expectations. The paper proposes how capacity market designs, and expectations as to their performance, can be better aligned with current and anticipated industry circumstances. While price-responsive demand should ultimately diminish the need for centralized capacity markets, in the meanwhile it should be accepted that capacity prices are likely to settle close to the net going forward costs of the most expensive existing generation, except in smaller zones. In light of the changed industry circumstances and a more realistic understanding of the economics, various capacity market design elements should be reconsidered, including the imposition of mandatory capacity obligations three years forward.

[1] James F. Wilson is an economist, principal of Wilson Energy Economics, and affiliate of LECG, LLC. This paper was prepared for the 29th Annual Eastern Conference of Rutgers University's Center for Research in Regulated Industries, May 19-21, 2010. The views expressed are those of the author and do not necessarily reflect the views of any client. Contact: jwilson@wilsonenec.com.

How Integrating Wind Power into an Electric Grid Affects the Economic Value of Transmission Lines

by

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Abstract

When establishing the current deregulated markets for electric energy, many regulators believed that the size of the congestion rents (i.e. the differences in nodal prices times the quantity of energy transferred) would provide the correct incentives for investing in new transmission lines. This rationale for merchant transmission is potentially feasible for transmission lines that are needed mainly for transferring energy from inexpensive sources to expensive sinks, e.g. transmission lines linking hydropower in Quebec to customers in Boston and New York City. However, maintaining Operating Reliability (i.e. providing redundant capacity to avoid shedding load when contingencies occur) is also an important function of transmission. In a meshed network with AC components, a single transmission line may play an essential role for maintaining the reliability of supply as well as for transferring power. Since reliability is essentially a public good, transmission owners will tend to under-invest in the transmission lines needed for reliability purposes. The objective of this paper is to present an analytical framework for determining the economic value of individual transmission lines, and in particular, to determine how these economic values change when an inherently intermittent source of generation, such as wind capacity, is added to a network.

Although adding wind capacity to a network lowers the annual operating cost of meeting a given pattern of loads by displacing conventional generation, mitigating the variability of wind generation and maintaining reliability standards are likely to impose additional costs on the system that should not be ignored. Determining these different costs for an AC network can be accomplished using a security constrained OPF with endogenous reserves (SuperOPF). An important feature of the SuperOPF is that it determines the optimum AC dispatch and reserve capacity by minimizing the expected cost of meeting load over an explicit set of credible contingencies. The corresponding nodal prices reflect the patterns of dispatch for the intact system as well as for the system when contingencies occur. Although, the probabilities of contingencies occurring are small, the corresponding nodal prices may be relatively high and provide the major source of expected congestion rents for some transmission lines. These are the nodal prices that measure the economic value of the transmission lines for maintaining reliability on a network and therefore provide the signal for investment in the long run. Different scenarios are evaluated for individual transmission lines to determine 1) the congestion rents coming from transferring power, and 2) the congestion rents coming from maintaining reliability. The analysis also determines how these costs change when 1) different levels of wind capacity are installed at a remote location, and 2) the main tie line linking the wind capacity to a load center is upgraded. The results show that the net benefits (i.e. the reduction in the total annual system costs, including the capital costs and the expected cost of Load-Not-Served) and the relative magnitudes of the congestion rents for transfers and for reliability are very sensitive to how effectively the inherent variability of wind generation is accommodated on the network. With higher penetrations of wind generation, it will become even more impractical to rely on the conventional economic incentives used for merchant transmission to develop an efficient investment plan for transmission that maintains reliability standards.