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Market structure in the US electricity industry: A long-term perspective

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Abstract

We estimate changes in market structure in the US electric power industry during the last three decades using two independent approaches. First, we estimate an industry-wide conjectural-variations parameter. We find that industry concentration was generally rising during the 1970s, but has been gradually and consistently falling since the early 1980s. To check the robustness of these results, we then use a translog production function to estimate the Lerner Index. The results confirm that the industry was becoming less concentrated during the 1980s, though the Lerner Index tended to fluctuate during the late 1980s and early 1990s. Our results suggest that the current state of the electricity industry may have more to do with long-term changes in market structure than recent attempts to establish competitive wholesale electricity markets.

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1. Introduction

Since the 1930s electric utilities have been regulated by the states in which they provide service. Nominal and real electric prices dropped from 1930 to 1960 as power plants became larger and more efficient and fuel costs fell. This changed in the 1970s, as fuel prices, especially oil, soared. The Department of Energy was created in 1977 along with an independent regulatory authority, the Federal Energy Regulatory Commission, that assumed most of the statutory duties of the former Federal Power Commission. The 1978 Public Utility Regulatory Policies Act (PURPA) was passed to deal with these fuel constraints, and subsequently large utilities began facing competition from small independent producers and their own large industrial customers.¹

Congress formally deregulated the wholesale electric market with the Energy Policy Act of 1992.² On April 1, 1998, the largest electric power market in the US, California, further pushed competition by allowing utility ratepayers to buy from any supplier they choose. At the time, other states such as Massachusetts, New Hampshire, New Jersey, New York, Oregon, Pennsylvania, and Rhode Island were in various states of restructuring their electricity markets. According to the Department of Energy's (DOE) September 2000 deregulation update, twenty-three states had enacted deregulation legislation, while another twenty had orders pending or ongoing legislative deregulation investigations. However, while by 2005, eighteen states had deregulated, they did so by retaining control of the "wires" or delivery side of the business, but removing restrictions on the generation and sale of electricity (Smith, 2005).

Recent research on electric-market competition has generally focused on the effects of introducing formal markets for wholesale power³ and price spikes and supply problems in California in 2000–2001 and elsewhere. These studies raise questions about the effectiveness of these markets. However, there is relatively little evidence on the long-term trends in the market structure of the US electricity industry following the oil shocks of the 1970s. If concentration, strategic interaction, and other market characteristics are affected by technology, firm organization and governance, the legal environment, and similar factors besides the creation of formal wholesale markets, then a broader perspective may be necessary to understand the effects of recent policy changes on market structure and performance.⁴

We examine market structure in the US electric utility industry from the 1970s to the 1990s. Our results are interesting. First, using a conjectural-variations (CV) approach, we find that electricity markets became less concentrated beginning in the 1980s, with little

¹ Their response was to fight the new Carter-inspired competition all the way to the U.S. Supreme Court, eventually losing in the early 1980s.

² Throughout the paper we use the term "deregulation" as shorthand for the introduction of limited market-based incentives into wholesale or retail markets. Obviously we do not refer to complete deregulation, but rather the partial deregulation characterizing most restructuring programs.

³ See, e.g., Wolfram, 1999.

⁴ Danielsen et al. (1999), for example, show how the effects of restructuring depend on courts' attitude toward contractual breaches. When restructuring alters the existing "regulatory compact", electricity-market participants increasingly look to renegotiate contractual agreements signed under previous regulatory regimes (to reduce stranded costs, for instance).

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