Extending Value at Risk to a Corporate Setting

An Application to Fonterra Cooperative

A thesis presented in partial fulfilment of the requirements for the degree of
Master of Business Studies in Finance

at Massey University

Palmerston North, New Zealand

Jared M Cahan

13 December, 2005

Abstract

This paper demonstrates the development and application of a corporate Value-at-Risk model. Using the RiskMetrics Group's CorporateMetrics as a starting point we show how the framework can be modified to meet the specific needs of Fonterra Cooperative, a major New Zealand dairy exporter. We develop a Monte-Carlo simulation model that uses univariate ARIMA and multivariate Vector Error Correction (VECM) forecast models to estimate the Value-at-Risk on Fonterra Group Treasury's interest rate and FX hedge portfolio over a 15-month period.

Acknowledgements

Firstly, I would like to acknowledge the contribution made by my supervisors Michael Naylor and John Powell. Their input to this project has been invaluable. I am particularly grateful for their recommendation that the scope of this project warranted recognition as a Masters Thesis.

I am deeply indebted to Raymond Greenwood of Fonterra who was instrumental in setting this project up and assisted throughout, particularly in arranging for me to work part-time at Fonterra over the life of the project. Working at Fonterra was an outstanding opportunity, both from a research and career perspective, and has opened many doors for me. I would like to thank all those at Fonterra who made a contribution, especially Stephan Deschamps.

A big thank you must also go to my brother Rochester Cahan, now of Citigroup Global Quantitative Research in Sydney, who made an important contribution to the early stages of this project.

Finally I want to thank my wife Rachael for her support in all my endeavors.

Confidentiality

The commercial sensitivity of certain Fonterra specific information necessitates its removal from the publicly available version of this thesis.

Appendix D, containing information regarding the Group Treasury's FX and interest rate hedging strategies and graphs of proprietary basic commodity price (BCP) data series, has been removed from this report. Requests to access this information should be directed to the author.

It is our intention that the removal of these details does not detract from the academic rigor of the analyses. Rather than focus on the specific model developed for Fonterra, we emphasise the development of a general long-term corporate VaR model.

Contents