

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

International Review of Economics and Finance

journal homepage: www.elsevier.com/locate/iref

Contagion effect between fuel fossil energies and agricultural commodity markets and portfolio management implications

Farzaneh Ahmadian-Yazdi^a, Soheil Roudari^a, Vahid Omidi^b, Walid Mensi^{c,d,e}, Khamis Hamed Al-Yahyaee^{e,*}^a Faculty of Economics and Administrative Sciences, Ferdowsi University of Mashhad, Mashhad, Iran^b Department of Economics, Faculty of Economics and Administrative Sciences, University of Qom, Qom, Iran^c Department of Economics and Finance, College of Economics and Political Science, Sultan Qaboos University, Muscat, Oman^d Department of Finance and Accounting, University of Tunis El Manar and IFGT, Tunisia^e Muscat University, Al Ghubrah North, Muscat, Oman

ARTICLE INFO

JEL classification:

G14

Keywords:

Agricultural commodities

Fossil fuels

Spillover

Portfolio management

ABSTRACT

This study investigates the dynamic spillover effects between fossil fuels (Brent oil and natural gas) and major agricultural markets (maize, soybeans, and wheat) using a time-varying parameter vector autoregression (TVP-VAR) model. Additionally, we quantify the cumulative return of the investment portfolio, optimal weights, time-varying risk coverage, and hedging effectiveness of bivariate commodity portfolios using the Minimum Variance Portfolio (MVP), Minimum Correlation Portfolio (MCP), Minimum Connectedness Portfolio (MCoP) under bearish, tranquil, and bullish market conditions. The results show that maize and natural gas are the main net receivers of spillovers, whereas wheat and Brent oil are the main net transmitters of shocks to the network, respectively. Our findings of optimal weights in multivariate portfolio suggest more weights for agri-commodities against fossil fuels in all three modes of market. In addition, the optimal weights of bivariate portfolio analysis show that the most optimal portfolio which has the highest HE value is related to natural gas pairs with agri-commodities. Moreover, depending on the status of the market; in an average and bearish modes, the highest optimal weight is related to maize/natural gas. However, in the bullish market, the highest optimal weights are related to natural gas/Brent oil pair. Furthermore, the results of optimal bivariate hedge ratios show that natural gas/wheat (wheat/maize and vice versa) portfolio is the cheapest (the most expensive) investment strategy in all modes of market and based on MVP and MCoP approaches.

1. Introduction

Fossil fuels are the most important raw materials and energy sources in the world. Fossil fuels are among the most important energy sources used in agricultural machinery, and changes in their prices can affect the prices of agricultural products (El Montasser, 2023; Rafiq et al., 2009). After the 2006 food crisis, the relationship between fossil fuels and agricultural products became an interesting topic among researchers and policymakers. In recent years, the price of agricultural products has experienced many fluctuations

* Corresponding author.

E-mail addresses: f.ahmadian@um.ac.ir (F. Ahmadian-Yazdi), soheil.roudari@gmail.com (S. Roudari), v.omidi@qom.ac.ir (V. Omidi), walidmensi1@gmail.com (W. Mensi), kalyahyaee@muscatuniversity.edu.om (K.H. Al-Yahyaee).<https://doi.org/10.1016/j.iref.2024.103492>

Received 6 November 2023; Received in revised form 10 June 2024; Accepted 4 August 2024

Available online 5 August 2024

1059-0560/© 2024 Elsevier Inc. All rights are reserved, including those for text and data mining, AI training, and similar technologies.