

The European CO₂ emissions trading system (EU-ETS): The good, the bad and the interesting^{*}

Rafał Weron

Institute of Organization and Management

Wrocław University of Technology, Poland

In January 2005 the EU-wide CO₂ emissions trading system (EU-ETS) has formally entered into operation. Within the new trading system, the right to emit a particular amount of CO₂ has become a tradable commodity, called EU Allowance (EUA), and carbon pricing has become an important mechanism for providing companies with incentives to invest in carbon abatement. However, price formation in carbon markets involves a complex interplay between policy targets, dynamic technology costs and market rules.

In this paper we review the basic characteristics of carbon markets and investigate the relationship between spot and futures prices within the EU-ETS. We conduct an empirical study on price behavior, volatility term structure and correlations in different CO₂ EUA contracts during the pilot trading and Kyoto commitment periods. We find that while for the pilot trading period (2005-2007) the market was initially in backwardation, after the news of overallocation, both allowance prices and convenience yield approached zero. During the Kyoto commitment period (2008-2012), the market has changed from initial backwardation to contango with significant convenience yields in futures contracts.

We further examine the dynamic structure of the relationship between spot and futures prices in the functional form by applying a relatively new approach of dynamic semiparametric factor models (DSFM). Interestingly, our DSFM results can be related to the classic Gibson-Schwartz two-factor model for pricing contingent claims in commodity markets that uses the spot price and the instantaneous convenience yield as factors. Our results might point towards future applications of the Gibson-Schwartz model for pricing of intra- and inter-period EUA derivatives contracts.

^{*} In collaboration with Stefan Trueck (Department of Applied Finance and Actuarial Studies, Macquarie University, Sydney, Australia)