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Herd and causality dynamics between energy commodities and ethical investment: Evidence from the different phases of the COVID-19 pandemic

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Abstract

This paper examines herd behaviour, causality dynamics and dynamic relationships among energy commodities, namely WTI, Brent, gasoline and natural gas, and ethical energy investment indices (S&P Global clean energy, WilderHill clean energy and NASDAQ clean edge green energy) in different phases of the COVID-19 pandemic. Our dataset spans four and a half years of daily data, from August 2018 to February 2023. Unintentional herding behaviour is observed in about 20% between energy commodities and between 10 and 15% between ethical investment indices, and is spread across different phases of the pandemic. WTI is the largest source of time-varying Granger causality to other energy commodities and ethical investment indices at the beginning of the pandemic and remains so after the pandemic. Finally, our wavelet coherence analysis shows that natural gas is decoupled from crude oil and gasoline markets and is not affected by the pandemic. © 2023 Elsevier B.V.

Author Keywords

Crude oil; Energy commodity; Ethical investment; Herding; Markov Chain Monte Carlo (MCMC); Time-varying Granger causality (TVGC); Wavelet coherence

Index Keywords

Crude oil, Investments, Natural gas, Philosophical aspects, Statistical tests; Energy commodity, Ethical investments, Granger Causality, Herding, Markov chain Monte Carlo, Markov Chain Monte-Carlo, Time varying, Time-varying granger causality, Wavelet coherences; Gasoline

References

- Aggarwal, R.
Animal spirits in financial economics: a review of deviations from economic rationality
(2014) *Int. Rev. Financ. Anal.*, 32, pp. 179-187.
- Arora, V., Shi, S.
Energy consumption and economic growth in the United States
(2016) *Appl. Econ.*, 48 (39), pp. 3763-3773.
- Babalos, V., Stavroyiannis, S.
Herding, anti-herding behaviour in metal commodities futures: a novel portfolio-based approach
(2015) *Appl. Econ.*, 47 (46), pp. 4952-4966.
- Babalos, V., Stavroyiannis, S., Gupta, R.
Do commodity investors herd? Evidence from a time-varying stochastic volatility model
(2015) *Res. Policy*, 46, pp. 281-287.
- Baručnik, J., Kočenda, E., Vácha, L.S.
Volatility spillovers across petroleum markets
(2015) *Energy J.*, 36 (3), pp. 309-329.
- Basak, S., Pavlova, A.
A model of financialization of commodities

- (2016) *J. Financ.*, 71 (4), pp. 1511-1556.
- Batten, J.A., Ciner, C., Lucey, B.M.
The dynamic linkages between crude oil and natural gas markets
(2017) *Energy Econ.*, 62, pp. 155-170.
 - Baum, C.F., Hurn, S., Otero, J.
The dynamics of U.S. industrial production: a time-varying Granger causality perspective
(2021) *Econom. Stat.*,
 - Bikhchandani, S., Sharma, S.
Herd behavior in financial markets
(2000) *IMF Staff Papers*, 47 (3), pp. 279-310.
 - Brigida, M.
The switching relationship between natural gas and crude oil prices
(2014) *Energy Econ.*, 43, pp. 48-55.
 - Brown, S.P.A., Yücel, M.K.
What drives natural gas prices?
(2008) *Energy J.*, 29 (2), pp. 45-60.
 - Burrus, S.C., Gopinath, R.A., Guo, H.
(1998) *Introduction to Wavelets and Wavelet transforms: A Primer*,
Prentice Hall New Jersey
 - Chang, E.C., Cheng, J.W., Khorana, A.
An examination of herd behavior in equity markets: an international perspective
(2000) *J. Bank. Financ.*, 24 (10), pp. 1651-1679.
 - Christie, W.G., Huang, R.D.
Following the pied piper: do individual returns herd around the market?
(1995) *Financ. Anal. J.*, 51 (4), pp. 31-37.
 - Demirer, R., Lee, H.-T., Lien, D.
Does the stock market drive herd behavior in commodity futures markets?
(2015) *Int. Rev. Financ. Anal.*, 39, pp. 32-44.
 - Fromentin, V.
Time-varying Granger causality between the stock market and unemployment in the United States
(2023) *Appl. Econ. Lett.*, 30 (3), pp. 371-378.
 - Fromentin, V., Lorraine, M.S.H., Ariane, C.P.E.R., Alshammari, T.
Time-varying causality between stock prices and macroeconomic fundamentals: connection or disconnection?
(2022) *Financ. Res. Lett.*, 49.
 - Gavriilidis, K., Kallinterakis, V., Ferreira, M.P.L.
Institutional industry herding: intentional or spurious?
(2013) *J. Int. Financ. Mark. Inst. Money*, 26 (1), pp. 192-214.
 - Geweke, J.
Evaluating the accuracy of sampling-based approaches to the calculations of posterior moments
(1992) *Bayesian Stat.*, 4, pp. 641-649.
 - Gong, X., Liu, Y., Wang, X.
Dynamic volatility spillovers across oil and natural gas futures markets based on a time-varying spillover method
(2021) *Int. Rev. Financ. Anal.*, 76.

- Granger, C.W.J.
Investigating Causal Relations by Econometric Models and Cross-spectral Methods
(1969) *Econometrica*, 37 (3), pp. 424-438.
- Grinsted, A., Moore, J.C., Jevrejeva, S.
Application of the cross wavelet transform and wavelet coherence to geophysical times series
(2004) *Nonlinear Process. Geophys.*, 11 (5-6), pp. 561-566.
- Hartley, P.R., Rosthal, K.B.M.I.I.I., J. E
The relationship of natural gas to oil prices
(2008) *Energy J.*, 29 (3), pp. 47-66.
- Holmes, P., Kallinterakis, V., Ferreira, M.P.L.
Herding in a concentrated market: a question of intent
(2013) *Eur. Financ. Manag.*, 19 (3), pp. 497-520.
- In, F., Kim, S.
An introduction to wavelet theory in finance: a wavelet multiscale approach
(2012) *World scientific*,
/
- Keynes, J.M.
(1936) *The General Theory of Employment, Interest and Money*,
Mac Millan Houndsmills, UK
- Lahiani, A., Miloudi, A., Benkraiem, R., Shahbaz, M.
Another look on the relationships between oil prices and energy prices
(2017) *Energy Policy*, 102, pp. 318-331.
- Li, X., Sun, M., Gao, C., He, H.
The spillover effects between natural gas and crude oil markets: the correlation network analysis based on multi-scale approach
(2019) *Phys. A: Stat. Mech. Appl.*, 524, pp. 306-324.
- Lin, B., Li, J.
The spillover effects across natural gas and oil markets: based on the VEC-MGARCH framework
(2015) *Appl. Energy*, 155, pp. 229-241.
- Lin, B., Su, T.
Does COVID-19 open a Pandora's box of changing the connectedness in energy commodities?
(2021) *Res. Int. Bus. Financ.*, 56.
- Lovcha, Y., Perez-Laborda, A.
Dynamic frequency connectedness between oil and natural gas volatilities
(2020) *Econ. Model.*, 84, pp. 181-189.
- Masters, M.W.
Testimony before the Committee on Homeland Security and Governmental Affairs, United States Senate. Washington, DC
(2008), p. 20.
- Mensi, W., Rehman, M.U., Vo, X.V.
Dynamic frequency relationships and volatility spillovers in natural gas, crude oil, gas oil, gasoline, and heating oil markets: implications for portfolio management
(2021) *Res. Policy*, 73.
- Mohamad, A.
Safe flight to which haven when Russia invades Ukraine? A 48-hour story

(2022) *Econ. Lett.*, 216, p. 110558.

- Mohamad, A., Inani, S.K.
Price discovery in bitcoin spot or futures during the Covid-19 pandemic? Evidence from the time-varying parameter vector autoregressive model with stochastic volatility
(2022) *Appl. Econ. Lett.*, pp. 1-9.
- Mohamad, A., Stavroyiannis, S.
Do birds of a feather flock together? Evidence from time-varying herding behaviour of bitcoin and foreign exchange majors during Covid-19
(2022) *J. Int. Fin. Mark. Inst. Money.*, 80, p. 101646.
- Mu, X.
Weather, storage, and natural gas price dynamics: fundamentals and volatility
(2007) *Energy Econ.*, 29 (1), pp. 46-63.
- Nakajima, J.
Time-Varying Parameter VAR Model with Stochastic Volatility: An Overview of Methodology and Empirical Applications
(2011) *Monet. Econ. Stud.*, 29, pp. 107-142.
- Natoli, F.
Financialization of commodities before and after the great financial crisis
(2021) *J. Econ. Surv.*, 35 (2), pp. 488-511.
- Nick, S., Thoenes, S.
What drives natural gas prices? — a structural VAR approach
(2014) *Energy Econ.*, 45, pp. 517-527.
- Otero, J., Baum, C., Hurn, S.
TVGC: Stata module to perform Time-Varying Granger Causality tests
- Phillips, P.C.B., Shi, S., Yu, J.
Testing for multiple bubbles: historical episodes of exuberance and collapse in the S&P 500
(2015) *Int. Econ. Rev.*, 56 (4), pp. 1043-1078.
- Phillips, P.C.B., Shi, S., Yu, J.
Testing for multiple bubbles: limit theory of real-time detectors
(2015) *Int. Econ. Rev.*, 56 (4), pp. 1079-1134.
- Serletis, A., Herbert, J.
The message in North American energy prices
(1999) *Energy Econ.*, 21 (5), pp. 471-483.
- Shi, S., Phillips, P.C.B., Hurn, S.
Change detection and the causal impact of the yield curve
(2018) *J. Time Ser. Anal.*, 39 (6), pp. 966-987.
- Shi, S., Hurn, S., Phillips, P.C.B.
Causal change detection in possibly integrated systems: revisiting the money-income relationship
(2020) *J. Financ. Econ.*, 18 (1), pp. 158-180.
- Stavroyiannis, S., Babalos, V.
Herding behavior in cryptocurrencies revisited: novel evidence from a TVP model
(2019) *J. Behav. Exp. Financ.*, 22, pp. 57-63.
- Swanson, N.R.
Money and output viewed through a rolling window
(1998) *J. Monet. Econ.*, 41 (3), pp. 455-474.

- Thoma, M.A.
Subsample instability and asymmetries in money-income causality
(1994) *J. Econ.*, 64 (1-2), pp. 279-306.
- Tsionas, M.G., Philippas, D., Philippas, N.
Multivariate stochastic volatility for herding detection: evidence from the energy sector
(2022) *Energy Econ.*, 109.
- Villar, J.A., Joutz, F.L.
The relationship between crude oil and natural gas prices
(2006) *Energy Information Administration, Office of Oil and Gas*, pp. 1-43.
- Vücel, M.K., Guo, S.
Fuel taxes and cointegration of energy prices
(1994) *Contemp. Econ. Policy*, 12 (3), pp. 33-41.
- Zainudin, A.D., Mohamad, A.
Financial contagion in the futures markets amidst global geo-economic events
(2021) *Q. Rev. Econ. Fin.*, 81, pp. 288-308.
- Zainudin, A.D., Mohamad, A.
Pandemic impact on the co-movement and hedging effectiveness of the global futures markets
(2023) *Invest. Anal. J.*, pp. 1-21.

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