

Review

[Science](#), [Mathematics](#)



Importance of the idea Owing to the importance of their role in trading and risk management, financial derivatives like future prices and options have become factors of immense value for the financial institutions particularly over the last thirty years. Successful hedging strategies and portfolio investments cannot be identified without accurate pricing of these derivatives. Value of the underlying assets determines the value of a derivative. For instance, the price of oil controls an oil option contract's value. Oil prices are amongst the most important commodities in the world. Their behavior over the last twenty years has become increasingly complicated as oil prices have been affected, directly or indirectly, by a host of factors that included but were not limited to net demand and interest rates. The topic of this research is oil prices' dynamics and valuations of the derivatives of oil. This research would help create more understanding about why oil prices are so volatile and how they affect the oil derivatives. This research is directed at studying and drawing comparisons between different present stochastic models and proposing some new stochastic models that can help describe oil prices' dynamics. The price placed on the derivatives of oil depends upon the tendency and usefulness of these stochastic models in capturing the oil prices' behavior. Oil derivatives like options contracts, futures, and exotic financial contracts will be valued with the help of the best stochastic models found. Research benefits The benefit of this research is that it will provide an analysis of the valuations of oil derivatives and the dynamics of oil prices. This analysis is very important in order to understand the behavior of changes in the prices of oil as well as the derivatives of oil. Benefits of this research apply on the smallest of business entrepreneurs to

the largest of corporates as well as the whole countries and groups of countries. Knowledge of the factors involved in the volatility of oil prices and their derivatives' prices will help the consumers make informed decisions regarding the purchase of oil. Several attempts to determine suitable stochastic models have been made in the past. For example, (Black and Scholes) employed the model of Geometric Brownian Motion (GBM) with the help of which they derived a theoretical formula for the options in Europe. In addition to this, they did empirical tests upon the data of call option for assessment of the validity of the use of the GBM model. As a result of their research, (Black and Scholes) found that there was a reasonable deviation between the value suggested by the option formula and the actual price. It was mainly attributed to the fact their assumption that option holders did not pay any transaction costs. Since their research, oil prices have been frequently modeled with the help of their GBM model. For instance, (Brennan and Schwartz) used the GBM model to establish the link between the future and spot prices that also comprised convenience yield. These models have been frequently used in the past and have often been the subjects of debates because of their shortcomings, flaws, and inefficiencies in certain cases. Although there has been considerable research in the past, yet the models proposed by many past researchers have gaps and arbitrary parameters in them. A major part of the work previously done on the valuation of options was gathered in terms of warrants. Researchers like (Sprenkle) and (Samuelson), for example, produced the formulae of valuation for the options but those formulae contained a number of arbitrary parameters. This places the need for a comprehensive research that can

suggest a stochastic model free of arbitrary parameters so that the dynamic behavior of oil prices and the derivatives of oil can be fully understood. This research study will achieve this. Research methods The main purpose of this research is to analyze the way oil prices change and how the derivatives of oil can be valued. The purpose of this research will be achieved with the use of participatory data to guide with drawing the inferences of oil prices and oil derivatives' valuations. Reliable data will be gathered using both primary and secondary sources. Primary methods will be used to gathered original data for help in making the inferences. This will make data collection easier and more direct compared to what happens in a general case. Secondary sources will be used to father additional information. The research will seek guidance primarily from the literature review, but guidance for the inferences will be gained from the data.