UNDERSTANDING THE DYNAMICS OF THE EUROPEAN CARBON MARKET

Gary Koop, Department of Economics, University of Strathclyde, Glasgow, UK G4 OGE
Phone: +44 141 548-3840, Email: gary.koop@strath.ac.uk

Lise Tole, Department of Economics, University of Strathclyde, Glasgow, UK G4 OGE
Phone: +44 141 548-4556, Email: lise.tole@strath.ac.uk

Overview:
The goal of the EU ETS and carbon offset markets is to achieve CO2 reductions in an economically efficient manner. The existence of efficient financial markets for trading carbon permits is necessary to achieve this goal. The purpose of the present paper is to investigate the spot and futures markets for EUAs and their relationship with the market for CERs. These carbon markets are relatively new and have specific institutional features that set them apart from conventional financial markets. For instance, unlike conventional assets, the markets for EUAs exist due to the need for firms to comply with EU regulations, which have been changing over time. Problems have arisen in the EU ETS due to the over-allocation of permits to individual firms and fraud of various sorts. Furthermore, there is uncertainty over the future form of the EU ETS. Similar concerns hold with the CER market. Using daily data since 2008, we examine the nature of the relationship between the spot and futures markets in the EU ETS and possible linkages with the CER carbon offset market. We also consider the question of whether these relationships are changing over time.

Method:
We measure the statistical relationships between the variables using a flexible time series model known as the TVP-VAR regression model. This model allows for: 1) spot and futures prices in the EU ETS to be estimated along with the interest rate and the carbon offsets price jointly. 2) Coefficients in the model to change over time. 3) Volatility to change over time. To these ends, we use a multivariate time series model (for jointly modelling all of the variables) with time-varying coefficients (to allow for changes in the way spillovers occur over time) and multivariate stochastic volatility (to allow for changes in volatility as well as possible volatility spillovers).

Results:
Briefly, we find that are that there is only weak evidence of Granger causality between any of the markets. What evidence there is indicates some time-variation where causality increased during the financial crisis. However, there is strong evidence of contemporaneous relationships between EU ETS spot and future prices and between EU ETS futures prices and CER futures. We present evidence that the EU ETS futures market is driving these relationships. We also find some weak evidence for volatility spillovers, particularly between the EU ETS spot and future markets There also appears to be time variation in these relationship.

Conclusions:
We conclude that the different carbon markets are related to one another and the EU ETS future is playing the predominant role in driving the relationships. We conclude that the time-variation we observe is largely associated with major macroeconomic events such as the financial crisis and the European debt crisis.

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