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Examiner's Report:

Candidate: M Hamada

This is a very well written thesis. The writing style is very clear. The English is excellent. There are only a few typographical errors (the most obvious is in the title of section 4.5). The thesis provides a thorough technical background to the key topics with extensive references to other related work.

The first four chapters provide an extensive review of the related literature. The candidate, Mr Hamada, certainly demonstrates that he has a deep understanding of the theory and techniques of the broad field in which his own results are relevant. In these first four chapters, he has presented an up-to-date critical analysis of the related literature. In chapter 4, he also introduces the idea of "symbolic dynamic programming" as a solution. Unfortunately, this section (4.4) doesn't provide sufficient explanation of the "symbolic" aspect, nor of the details of implementation using software such as Matlab.

The major contributions of the candidate are in Chapters 5 and 6, where he generalizes the distortion measure approach suggested originally by Wang and followed up by Sherris and others. The application to derivative security pricing and comparisons with BS are quite interesting. In Chapter 6, the generalisation to the discrete case of possibly non-conjugate distortion functions in the application of asset allocation is very valuable. The detailed analysis of the one-period two-asset case provides very interesting insight into the optimal investment strategies. One of the key findings is actually the identification of the "corner solution" characteristic of the solution resulting from the linearity of the objective function in the control variates. This provides ample motivation for future research.

Overall, the candidate has produced a thesis of which he should be proud. He demonstrates a deep knowledge of relevant theory and techniques. He adds some unique contributions to that theory. I'm confident that several papers should be publishable based on the thesis.

Harry Panjer

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