

Market Stress in Agricultural Markets: Can Alternative Implied Volatility Measures Predict It?

Mahendra Kumar Singh

mahenks1@iastate.edu

Sergio H. Lence

shlence@iastate.edu

Department of Economics

Iowa State University

[Link to the latest version](#)

Abstract

In this paper, we provide a comprehensive assessment of the return and volatility predictive ability of option-implied information for corn, crude oil, soybean, and wheat futures options. In particular, we investigate the information content of four option-implied volatility measures, namely VIX (Demeterfi et al., 1999), SVIX (Martin, 2017), Black's (1976) implied volatility, and risk-neutral volatility measure (Bakshi et al., 2003). Furthermore, we examine the incremental information embedded in the gap of VIX and SVIX, which could arise due to the violation of a standard asset pricing theory assumption (i.e., stochastic discount factor and returns are conditionally jointly log-normal) during the market stress time, i.e., a period of high volatility or high uncertainty (Martin, 2017). In addition, we augment the return and volatility forecasting exercises with volatility smirk (Xing et al., 2010), risk-neutral skewness, and risk-neutral kurtosis (Bakshi et al., 2003). We find several interesting results: (i) option-implied measures have very limited predictive ability to forecast daily or monthly returns and could barely explain up to 1% of the total variation, i.e., an indirect implication for efficient market hypothesis; (ii) option-implied variables have strong predictive ability to forecast realized volatility (up to 60% of the total variation); (iii) all four alternative implied volatility measures mentioned above impacts realized volatility positively for corn, crude oil, soybean, and wheat; (iv) the gap between VIX and SVIX has no embedded incremental information or statistical forecasting power to predict the returns or realized volatility although those gaps widen during the period of high market volatility or periods of high uncertainties. Overall, our findings are relevant for real-world applications, i.e., for risk management agencies.

Keywords: agricultural futures options, implied volatility, VIX, SVIX, volatility smirk, risk-neutral moments

JEL Classifications: G13, G14, G32, Q02