

A hybrid machine learning approach for carbon price forecasting

Zezhun CHEN (London School of Economics), **Dimitris CHRISTOPOULOS** (Heriot Watt University), **Despoina MAKARIOU** (University of St Gallen), **Joe MEAGHER** (Hymans Robertson), **Andreas TSANAKAS** (City, University of London), **George TZOUGAS** (Heriot Watt University), **Rui ZHU** (City, University of London)

Abstract:

We investigate the impact of Brexit on the EU and UK Emissions Trading Systems (ETS), highlighting the risk of potential carbon leakage arising from differing carbon pricing dynamics. To analyze post-Brexit carbon market differences, we develop a novel hybrid ARIMA-LSTM machine learning model which captures both linear and nonlinear patterns, providing more accurate predictions and insights into carbon pricing trends than benchmark models. Our results reveal divergence between the two carbon markets post-Brexit underscoring the need for coordinated policies to address these disparities and emphasizing the importance of effective forecasting models to manage carbon pricing risks and promote fair competition.

Keywords: Brexit, carbon market divergence, carbon price forecasting, carbon leakage, Long short-term memory