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Bilateral contracts and the spot market for electricity: some observations on the British and the NordPool experiences

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Abstract

The performance of the futures and the spot market for electricity in England and Wales (EW) and in the Nordic countries have significant differences in terms of volumes traded and evolution of prices. Even though the institutional arrangements show significant differences and the data collected has important limitations we observe in EW for 1990–99 that as the coverage via bilateral contracts diminished, spot prices tended to increase, there was higher price volatility and an increasing number of plants were declared unavailable. In the NordPool, by contrast, market structure is more distributed, the bilateral contract price has tended to smooth the volatility in the spot price and a very diverse pattern behavior of prices has been observed. We interpret these observations as additional support in favor of the theoretical result by Allaz and Vila (Journal of Economic Theory 59 (1993) 1), but hint at the possibility of strategies by the firms that can diminish the welfare enhancing properties of this new bilateral market. © 2001 Elsevier Science Ltd. All rights reserved.

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1. Introduction

In several countries the liberalization of the electricity markets has been accompanied by the introduction of futures or bilateral contracts that allow agents to buy/sell Kwh today for delivery at a certain date in the future at a known price. The electricity generation is subject to some risk in that it depends on climatological circumstances, technological innovations and the regulatory framework. The introduction of the futures or contracts markets is aimed at achieving a better allocation of risks among the agents in the market.

Due to historical and technological reasons, in some countries the generation activity is highly concentrated. Concentration in generation may have profound implications in the efficiency gains expected after the liberalization process and in the performance of the bilateral contracts market. In this setting of oligopolistic

market structure a fundamental question arises: given that the generation activity is concentrated in a small number of firms, does the introduction of a bilateral contracts market lead to a more competitive allocation of resources in the industry?

This question has received considerable theoretical interest but less so on the empirical side. In this study we conduct a two-step exercise: first we look at the evolution of volumes and prices traded in both markets, i.e. the spot and the bilateral contracts market, in two different experiences, i.e. the NordPool and England and Wales. In Sections 3 and 4 we propose an interpretation of the evolution observed: based on the theoretical results proposed by Allaz and Vila (1993) and Green (1999) that link the performance of the spot and the bilateral markets, we emphasize the pro-efficiency implications derived from the introduction of a bilateral contracts market.

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2. Some empirical observations on the Nordpool and England and Wales experiences

2.1. The England and Wales experience

In 1990 the UK Government decided to introduce the market mechanism in the electricity industry and implemented a radical reform in England and Wales (EW) followed by Scotland. In 1990 the concentration ratio for the two largest generators in EW was 77% and this fell to 52% in 1998 due to new entry and divestiture of assets of the main generators during this period. In Table 1 market shares of the active firms in EW is presented for these two years. Total generation capacity has remained more or less constant throughout the period 1991–98 at 60 GW/year. Fuel cost and coal prices have diminished over the same period.¹ Furthermore, the main volume of bilateral contracts linked to coal in the beginning of the liberalization process expired mostly in 1998.

From the beginning of the liberalization process, active agents disposed of one instrument for covering the risk of volatility in electricity prices: contracts for differences (CfD).² In 1997 new (more standardized) contracts were introduced as well, the electricity forward

agreements (EFAs).³ In Fig. 1 we present the volume contracted in CfDs by the generators as percentage of production and the proportion of coverage (with respect to total demand), with external contracts signed by the RECs where we can observe a clear trend of continuous reduction in the coverage for all firms.⁴ Note that in Fig. 1 the amount (%) of coverage by the REC stands for the percentage of coverage with external contracts signed by the RECs with any generator, excluding contracts established with independent power producers (IPPs) or internal contracts. In 1991–93 most of the generation was covered with CfDs, which covered 1–3 years. In 1993–94 most of these CfDs ended and a new wave of 5-years contracts were signed, though the total amount covered was smaller. In the initial period after the liberalization, 1991–93, there was political pressure to extend coverage via CfDs and at prices that could sustain the coal industry. In fact, in 1990–91 almost the entire generation by companies (97%) was hedged with CfDs. In 1996–97 this figure was 88% (OFFER, 1998a) and for the year 2000 OFFER (Office for Electricity Regulation in the UK) estimated that at least 25% of the total supply by the RECs would not be covered with CfDs. Since 1998, the RECs have started to sign contracts with

Table 1
Market shares (%) and GW produced by the main generators in EW, 1990–98. Source: OFFER (1998a)

	1990		1998	
	GW	%	GW	%
Nat Power	30	47	17	27
PowerGen	19	30	15.4	25
Eastern	0	0	6.7	11
Nuclear Elec	8.7	14	7.3	12
Magnox Elect	0	0	3.1	5
New entrants	0	0	7.3	12
First Hydro	2.1	3	2.1	3
Interconnectors	2.9	5	3.2	5
Other	0.2	1	0.2	1
Total	62.8	100	62.3	100

¹ The generation by fuel type in EW has changed during this period in favor of gas stations. By 1999, 30% of generation used coal and 35% used gas as input, 25% was based on nuclear fuel and 8% originated in interconnectors.

² These are bilateral contracts negotiated directly between the generators and the regional electricity companies (RECs). They can cover any magnitude of production and the length can vary from 1 to more than 10 years. The most part of CfDs were contracted in 1991 for a 3-year period and another wave of 5-year bilateral contracts were signed in 1993. It is very difficult to obtain information on these contracts because they are privately negotiated and no obligation for publicity is imposed.

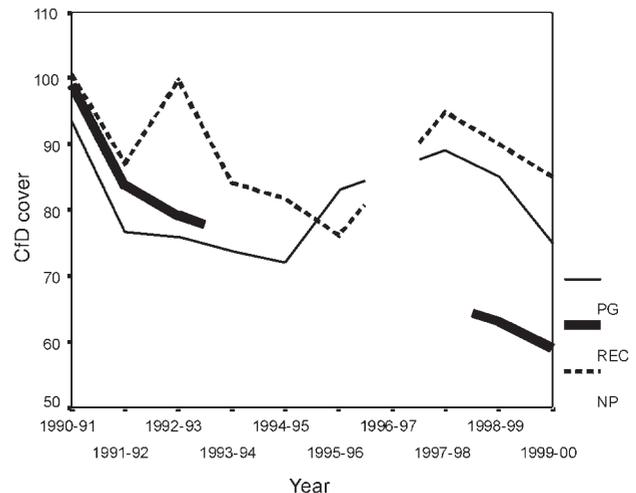


Fig. 1. Volumes (as percentage of total production) of CfDs signed by National Power (NP), PowerGen (PG) and the RECs in the UK. IPPs are contracts signed by the RECs with independent power producers. Figures for 1999–2000 are estimations by OFFER (1999a). Sources of data are explained in Appendix A.

³ The EFAs are standardized futures contracts. There are several types of EFAs, each of them covering a specific time period within a day, several days (working days or weekends) and the length of the contract can vary from 1 to 52 weeks. These contracts are negotiated with the help of a broker. There is no publicity on the conditions contracted but some information on prices and quantities traded can be found in the industry newsletters.

⁴ In Table A1 in Appendix A, figures on quantities contracted by the RECs for the period 1991–2001 and sources of data are presented.

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