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Predicting Commodity Turning Points with Mixed Causal–Noncausal Models and Exogenous News

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Commodities play a pivotal role in the global economy and, like other financial assets, are susceptible to speculative bubbles. These speculative episodes, marked by sharp price rises followed by abrupt corrections, can generate severe financial instability. Standard causal time-series models are ill-suited for capturing these speculative dynamics. However, mixed causal–noncausal autoregressive (MAR) models have recently emerged as a promising alternative, combining backward-looking (causal) dynamics with forward-looking (noncausal) components, and thereby enabling the modeling of anticipatory behavior and bubble-like episodes. This thesis further develops and empirically tests MAR models for forecasting turning points and crash risk in commodity prices.

The core contribution is the introduction of a MAR framework augmented with exogenous news variables, constructed from macroeconomic and sector-specific news indices as well as text-based signals. This extended MAR model aims to improve early warning signals for price reversals, disentangle surprise-driven from anticipatory effects, and assess how news propagates through causal and noncausal channels. Methodologically, the project estimates MAR benchmarks under non-Gaussian errors, employs likelihood-based identification, and evaluates predictive gains in crash and regime-switch forecasting across major commodity markets (oil, metals, and agricultural products). Overall, this thesis aims to deliver practical insights for policy analysts on integrating news into forward-looking time-series models.

Field of Research/Work

Beyond Physics

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