

Energy market connectedness: A tale of two crises

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Abstract

From 2020 to 2023 energy markets experienced a tumultuous period. The COVID-19 demand shock in 2020 led to substantial declines in oil, coal and natural gas prices (although smaller for the latter). From mid-2021, however, supply shocks disrupted energy markets, with natural gas and coal prices reaching record highs alongside soaring oil prices. Some countries were forced to seek alternative suppliers and/or sources of fossil fuel. This unprecedented situation becoming known as the world's first global energy crisis (GEC). We investigate intra- and intermarket connectedness of oil, coal and natural gas prices during the GEC (June 2021 – August 2023). We also analyse the immediately preceding COVID-19 crisis (January 2020 – May 2021) and a pre-COVID-19 period (October 2017 – December 2019) allowing us to compare connectedness during two unparalleled crises. We employ the time-varying VAR with heteroscedastic variance-covariances of Antonakakis et al. (2020) and Chatziantoniou and Gabauer (2021) to model connectedness and then go on to examine the determinants of energy market connectedness.

Results show energy markets experienced increased connectedness during the COVID-19 crisis although this was temporary. Initially energy prices and connectedness were asynchronous, but they became more aligned as the pandemic progressed. Greater synchronicity was observed between energy prices and energy return connectedness during the GEC. Oil is the energy market leader, consistently transmitting spillovers to other fossil fuels across all periods. While its dominance weakened during the COVID-19 crisis, it strengthened during the GEC. Coal remained a follower with minimal variation across the crises. During the COVID-19 crisis, natural gas spillovers to oil and coal increased, although this influence waned during the GEC. WTI and Brent crude oil dominate as net transmitters although their contribution fell during the COVID-19 crisis. The role of Urals oil as a net transmitter significantly diminished during the GEC, aligning with bans on Russian oil imports. European natural gas price benchmarks are net transmitters, contrasting with American, Australian, Canadian and Asian benchmarks which are net recipients. Overall, our results show rising connectedness across energy markets during the COVID-19 crisis and GEC. However, the impact of various energy sources deviated more from historical patterns during the pandemic than the GEC, suggesting that the demand shock influence intra-energy market dynamics more than the supply shock. We go on to show that connectedness is driven by energy prices, economic conditions, uncertainty and sentiment. Our findings have important implications for industrial companies (for whom energy is a critical input), portfolio managers (given the rising financialisation of commodities) and policymakers tasked with energy security.