Reduced form electricity spot price modeling with a view towards spike risk

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The recent deregulation of electricity markets has led to the creation of energy exchanges, where the electricity is freely traded. We study the most salient statistical features of electricity prices with a particular attention to the European energy exchanges. These features can be adequately reproduced by the sum-OU model: a model represent ing the price as a sum of Levy-driven Ornstein-Uhlenbeck (OU) processes. We present methods for filtering out the different OU components and develop a statistical procedure for estimating the sum-OU model from data. Besides capturing well the characteristics of spot prices, our model is simple enough to allow for analytic pricing of electricity forwards and futures. Electricity forward and futures contracts have the distinctive feature of delivery over a period rather than at a fixed point in time, which leads to quite complicated expressions when using the more traditional multiplicative models for spot price dynamics. We conclude by showing our model at work for the EEX Phelix Base electricity price index. Simulated sample paths from our model exhibit the same features as the real data set.