

**ELECTRICITY MARKET OPERATION: TRANSITIONING FROM  
A FREE MARKET TO A SINGLE BUYER STRUCTURE****Toby Dalglish**

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The debate around optimal energy market structures is one that captures the attention of regulators, retailers and generators around the world. The argument for government control centres around lessening market power to increase consumer surplus. In contrast, the argument for privatisation is based on efficiency gains leading to increased total surplus in the market. Comparing the two structures has always been problematic because it is difficult to set side by side a single buyer model in one country with a free market in another, while remaining confident that results are not biased by technological differences, geographic effects, or political influences. The Brazilian market helps overcome this problem, as from 1996-2004, it was a free market, while since March 2004 it has operated under a single buyer structure. The single buyer model has the market's regulator dictate a price for electricity, and a quantity that each supplier must produce.

Our paper aims to evaluate the effect on electricity prices and their volatility of shifting from the earlier, laissez faire, electricity market to the single buyer model, using data from the free market and the Regulated Contracting Environment (RCE). We use data spanning 2000-2014 (from 4 years prior to the reform to 10 years post-reform) and use a Markov Switching model for electricity price changes in the market to examine the reform effect. Since electricity prices are often characterised as facing periods of extreme volatility, interspersed with quiet periods, we model two states in the market, in which we allow control variables to influence electricity price changes in different ways.

We find that the reform appears to decrease volatility in prices in quiet periods. However, the market still spends some periods in an unstable state both pre- and post- reform. This unstable state becomes more volatile after the introduction of the RCE. By examining the relationship between water levels and rainfall (the "hydrological" state), and market state transitions, we characterize the reform as creating a more "forgiving" environment, where a wider range of hydrological states are consistent with not seeing energy crises develop. Here, an energy crisis refers to entering a volatile state for a protracted period. However, when we examine the steady state of the hydrological system pre- and post-reform, we find that the system has frequently been managed in such a way as to make crises possible, as is evidenced by the periods of volatility.

In conclusion, we find mixed evidence for the merits of the two regimes. On the one hand, a more centralised model can lead to some mitigation of price fluctuations. However, difficulties in efficiently managing hydrological resources can result in protracted periods of high volatility. This "tail risk" can partially or wholly offset the gains from lower price volatility through eliminating market-driven wholesale price fluctuations.