TOWARDS THE IDENTIFICATION OF A COST-EFFECTIVE SECURITY FOR BIOTECHNOLOGY COMPANIES

A Dissertation presented in partial fulfilment of the requirements
for the degree of Doctor of Philosophy
in Finance at
Massey University

Jennifer R Parry

1998

THE DETERMINATION OF A COST-EFFECTIVE SECURITY FOR BIOTECHNOLOGY COMPANIES

ABSTRACT

When biotechnology companies have a drug ready for submission to a regulatory authority issuer-investor aspects of security selection become important. If approval to market the drug is received then the company may wish to consider an alternative to their Equity and/or Option/Warrant type of financing. The successful issue of any security will require the approval of and the acquisition by interested investors as well as a guarantee that it is cost-effective as far as the issuer is concerned.

The research was divided into two parts: firstly, a questionnaire was sent to those institutional investors in Australia and the UK who were analysing pharmaceutical/ biotechnology companies; and secondly, based on the results obtained from the questionnaire, six securities were selected for further investigation. The research then centred on determining which security would have the greatest benefit for the companies. In this part of the study cash flows and net present values (NPV) were calculated for each security. Spreadsheets using these data then formed the foundation for conducting a Monte Carlo simulation. The results of these simulations highlighted those variables which had the greatest impact on the end of year cash flows and company NPVs. Finally, a decision tree model was developed to ascertain which security was the optimal one for the company to use during the first five years of marketing its first drug.

The results demonstrate that during this first five year period the type of funding for the companies included in the study would be the same as those currently employed. However, by the end of five years the dominance of options/warrants as a form of financing was declining in favour of other equity-type securities. Therefore, the implications are that even though some positive cash flows were being generated during this period, the cash outflows associated with servicing and refunding fixed interest-type securities mean that they are not the most cost-effective source of funds for these companies.

DEDICATION

To my husband David who has been my source of encouragement throughout my studies and for his patience and motivation when the obstacles seemed insurmountable.

ACKNOWLEDGEMENTS

There are so many people who have assisted me in some way to bring this research through to completion. Firstly, my sincere thanks go to Professor Larry Rose for accepting me as a student and for his support, enthusiasm and constant positive outlook for the project at all times. Wheneven I felt that progress was impossible he was able to point me in the right direction. However, I think it was his belief in the project and my ability to complete it which gave me the impetus to continue. I am also extremely grateful for his prompt responses to drafts and the suggestions which accompanied them.

My thanks also go to my second supervisor, Professor Philip Dewe, for his assistance with the questionnaire survey and for his meticulous care in ensuring its compilation would achieve the desired results. I am grateful for the many discussions and encouragement Professor Dewe gave me in the difficult middle stages of the project which also provided the much needed motivation to continue.

A number of meetings were held in the early stages of the research with people associated with the biotechnology/pharmaceutical industry. The information obtained from these meetings provided me with an invaluable amount of background information that was essential to my understanding of the industry. These people were Mr James Noble, Finance Director, British Biotech plc, Dr John Pardon, British Biotech plc, Mr Richard Wadley, Secretary, Biota Holdings Limited, and Mr Terrence Aschoff, Researched Medicines Inc.

Appreciation also goes to Professor Allan Rae, Professor Tony Vitalis, Professor David Parry, Dr Gill and Dr Robert Norris and Mrs Barbara O'Driscoll for reading copies of the draft dissertation and providing constructive comments. Any remaining errors are my own responsibility.

I would also like to thank my colleagues in the Finance Group for accepting my uneven teaching load over the past three years. The support from Hamish Anderson in particular is greatly appreciated - if he had not been my research student I may never have become interested in R&D. My appreciation also goes to Heather Tod and staff from Datastream Inc. who provided me with the relevant information from the Datastream database.

Finally, my thanks go to my father, my husband, children and their partners for their love and support over the past few years. Their belief that the project would be completed and that I could achieve my goal was a real motivator and for this I am eternally grateful.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES