



Book review

Competitive Electricity Markets: Design, Implementation and Performance, Fereidoon P. Sioshansi (Ed.). Elsevier, Amsterdam (2008). xxxiv+582pp. ISBN: 978-0-08-047172-3

This is a successor volume to the same editor's *Electricity Market Reform: An International Perspective* (with Pfaffenberger, 2006). That volume had a geographical focus, describing and evaluating the reform process in different parts of the world. The articles in the present volume are grouped in four broad (and rather elastic) themes: market reform evolution; market performance, monitoring and demand participation; capacity, resource adequacy and investment; and market design issues.

Pollitt's Foreword asks how we can get the balance right between liberalization and regulation. This thoughtful review of many of the issues and international lessons at the same time usefully puts into perspective the papers in this volume. He comes down in favour of transmission unbundling (rather than vertical integration), divestiture of generation to say five players, and full retail competition. Regulation is required for market monitoring, non-discrimination in network access, and incentive regulation of networks. He concludes that reform has stalled in so many places because it requires both a belief in markets and effective institutions of competition policy—though a suitable institutional framework can be developed if the will to do so is there.

Pfaffenberger's wide-ranging Preface on competition and long-term dimensions of electricity supply is also a gentle warning against the dangers of overregulation. Sioshansi's Introduction highlights some aspects and challenges of international reform experience, then introduces the remaining chapters (perhaps overlapping somewhat with the Foreword and Preface).

Chao, Oren and Wilson conclude that arguments for both vertical integration and unbundling are deficient and that a balanced mixture is superior to the extremes. The nature of this mixture is unclear, unless it be the "central conclusion" that efficient risk management requires the retention of universal service for non-industrial customers. The analysis reflects concerns and experience (if it can be called that) of retail competition in the US. It is organised around summaries of "the problems that cannot be solved efficiently by market processes" and "the problems that might in principle be solved by market processes" but have not yet been. There is no discussion of the competitive retail markets that work effectively in some other countries.

In an innovative and welcome albeit ambitious paper, Correljé and de Vries seek to explain why there are so many "hybrid" markets, stuck somewhere between the former monopoly state and a presumed goal of perfect competition. They argue that neoclassical economics provides the contours of the desired end-state and provides a framework for diagnosing market imperfections (I fear this is too generous), but its prescriptive nature does not explain how countries actually go about restructuring. They use institutional economics to compare motives and policies for

restructuring in the physical, social and economic context of many countries internationally. They conclude, perhaps inevitably, that the outcome depends on many factors, and that limited feedback possibilities mean that convergence of market design is likely to be slow.

Cornwall provides a valuable and systematic albeit lengthy account of efforts to achieve electricity market integration in Europe. While there have been some successes (the allocation of cross-border interconnection capacity, harmonization of transmission tariffs and compensation to TSOs), the reform path continues to be more difficult than initially envisaged. Regional markets are a sensible step forward. The priorities now are to tackle congestion, intra-day market access and transparency. It would have been interesting and useful to have had companion papers on the US, Australia, Central America and elsewhere.

Singh surveys transmission markets, congestion management and transmission investment in the US after a decade of open access. Two distinct models now co-exist: (open access) Order 888-based markets and organised RTO markets. There is room for improvement via long-term transmission rights. The early debate on for-profit versus not-for-profit grid operators has been superseded by a debate over independent Transcos versus vertically integrated utilities. Transmission investment, previously lagging, is increasing, with limited merchant transmission. This is a thorough, well organised and thoughtful survey.

Helman, Hobbs and O'Neill provide an exceedingly thorough, informed and extensive (not to say long) review of the design of US wholesale energy and ancillary service auction markets: theory and practice. "These vast regional wholesale spot markets, several consisting of tens of thousands of simultaneously determined prices at locations on the grid, are one of the signal technological achievements to date of the regulatory reform of the US electricity industry." Yet there remain many design and implementation challenges, including incompleteness, lack of buyer responsiveness, transmission constraints and offer price caps. And "an efficient spot market ... ends up being rather complicated", which has led to calls for simplification. The authors see the market design evolving. It will be interesting to see whether it has sufficient flexibility, as well as productive efficiency, to meet the challenges that might lie ahead.

Sioshansi, Oren and O'Neill estimate "the cost of anarchy in self-commitment-based electricity markets". The term "anarchy" is misleading and does not reflect the content of the article. They estimate a bound of about 4.25% on productive efficiency losses from self-commitment compared with central commitment in systems assumed to be perfectly competitive. The comparison appears to be based on an assumed Walrasian auction process for communicating information rather than on the methods actually used in self-commitment systems. The article does not estimate the possible incentive gains from self-commitment, nor any benefits of greater flexibility in the event of changes over time in the assumptions under which the centralised system is set up.

Adib and Hurlbut show how market power can be exercised and how effective market monitoring is necessary to prevent abuse if legislators and regulators have failed to deal with market structure. Traditional approaches based on market concentration are being supplemented by newer methods that test market outcomes. The evolution of market monitoring has shown the importance of establishing and protecting the independence of the monitors. This is a well informed and considered appraisal.

Zarnikau surveys the experience with demand participation in restructured markets. It was expected that markets would enhance demand-side participation, but this has happened to only a limited degree. The general decline in dispatchable demand-side resources has been greatest in the most restructured markets. An interesting case study of experience in Texas suggests that concerns about negative bids by loads acting as resources and about distortions to market prices led to limits on demand participation.

Part Three has a provocative and stimulating triplet of papers on resource adequacy. Adib, Schubert and Oren examine alternative perspectives and divergent paths, particularly informed by experience in Texas. Increasingly, capacity mechanisms are being rejected because of their failure to encourage new investment in generation “and their troubled evolution into less market-friendly, more complicated forms”. Meanwhile, markets without capacity mechanisms are working successfully, hence “the momentum in resource adequacy has shifted towards the energy-only approach, something almost unimaginable a few years earlier”.

In contrast, Bowring’s informed account of the evolution of PJM’s capacity market concludes that “the actual performance of PJM’s markets between 1999 and 2006 supports the need for a capacity market and for a capacity market with improved design features”. He claims that “there is no wholesale power market in the US that has successfully relied on an energy-only market to provide adequate capacity”, but does not explain how this is consistent with policy and experience in Texas. The paper emphasizes that “exogenous reliability requirements exist and must be met regardless of whether capacity markets are incorporated or whether the market design relies solely on energy markets”. It is not clear whether this is equally true of markets outside the US or even within it. Vulnerability or otherwise to externally imposed standards may be a relevant criterion in judging alternative market designs.

Moran and Skinner examine resource adequacy and efficient infrastructure in the Australian context. Despite some fragilities as a result of government intervention, a reasonably efficient energy-only market has been achieved there, with new generation capacity keeping pace with requirements. The discipline of a competitive retail market has been important in this respect.

Part Four is essentially “other topics”. Haas et al. combine the experience and insights of seven authors to examine the lessons learned from the EU, the US and Japan in promoting electricity from renewable energy sources. This is a lengthy paper with much valuable detail. Feed-in tariffs seem to be effective in securing additional capacity, but not necessarily the most efficient in terms of cost. The paper is short on general conclusions. One—that proper designs produce better results and that credibility and continuity reduce risks and costs to investors—is hardly surprising. The other conclusion is that “renewables have to grow at an even faster pace if we expect them to contribute on a significant scale to the world’s energy mix”.

Bauknecht and Brunekreeft examine the regulatory challenges posed by distributed generation. It has advantages but can be costly and problematic to integrate into networks. The case-specific costs of distributed generation make it difficult to choose

between cost pass-through and price capping. And because of the case-specific network impact, unbundling of network and generation can lead to coordination problems. The authors confess that “it is unclear how to address the problem”, and “more work is required on integrating distributed generation into network operation and incentives for distribution network operators to implement innovative network concepts”. Perhaps a later paper can focus on a comparison of how different markets are actually responding in practice to these challenges.

Ford looks at global climate change and the electric power industry. This is a heroic attempt to encapsulate almost all that has been said on this issue in a single longish paper. The first part surveys the science and models of global warming and goals for emissions reductions, with heavy emphasis on the reports of the Intergovernmental Panel on Climate Change (IPCC). Perhaps there might have been a little more discussion of the concerns, of some economists and others, about the IPCC processes and recommended policies. The second part looks at policies to reduce emissions, the debate about carbon tax or carbon market, the European Emissions Trading Scheme (ETS), and the US and Canadian policy. It is an achievement to have synthesised so much material, for which students will be grateful. But the overall result is overwhelming, and the conclusions provide no obvious lessons or clear way forward.

Araújo et al. discuss the problems and solutions associated with the reform of reforms in Brazil. Following “an initial scramble when privatization and reform followed nearly independent paths”, there was “an attempt at mending things” then a more substantial reform in 2004. The paper brings out well the initial problems for customers, investors and investment. It provides a fascinating (or worrying) account of the extensive measures taken to address these issues, involving a greater role for central government. The measures include new auction-based contracting procedures between generators and distribution utilities. They appear moderately successful but the model still needs adjustments in many dimensions. The fast growth of the free contracting sector, compared with the regulated one, is an interesting challenge.

This is a remarkably good collection of papers. The authors are experienced and informed, and in general have taken pains to discuss the literature and to put their analyses into international context. The ability to learn from the experience of other markets in this way is an immense potential benefit.

Perhaps the collection might have been more effective—more than the sum of its parts, and more liable to be consulted—if it had been more tightly organised around more specific themes. With a median paper length of 30 pages (perhaps twice the normal journal article length) extending up to 65 pages, and a total length of over 600 pages, some of the messages might have been conveyed more succinctly without compromising thoroughness. And those authors concluding along the lines of “there is a lot to be done, a mix of alternatives might be appropriate, and careful thought will be required” might have been prodded to be a little more specific.

All in all, a very useful volume that regulators especially should study carefully. They may conclude that they should act to promote more competitive markets with less need for detailed regulation.

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