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Price multifractality and informational efficiency in the futures markets of the US soybean complex

This work investigates price multifractality and informational efficiency in the futures markets of the US soybean complex (soybeans, soybean meal, soybean oil, and the crush spread) using daily prices from 2015 to 2021 and Multifractal Detrended Fluctuation Analysis (MF DFA). The empirical findings suggest: First, none of the four series exhibited long-range dependence. They did, however, show considerable serial dependence locally. The futures prices of soybeans and soybean oil, and of the crush spread were locally anti-persistent (persistent) for large (small) fluctuations whereas the futures prices of soybean meal were persistent for all small and large fluctuations. Second, all markets in the US soybean complex exhibited some degree of informational inefficiency with that of the crush spread being less efficient relative to the other three. Overall, the results provide valuable information to investors as to whether trend-following or oscillatory trading strategies are more appropriate.

Keywords: price predictability; multifractality; informational efficiency; soybean complex.

JEL classification: G14; Q11; C12.

1. Introduction

Price predictability is central in all theoretical works on market efficiency. Fama (1965) advanced the Efficient Market Hypothesis (EMH) which — in its weak form — suggests that investors are rational and current prices reflect all information about past prices². Therefore, from a statistical viewpoint, prices are random walk processes and (log-) price changes are independent and identically distributed (i.e. white noise processes). For Samuelson (1965), a less restrictive statistical characterization of a price series in an informationally efficient market is that of a martingale process. Under both the random walk and the martingale characterization, however, returns in informationally efficient markets do not possess any statistically significant serial dependence structure and, as such, they are very difficult to forecast even in the short-run (e.g. (Kristoufek, 2018; Ftiti et al., 2021)).

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² A market is informationally efficient if it completely processes all information relevant to the fundamental price generation (i.e. a market in which all the available information is fully reflected in prices). Depending on the type of information available, the EMH is distinguished into three forms: weak (information about past prices), semi-strong (public information), and strong (all information, including private one) (Kristoufek, Vosvrda, 2016).