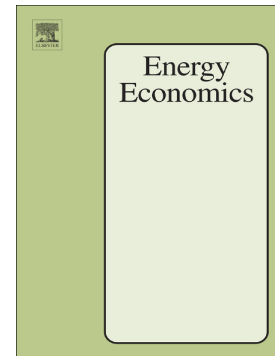


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Gazi Salah Uddin, Jose Areola Hernandez, Syed Jawad Hussain Shahzad, Axel Hedström



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Multivariate dependence and spillover effects across energy commodities and diversification potentials of carbon assets

Gazi Salah Uddin

*Department of Management and Engineering, Linköping University, 581 83, Linköping, Sweden
E-mail: gazi.salah.uddin@liu.se*

Jose Areola Hernandez

*ESC Rennes School of Business, Rennes, Brittany, France
E-mail: jose.arreolah.finance@gmail.com*

Syed Jawad Hussain Shahzad

*Montpellier Business School, Montpellier France
E-mail: jawad.kazmi5@gmail.com; j.syed@montpellier-bs.com*

Axel Hedström

*Department of Management and Engineering, Linköping University, 581 83, Linköping, Sweden
E-mail: hedstrom.axel@gmail.com*

Abstract

In a first step, we model the multivariate tail dependence structure and spillover effects across energy commodities such as crude oil, natural gas, ethanol, heating oil, coal and gasoline using canonical vine (C-vine) copula and c-vine conditional Value-at-Risk (CoVaR). In the second step, we formulate portfolio strategies based on different performance measures to analyze the risk reduction and diversification potential of carbon assets for energy commodities. We identify greater exposure to losses arising from investments in heating oil and ethanol markets. We also find evidence of carbon asset providing diversification benefits to energy commodity investments. These findings motivate for regulatory adjustments in the trading and emission permits for the energy markets most strongly diversified by carbon assets.

Keywords: Carbon assets; energy commodities; tail dependence; risk spillover

JEL classification: C58, G10, G11, Q02

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