Empirical Performance of Alternative Option Pricing Models

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From this paper we can and already having a general knowledge of the Black-Sholes option pricing model we can start to see it has some limitations. There have been many attempts to try and correct these limitations and in this paper, Bakshi, Cao, and Zhwu attempt to report on how powerful and valid these other types of models are. More specifically they are trying to review and summarize the pricing biases that are present in the Black-Scholes model by including models that account for stochastic volatility, models that have jumps in the underlying processes, jump diffusion models, models with transaction costs, and GARCH models. They use three different theories to try and evaluate these different models. First, how mis-specified the model is, second, which model minimized price errors, and lastly, how well the model performs when it creates its hedge. Their methods for these theories are monitoring the hedge errors of each model, comparing implied structural model parameters with what was observed in the time-series data, and mis-pricing of the options, which is also used to model the mis-specification. They used three different parameters to frame their findings. First the interest rate process, second, the underlying price process, and lastly the market risk premiums. They observed 38,789 S&P 500 call options from June 1988 to May 1991 to test each of the different models.

In the paper the end up findings a model that recognizes stochastic volatility, stochastic interest rates, and random jumps. This model has real world applications and produces useful analytic hedge ratios. They found the most important way to improve Black-Sholes was to incorporate stochastic volatility into the model. When compared to the Black-Scholes model they claim that a model that has stochastic volatility and stochastic interest rates performs much better than the BS model. The SV model was the best for studying and implementing hedge ratios.