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# Future works and finak remarks

This work concerned option pricing of two special GARCH models, viz the FC-GARCH and the Mixture of GARCHs. We found the theoretical risk neutral version of those models and also simulated the option prices under different schemes. We also discuss the possibility of using negative noise to the Shifted-Gamma case and perform the calculations in both models as well as we performed simulation experiments. Then we made some sensibility analysis to the paramters. The only theoretical contributions we achieve in these two papers are the four theorems relating the econometric models in the original $P$ measure and in the risk neutral measure, viz., Theorems 35, 36, 41 and 42 showed in chapters 5 and 6.

We intend to continue in this direction, studying pricing methods and applying them in more complex models and more sofisticated kind of contracts so that practioners have a variety of possibilities of models to choose from.

According to our results, if the data comes from one of those two models proposed, there is a significant difference among the option prices in the different schemes. It shows that it is worth pricing using a reasonable model and with the proper innovation distribution in order to obtain more precise option prices.

We tried to extend the methodology in Siu et al.(43) to characteristic functions, but the imaginary $i$ brought us concern when dealing with the martingale condition. It would be nice if we could find a way in solving this issue and generalize the methodology.

Another possible improvement is to create a trading scheme to compare our results to the obtained by real options data. In such a paper we intend to compare real data prices with both the FC-GARCH and the Mixture of GARCHs option prices.