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Understanding the Price Dynamics of Emission Permits: A Model for Multiple Trading Periods

Abstract
Emission Trading Systems, like the EU Emission Trading System (EU ETS), are currently established in many different countries all over the world. Those are characterized by different regulatory rules which have shown to be appropriate in the recent past. The regulatory framework clearly impacts the characteristics of the spot price dynamics of such emission permits, a dependency not yet fully understood. In fact, there exists no theoretical model accounting for the main stylized facts like the existence of multiple trading periods, the allowance of banking, and the later delivery of lacking certificates, although insights into this subject are worthy for risk management, derivative pricing, and energy-related investment decisions. Therefore, we develop a dynamic stochastic equilibrium model for multiple trading periods, which makes it possible to account for those features. We present a solution for the equilibrium spot price and analyze the spot price dynamics and volatilities as well as sensitivities towards market design parameters. Moreover, we can show that the spot price can be subdivided into different ratios, each one resulting from one trading period of a particular setting.