

FINANCIAL TRANSMISSION RIGHTS IN ONTARIO'S WHOLESALE ELECTRICITY MARKET

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Overview

This paper reports results of statistical and econometric analyses of financial transmission rights (FTRs) in the Ontario—the most populous province in Canada—wholesale electricity market. FTRs entitle their holder to receive a stream of payments related to the degree of congestion observed on a given transmission path during a pre-specified period of time. Market performance is assessed from the perspective of the informational efficiency/unbiasedness of forward market auctions. Aspects of potential manifestations of intertemporal learning are considered as well. The analysis distinguishes between and considered both short- and long-term FTRs, that is, FTRs that are valid for one month and one year, respectively.

Methods

The data are associated with a set of transmission paths observed through time, thereby forming a panel. The methods chosen must accommodate the censored nature of these data. As linear estimators are expected to yield biased and inconsistent results, a variety of censored data-adapted alternatives are explored, including the Tobit dummy variable and Honoré trimmed least absolute deviations estimators, both with fixed effects, and a random-effects equivalent. These results are compared to each other as well as to those that pool the data. More basic issues, such as stationarity, are addressed in advance of estimation. As well, a variety of regressor specifications and functional forms are considered.

Results

Regardless of the method, it is concluded that while FTR market performance varied across the transmission paths considered and that some performed better than others, the market as a whole was not informationally efficient in the sense that the MCP for a particular auction does not tend to provide an unbiased forecast of future payout/congestion.

Conclusions

There are important implications to a finding evidence of informational inefficiency in Ontario's market for FTRs. Among these is whether the market should be reformed to either encourage greater participation or whether the market should be eliminated altogether, with the congestion rents (ICP) being used directly to cover the costs of ongoing transmission investment. Significantly, the latter option would eliminate the availability of FTRs for use in hedging the risks of congestion. Both of these, and other, options are currently under discussion in Ontario and are expected (by the author) to be the subject of formal stakeholder consultations in the latter half of 2013 and require additional research.

References

- Adamson, Seabron and Scott Englander (2005). "Efficiency of New York transmission congestion contract auctions." *Proceedings, Hawaiian International Conference on System Sciences* 38 (2), 59-64.
- Adamson, Seabron, Thomas Noe, and Geoffrey Parker (2010). "Efficiency of financial transmission rights markets in centrally coordinated periodic auctions." *Energy Economics* 32 (4), 771-8.
- Amemiya, Takeshi (1984). "Tobit models: a survey." *Journal of Econometrics* 24 (1-2), 3-61.
- Barnhart, Scott W. and Carol Szakmark (1991). "Testing the unbiased forward rate hypothesis: Evidence on unit roots, cointegration, and stochastic coefficients." *Journal of Financial and Quantitative Analysis* 26 (2), 245-67.
- Bessembinder, Hendrick (1992). "Systematic risk, hedging pressure, and risk premiums in futures markets." *Review of Financial Studies* 5 (4), 637-67.
- Drukker, David M. (2003). "Testing for serial correlation in linear panel-data models." *Stata Journal* 3 (2), 168-77.

- Engel, Charles E. (1996). "The forward discount anomaly and the risk premium: a survey of recent evidence." *Journal of Empirical Finance* 3, 123-92.
- Frankel, Jeffrey A. (1980). "Tests of rational expectations in the forward exchange market." *Southern Economic Journal* 46 (4), 1083-101.
- Hadsell, Lester and Hany A. Shawky (2006). "Electricity price volatility and the marginal cost of congestion: an empirical study of peak hours on the NYSIO market, 2001-2004." *Energy Journal* 27 (2), 157-80.
- Hadsell, Lester and Hany A. Shawky (2009). "Efficiency and profit in the NYISO transmission congestion contract market." *Electricity Journal* 22 (9), 47-57.
- Hansen, Lars Peter and Robert J. Hodrick (1980). "Forward exchange rates as optimal predictors of future spot prices: an econometric analysis." *Journal of Political Economy* 88 (5), 829-53.
- Heckman, James J. (1976). "The common structure of statistical models of truncation, sample selection, and limited dependent variables and a simple estimator for such models." *Annals of Economic and Social Measurement* 5 (4), 475-92.
- Heckman, James J. (1979). "Sample selection bias as a specification error." *Econometrica* 47 (1), 153-61.
- Hodgson, Douglas J., Oliver Linton, and Keith Vorkink (2004). "Testing forward exchange rate unbiasedness efficiently: a semiparametric approach." *Journal of Applied Economics* 7 (1), 325-53.
- Hogan, William (1992). "Contract networks for electric power transmission." *Journal of Regulatory Economics* 4 (3), 211-42.
- Honoré, Bo E. (1992). "Trimmed LAD and least squares estimation of truncated and censored regression models with fixed effects." *Econometrica* 60 (3), 533-65.
- Joskow, Paul and Jean Tirole (2000). "Transmission rights and market power in electric power networks." *Rand Journal of Economics* 31 (3), 450-87.
- Moore, Michael J. and Ursula Cullen (1995). "Speculative efficiency on the London metal exchange." *Manchester School* 63 (3), 235-256.
- Olmstead, Derek E. H.. 2012. *Public policy and economic efficiency in Ontario's electricity market: 2002-2011*. Doctoral thesis, Carleton University, Ottawa, Canada.
- Siddiqui, Afzal S., Emily S. Bartholomew, Chris Marney, and Shmeul S. Oren (2005). "Efficiency of the New York Independent System Operator market for transmission congestion contracts." *Managerial Finance* 31 (6), 1-45.
- Veall, Michael R. and Klaus F. Zimmerman (1994). "Goodness of fit measures in the Tobit model." *Oxford Bulletin of Economics and Statistics* 56 (4), 485-99.
- Watkins, Clinton and Michael McAleer (2004). "Econometric modelling of non-ferrous metals prices." *Journal of Economic Surveys* 18 (5), 651-701.
- Wooldridge, Jeffrey M. (2002). *Econometric Analysis of Cross Section and Panel Data*. Cambridge: MIT Press.