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*Refinement of the Barndorff-Nielsen and Shephard model with machine learning: analysis of various price indices.*

A commonly used stochastic model for the derivative and commodity market analysis is the Barndorff-Nielsen and Shephard (BN-S) model. At first, an application of the BN-S model will be presented to find an optimal hedging strategy for the oil commodity from the Bakken, a new region of oil extraction that is benefiting from fracking technology. Though this model is very efficient and analytically tractable, it is known that this model suffers from the absence of long-range dependence and many other issues. In this presentation, with the implementation of various machine learning algorithms, a simple way of improving the BN-S model will be proposed. This resulting model is more efficient and has fewer parameters than the superposition models that are used in practice to improve the BN-S model. The refined BN-S model will be implemented in the analysis of various price indices. (Received July 31, 2019)