A Coordination-Failure Model of Demand Management in Electricity Markets

Thursday, 19th August 2011
1.00pm – 2.00pm
MSB.0.01

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Abstract:
It is a defining characteristic of electricity supplied through AC networks that it cannot be efficiently stored, and needs to supplied at the instant that demand is registered. If retail prices in electricity markets do not fluctuate in response to fluctuations in demand and supply, then the burden of adjustment falls completely on the supply sides, necessitating a large investment in generation and transmission capacity to be able to handle peak loads. The capital cost of this rarely used peaking plant is then a large component of the true marginal cost of electricity.

It is something of a puzzle then that most retail electricity markets are characterised by fixed-price contracts. In this paper, we explore a possible explanation for this puzzle—that markets for historical reasons are caught in an inferior equilibrium of a coordination failure game. The idea is that there is a strategic complementarity in retail contracts in which the smaller the proportion of consumers opting for flexible-price contracts, the greater is the resulting volatility in spot-market prices, reducing the attractiveness of flexible-price contracts to risk-averse consumers.

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