Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

A DATRY SUPPLY MODIL INCORPORATING THE CONCEPT OF LIVESTOCK AS INVESTMENT INPUTS

A thesis presented in partial fulfilment of the requirements for the degree

of

Master of Agricultural Science

in

Agricultural Economies and Marketing

2.5

Massey University

P.G. Spackman

May 1977

Acknowledgements

I am in debt to my supervisor, Dr. A.C. Lewis for his advice, constructive comment and encouragement throughout this study.

This study was undertaken while employed by the Department of Agricultural Economics and Farm Management and I am grateful for the time made available to complete the study. I am in debt to several members of the Department for their advice and constructive comment during the model building stages and to other University staff for their help in the computing stages. I would also like to record my appreciation of the encouragement and understanding by other people connected with the study.

I fully appreciate the cooperation and assistance of the New Zealand Dairy Board and especially the Farm Production Division, in identifying data sources and in providing data.

The Market Research Centre, Massey University financed the computer work and for this I am sincerely thankful.

Table of Contents

| | | | Page | | |
|------------|-------|------------------------------------------|-----------------------------------------------|----|--|
| Chapter 1. | Intro | oduction | 1 | | |
| Chapter 2. | The S | elationships in Agriculture 5 | | | |
| | 2.1 | The Ger | neralised Derivation of a Simple | | |
| | | Multipo | eriod Supply Function | | |
| | 2.2 | Diffict | ulties in Supply Analysis | | |
| | | 2.2.1 | Farmers' Objectives | | |
| | | 2.2.2 | Complexities of Production | | |
| | | 2.2.3 | Aggregation | | |
| | | 2.2.4 | Technological Change | | |
| | | 2.2.5 | Uncertainty of Prices and Production | | |
| | | | Responses | | |
| | | 2.2.6 | Investment in Fixed and Quasi-fixed | | |
| | | | Factors of Production | | |
| | 2.3 | Relevar | nt Previous Studies | | |
| | | 2.3.1 | New Zealand Dairy Supply Studies | | |
| | | 2.3.2 | New Zealand Dairy Farmers' Price Expectations | | |
| Chapter 3. | Relev | vant Trer | nds in the Region Under Study 40 | | |
| | 3.1 | Price S | Setting and the Release of Price | | |
| | | Information to Suppliers in the Taranaki | | | |
| | | Region | | | |
| | | | Milkfat Prices | | |
| | | 3.1.2 | Surplus Calf Prices | | |
| | | | Cull Cow Prices | | |
| | | | Sources of Price Series and | | |
| | | 500 rac # | Movements in Prices | | |
| | 3.2 | The Far | rm Production Division's Survey of Factory | | |
| | | | Dairy Farms | | |
| | 3.3 | | ranaki/Western Uplands Region | | |
| | 1 | 3.3.1 | | er | |
| | | PARTIE D | Uplands Factory Milk Supply Dairy Farms | | |
| | | | - The first second | | |

| | | | Page | | |
|------------|-------------------------------------------------|-------------------------------------------|------|--|--|
| | 3.4 | A Simple Analysis of the Important | | | |
| | Production Factors | | | | |
| | 3.5 Summary and Conclusions | | | | |
| | | | | | |
| Chapter 4. | The Dairy Production and Decision Model | | | | |
| | 4.1 | The Model | | | |
| | 4.2 | The Production Model | | | |
| | | 4.2.1 Milk Production | | | |
| | | 4.2.2 Surplus Calves | | | |
| | | 4.2.3 Milking Costs | | | |
| | | 4.2.4 Heifer Costs | | | |
| | | 4.2.5 Stock Reconciliations | | | |
| | | 4.2.6 Farm Area | | | |
| | 4.3 | The Model of the Decision Process | | | |
| | | 4.3.1 Decision Variables | | | |
| | | 4.3.2 The Objectives of the Dairy Farmer | | | |
| | | 4.3.3 Price Expectations | | | |
| | 4.4 | The Overall Model | | | |
| | 4.5 | The Projection Methods | | | |
| | 4.6 | Summary | | | |
| | | | | | |
| Chapter 5. | Estimation, Results, Evaluation and Projections | | | | |
| | 5.1 | Estimation of the Parameters | | | |
| | 5.2 | Discussion of the Results and Evaluation | | | |
| | | of the Model | | | |
| | • | 5.2.1 The Parameter Values | | | |
| | | 5.2.2 Evaluation of the Model | | | |
| | | 5.2.3 The Responses to Price Changes | | | |
| | 5.3 | Projections | | | |
| | 5.4 | Summary of Results | | | |
| | | | | | |
| Chapter 6. | <u>Conclusions</u> 1 | | | | |
| | 6.1 | The Results and Policy Implications | | | |
| | 6.2 | The Approach to Supply Analysis and Its . | | | |
| | | Limitations | | | |

| | | | Page |
|-----------|------|------------------------|------|
| Bibliogra | iphy | | 115 |
| Appendix | Α. | The Data | 122 |
| Appendix | В. | The Milkfat Production | 131 |
| | | Relationships | |
| Appendix | C. | The Results | 137 |