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FACTORS INFLUENCING NET INVESTMENT DECISION MAKING  
FOR A GROUP OF LOWER NORTH ISLAND SHEEP AND BEEF FARMERS

A thesis presented in partial fulfilment of the  
requirements for the degree of Master of Agricultural  
Economics at Massey University

Paul James O'Neil

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## ABSTRACT

This study investigated the process of net investment decision-making on a group of New Zealand sheep and beef farmers. A review of previous theoretical and empirical research led to the study's objectives, namely to test that investment decision making on New Zealand farms could be incorporated in two dimensions: the determination of a desired level of capital stock and a description of the rate of adjustment of actual capital stock to the desired level.

A study of net investment decision-making was chosen because net investment was seen by policy-makers in the 1970's to be an ingredient in planned growth in output. Information on net investment at the individual farmer level was not, however, available to policy-makers at the time. The study was at the individual farmer level to complement previous research at the macro-level on investment in the New Zealand pastoral sector.

An investment model was tested using ordinary least squares combining time-series and cross-section data. The initial specification included individual farm dummy variables to account for cross-sectional differences in net investment decision-making. Later, candidate variables hypothesised as explaining cross-section differences were included in the model.

The regression results led support to the study's objective. Demand for desired capital stock was viewed as determined by Government policy measures, farm size, farmer age and the initial development state of the farm. Adjustment of actual capital stock to the desired level was viewed as determined by the level of cash at the beginning of each period and windfall gains or losses in net income in the current period. The results provide some basis for the better targeting

## ABSTRACT (Cont'd)

of future policy measures to the farm sector.

The study was limited by lack of a priori knowledge of inter-farm differences in the desire for capital, by the lack of a precise measurement of actual capital stock and the failure to account for interdependencies in the consumption-investment decisions that take place on farms. These limitations could provide avenues for future research.

## Chapter One

### Introduction to the Study

#### 1.1 Introduction

This study is concerned with an explanation of net investment on a group of New Zealand sheep and beef farms from 1973/74 to 1980/81. Because of the impact on New Zealand's economic growth due to growth of the agriculture sector, an investigation into one of the vehicles of growth, namely investment, is of interest to policy-makers.

The period from the early 1970s to the early 1980s was one of considerable uncertainty for farmers. This was a period when inflation, product price variability, weather variability and Government policies combined to influence the environment in which farmers made their production and investment decisions.

The climate for most of this period was kind with mild winters, wet springs and enough summer and autumn showers to give adequate pasture growth throughout the year. This pattern was interrupted twice. In 1972/73 much of New Zealand experienced a cold winter followed by a serious summer drought. It was not until the winter of 1974 that rains were sufficiently heavy to build up soil water reserves. The 1977/78 season was again a very demanding one, especially for Wairarapa farmers. Rainfall in this region in the winter of 1977 was 190 percent of the 30 year average resulting in severe flooding and landslips. This was followed by a summer drought with rainfall 60 percent of the 30 year average.

These random events may have made farmers pessimistic about the profitability of certain investment projects, particularly where high stocking rates were evident. On the other hand, these random events may have encouraged investment in certain capital inputs such as provision of supplementary feed facilities and water schemes.

The market environment over the period was a difficult one for farmers. As Table 1.1 shows, farmers faced a declining terms of trade which at the time may not have enhanced farmers optimism about the profitability of additional investment.

Table 1.1: New Zealand Sheep and Beef Farms  
Terms of Exchange

Year	Prices Received Index	Prices Paid Index	Terms of Exchange Index
1970/71	594	617	963
1971/72	580	656	884
1972/73	940	690	1362
1973/74	940	787	1194
1974/75	669	892	750
1975/76	1000	1000	1000
1976/77	1261	1186	1063
1977/78	1202	1371	877
1978/79	1480	1496	989
1979/80	1753	1831	957
1980/81	1957	2264	861

Source - New Zealand Meat and Wool Board' Economic Service.

Product prices generally increased over the data period. If farmers believed at the time that inflation was a temporary phenomenon, farmers could have been optimistic about expectations of future income. However, the relative prices of the major products changed over the data period. The wool boom in 1972/73, coinciding with high prices for sheep and cattle meat, continued into 1973/74. Beef prices reached an all-time high in 1973/74. In the autumn of 1974 beef and sheep prices plummeted. This continued into the 1974/75 season.

In 1975/76 product prices improved some 50 per cent and continued rising in the 1976/77 season. Sheep meat and wool prices, however, moved more significantly than cattle meat prices. On East Coast farms at this time, the return on a sheep stock unit was 145 percent greater than for a beef stock unit. In 1977/78 this situation began to reverse. Wool and lamb prices were checked while beef prices increased. All prices continued to rise throughout the remaining years of the data period, with beef prices in 1978/79 exceeding the record prices of 1973/74. Such changing relative prices may have had an influence on input use. In particular, the greater returns from sheep may have encouraged greater use of feed control systems requiring subdivision fencing, water supply and supplementary feed capital inputs.

Because of the linkages among export receipts from the pastoral sector and employment and economic growth in New Zealand, the Government in turn attempted to positively encourage output from the pastoral sector. A major emphasis by Government over the period was to stabilise farmers' incomes. In response to the boom years of 1972/73 and 1973/74, the Government of the day introduced a voluntary income stabilisation scheme and encouraged farmers (with the threat that such a scheme could be made compulsory) to commit sums to a target total of \$85 million. It transpired that such a deposit proved a saviour to many farmers in the 1974/75 season when product prices fell, although it is uncertain what farmers would have done with the money in the absence of such a scheme. Under the encouragement of Government, farmers as a group, through their Meat and Wool Boards, introduced in 1976 a permanent income stabilisation scheme. This scheme guaranteed a minimum price for meat and wool products and set a trigger price at which level receipts were to be deposited in the stabilisation fund. In 1978 the Government superimposed on this permanent scheme its own

scheme, a supplementary minimum price (SMP), guaranteeing a minimum price for the coming and subsequent season. The SMP was about to finish at the time of writing this study.

There is some speculation as to the effectiveness of income stabilisation in encouraging productive investment. A prominent New Zealand view was that farmers had a high propensity to invest out of the previous year's income so income stabilisation was good. Another view was that farmers had a higher propensity to invest when incomes were unstable so that income stabilisation was bad. At the time of the introduction of the income stabilisation scheme, however, it was favourably received and probably contributed to a wave of optimism over future income expectations.

So that it could concentrate on the capital needs of the pastoral sector, and to ensure that development of this sector was not hindered by inadequate medium-term finance, the rural lending activities of the State Advances Corporation were reconstituted by the Government in 1973 into the Rural Banking and Finance Corporation. This long and medium term source of finance has been at concessional interest rates. Perhaps more significantly, the Rural Bank acted as the Government agent in directing development expenditure towards specific capital inputs.

Two schemes were of particular prominence during the period. The first, the Livestock Incentive Scheme rewarded a farmer for permanently increasing the numbers of livestock he carried on his farm. This reward came in the form of a \$12 cash grant or a \$24 deduction in assessable income for each stock unit increase above a certain minimum increase. This scheme begun in 1977 and continued into the 1980s. The other scheme, began in 1978 and continued into the early 1980s, encouraged farmers to rapidly improve reverted or undeveloped farmland, including previously untopdressed pasture. Known

as the Land Development Encouragement Loan, this scheme provided a grant of \$250 per hectare to develop the farmland for a term of 15 years at concessional interest rates. Provided the development was permanent, the interest was deferred and written off at five-yearly intervals and one half of the sum advanced was to be written off at the end of the tenth year of the loan. Loan repayments did not have to begin until five years after the sum was advanced.

Both these schemes were well accepted by farmers, with 13,800 authorisations of \$128 million for the loan option of the LIS between 1976/77 and 1982/83 and 7,500 authorisations of \$151 million for the LDEL between 1978/79 and 1982/83.

The Government had also over the period of study directed expenditure on certain capital inputs through the use of input subsidies and taxation and investment allowances. Fertiliser subsidies were in operation throughout the data period. These mainly existed to encourage such expenditure when farm incomes were low. Prior to 1973/74 price subsidies existed on fertiliser, its cartage and application, on pesticides, weedicides and animal drenches. The buoyant conditions of 1972/73 led the Government in 1973 to lower the subsidy on fertiliser and its cartage and to remove the subsidies on the other inputs. The downturn in product prices and incomes in 1974/75 resulted in the fertiliser price being held at the 1974 price level and the reintroduction of spreading bounties and subsidies on pesticides and weedicides. The higher income years of 1975/76 and 1976/77 resulted in the fertiliser price subsidy being reduced in both years. The climatic vagaries affecting farm incomes nationally in 1977/78 led to a substantial increase in fertiliser subsidies in that year, although the spreading bounty was abolished. In 1979 Government philosophy changed against fertiliser price subsidies which were reduced substantially, remaining so into the early 1980s.



The Government actively promoted general investment expenditure and expenditure on specific capital inputs through taxation and investment allowances throughout the data period. All development expenditure could be claimed as current operating costs, either in the year of expenditure if the amount spent was small, or spread over nine years (three in the case of fertiliser) if the amount spent was large. Farmers had the opportunity to fix the values of their livestock. New entrants or those increasing livestock numbers could benefit from the Nil Livestock Values Scheme. Expenditure on fixed assets was encouraged by the Government through generous depreciation and investment allowance. Ordinary depreciation allowances on buildings and plant and machinery were constant over the data period. The most common depreciation allowances included 2½% C.P. on wooden buildings, 10% C.P. on covered yards, 10% D.V. on most items of plant and machinery and 20% D.V. on vehicles. Other allowances made such expenditure more attractive in reducing assessable income.

From 1973/74 to 1975/76 a special depreciation allowance up to 20% was allowable on the cost price of plant and machinery and new buildings and extensions other than residences. In these years an investment allowance of 20% was allowable on the purchase of new plant and machinery. This system was replaced in 1975/76 with first year depreciation allowances of 60% on new plant and machinery, 50% on second-hand plant and machinery and 40% on buildings. In 1976/77 the first year depreciation allowance on all plant and machinery was reduced to 25% but an investment allowance of 40% was made available. In 1979/80 the first year depreciation allowance on buildings was reduced to 20% and the investment allowance on plant and machinery was reduced to 20%.

Any of these market and institutional changes that occurred over the data period could have led to changes in the farmers' perception of future profitability of

investment projects. The pattern of real gross investment on New Zealand farms over the 1970s reflected the market and institutional influence faced by the agriculture sector over the period. Table 1.2 shows real gross capital expenditure in various capital aggregates over the 1970s. Those years in which the terms of trade were more favourable (1971/72, 1972/73, 1975/76, 1976/77) were years where increases in gross capital expenditure occurred. In particular, the two years when the terms of trade were most favourable, 1971/72 to 1972/73, were years when annual gross capital expenditures were the largest, not being exceeded for the remainder of the period.

Of the various capital aggregates, only buildings did not show a large decrease in expenditure when the terms of trade fell in 1974/75. The various capital aggregates show similar patterns of expenditure. Expenditure increased in 1971/72 and 1972/73, spectacularly in the case of transport vehicles, to fall in 1974/75. Gross capital expenditure on all capital aggregates tended to be static over the middle 1970s, although at higher levels to that experienced before 1970/71. From 1977/78 to the end of that period gross capital expenditure in each capital aggregate showed a steady annual increase. The pattern of sustained, then increased, gross capital expenditure from the mid-1970s on occurred in an environment of declining terms of trade. It is clear some events were occurring to modify farmers' expectations as to the profitability of gross investment in this period of low terms of trade. The various policy measures mentioned in section 1.1 could have been an ingredient in this process.

## 1.2 Objective of the Study

The primary objective of this study is to determine the factors that influenced farmers' decision-making with respect to capital investment over the 1970s. Reference has already been made to market and institutional factors which may have influenced such decision-making.

Table 1.2: Real Capital Expenditure on Farms \$(000)  
(Base year 1970/71)

Year <sup>1</sup>	Buildings <sup>2</sup>	Construction <sup>3</sup>	Transport Vehicles	Tractors and Farm Machinery	Other Improvements and Development <sup>4</sup>	All Groups
1970/71	34,080		25,503	28,180	38,827	127,590
1971/72	29,629	7,144	37,094	34,352	26,630	134,849
1972/73	35,268	9,627	55,850	39,947	36,198	176,890
1973/74	44,003	9,032	48,046	39,733	40,921	181,735
1974/75	46,757	7,534	29,739	31,975	29,011	145,016
1975/76	42,964	8,333	33,275	35,069	29,944	149,585
1976/77	45,121	8,063	33,001	37,868	29,556	153,609
1977/78	41,161	8,088	26,627	27,869	28,330	132,075
1978/79	38,382	8,536	34,854	36,241	35,573	153,586
1979/80	45,059	9,199	38,934	34,348	37,878	165,418
1980/81	50,437	9,043	40,212	33,796	40,653	174,141

1 Prior to 1973/74 year ended 31 March, from 1973/74 year ended 30 June

2 Prior to 1973/74 buildings also included construction

3 Includes permanent yards, roading, bridges, airstrips, water supply systems, dips and sprays

4 Includes working animals.

Source - Department of Statistics Agriculture Statistics 1981/82 deflated by Farm Capital Expenditure Price Index

Johnson (1971), in one of the few studies of investment on New Zealand farms, pointed out that net investment was the important policy aggregate as it was additions to the capital stock that provided for growth. The official statistics on capital expenditure referred to in section 1.2 related to gross investment. Johnson pointed out that gross investment levels were an inadequate guide to current net investment in the agricultural industry, and could lead to policies that would jeopardise the expansion of the industry. Because net investment is the important policy variable, this study will consider only the net investment component of capital investment.

The major recent studies on New Zealand farm investment behaviour have been at the national level. A study at the individual farmer level, by removing the problems of aggregation across farmers would compliment previous work. The focus of this study will therefore be at the individual farmer level.

### 1.1 Outline of the Study

Chapters Two and Three review the literature on investment decision-making in order to draw upon the experience of other researchers. A testable hypothesis supposes investment to be the simultaneous solution of two processes. The first process is the identification of a gap between the current level of capital stock and a desired level of capital stock. The second process concerns itself with how quickly this capital gap is removed.

This study derives an investment model for net farm investment. Thus it was necessary to construct a data base from which this variable could be estimated. The process of data collection is presented in Chapter Four.

A brief description of the farms in the study is presented in Chapter Five. This description highlights the different levels of capital development of the farms in the study.

An investment model is introduced and tested empirically in Chapter Six. The investment model is estimated from combined time-series and cross-section data of the farms surveyed.

The study concludes in Chapter Seven with a discussion of the implications that were implied by the results of the empirical analyses. The model was also re-examined in terms of its shortcomings in predicting investment behaviour.

Finally, in the light of the shortcomings of the model, improvements to the model as subjects for further research are suggested.