NEW ZEALAND AGRICULTURAL POLICY REFORM AND IMPACTS ON THE FARM SECTOR:

Detailed Historical Analysis Addressing the Issue of the Specificity of the Farm Sector

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PREFACE

It is now a decade since the reforms to New Zealand agricultural policy were initiated in 1984. Since that time there have been a number of reports and publications documenting the changes that resulted from the new policies. In this report Dr. Gouin, from Québec, and his co-authors provide data from a wide range of sources and for a long time period so that the post-1984 events can be seen within the context of the general evolution of New Zealand agriculture. The report presents the view of an interested overseas observer and will be of value to those in New Zealand and overseas keen to learn about the impacts of agricultural policy reform on the farm sector.

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Tony Zwart
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SUMMARY

This research analyses the effects on the farm sector of the reform of New Zealand agricultural policy undertaken in 1985. This analysis is placed within a discussion of the larger issue of the specificity of the farm sector and whether this specificity requires special support from the state in most of the developed countries. This study describes the crisis of the New Zealand economy at the beginning of the deregulation process and explains why the farm sector was at the centre of the reform. The removal of state support to agriculture and the transition measures set in place are documented. The research also analyses the effects of the reform on farms both at the structural level and in terms of farm incomes. The sheep and the dairy sectors are analysed in detail. The analysis concludes that the farm sector has maintained its level of economic activity despite important reductions in state support. Finally, this study discusses some lessons that can be obtained from the New Zealand experience, notably in relation with the specificity of the farm sector.

CHAPTER 1

INTRODUCTION

In many developed countries, the intervention of the state in the farm sector is at present being questioned. The problems associated with balancing the public budget and the persistent crisis of low price of commodity products on the international markets has led to questions about the wisdom of subsidising the farm sector. But, until today, the traditional teaching as regards agricultural policies has justified the intervention of the state by emphasising the specificity, or distinctiveness, of the farm sector in comparison to the other economic sectors[1].

The farm sector is unique in the sense that it has some characteristics which lead to chronically low returns to the resources invested. It is generally admitted that the demand for most agricultural products is price inelastic in developed countries. This means that an increase in the level of production results in a decrease in gross income. Also, the income elasticity of demand is low for agricultural products.

The supply of agricultural products fluctuates in the short term but is generally maintained in the long term. In the short term, the supply is often cyclic and this can be explained by the "cobweb theorem". This theorem is based on three conditions: "that price in the market be determined by the supply available; that producers' output in the next production period be solely determined by price in the current period; and that production conditions are such that there is a time period between current prices and output response" (Hathaway 1963, p.147). These three conditions explain the continual fluctuations in agricultural product prices that affect the returns. Also in the short term, production variations caused by climatic events adds to the sector's instability.

In contrast, in the long term, supply is generally maintained. Technological progress facilitates reduced cost and increases supply at the individual level. As technological progress spreads, prices will decrease with the increase in supply, and the returns will go back at their initial level. This is the model of the Agricultural Treadmill elaborated by Cochrane (1958, pp.85-107). Technological progress is a continuous process, so a temporary disequilibrium caused by technological progress in the farm sector can become a permanent state. This situation is accentuated by the fact that in the farm sector there is often lack of asset mobility, and change

[1] There has been considerable development of this literature in recent years, and it includes rent-seeking, theory of regulation and government failure, for example. However, for the purposes of this report we note only the classic origins of this literature.

of production is costly and takes a long time. In considering leaving farming, the rural unemployment rate, the qualifications of labour and the attachment to the profession reduce mobility. In consequence, even if the economic terms deteriorate, farmers would accept a drop in their standard of living in order to stay in farming. Their own assets, capital and labour, do not need to be remunerated at the market rate. Thus, farmers have some capacity to resist lower levels of price and returns.

Finally, in addition to these economic explanations, the traditional intervention of the state in the farm sector arises from historical conditions. The importance of farming for employment, for territorial occupation and for food security, are elements that have justified the elaboration of agricultural policy in many developed countries. Thus, there is in most developed countries a set of policies with the objective of stabilising and supporting prices and incomes in the farm sector.

But this view of the specificity of the farm sector, justifying special intervention by the state, is questioned increasingly. The inclusion of the farm sector in the last GATT negotiation, the Uruguay Round, shows already a certain will from member countries to reduce support to the farm sector and to expose it more to market forces. The results of this round of negotiation do not mean a dismantling either of agricultural policies and programs or of all trade barriers, but it is a first step in this direction. Nevertheless, the principle that the farm sector could be treated like other commodities or industrial goods sectors in the multilateral negotiations is now accepted. There is no doubt that the next round of GATT negotiations will include a reduction in state intervention in this sector.

The specificity of farm sector is also questioned by the New Zealand case[1] with its important reduction of state support to the farm sector. Prior to the conclusion of the Uruguay Round this country had undertaken and nearly completed the reform of its agricultural programs and policies. From a level of public expenses of more than $NZ one billion in 1984/85, the amount of the New Zealand budget assigned to the agricultural sector dropped to less then $NZ 200 million in 1992/93 (see annex 3.2). The New Zealand case is the "model" that could prove that the farm sector is not perhaps so specific or, at the very least, that its specificity does not justify a special intervention from state.

But what about the exact outcome of this reform of agricultural policy in New Zealand ? The main objective of the present research is to examine the effects of the abolition of agricultural subsidies to the New Zealand farm sector.

[1] We acknowledge that specificity is also questionned by some cases in the Cairns' Group of countries.

First, Chapter 2 presents macro-economic data on the New Zealand economy in order to show the crisis of this economy at the beginning of the deregulation process. It is relevant to place the reform of agricultural policy in perspective by explaining the global economic context in which it took place.

Chapter 3 concerns the removal of the agricultural policy. Key questions are: which programs have been removed and at what rate, and what types of production have been affected ? It is also necessary to document the transition measures that were used to allow the farm sector to adapt to the new economic environment.

The results of this reform of agricultural policy are analysed in Chapters 4 and 5. It is relevant to investigate first at an aggregate level how the production sector was affected. Three major elements are involved: the level of production, the level of exports (essential to the New Zealand economy as we will see), and the structural changes to the farm sector. Finally in Chapter 5, at a more micro-economic level, the evolution of farm incomes following the abolition of subsidies is analysed. This analysis must consider the relative effects of the abolition of support on farm incomes and other variables such as export prices, exchange rate and production costs.

Finally, in Chapter 6, the conclusion takes up the issue of what can be learnt about the agricultural policy reform in New Zealand. In particular, the question of the specificity of the farm sector and the necessity of special intervention by the state in this sector is again discussed in the light of the results from the analysis in the preceding chapters.

CHAPTER 2

THE CRISIS OF REGULATION IN THE NEW ZEALAND ECONOMY

2.1 Introduction

It is thought that the agricultural reforms in New Zealand did not result from a singularly dogmatic stand on the non-specificity of the farm sector. Although the reforms question this specificity, it was mainly for other reasons that they were undertaken. In fact, it was more from a crisis of regulation in the New Zealand economy as a whole that led to the removal of most of the subsidies to the farm sector. It was by necessity, if we can say that, that the agricultural sector was so severely affected by the New Zealand economic reforms. Obviously, we could question the necessity of applying such drastic cuts to agricultural subsidies, or the degree of state intervention which was or could be maintained, but this is not our main objective. The present chapter is more interested in documenting the crisis situation regarding regulation in the New Zealand economy and in explaining why the farm sector was at the front line of the decrease in public expenditure.

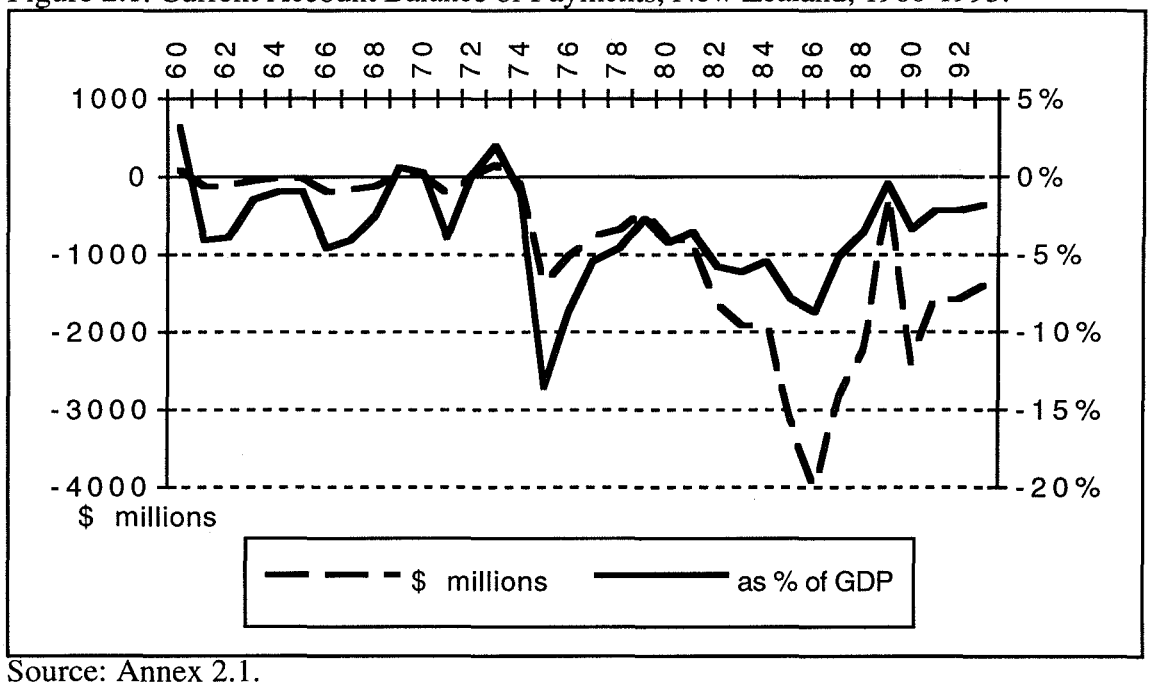
2.2 The Origin of the Crisis

The balance of payments represents a primary indicator of the health of the New Zealand economy. New Zealand does not have a large population, at about 3.5 million people, and has at all times based its economic development on exports to other countries. At the same time, a population relatively low in numbers, does not provide a domestic consumption basis on which national industry can sustain development. All the same, an equilibrium was maintained between the value of exports and imports during the 1960s and the beginning of the 1970s. Thus, from 1960 to 1974, the balance of payments was relatively stable, in absolute value as well as in percentage of gross domestic product (see Figure 2.1).

The 1970s were characterised by three major shocks from international markets. In the first case, the entry of the United Kingdom into the EEC in 1973 partially closed access to traditional markets for New Zealand agricultural products. Indeed the exports to the United Kingdom were 31% of total New Zealand exports in 1972 and five years later they were 20%

of the total[1]. Secondly, there were relative shortages on the international cereal markets which carried temporarily the prices of agricultural products to historic highs. This provided New Zealand with a positive balance of payments from 1972 to 1974. Third, the petrol shocks had important repercussions on the New Zealand economy, entirely dependent on importation of fuel. With the fall in farm prices and the increase in the cost of petrol imports, the balance of payments deteriorated seriously. From a historic low of 13.5% of GDP in 1975, it gradually recovered by 1979. But the second petrol shock, followed by the economic recession at the beginning of the 1980s, provoked a new drop in the balance of payments as a percentage of GDP.

Figure 2.1. Current Account Balance of Payments, New Zealand, 1960-1993.



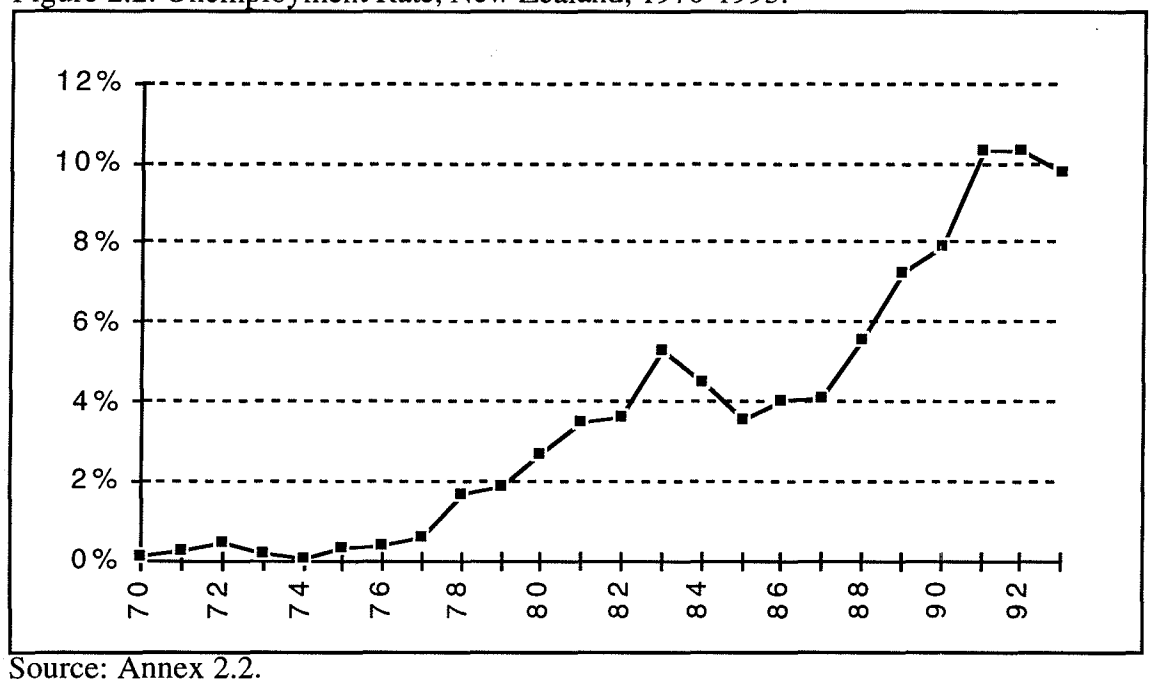
Source: Annex 2.1.

In current dollars, the balance of payments has had an average deficit in the order of $800 million in 1980 and 1981, and of two billions each year in 1983 and 1984, the year in which economic reforms began.

Parallel to the deterioration in the balance of payments, the unemployment rate began to increase (see Figure 2.2). It stayed at under one per cent until the end of the 1970s and it was only after 1974 that it began to increase to exceed two per cent in 1980. Although relatively weak, a two per cent unemployment rate was considered abnormal in a country used to full employment.

[1] New Zealand has had no other choice than to continue to diversify its export destinations. As of 1991, United Kingdom markets took no more than 6.5% of New Zealand exports (taken from the Department of Statistics, Overseas Trade).

Figure 2.2. Unemployment Rate, New Zealand, 1970-1993.



Source: Annex 2.2.

2.3 A Keynesian Reaction to the Economic Crisis

To counteract the deficit in external trade and to try to maintain a level of full employment, the government chose to end the 1970s, in the Keynesian tradition, with a marked expansion of public investment in large-scale industrial projects (the 'Think Big' projects). These projects included among others "the electrification of the North Island railway line, the establishment of a synthetic fuel plant, construction of a nitrogen fertiliser plant, expansion of the oil refinery, etc." (Sheppard and Lattimore 1993, p.16). These were seen as " being 'too large' for conventional private investment and this was therefore replaced by direct government investment" (Sheppard and Lattimore 1993, p.16).

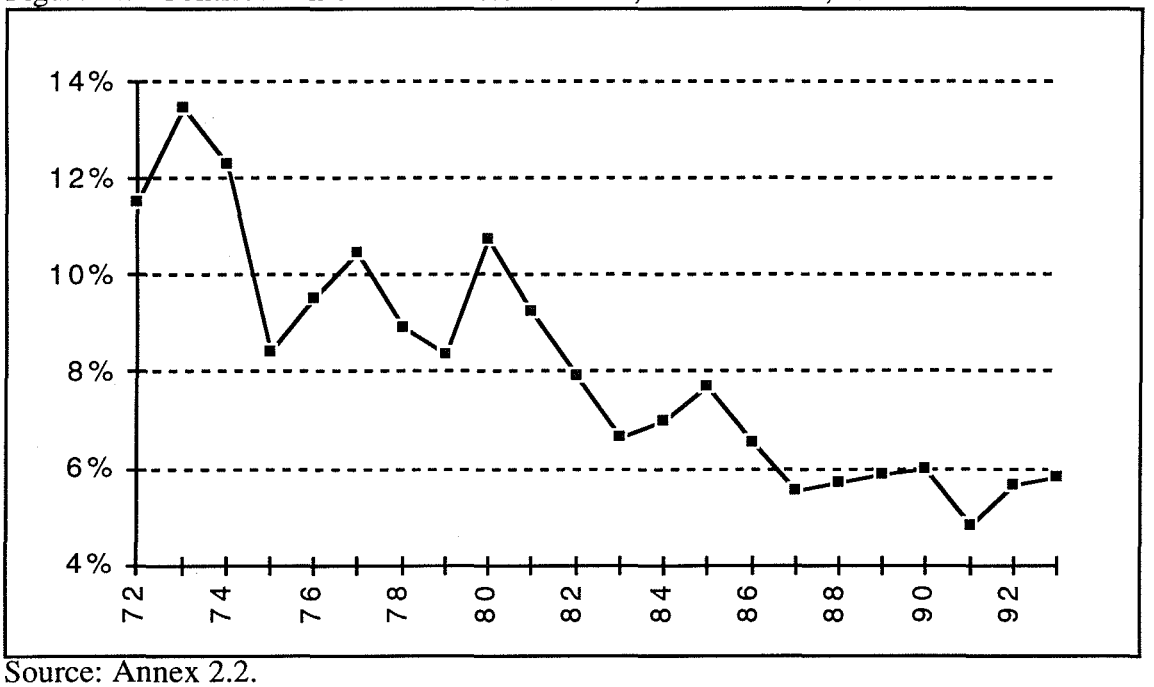
Simultaneously, the government took the decision to encourage, with specific programmes, the development of agricultural production in order to increase the level of agricultural exports and improving the balance of payments (Griffith and Martin 1988, p.1). The first part of these government programmes consisted of direct contribution of public funds to stimulate productive investment in the farm sector. The second part of the programmes complemented the first and provided stabilisation of farm incomes in order to secure farmers regarding their expectations regarding their investment in the sector [1]. And accordingly for all this period "the

[1] These programmes are explained in detail in Chapter 3.

overriding concern of New Zealand policy has been to increase production so as to provide a bigger exportable surplus" (Ross and Sheppard 1990, p.300).

For the New Zealand government, the improvement of the balance of payments was to derive from the agricultural sector. This is explained by the historical importance of the agricultural sector in the New Zealand economy. On average, during the 1970s, the agricultural sector counted for more than 10 per cent of the gross domestic product (GDP) of the country [1]. Although decreasing over the years (see Figure 2.3), the contribution to GDP from agriculture stays at a generally higher level than that in other developed countries[2].

Figure 2.3. Contribution of Farm Sector to GDP, New Zealand, 1972-1993.



Source: Annex 2.2.

The importance of the agrifood[3] sector to total exports explains well the emphasis put on the development of agricultural production to improve the country's balance of payments. Exports from the agrifood sector counted, from the beginning of the 1970s, for more than 90 per cent of the total value of the country's exports (see Figure 2.4). From the time of starting the agricultural development programmes to the end of the 1970s, three quarters of total exports

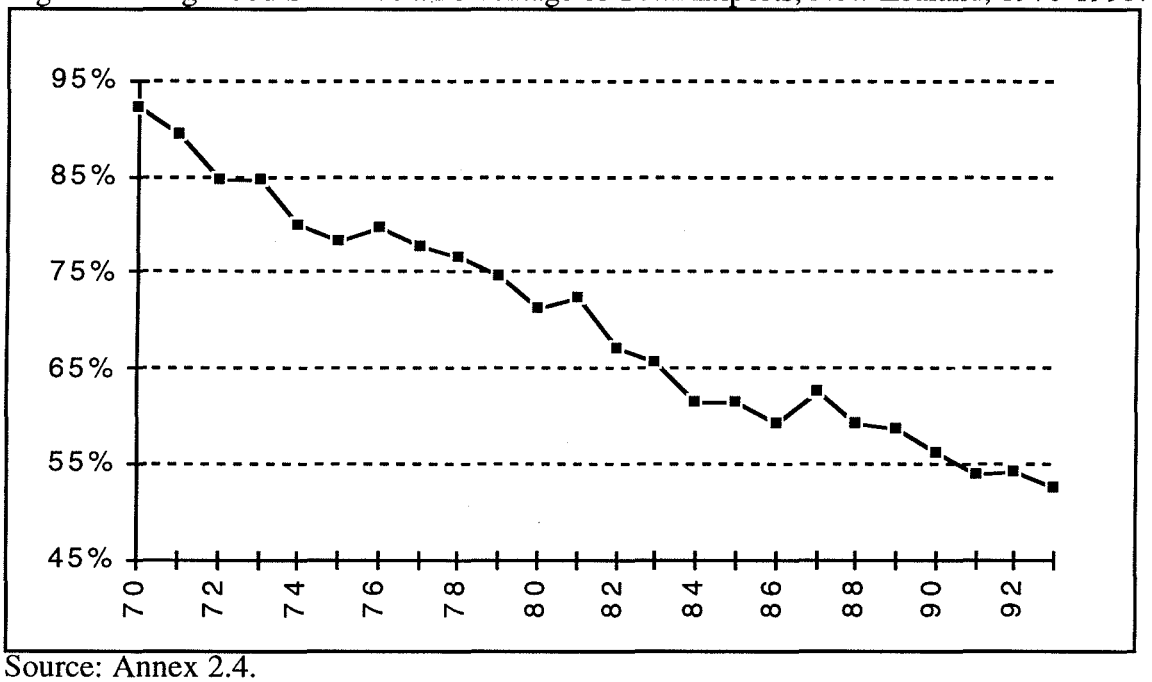
[1] If the total farm produce sector is taken and not only the agricultural sector, the contribution to GDP was 16.9% in 1982 and 12.2% in 1991 (MAF 1992, p.93).

[2] In OECD countries, the contribution of agriculture to GDP is generally less than four per cent (taken from OECD, Economic Surveys, diverse countries and years).

[3] We define the agrifood sector to include farming and all the farm product processing sectors.

were from the agrifood sector. Today, despite a continuing decline in the agrifood share of sector exports, these represent more than 50 per cent of total exports[1].

Figure 2.4. Agrifood Sector as a Percentage of Total Exports, New Zealand, 1970-1993.



Source: Annex 2.4.

In fact, historically, the economic development of New Zealand has above all been based on agricultural revenues and exports, as explained by Ross and Sheppard (1990, pp.272-273):

> Since the early 1870s, as gold production declined, the agricultural sector has been the main contributor to the country's export income... The external account has always played a dominant role in the New Zealand economy, with strong growth and high levels of activity being experienced during periods when receipts were high, and recession or stagnation resulting from low receipts ... Sustainable receipts are based on exports, and since the 1870s these have been dominated by payments for agricultural commodities. The agricultural industry has therefore played a key role in the development of the New Zealand economy.

Until recently, the industrial sector has above all been oriented to providing internal markets and was protected by import controls. This protection policy was put in place in the 1930s and was based on the "infant industry" argument that had been in vogue for 50 years until the 1980s (Lattimore 1985, p.4). Lattimore explains this argument:

> This school of thought argued, and still argues, that balanced economic development requires initial import protection. In New Zealand's case,

[1] This relative decline of agrifood exports, even if they have increased by 170 per cent from 1980 to 1993, is explained by a bigger growth of total exports, at around 250 per cent for the same period, all in current dollars (see Annex 2.4).

> balanced development was taken to mean expanding the manufacturing sector principally by drawing capital and labour resources out of agriculture. Tariffs and other import restrictions achieved this by providing a subsidy to the import substitute segment of manufacturing and other sectors (in the form of the tariff) and an implicit tax on the whole export sector in the form of higher cost inputs purchased from the rest of the economy" (Lattimore 1985, p.4)

But for Lattimore and many other analysts, this argument does not hold and the objective of allowing the development of a national industrial capacity has not been attained in New Zealand. In this way, Lattimore continues:

> While it has yet to be proven, there is growing evidence in New Zealand that the import substitution bias which has existed since the 1930s has hindered industrial development, stimulated foreign ownership, reduced employment growth and reduced real income. These results would be expected if New Zealand's trading environment were that of a small country and the domestic market alone offers few (if any) opportunities to exploit economies of size... It appears as if the manufacturing sector completely missed the opportunity to participate in the world trade growth in manufactures of the 1950s and 1960s, in part because of the high disincentive to produce for export" (Lattimore 1987, pp.21-22).

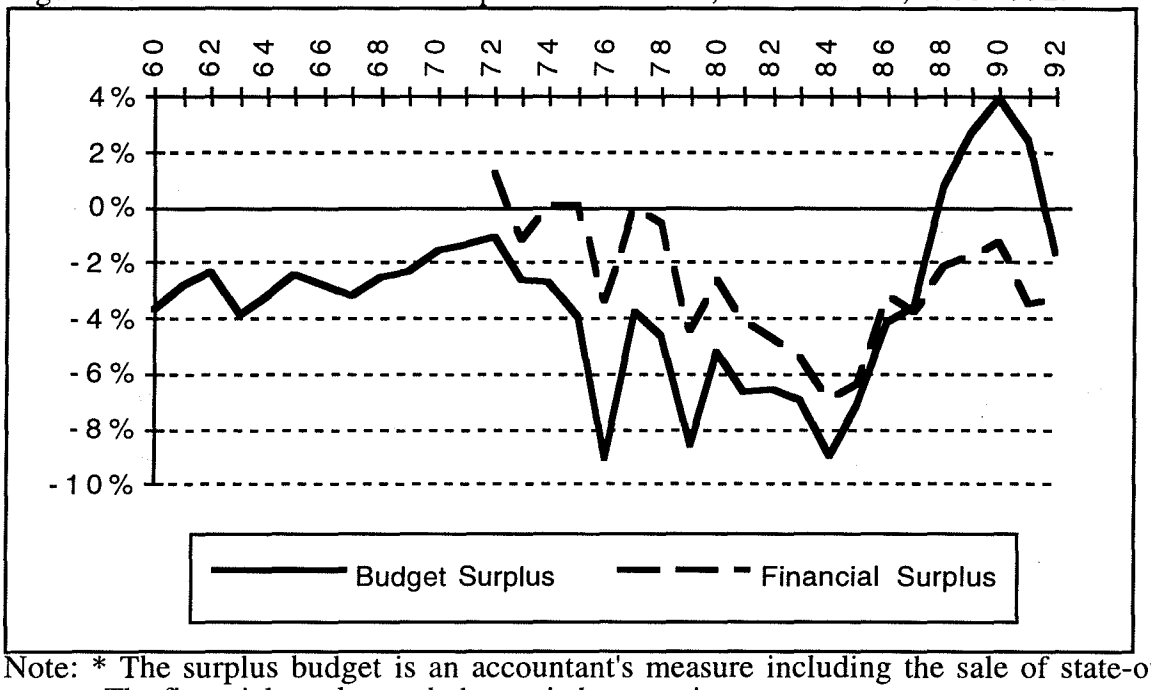
In any case, the presence of such political control of imports, whether adequate or not, represented a supplementary justification to the implementation of specific programmes to subsidise the agricultural sector. The agricultural sector then faced increased costs from the input industries and the different programmes of support compensated this rise in production costs (Rayner 1980, p.17).

The New Zealand government then engaged in large-scale measures to resolve the deficit of the balance of payment and to try to maintain full employment with large-scale industrial projects and the development programmes for agriculture. The results for the overall economic situation were not what was expected: "the outcome included a major growth in overseas debt as the government sought to finance the 'Think Big' projects and it included a continuing deficit in the balance of payments as demand for raw materials imports coupled with continued consumer demand for imported finished goods ... was not matched by increased demand and return for export products" (Sheppard and Lattimore 1993, p.16). From 1978 to 1984, the balance of payments continued to decline, as is shown in Figure 2.1. At the same time the unemployment rate, which did not reach two per cent in 1978, progressively increased to exceed five per cent in 1983, as shown in Figure 2.2.

2.4 Public Debt Out of Control

An unfavourable current account balance and an increase in public debt, to finance, among others, the large investment projects, led to the government budgets in a permanent and increasing deficit situation (see Figure 2.5). As a percentage of GDP, the budget deficit had been maintained at a relatively stable level between two per cent and four per cent from 1960 to 1975. From 1976 the situation deteriorated; the deficit was very variable but overall gradually increased, at more than six per cent of GDP for 1982 and at nine per cent in 1984[1].

Figure 2.5. Annual Government Surplus as % of GDP, New Zealand, 1960-1992.



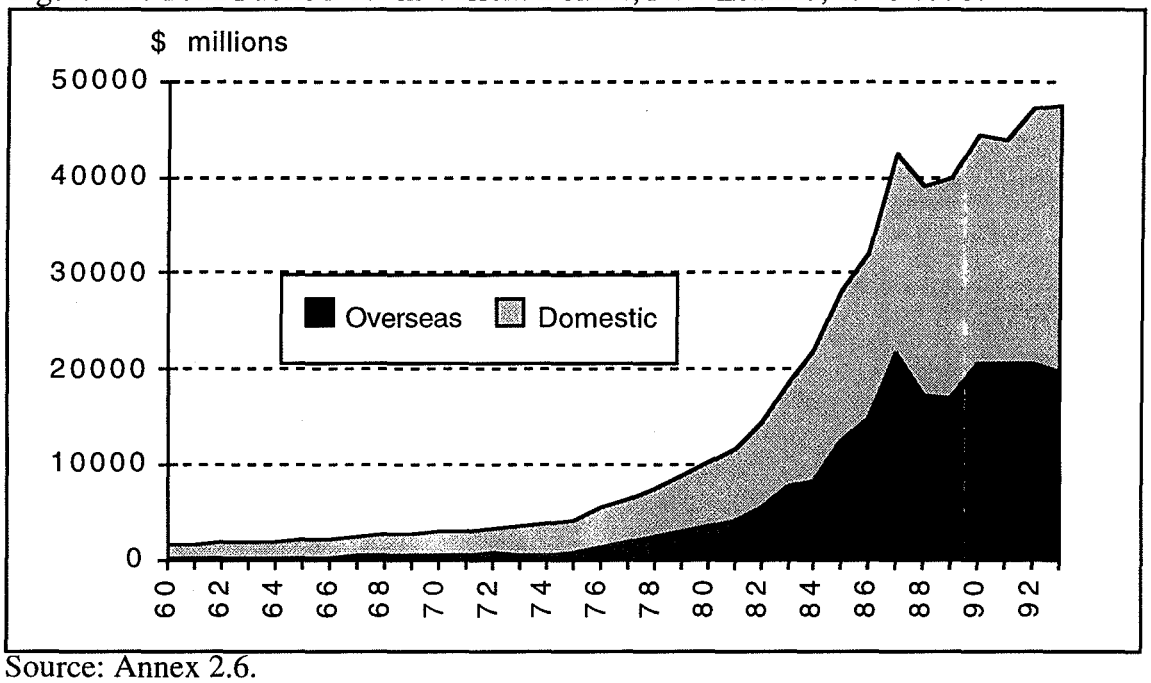
Note: * The surplus budget is an accountant's measure including the sale of state-owned assets. The financial surplus excludes capital transactions.
Source: Annex 2.5.

In these conditions, the total New Zealand debt could only grow in absolute value and as a percentage of GDP (see Figures 2.6 and 2.7). In the mid-1970s, at the time of the petroleum crisis, the New Zealand public debt was around 40% of GDP, well at its lowest level for the whole period under observation. Since that time, the level of public debt in current dollars increased rapidly and was multiplied by nearly six between 1974 and 1984. This increased indebtedness was more rapid than the overall growth in the economy, measured by GDP, which is shown by the public debt surpassing 60 per cent of GDP in 1984. This level is no higher than in the beginning of the 1960s but the structure of the New Zealand debt has

[1] It was after three years of reform that the budget deficit came below four per cent of GDP in 1987. After the sale of Air New Zealand, the Bank of New Zealand, and Telecom, among others, permitted a budget surplus. In contrast the national accounts always puts a financial deficit near to four per cent of GDP at the end of the period under study.

changed drastically. From 1960 to 1974, New Zealanders borrowed on the domestic market for more than 80% of their debt, but in 1984 around 40% of the debt was financed by international markets. Thus, at the beginning of reforms in 1984, the overseas public debt reached 24% of GDP[1], and promised to increase indefinitely.

Figure 2.6. Total Public Debt in Current Dollars, New Zealand, 1960-1993.



Source: Annex 2.6.

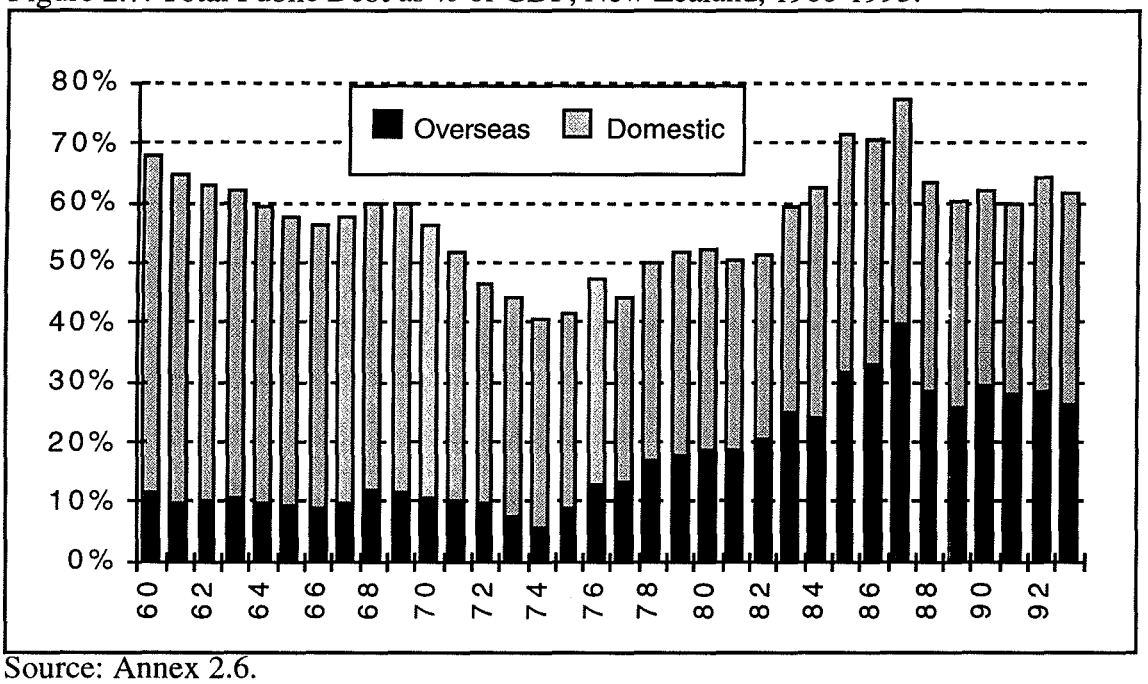
The New Zealand economic situation became unsustainable. Inflation was increasing rapidly (see Figure 2.8). From 1974 to 1984, the Consumers Price Index increased 250% with annual inflation in the order of 11% to 17%. It was only with a freeze on prices and wages that the inflation rate was maintained artificially at the level of 7.4% and 6.1% respectively for 1983 and 1984.

The New Zealand economy was performing poorly as is demonstrated in the change in GDP which showed only a very weak increase in real terms (see Figure 2.9). From 1975 to 1984, the GDP was almost stagnant with a slight increase of 8.5% for the whole period. In comparison to other industrialised countries, the economic performance of New Zealand at that time was lagging behind. Thus, for the 1975 to 1984 period, the average rate of annual increase of GDP in constant US dollars was only 0.6% in New Zealand compared to 2.0% in

[1] The total overseas debt, including the private sector, reached 48% of GDP in 1984 (Wallace 1990, p.47).

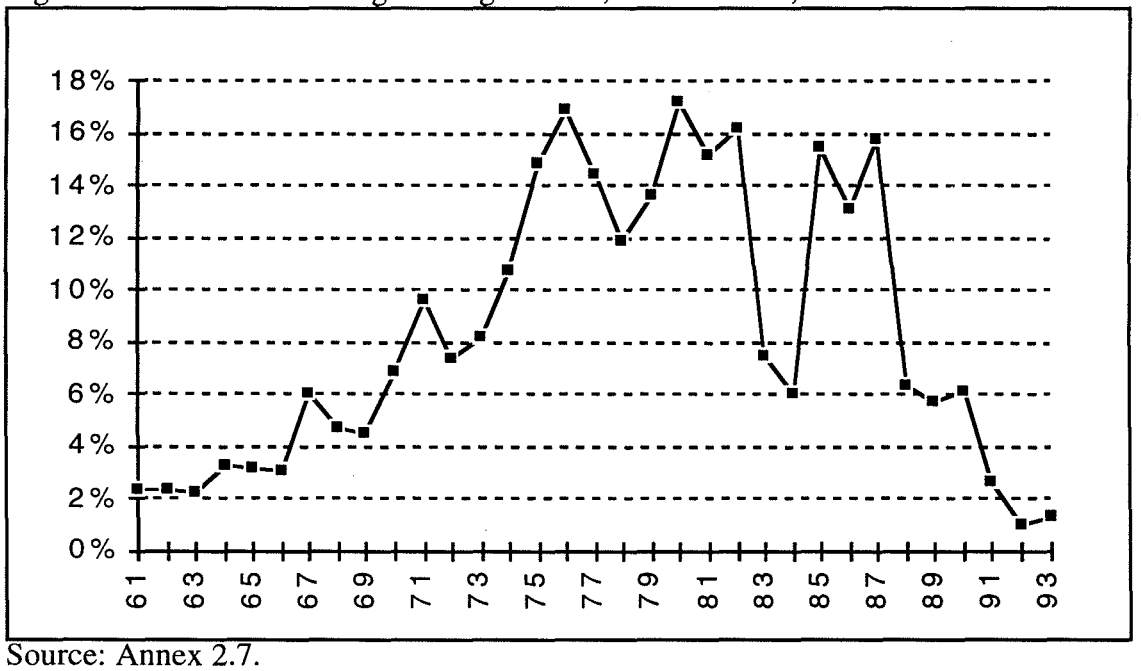
small OECD countries and 2.7% for all OECD countries (calculations taken from OECD 1990, p.181).

Figure 2.7. Total Public Debt as % of GDP, New Zealand, 1960-1993.



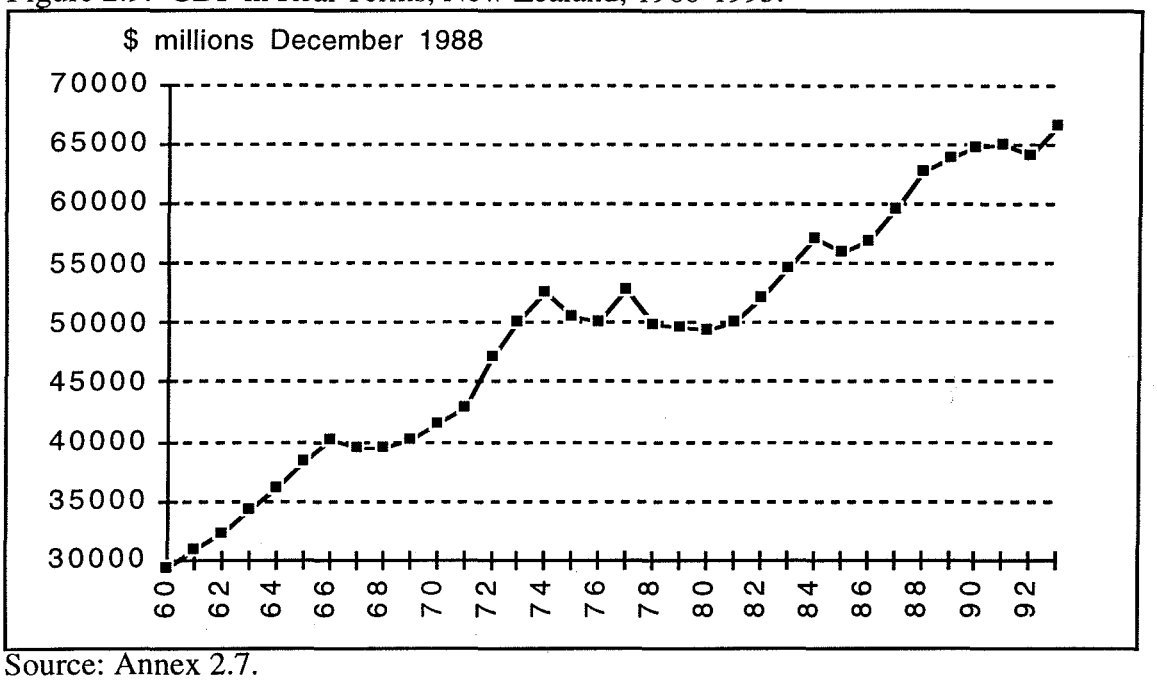
Source: Annex 2.6.

Figure 2.8. Annual Percentage Change in CPI, New Zealand, 1961-1993.



Source: Annex 2.7.

Figure 2.9. GDP in Real Terms, New Zealand, 1960-1993.



Source: Annex 2.7.

The economic indicators all converge to show the importance of the economic crisis which hit the New Zealand economy. Rayner reviewed the state of the economy in 1984:

> The state of the economy itself was such that action had to be taken. Ongoing inefficiencies were still largely present and, in addition, a number of acute problems had to be addressed. Overseas debt was extremely large, and the fiscal debt had reached proportions that were imposing ever large servicing burdens on taxpayers. Inflation was under control, but only through the expedient of a price freeze... Unemployment continued to grow and the economy to stagnate, apart from the temporary improvements to both resulting from massive expenditure on the "Think Big" projects (Rayner 1990, p.22).

For Rayner, this decline in the total economic situation required a major reform to government intervention in the economy, reform which has been an effective enterprise since 1984:

> It was apparent to many economists and voters alike that there would have to be a major policy change. The alternative of further interventions as a solution to the problems of the economy had been tried to an extreme and had demonstrably failed. The costs of these policies were becoming clear and there were few who could believe that the solution was simply more of the same (Rayner 990, p.22).

The analysis of Sheppard and Lattimore is no different to that of Rayner: "The government deficit rose steeply at this time to a peak of 9.1% of GDP in the 1983/84 year and it became obvious that fundamental changes were required in total government policy" (Sheppard and Lattimore 1993, p.4). The regulation of the New Zealand economy was in crisis.

2.5 The Farm Sector at the Front Line of Economic Reform

The important historical role of the farm sector in the economic development of New Zealand led the government to consider as a priority the revision of its intervention in that sector. If we add to this historic perspective the prevailing budgetary conditions, it is obvious that the farm sector could not have escaped economic reforms.

In fact, it is necessary to note that "in the early 1980s the fiscal costs of assistance to agriculture rose very sharply as a result of a widening gap between market prices for some agricultural commodities and the prices guaranteed by stabilisation programmes" (Sheppard and Lattimore 1993, p.4). This increase in subsidies to agriculture was so important that they reached close to 40% of the budget deficit in 1985.

Equally, the increase in subsidies to the farm sector made them vulnerable to retaliation measures from importing countries, a risk that could not be taken indefinitely by the New Zealand farm sector, so dependent on external markets to sell its production. Nothing indicated that the situation would improve and as a consequence, drastically reducing agricultural subsidies was a means to rapidly improve the overall budget balance.

In any case, did New Zealand have any other choices in the context of increasing costs of subsidies to the farm sector in all other industrialised countries? According to Gibson et al., it became obvious that the government could not compete with the American, European and Japanese treasuries: "Its treasury could not continue to cope in the mid-1980s" (Gibson et al. 1992, p.20). For these authors, despite the risks that this put on the long term competitiveness of the farm sector in international markets, there was no other choice than to submit the agrifood sector to the law of the market, even though these markets were distorted by agricultural subsidies in other countries. In this way they affirmed that "the meagre nature of a small country's treasury forced it to bite the bullet and liberalise, regardless of the actions of other countries" (Gibson et al. 1992, p.26).

Some political factors facilitated putting in place the reforms to the farm sector. The Labour Party, brought to power in 1984, did not depend on rural votes to gain its power: "The Labour Party, given its urban base of support both ideologically and pragmatically, was also less likely to be interested in farmer concerns" (Roche et al. 1992, p.176). Having said that, the farm sector reacted all the same to the implementation of the reforms. Walker and Bell emphasised that "farmers initially acted with disbelief. They could not believe that government would not support them as it had done in the past. Then they became very angry and, in 1986, nearly

one-third of the farming population (sic) marched in protest to Parliament" (Walker and Bell 1994, p. 30). The government did not shrink.

Cloke mentions that "the farming lobby in New Zealand was divided in its response to policy change... The farmers' interest group, Federated Farmers, was therefore subject to internal divisions over its response to policy change, and as a result its opposition was less effective than its previous history of influence and power might suggest" (Cloke 1989, p.40). Sheppard and Lattimore have a point of view somewhat different than that of Cloke, but they arrive nevertheless at a similar conclusion:

> The New Zealand farmers union (Federated Farmers) strongly supported the overall liberalisation programme (including that for agriculture) but not the particular sequence and timing of policies chosen. However, once the particular sequence was chosen by Government it developed a momentum of its own which gave farmers little influence over the detail of the policy programme (Sheppard and Lattimore 1993, p.21).

Finally, the traditionally powerful farmers' union was not really consulted or listened to at the time of the implementation of the economic reforms. It seemed evident that as well as the political conditions there were economic conditions which in favoured of a fundamental calling into question of governmental intervention in the New Zealand farm sector.

CHAPTER 3

THE DISMANTLING OF AGRICULTURAL POLICIES

3.1 Introduction

As we have come to see it, the economic and budgetary crises which hit New Zealand at the beginning of the 1980s led to a total reform in government intervention in all economic activities. But the farm sector was not affected by government political and economic reforms only for external reasons such as balance of payments, the budget deficit, etc. The calling into question of agricultural policies and programmes was also justified by considerations more strictly agricultural.

The level of subsidies was increasing, as we have already seen, but also certain production levels were increasing, notably for sheep, even as the markets deteriorated. Also, as was mentioned in 1986 in a ministerial declaration signed by both the Minister of Agriculture and the Minister of Finance of the New Zealand government, "the farm sector was encouraged to believe that increased production would result in increased returns, ignoring the fact that farm incomes", because of the level of government subsidies, "did not reflect overseas returns for farm products" (Moyle and Douglas 1985, p.4).

Thus, all the support measures to the sector, then in force, and the apparent absence of response to the negative signals from the market, led the minister to say that the farm sector had evolved in an:

> ...highly protected environment which insulated farmers from the changes taking place in the international markets. The government had effectively become the risk-taker in farming. That form of support meant there was less incentive to look for greater efficiency in the farming sector. This put off necessary change in such areas as the processing sector which is now costing the farmer dearly (Moyle and Douglas 1986, p.3)

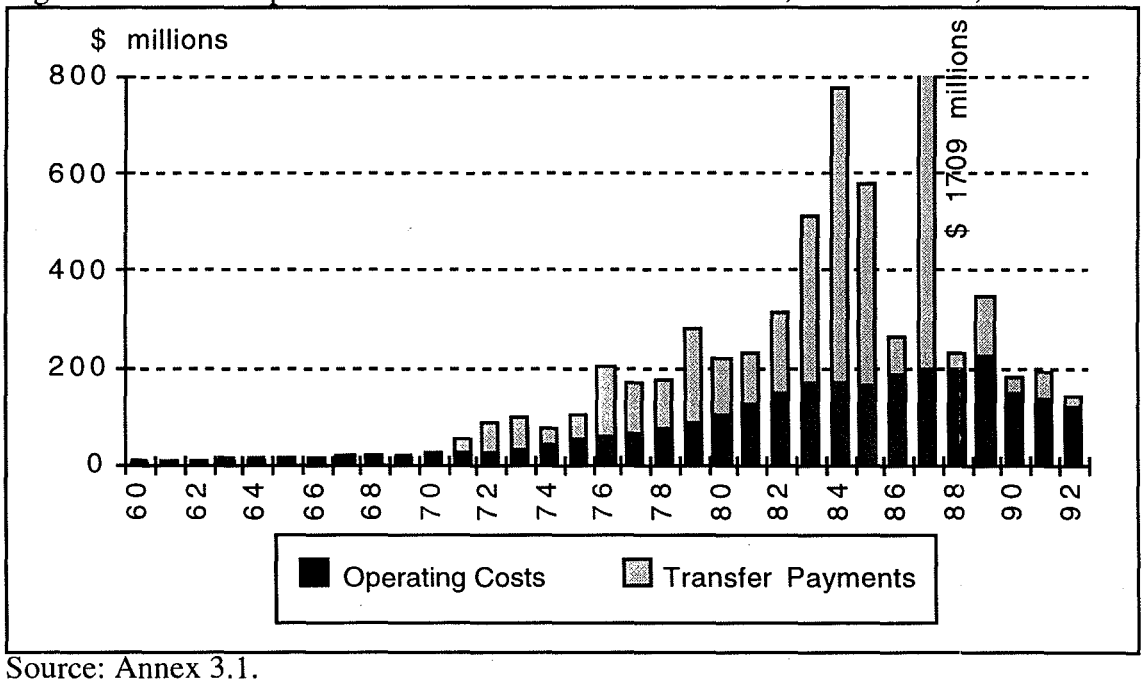
Faced with such arguments, put forward by ministers with joint responsibilities for the agricultural and finance portfolios, it is not surprising that support to the farm sector was completely questioned. In fact, the reforms of politics and of agricultural programmes were undertaken before this ministerial declaration. But what did this agricultural policy consist of whose effects were so seriously questioned by the ministers? This we will examine first. Afterwards, the transition programmes which were judged necessary to help the farm sector adapt to the new economic environment and become more oriented to the markets, are

explained. Finally, we analyse what remains of the agricultural programmes after ten years of economic reform.

3.2 The Cost of Agricultural Policy

As in most of the developed countries, the agricultural policy of New Zealand was a vast panoply of programmes. This panoply included input subsidies, some measures to support prices and incomes, technical support for the productive sector, programmes concerning the quality of agricultural products and some regulatory measures permitting the organisation of markets. From the public accounts, we have regrouped the expenditure engaged in the farm sector by the Ministry of Agriculture and Fisheries into different headings. Figure 3.1 shows the evolution of the total expenditure of MAF and its distribution between the transfer payments and the operating costs. Figure 3.2 shows the breakdown of MAF Expenditure into the following three headings: general administration, which includes stabilisation payments and income support; research and advisory services; and animal health and inspection.

Figure 3.1. MAF Expenditure in Millions of Current Dollars, New Zealand, 1960-1992.

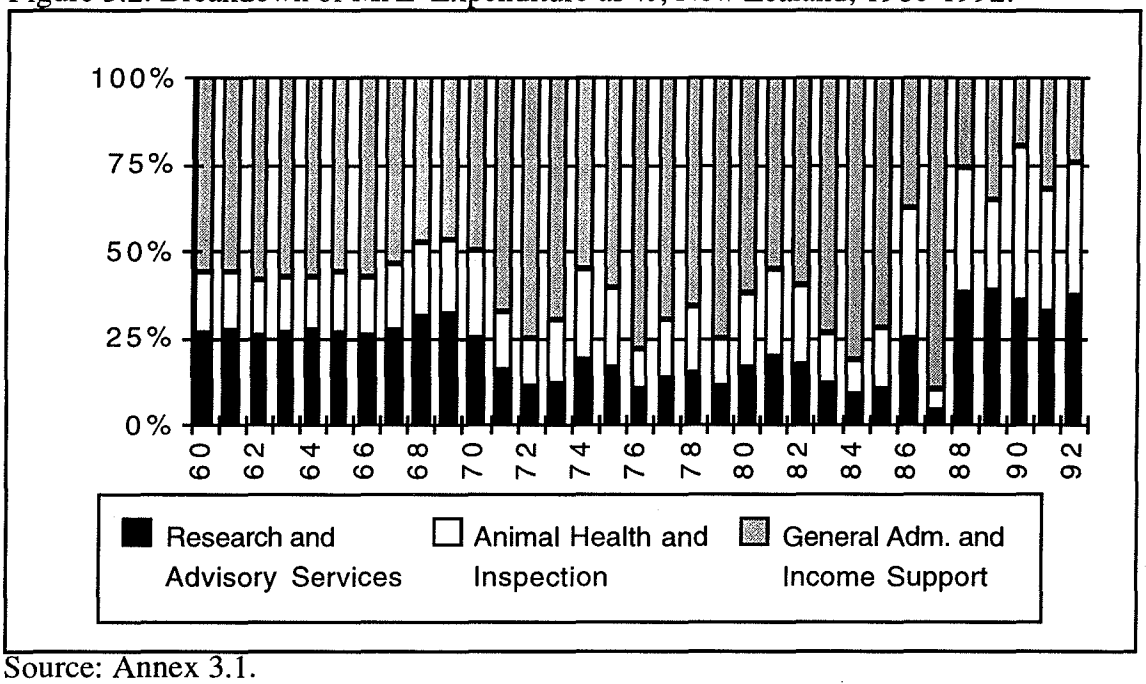


Source: Annex 3.1.

For all of the 1960s, MAF expenditure was less than $20 million. Research and advisory services and the animal health and inspection was, for the same period, at a relatively constant level of around 50 per cent of the total. In contrast, from the beginning of the 1970s, total expenditure increased rapidly to culminate in 1984 at close to $800 million and in 1987 at more than $1,700 million. This increase in expenditure has been wholly derived from an increase in

transfer payments which from 1971 to 1985 oscillated between 50% and 75% of total expenditure. In 1987, an exceptional year when the deficits accumulated by the Meat Industry Stabilisation Account and the Dairy Board working capital debt were written off by government, the transfer payments reached close to 90% of the total MAF expenditure.

Figure 3.2. Breakdown of MAF Expenditure as %, New Zealand, 1960-1992.



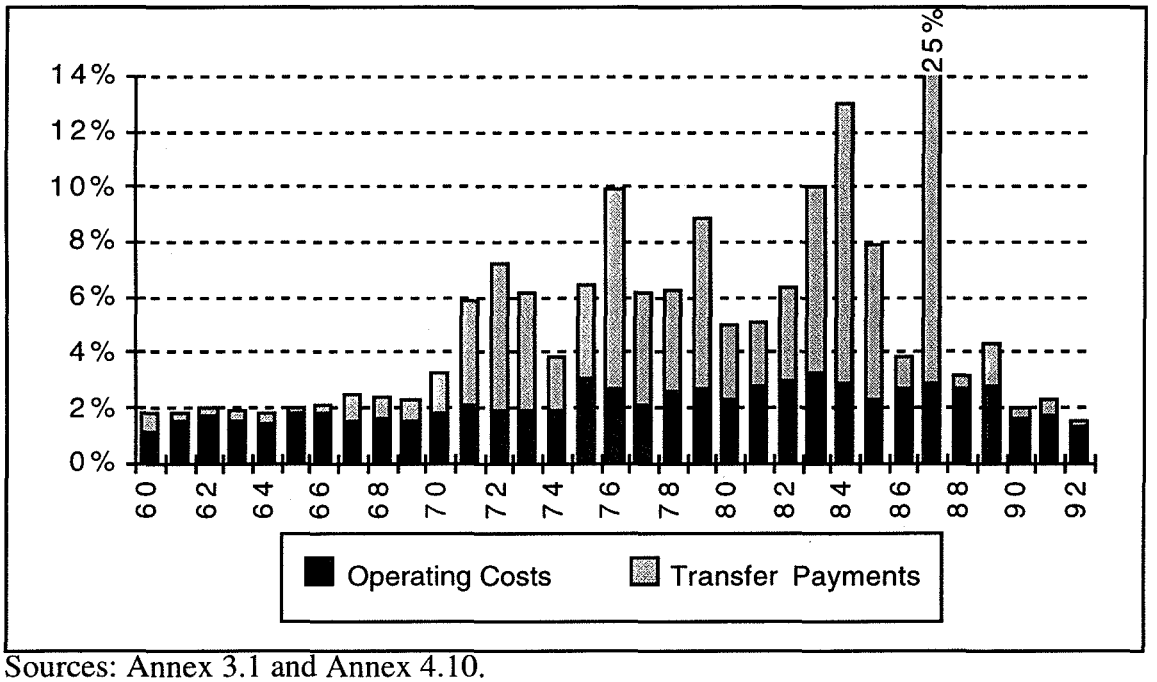
Source: Annex 3.1.

However, it is since 1985 that the political reforms of agriculture began to have an effect. MAF expenditure has decreased since that year, with the exception of 1987, and above all the transfer payments were drastically cut. They only represented around 25% of total expenditure since 1988. The activities of research and advisory services and of animal health and inspection then gained in their relative importance. Figure 3.2 shows that these expenditures were 25% in 1985 but have since risen to about 75% of total expenditure. Finally, since 1990 total MAF expenditure has been maintained at under $200 million per year, a level around four times less than in 1984, the year preceding the beginning of the reform of agricultural policy.

Another way of understanding the changes in the support to the agricultural sector are measures that relate to the value of production; and these are shown in Figure 3.3. This graph shows obviously the same patterns as the preceding analysis but it accentuates the effects of income support payments for the downturn years, which were 1976, 1979 and 1984. It should be noted in this graph that for all of the 1960s, MAF expenditure was maintained at around two per cent of the value of agricultural output and that the transfer payments were of relatively little importance. In the 1970s, MAF expenditure as a percentage of agricultural output was variable, at 6.4% on average for the decade. This increase in expenditure was caused mostly

by the increase in transfer payments. After a relative pause in 1980 and 1981, the increase in MAF expenditure is almost exponential until 1984, when it came to nearly 13% of gross agricultural output. Finally, after a few years of reform, the level of MAF agricultural expenditure in the 1990s returned to that of the beginning of the 1960s, at less than two per cent of value of agricultural output.

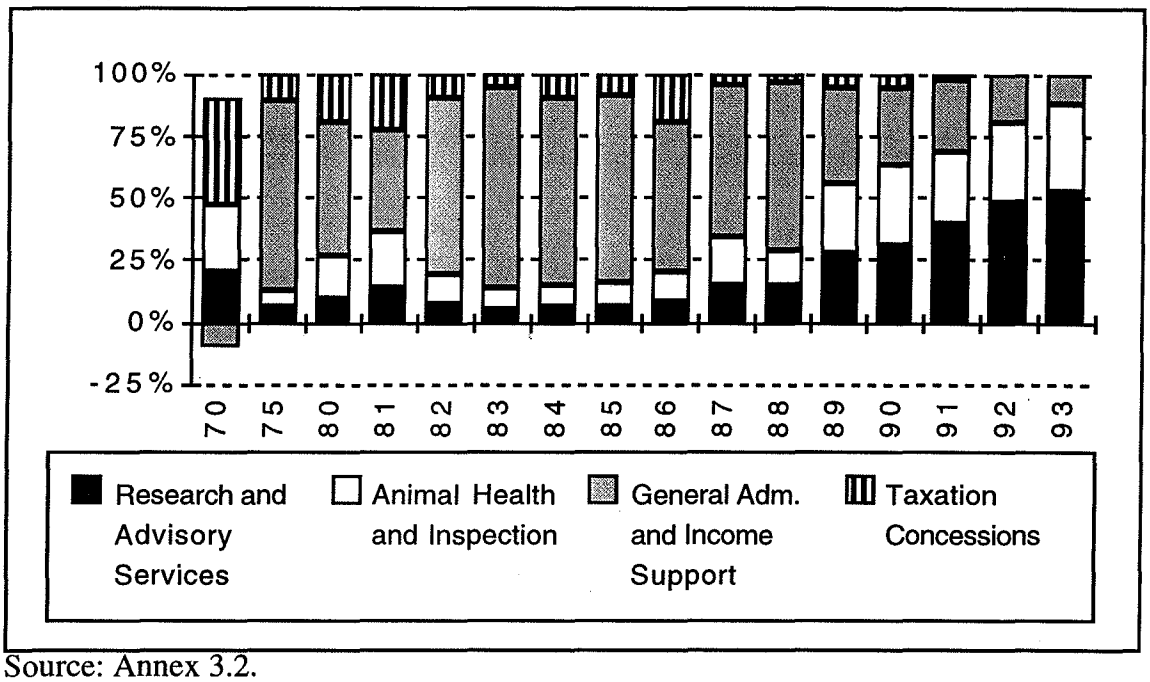
Figure 3.3. MAF Expenditure as a % of Farm Sector Value of Output, New Zealand, 1960-1992.



Sources: Annex 3.1 and Annex 4.10.

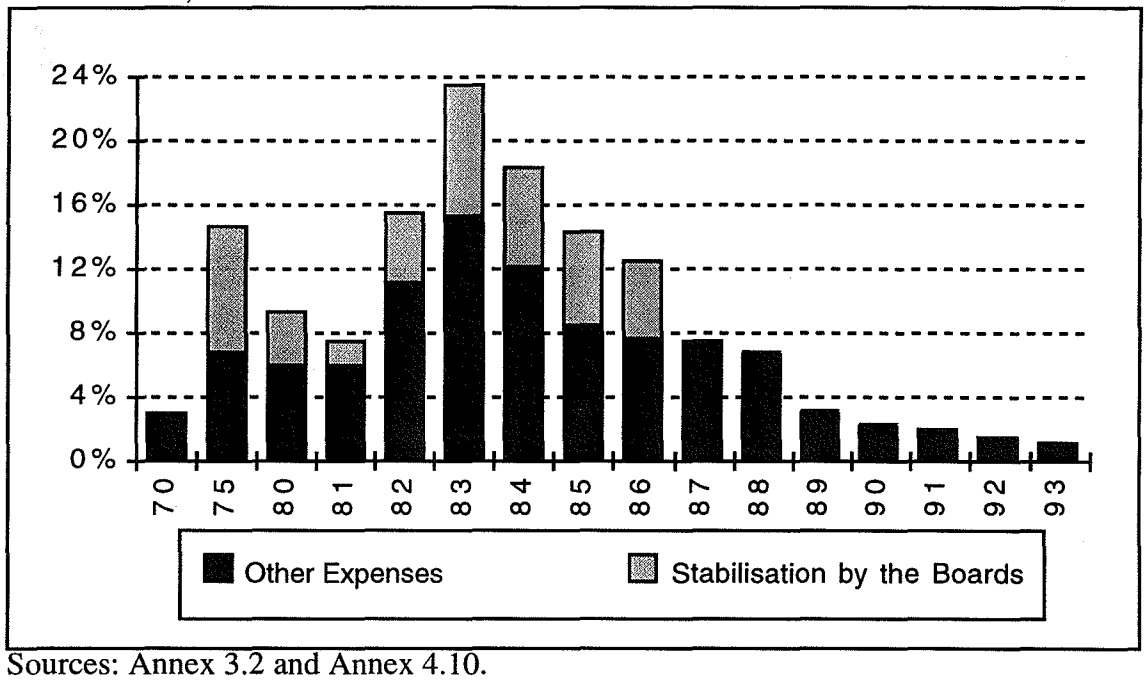
A different method of accounting for the costs of support to agriculture has been used by Tyler and Lattimore (1990, pp.72-73) and in MAF publications (MAF 1992, p.95; MAF 1993, p.134). This method has the advantage of assessing all the support to the agriculture sector, not only MAF expenditures. Further, the calculations provided by Tyler and Lattimore spread over the previous years the government write off of the Boards' debts which we included only for 1987 in our own calculations. These authors consider that the Boards' debt has to be imputed in the years when the income support payments had been made to the producers, in order to "best capture the supply response impact and therefore the resource allocation effects of these assistance measures" (Tyler and Lattimore 1990, p.71). However, this calculation is only for the pastoral sector and for a relatively short period, 1970, 1975 and annually since 1980. As Figures 3.4 and 3.5 show the results of this analysis are not greatly different from those above.

Figure 3.4. Breakdown of Total Assistance to Pastoral Agriculture by Category, New Zealand, 1970-1993.



Source: Annex 3.2.

Figure 3.5. Total Assistance to Pastoral Agriculture as % of Farm Sector Value of Output, New Zealand, 1970-1993.



Sources: Annex 3.2 and Annex 4.10.

The part of total subsidies relied upon by research, advisory services and animal health and inspection follows an evolution similar to that shown in Figure 3.2. This was around 50% at the beginning of the period, then decreased to under 15% for the years when the total subsidies were highest and it finally increased to 75% of the total in 1992. Regarding the total subsidies

as a percentage of agricultural output, the distribution of support payments from the Boards has the effect of removing the 1987 peak seen in Figure 3.3 and to spread it over the previous years. Having said this, the change in subsidies, net of stabilisation payments, is very similar to the change in MAF expenses shown previously: at a level of nearly three per cent of output in 1970, increasing until close to 15% in 1983 and then decreasing rapidly to less than two per cent in the 1990s.

In conclusion, it is important to note that, whatever the method of calculation chosen, the level of agricultural subsidies returned in 1986 to a level where they had been during the 1960s, around two per cent of the value of agricultural output. This simple observation puts the agricultural policy reform in the right perspective. In effect, it seems that it is not so much the drastic decrease in subsidies from 1985 which was exceptional as the period 1970 to 1984 being characterised by the rapid increase in MAF expenditure caused above all by the increase in transfer payments[1]. These years corresponded with the period where the New Zealand government was engaged in a phase of public investment in order to improve the balance of payments. In providing programmes of support for the level of agricultural income, the New Zealand government counted on increasing production and export receipts.

3.3 Agricultural Policy at the Beginning of the Reforms

The research, advisory and animal health and inspection services have been historically at the base of agricultural policies of the developed countries. New Zealand was no exception and as in other countries these programmes were universally provided by the government at no cost to users. Their relative importance lessened from 1970 to 1984, as we have seen earlier, but not the absolute level of expenditure which slightly increased in relation to the value of agricultural output. Given the relative stability of these programmes during these times, we have not judged it useful to analyse them in any more detail. Of more interest now are the programmes that were put in place to encourage the development of production in the 1970s and which were dismantled after 1985.

These production development programmes involved direct transfer payments to the farm sector. They were of three types: investment development, income support and stabilisation, and input subsidies.

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[1] An analysis of a longer period, since 1935, confirms that "with the exception of the immediate post World War II period, assistance to farming and export agriculture was negligible from the Depression until 1971" (Lattimore 1985, p.13).

3.3.1 Programmes to Develop Investment

In order to increase investment in the farm sector, the Livestock Incentive Scheme (LIS) and the Land Development and Encouragement Loans (LDEL) were introduced in 1976 and 1978 respectively. These programmes were concerned above all with the pastoral sector, the traditional export sector. The LIS scheme, in force from 1978 to 1982, was a direct intervention programme to increase the number of stock units[1] retained for production. A loan of $12 was given for each supplementary stock unit, or a tax deduction of $24 was available, in order to encourage permanent investment to increase the number of stock units retained for production. If the increase in stock units was above two per cent and maintained for more than two years, the loan was simply written off. Thus the loan was changed to a direct subsidy[2]. In total, around $145 million was given to the pastoral sector by this programme (Griffith and Martin, p.26).

The LDEL scheme, in force from 1978 to 1981, had the objective of encouraging the development of unimproved land into permanent pasture. Preferential loans were available for a term of 15 years for a maximum of $250 per hectare for all development projects of no less than 10 hectares carrying no less than 100 stock units. If the increase was maintained to the satisfaction of the authorities, the interest accumulated was written off periodically and only half of the capital had to be repaid (Griffith and Martin, p.30). In consequence, these concessions were a direct subsidy to the development of pastoral production. In total, nearly $150 million of loans were granted (Johnson 1985, p.13).

In a more general way, other investment incentives were available. Among others a depreciation rate much higher than normal was allowed for the first year for buying new equipment and machinery, the construction of farm buildings and housing for employees. Also, there existed the possibility of deducting all development expenses, with the exception of machinery, from revenue in the year it was realised (Johnson 1986, p.13). The calculations of Tyler and Lattimore show the value of all the fiscal measures for the pastoral sector was between $67 and $79 million per year from 1980 to 1983, and was more than $100 million in 1984 (Tyler and Lattimore 1990, p.72).

Recall that at the end of 1970s, this policy to encourage investment was not directed only to the farm sector. In a similar way the industrial sector benefited from large investment

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[1] The stock unit is based on sheep and one beef animal equals six stock units.

[2] The minimum increase in stock units was different from year to year, but the basic principle of the programme stayed the same.

programmes, the "Think Big" projects. The main objective of New Zealand economic policy was, as we have already mentioned, to increase exports and to reduce imports in order to improve the balance of payments.

3.3.2 Income Support and Stabilisation Programmes

With a view to supporting productive investments in the farm sector, these programmes had the aim to providing a income security to investors in farming. The Boards had historically administered the income support and stabilisation programmes[1]. The Dairy Board had had a long experience in this matter, administering stabilisation funds, working on a self financing basis, from 1938 (Johnson 1986, p.15). The Meat Board received governmental funds when required to support the price of production. Occasionally, the Wool Board intervened directly in the markets and acquired the volumes required to maintain the price, ultimately for reselling, thus playing a role in stabilising the markets. Following the large fluctuations in market prices during the 1970s the principle of funds being theoretically self-financing was extended to the activities of the Meat Board and the Wool Board in 1975.

These programmes financed themselves by deductions imposed on the total market income during years of good prices. The reserves obtained in this way were to be used in years when price conditions deteriorated in order to provide a certain stabilisation of annual income. For this to work, when the market price decreased under the trigger price, the Boards could either pay price supplements or buy on the markets the quantities required for the floor price to be reached. If the stabilisation account was in deficit the Boards could obtain finance from the Reserve Bank at a preferential interest rate of one per cent (Sheppard and Biggs 1982, pp.5-8).

In fact the stabilisation funds were not greatly used between 1976 and 1978, except in the dairy sector during only one production year. Despite this, the Government decided to create in 1978 a new stabilisation fund for pastoral agriculture, the Supplementary Minimum Price (SMP) scheme (Sheppard and Biggs 1982, p.11). The SMP scheme was a subsidy programme entirely financed by public funds. If the market price was less than the programme target price, a direct income subsidy was paid by the government. The SMPs were an official programme that replaced the ad hoc payments which had been used during the preceding market crises in 1972/73 and 1975/76.

The target price for SMPs was not fixed according to a precise basis and seemed to have varied from one year to another. In 1978, at the time of its beginning, these authors emphasised that

[1] For a history of the origins and activity of the different boards see Martin 1986, p.20-70.

the target price had been established on the basis of an adequate income level for farmers (Sheppard and Biggs 1982, p.11). In contrast comparing the ministerial declaration of 1978 and 1979 that announced the target price level for farmers in the next years, Sheppard and Biggs concluded that "The emphasis had moved from the original idea of providing income adequacy for farmers and been replaced by a slightly more market orientation designed to protect the farmer from short term price recessions" (Sheppard and Biggs 1982, p.12). However, the target price for 1981/82 and 1982/83 had been fixed at a level above the market price, showing "a government return towards the income adequacy orientation of the SMP scheme" [1] (Sheppard and Biggs 1982, p.13).

Until 1981/82, no major government contribution to income support had been necessary (Johnson 1986, p.17) [2]. In contrast, from 1981/82, the situation changed drastically as well for the stabilisation funds as for SMPs.

In the sheep meat sector in 1981/82, a drop in price on the international markets combined with an increase in the SMP target price led to massive intervention in the markets. The inability of the market to reach the floor price of the Meat Board stabilisation programme had led the Meat Board to acquire the sheep production. The policy was pursued in two subsequent periods (1982/83 and 1983/84) when the Meat Board acquired the total production, and traditional exporters were then used by the Board as commission agents. The Meat Board intervention was based on the SMP target price, and the difference between the target price and the intervention floor price in the stabilisation funds was covered by a direct government payment[3]. The losses on these operations of selling the products on the markets were to be covered by the Board's stabilisation funds, which led to a large operational deficit (Griffith and Martin 1988, pp.15-21).

In the beef sector, SMP income subsidies were also paid in 1981/82 and 1982/83. In contrast, the market situation was relatively better than that for the sheep sector, and the intervention of the Meat Board and use of stabilisation funds were only minor (Griffith and Martin 1988, pp. 22-25).

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[1] These authors emphasised that "It may not be inappropriate to suggest that the relatively high price levels announced... in the 1982 budget, may have been related to the political situation at that time in that 1981 was an election year (Sheppard and Biggs 1982, p.13).

[2] Only the beef stabilisation funds had been used, to pay stabilisation payments of $33 million in 1980 and 1981. These payments came from deductions levied from a total of nearly $40 million obtained in 1978/79 when the market price was above the predetermined level.

[3] In this way, the SMP conceived originally as programme of income support was used more in the case of sheep production to sustain the market price.

Wool production had also benefited from SMP income support payments during 1981/82 and 1983/84. Moreover, the Wool Board stabilisation funds had been used to maintain incomes in 1981/82 and 1982/83 (Griffith and Grundy 1988, p.13). However, this intervention was financed by the reserves accumulated from 1976/77 to 1980/81.

In the dairy sector, SMPs had only little effect, with price supports only required in the year 1978/79 (Griffith and Grundy 1988, p.13). From 1979/80 to 1982/83, the Dairy Board stabilisation funds had accumulated a reserve of more than $150 million, only starting to use them a little in 1983/84 (NZDB 1985, p.14). In contrast, the Dairy Board working capital funds were financed by a loan of about $750 million from the Reserve Bank at a preferential interest rate of one per cent (Tyler and Lattimore 1990, p.67).

Income support payments were also paid for adverse climatic conditions. Notably, these ad hoc payments were made in 1978/79 following a drought which affected the East coast of the country (Johnson 1986, p.17). It was an important period from the point of view of the government "to provide some compensation for the resulting loss of income and also to encourage farmers to continue development programmes." (Budget 1978, cited by Johnson 1986, p.17). In the same logic, if farm income needed to be stabilised and subsidised because of lowered market prices, it was also necessary to help in the case of climatic hazards.

The production of fluid milk, eggs and wheat was oriented towards providing the internal market, and these all benefited from policies of fixing and supporting prices carried out by the boards. Milk and eggs were under production quotas and fixed prices applied from farm level to consumer. Wheat imports were controlled and the price fixed, as well as at the farm level and for milling. These three commodities evolved in a strongly regulated environment. However, in value, these were relatively minor with respect to total New Zealand agricultural production.

3.3.3 Programmes for Input Subsidies

Input subsidy programmes had been used for a long time in the New Zealand farm sector. These programmes can be interpreted as compensation paid to the sector in the face of supplementary costs derived from the control of industrial imports. In particular, transport and application of fertiliser had already been subsidised in the 1930s and this subsidy increased in the 1970s (Lattimore 1985, Annex 1). At the beginning of the 1980s the subsidies on fertilisers totalled more than $50 million annually (Tyler and Lattimore 1990, p.72).

Capital inputs were also subsidised by means of a reduced interest rate from the Rural Bank, a government credit organisation. These subsidies on interest can also be interpreted as investment and development support (see above).

3.4 Agricultural Policies in Revision

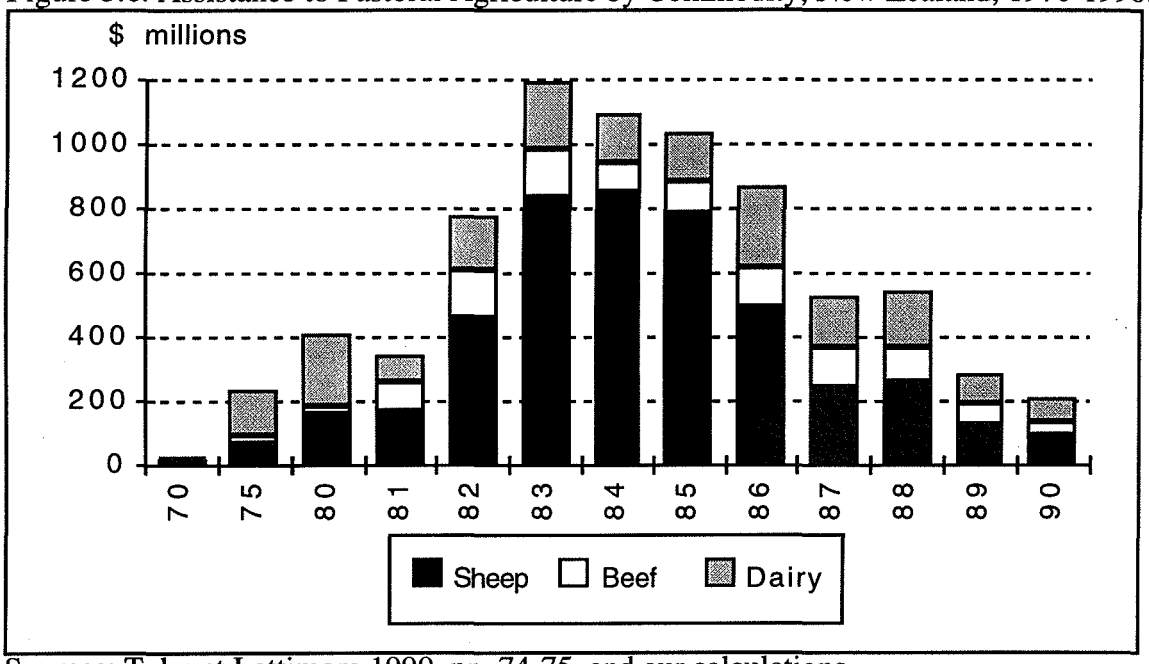
At the beginning of the reforms, the New Zealand agricultural policies can be seen as a set of measures, more or less coherent, to achieve the objective of increasing exports. However, the effect of all these programmes on development of agricultural production has been discussed and not always unanimously. For Johnson, "the national goal of increased livestock exports was achieved". He explained this result by mentioning that "it does appear that the agricultural investment boom from 1978 to 1982 was sustained by satisfactory incomes in the 1979-80 season and partly by policy measures introduced by Government at the time" (Johnson 1985, pp.30-31).

Regarding the specific effect of SMPs, Johnson adds that "the deficiency payments scheme did prevent sheep farmers' incomes from declining over the years 1982-85, with a consequent maintenance of investment levels" (Johnson 1986, p.44). In contrast, other authors affirmed that "the use of Supplementary Minimum Prices seems to be an inefficient way of achieving the desired objective of increases in agricultural production" (Sheppard and Biggs 1982, p.40). However, these authors note that the investment development programmes have had the effect expected: "it is clear that the LIS and LDEL programmes have contributed to the recent upsurge in production by assisting farmers to increase stocking capacity by upgrading low producing unimproved or reverted land" (Sheppard and Biggs 1982, p.73).

Anyway, it is not our purpose here to end with a debate on the respective effects of different programmes aimed at increasing agricultural exports. What is more interesting for us now is that the different authors are agreed on the fundamental point that this set of measures appear to have let to a bad resource allocation in the agricultural sector in relation to the market returns. We have shown at the beginning of this chapter in a ministerial declaration the worry about the gap between the level of agricultural income maintained by the subsidy programmes and the returns obtained from the exports markets. Johnson affirms that "In the period since 1981, New Zealand had probably produced higher levels of sheepmeat and wool output than were justified by world markets prices" (Johnson 1986 p.43). Sheppard and Lattimore agree with this statement and mention that of all the agricultural products "sheepmeat was the most significantly assisted... A result of this was excess supply of sheepmeat for export markets and lower market returns" (Sheppard and Lattimore 1993, p.19). Tyler and Lattimore confirm

this view when presenting the level of support to pastoral agriculture by type of production. Figure 3.6 shows that sheep production increasingly benefited, until a maximum of 77% of the total support in 1984.

Figure 3.6. Assistance to Pastoral Agriculture by Commodity, New Zealand, 1970-1990.



Sources: Tyler et Lattimore 1990, pp. 74-75, and our calculations.

But more than this distortion in favour of the sheep production sector created by these agricultural programmes, the reform of New Zealand agricultural policy, which we have covered in Chapter 2, must be seen more broadly. Gibson et al. have noted that the "New Zealand policy reform in the mid-1980s was in part a realisation that the expense of maintaining farm prices for products with declining (or fluctuating) export prospects was becoming too great for macro-economy stability" (Gibson et al. 1992, p.28). It is from the end of 1984/85 that New Zealand agricultural policy, as we have described, began to be dismantled, and very quickly.

With the change in course of the overall New Zealand government economic policy, the agricultural sector had to become more responsive to market signals to secure returns to its resources invested. To achieve this, a large and rapid cut to most of the support programmes had been undertaken as shown in Table 3.1. Johnson described the new agricultural policy:

> In general, the new thrust of agricultural policy in New Zealand since 1984 has been to abolish input subsidies, phase out farm credit concessions, increase charges for government services, reduce distortions in taxation provisions, and to charge more realistic interest rates on marketing board trading and reserve stabilisation accounts. In line with this philosophy, the various marketing Boards have been required to modify their operations where these have been seen to contain high regulatory content (Johnson 1986, p.49).

Table 3.1. Change to Agricultural Programmes Since 1984.

	When Introduced	Year of Change	Change Made
Programmes to Develop Investment			
Livestock Incentice Scheme (LIS)	1976	1985	Target considered met
Land Development Encouragement (LDES)	1978	1985	
Fiscal Measures		1986	Mostly abolished
Income Support and Stabilisation Programmes			
Stabilisation by the Wool Board	1976	1985	Increased interest on deficits
Stabilisation by the Meat Board	1976	1985	
Stabilisation by the Dairy Board	1938	1985	
Supplementary Minimum Prices (SMP)	1978	1984	Abolished
Wheat Board	1965	1983	Deregulation
Milk Board (lait de consommation)	1967	1986	Deregulation
Egg Board	1980	1986	Deregulation
Programmes for Input Subsidies			
Fertiliser		1986	Abolished
Interest on Loans		1984	Market rate
Rural Bank		1987	Privatised
Services			
Research		1985	Policy of recovering costs
Advisory Services		1985	
Inspection		1984	

Source: Adapted from Johnson 1986, pp. 50-51.

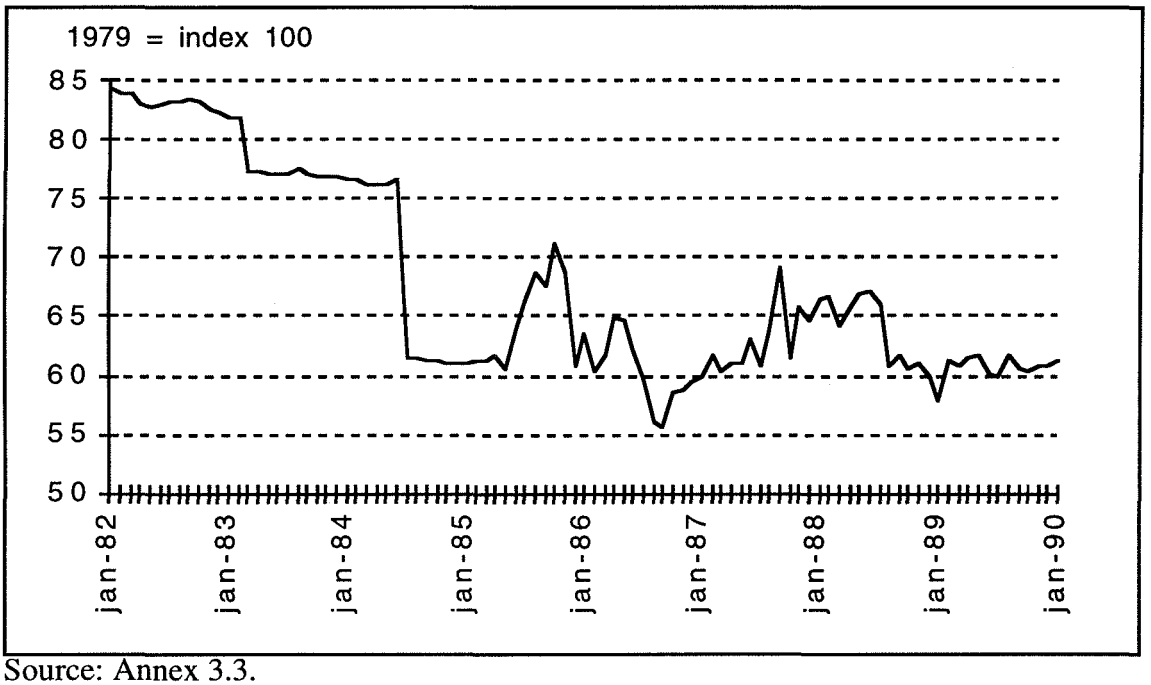
3.4.1 The New Macro-economic Context

The reform of public intervention in the New Zealand economy gave priority to the agricultural sector but not uniquely so. A number of macro-economic measures were also rapidly put in place by the new government after its accession to power in 1984.

In July 1984, the New Zealand dollar was devalued 20%, which favoured exporters and farmers in particular. Then, by March 1985, the exchange control was abolished and the dollar was floated. But contrary to these provisions the dollar then increased in value (Sheppard and Lattimore 1993, p.4). This was so significant that by October 1985 the dollar had regained

two thirds of the value lost during the devaluation in 1984 (see Figure 3.7)[1]. This revaluation severely affected farmer incomes, already decreased by the removal of many programmes and the fall of agricultural product prices on international markets.

Figure 3.7. Trade Weighted Exchange Rate Index, New Zealand, January 1982 - January 1990.



Source: Annex 3.3.

This appreciation of the New Zealand dollar is explained in part by the liberalisation of financial markets and notably by the deregulation of interest rates in July 1984. This liberalisation, combined with the government decision to borrow only from the New Zealand finance market, caused a net increase in interest rates (see Figure 3.8) which were previously subject to control at low level (Sheppard and Lattimore 1993, p.4).

The increase in interest rates, and the obligation given to the boards to finance their deficit at market rates, put an end to their stabilisation programmes. Thus, with the simultaneous abolition of SMPs, the farmers found themselves with no income stabilisation programmes. They were also hit by progressive increase in Rural Bank loan rates to the current market level.

In the same period, abolition of price and salary controls resulted in inflationary pressures. The annual rate of increase of CPI reached nearly 16% in 1985 (see Figure 2.8 above), a level higher than New Zealand's trading partners. This inflation rate added to the problems encountered by farmers. The value of agricultural products sold decreased because of the

[1] By mid-1986, the dollar had declined in value again.

appreciation of the dollar, the decrease of prices on international markets and the end of subsidies. At the same time, a high level of inflation in the rest of the economy contributed to a further increase in the cost of inputs and in the cost of living.

Figure 3.8. Interest Rates on Medium Term Government Bonds, New Zealand, 1975 -1993.

Source: Annex 3.4.

In total, the whole macro-economic situation which prevailed in 1985/86 can be summarised as follows:

> The high value of the dollar reduced farm product prices and their effect was compounded by weak international markets. Taking these factors together farmers were hit by lower prices for their products, together with high costs of servicing debt, over a period in which the Government's measures to reduce inflation were seen to have been taking a long time to act. The net result is that farm incomes were reduced to their lowest level in real terms for many years" (Sheppard and Lattimore 1993, p.4).

Johnson, noting a similar effect on farm income from the macro-economic policies and from the important shock caused by the dismantling of agricultural policies, mentioned that:

> There is clearly a need to focus on the changed income position of export producers in general and that of sheep-farmers in particular. Adjustments will be needed in the land market, the agricultural finance market and in farm ownership. Transition arrangements are needed to change to the total market environment that has been introduced by the government" (Johnson 1986, p.53).

We believe that the government authorities had arrived at the same conclusion because the transition programmes became effective at the end of 1986/87.

3.4.2 The Transition Programmes

The New Zealand government put in place a number of transition programmes in order to facilitate the agricultural sector moving to a new economic environment orientated to the market. Essentially, these transition programmes had the objective of lightening the burden of farmer's debt, at the level of their collective organisation as well as at the individual level.

First, at the collective level, the Dairy Board had purchased for $150 million nearly $750 million of debt which it had with the Reserve Bank. Similarly, the debt of the Meat Board stabilisation funds had also in large part been written off by government contributions of $930 million (Tyler and Lattimore 1990, p.68). With a financial viability re-established, the boards could continue to play a role in organising the markets and even more the Dairy Board, which had become an important export firm for New Zealand dairy products.

Then, at the individual level, the Minister of Finance and Agriculture announced in 1986 the establishment of special programmes relating to farmers' debt. The "Rural Bank Discount Scheme" had a double objective: "It will encourage farmers to get on with debt restructuring and, at the same time, help place the Rural Bank portfolio on a more commercial basis" (Moyle and Douglas 1986, p.4). This policy made the Rural Bank financially more attractive for eventual investors and prepared it for the subsequent privatisation. This programme was available to producers who were not in a position to meet their financial obligations. A part of their debt was written off by the Rural Bank but in response the interest rate on the loan was immediately raised to current market rates. Equally, a deal had to be made with the other creditors which had also to take their part to restructuring the farmer's debt. Finally, budgets had to be produced[1] and demonstrated that, following the restructuring of debt, the farm returned to viability (Moyle and Douglas 1986, pp. 5-6).

This programme was complemented by the "Conditional Seasonal Finance Guarantee Scheme" for farmers for whom the Rural Bank was not the principal creditor. In this case, the Rural

[1] It was explicitly mentioned in the Ministerial Directive that these budgets could not anticipate an increase in farm prices and had to be based on the performance of the existing management.

Bank agreed to finance up to 50% of the amount required to assure the operating expenses of the farm. The same conditions as above applied and, notably, the assurance that other creditors accepted the debt arrangements of the farmer.

There were 8,100 farms involved in the Rural Bank Discount Scheme, around 10% of the total of New Zealand farms (Johnson 1989, p.29). The requests from 4,700 farmers had been accepted by the Rural Bank while 700 other farmers restructured their debt by other means. Among the 2,700 farmers declined, some were judged to be in a "too good" financial situation to be eligible for the programme and others could not demonstrate their future viability (Johnson and Sandrey 1990, p.206). In total, $228 million of debt was written off, with an average of $50,000 per farmer representing 33% of the initial level of indebtedness of these farmers (Johnson 1989a, p.18).

The ministerial declaration in 1986 also provided better access for social payments to farm families. Notably, there was financial assistance to look for work provided by the Social Welfare Department which was also authorised to pay special payments covering the minimum cost of living of families (Moyle and Douglas 1986, pp.11-13).

Another transition programme, the "New Start Grant", had been put in place in 1988 to encourage those whose farm was no longer viable to leave agriculture. In fact, this programme had been created following a severe drought which had affected mainly the East Coast of both the South and the North Island. It is not necessary to discuss here whether this was more of an insurance programme or a transition programme. Whatever the case, drought added to the financial problems already experienced by many farmers by the process of change in agricultural policies (Sheppard and Lattimore 1993, p.23). In the context of this programme, the farmers were offered a free evaluation of their financial situation. For those for whom their finances seemed irremediably jeopardised, they could receive a subsidy of $45,000 to leave their farm with all their personal possessions and a car. In the region most affected by the drought, seven per cent of farmers took advantage of the programme (Taylor 1990, p.3). It must be noted however, that 20% of these farmers stayed on their farm but in a new form of ownership (Fairweather 1992, pp.49-50). In total for all of New Zealand, around 350 families left farming (Morris 1991, p.13).

These transition programmes put in place by the government led to a smaller decrease in the number of farmers than first expected. In effect, referring to the total economic situation, the change in agricultural policies and the base price of agricultural products, Gibson et al. confirm that:

> In such a situation it might be expected that there would be a massive exit from farming. Even official thinking seemed to accept this view, with Prime Minister Lange suggesting that 5,000 farmers (approximately seven per cent of the total) would have to leave the land... The fragments of evidence suggest a much less costly adjustment... Adjustment costs were lower ex post than expected ex ante. This was partly due to debt restructuring initiated by the government-owned Rural Bank (Gibson et al. 1992, pp.9-10).

3.5 Agricultural Policies in the 1990s

The revision of the agricultural policies in 1984 led to a real dismantling of the majority of programmes (see Table 3.1). The investment development programmes, income stabilisation and support measures and input subsidies had been initially abolished. As for research, advisory and animal health and inspection, these were relatively little affected by reform to agricultural policies. Their budget cost had been maintained between 2.3% and 2.8% of the value of output from 1986 to 1989. In contrast, at the end of 1990 with the reform of national accounting, these programmes, as for most other government programmes, had been subjected to a policy of recovering costs. In particular, advisory and inspection have been financially supported in part by the users of these services. In fact, up to 1992 only the research sector could count on relatively constant level of subsidies.

Finally, relating to income support, there remained only occasional programmes for natural catastrophes. The New Zealand government had sought since 1986 to better define the limits of this intervention in order to determine the precise scale of compensation in this domain, rather than using ad hoc interventions as in the past. Morris mentioned that:

> During the early 1980s adverse events continued to be considered on an ad hoc basis. Successive events received greater and greater levels of assistance. In addition, inadequate specification of criteria which defined whether an adverse event should or should not be declared resulted in a situation where large parts of New Zealand were continually under adverse event declaration for drought (Morris 1991, p.3).

However, the exercise did not seem to have been very conclusive. In effect, the criteria of a natural catastrophe in the case of drought, excessive rain and flooding had been elaborated. In these cases, the official means of intervention was a refund of interest for the two first years of the duration of the loans considered necessary to face the damage caused by the climatic event. Otherwise a set of criteria could not be defined in the case of snowfall, earthquakes and cyclones, and ad hoc interventions were always possible.

Further, in most cases of major natural catastrophe noted between 1987 and 1991 by Morris (1991, pp.5-11), including cases of drought and floods, some important ad hoc compensations had been given to farmers to around a total of $150 million. Morris concluded that "There has been no reduction in Government's exposure to future claims for relief" (Morris 1991, p.15). Having said this, it is not relevant to conclude that the natural catastrophes are an occasion for government to reinstate a high level of support to the farm sector. In effect, the total level of support to the sector had been drastically cut and the compensation given in the case of natural catastrophe were for important damages truly suffered by farmers. This analysis of the 1987-1991 period simply illustrates the difficulty of foreseeing, with objective criteria previously defined, all the possible variants of climatic events or exceptional natural events and the eventual damages incurred. Current policy emphasises that farmers are responsible for the costs of natural disasters and recent experience indicates that government will provide co-ordination and some minor assistance to farmers, but not direct payments.

3.6 Conclusion

Examination of current agricultural policies should not lead us to conclude that the New Zealand farm sector has been entirely deregulated. It is more relevant to mention that the subsidies to the sector had been drastically reduced. As to the deregulation, it was applied above all to the marketing boards which were oriented towards supplying the internal market, namely the New Zealand Poultry Board in the egg sector, the New Zealand Milk Board in the fluid milk sector and the New Zealand Wheat Board in the milling industry. A brief analysis of the deregulation of the fluid milk sector and the abolition of the New Zealand Milk Board is given in Annex 2.

In contrast, the marketing Boards concerned with exports have been maintained. In fact, the Kiwifruit Board was created in 1989, in the thick of the deregulation of the whole economy. This Board has the control of all exports and it is the major exporter of New Zealand kiwifruit on the international markets, like the Dairy Board for dairy products. Thus the farmers in New Zealand preserved the right of collective organisation to maximise the receipts from the sale of their export products, but this power is vigorously discussed (see notably Zwart and Moore 1990).

Having said this, there is no doubt that farm incomes are now dependent on the remuneration obtained from the market and, for a large part, on the international market. Direct transfers to the farm sector from public funds are almost non-existent, save only for the case of natural

catastrophes. However, this occasional aid is much lower than the record levels attained in the 1980s.

It is necessary to retain from the above analysis of the evolution of state intervention in the farm sector in New Zealand, that the massive aid, in particular the transfer payments, only represented a relatively short period in the history of agricultural development of the country. Income support had been increasing from the end of the 1970s and raised to exceptional levels for four years (1983 to 1985 and 1987) when the expenditures of the Ministry of Agriculture and Fisheries surpassed $400 million (see Figure 3.1). Thus, it was not so much the abolition of subsidies to the farm sector from 1985 that was exceptional, as the relatively short period when the support had been increasing and was high. From this point of view, the specificity of the farm sector justifying particular intervention from the state seems questioned by the experience of New Zealand not only by the revision of the agricultural policies since 1985, but by the longer history of relatively low levels of government support.

CHAPTER 4

STRUCTURAL CHANGES

4.1 Introduction

In any sector subjected to rapid policy reforms as New Zealand agriculture, at the same time as a market crisis for its products, would we expected to experience rapid structural changes. The specificity of the farm sector, which we have covered briefly in Chapter 1, would however lead to a certain delay in structural adjustment. In effect, many authors have already emphasised the ability of family farmers to keep in business with weak price levels and lowered profitability of production. Thus, in the developed countries, the maintenance of the number of farm families in conditions of low remuneration from their own resources no longer needs to be proved. This situation is explained by the status of family organisation in agriculture, as emphasised by Morisset and Réveret:

> In almost all farming, ... the predominant form of production consist of farms of a pre-capitalist type, that are not completely integrated into the market. There does not exist a separation between capital and labour. And these two "factors of production" do not always require the market level of remuneration (Morisset and Réveret 1985, pp.2-3).

Servolin argues in the same way when he talks of small-scale production in French agriculture: "The goal of production is not to put a value on capital and obtaining a profit, but the subsistence of the farmer and his family, and the reproduction of the means of production necessary to assure this" (Servolin 1972).

Thus, to come back to the process of structural adjustment in this context, the decrease in the profitability of agricultural production can have only small structural effects in the short term. Family farm organisation, largely dominant in New Zealand (Fairweather 1992, p.56), has been able to resist the effects of lowered incomes in the short term by reducing its standard of living[1]. The family assets (labour and capital) do not necessarily need to be remunerated at the market rate. Moreover, in the short term, farmers could respond to decreasing income by increasing their labour effort and increasing production. But in the case of a severe decrease in profitability for a long period, the capacity to keep in business can rapidly reach its limits. This is more true for the heavily indebted farmers who are obliged to find a return at market rates for

[1] The issue of the change in the level of farm and family income is analysed in the next chapter.

a large part of the capital engaged in production. And even for the others, the pressure for returns from their own resources, and the limit to the decline in their standard of living can show up as structural change in the medium term which our analysis can show.

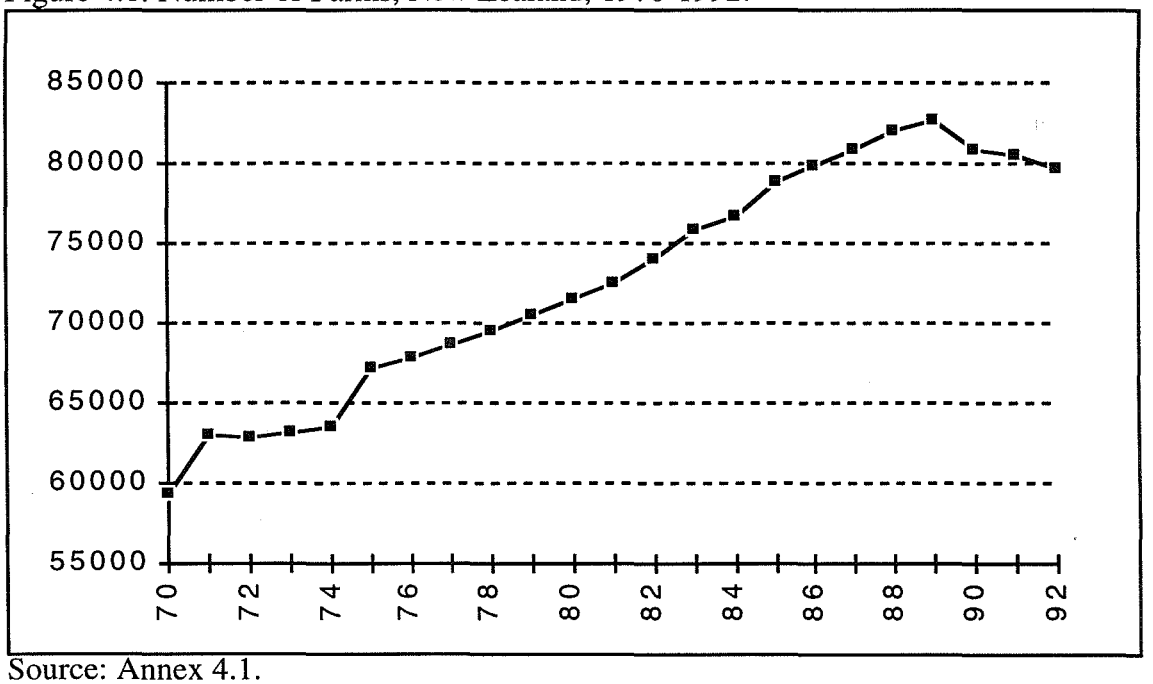
We will therefore take up in the remainder of this chapter, each of the elements in the process of structural change in order to appreciate its evolution in the specific context of revision to agricultural policies in New Zealand.

4.2 Concentration in the Production Sector

4.2.1 The Number of Farms

Following the revision to New Zealand agricultural policy and the abolition of transfer payments to the farm sector, which we have outlined in the preceding chapter, the drop in the number of farms has been less than previously expected by the government. On the contrary, the number of farms rose up to 1989 (see Figure 4.1), which is quite exceptional for a developed country. However, this increase in farms had already begun before the revision to agricultural policy in 1985. It is necessary to wait until 1989, after a delay of four years, to see a reversal of the trend and for the number of farms to fall.

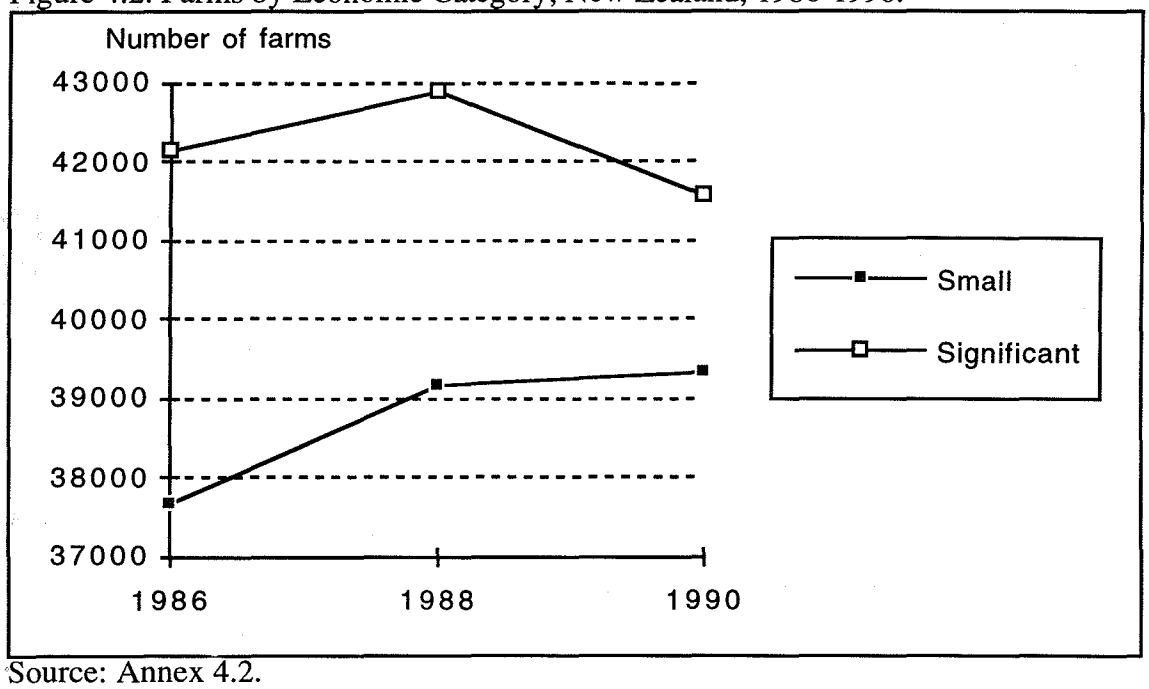
Figure 4.1. Number of Farms, New Zealand, 1970-1992.



Source: Annex 4.1.

This delay could be considered normal, especially since we have already mentioned the resistance capacity of farm families in conditions of economic difficulties. Besides, a more complete analysis of the change in the number of farms supports this view. The Department of Statistics has provided since 1986 a classification of farms into two broad categories: "small" or "significant". Fairweather explains the method used to establish this classification (Fairweather 1992, p.26). All the farms are classified first of all by type of production. Then, for each type of production, the estimated value of production is cumulated from the farms with largest production to the farms with smallest production. The demarcation between small and significant occurs when the accumulated total attains 95% of the total value of production for all the farms of that type. Thus, the group of farms classified as small contributes to less than five per cent of the estimated total value of production. Figure 4.2 shows the recent change in the number of farms in each of these economic categories.

Figure 4.2. Farms by Economic Category, New Zealand, 1986-1990.



Source: Annex 4.2.

The major part of the increase in the total number of farms between 1986 and 1988 is the result of the increase in the number of small farms. Between 1988 and 1990, the number of small farms continued to increase, although only slightly, and the number of significant farms declined. The response of each of these two categories of farms to the change in economic conditions is not therefore the same.

The category of small farms can be classed as "lifestyle blocks". These small units are owned by families who have chosen the rural life while pursuing another job or profession which provides their main income, or who own a secondary residence in the country. In both cases,

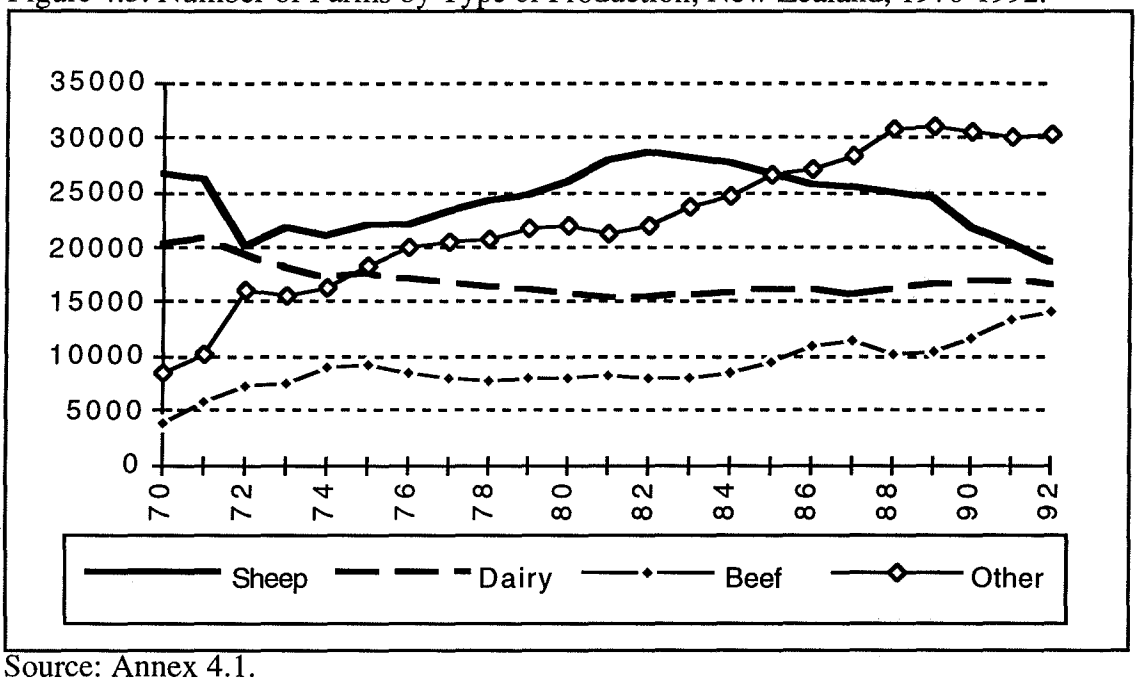
some farming activity is carried out on these lifestyle blocks. However, these farms are not really affected by deterioration of economic conditions, due to cutting subsidies or to weakness of markets, that otherwise influence the farm sector. In contrast, the significant farms are the ones which seemed to have been affected by the removal of subsidies and the variation of market prices, with a delay in reaction of about three tears as we have already mentioned. And even more, the forced sale of all or part of significant farms can allow for an expansion in the number of small farms. However, while this has happened in some cases it not be significant because, as Figure 4.2 shows, at the time when significant farms declined in number there was only a marginal gain in small farms.

The delay in family farm adjustment to change in economic conditions is reflected in changes of type of production (see Figure 4.3). The case of sheep production is particularly interesting since, as the preceding chapter shows, this sector was most supported and therefore the most affected by the removal of agricultural subsidies. Thus, the number of sheep farms had been increasing in the 1970s reaching its peak in 1982. Following this, the decline which began before 1985 continued until 1989 at an annual rate 1.1% to 3.5%. Then it accelerated to attain 10.7%, 6.6% and 8.4% respectively in 1990, 1991 and 1992. This sector was already in decline before the revision of agricultural policy, but this decline increased considerably five years after the reforms.

Given the increase in the total number of farms, at least to 1989, the decrease in the number of sheep farms can be compensated for by an increase in other types, especially beef. The combination of resources required for sheep and beef production are similar to each other, and these two types of production are easily interchanged. The number of beef farms, which were relatively stable since 1978, followed a reverse pattern compared to the number of sheep farms since 1982. The number of beef farms has therefore increased appreciably, by 76% between 1982 and 1992.

The number of dairy farms, which declined throughout the 1970s, also began to increase in 1982. However, the total increase from 1982 to 1992 is only seven per cent and is irregular from one year to another. Dairy production, as for sheep and beef production, is based above all on the use of pasture and competes with these other sectors for the use of land. Nevertheless, some more important investments are necessary for dairy production, notably the cost of milking equipment. Thus the increase in the number of beef farms and dairy farms confirms that the high levels of subsidies benefited the sheep sector relatively more, whose number of farms is now decreasing, and part of the resources engaged in sheep production seem to have been moved towards the other sectors of pastoral agriculture.

Figure 4.3. Number of Farms by Type of Production, New Zealand, 1970-1992.



Source: Annex 4.1.

The category of other types of farms is a quite disparate group including horticulture and "other" animals such as deer, goats, horses and pigs. The number of farms in this category has been increasing spectacularly since the beginning of the 1970s until 1979 when they increased in number only modestly until 1982. Subsequently, the increase persisted with some acceleration until 1988 and then levelled off. However, as for the total number of farms, their number began to decline in 1990.

For these other farms many phenomena seem relevant in explaining their increase until 1989. First, for new land uses, primarily horticulture, there has been subdivision of larger farms. One of the major horticultural activities was the production of kiwifruit[1] on small units of intensive land use. Second, the important increase in new animal production, in particular deer and goats (see below), has contributed to increasing the number of farms in this category. Finally, the increase of the number of lifestyle blocks is notable in this category of farms, the number of small farms having passed from 8,074 to 11,168, or from 29.7% to 36.5% of the total in this category, between 1986 and 1990 (see Annex 4.2)

The recent decrease in the number of "other" farms appears to have resulted more from the conditions of the market than from the process of revision to agricultural policy. For example, kiwifruit production is presently going through an important market crisis because the arrival of

[1] It is necessary to note however that the total area in kiwifruit production levelled at around 18,000 hectares since 1985, but that there were only 720 hectares in 1972.

new producing countries has created turmoil on the export markets. Similarly, Angora goats are rapidly decreasing in numbers as we will see later, because the expected market opportunities were not realised. Finally, the stock market "crash" of 1987 reduced the demand for lifestyle blocks (Fairweather 1992, p.25).

In total, it seems that the decrease in the number of sheep farms since 1982 has been associated with an increase in the number of farms in other traditional pastoral sectors. Equally, there has been some diversification towards non-traditional sectors (goats, deer and horticulture), which began in the 1970s and has continued. Following the revision in agricultural policies, there does not seem therefore to have been marked changes from the tendencies already occurring. Only the decrease in the number of sheep farms has accelerated, after a lag of four years.

The overall evolution in the number of farms is however only one facet of the process of structural change. The utilisation of agricultural land is another which we consider now.

4.2.2 The Utilisation of Agricultural Land

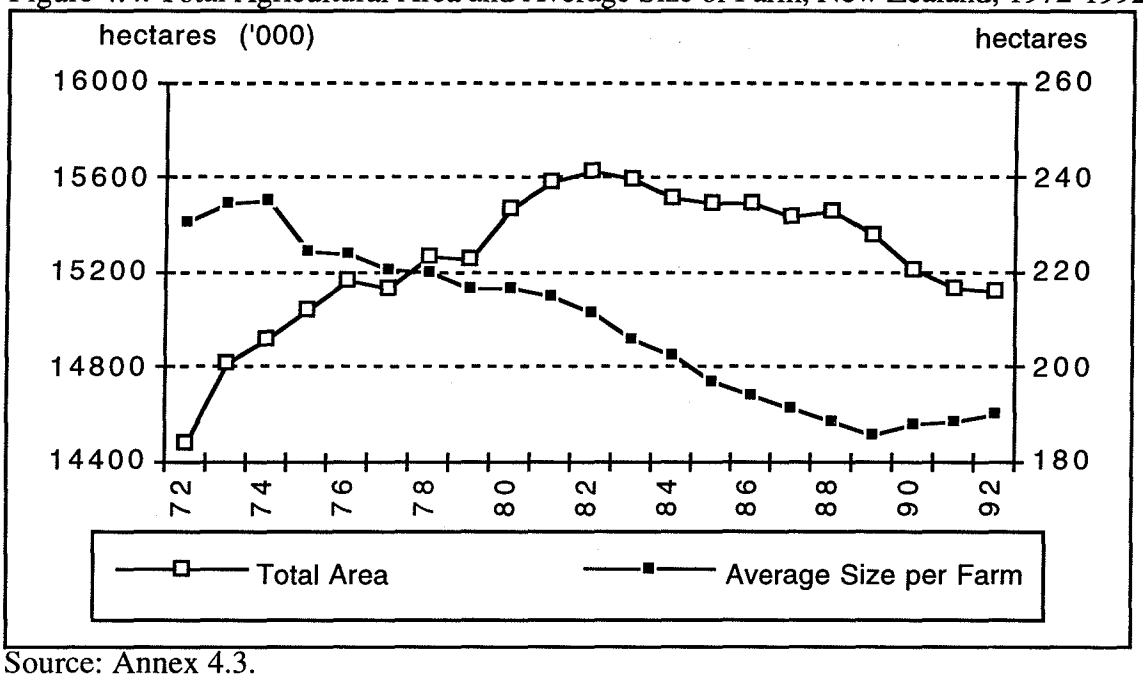
In general in developed countries, the process of concentration of production operates by decreasing the number of farms on a relatively fixed area of land. This occurs as population increases and other pressures, like urbanisation, industrial and recreative uses, take land out of production. New Zealand, from this point of view, has been in a peculiar position. Concerning the total agricultural land area, there has been an increase from 1972 to 1983, of eight per cent then followed by a slight decrease, of three per cent between 1983 and 1991. During this time, the number of farms have been increasing quite rapidly as we have seen previously, and consequently the average area of farms has declined (see Figure 4.4). From this perspective there has not therefore been concentration of the land resource.

However, this approach is somewhat limited. Is a division of a sheep farm, for example, into small horticultural farms the reverse of concentration? The answer is not evident, because it is a matter at least of a process of intensification of land use. To go deeper into this analysis, land use is examined in terms of the area in three broad categories of land use (see Figure 4.5).

The area in pasture occupies around nearly 90% of the total agricultural area. However, the number of hectares in pasture has declined by 5.7% after an increase of 4.9% during the preceding decade. The decrease in the number of sheep farms noticed previously seems to affect the land use. As for the category "grain and horticulture", it groups two different activities: the detailed data available since 1986 (MAF 1993, p.110) show that the area in

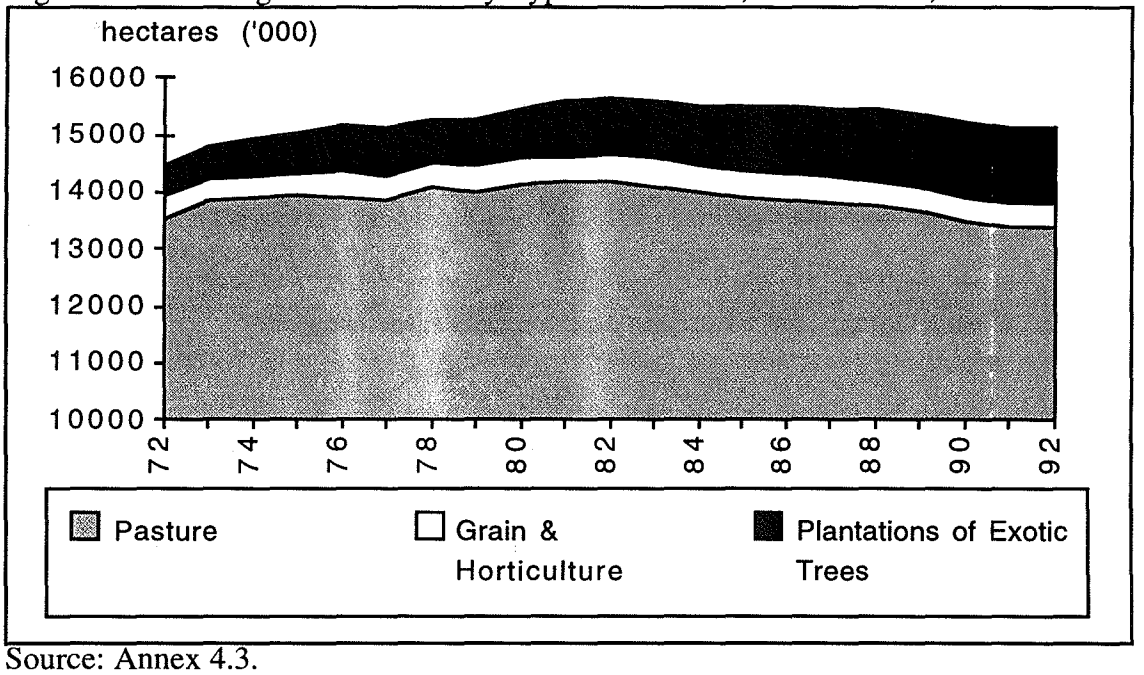
horticulture is relatively constant while the area in grain has fallen. Finally, the plantation area has increased during all of this period and by 38.7% since 1982.

Figure 4.4. Total Agricultural Area and Average Size of Farm, New Zealand, 1972-1992.



Source: Annex 4.3.

Figure 4.5. Total Agricultural Area by Type of Land Use, New Zealand, 1970-1992.



Source: Annex 4.3.

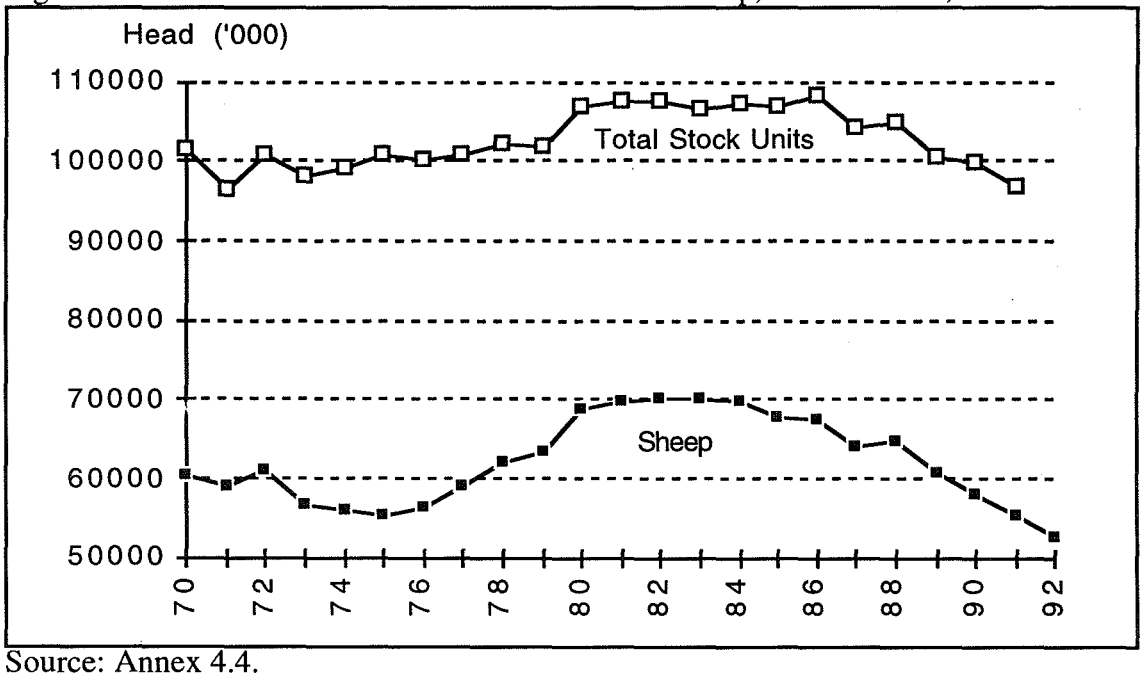
It is difficult to interpret these data as regarding the effects of the revision of agricultural policy. The end of programmes to encourage the development of farm production and the end of programmes of income support could have led to other uses more appropriate, notably forest

on the less productive land. But this tendency arose before the abolition of agricultural subsidies and does not seem to be increasing following their removal. Without the data sufficiently detailed to make a formal conclusion, we suggest that the decrease in cereal production has resulted from the liberalisation of the internal market for wheat and the consequent lower return from this specific sector of production.

In total, despite the decline in the area of pasture since 1982, pastoral production remains by far the main user of the land resource in New Zealand. In consequence, the evolution of different types of livestock "carried" by this resource must also be analysed.

Figure 4.6 shows that the total number of stock units had increased until 1980, was stable from 1980 to 1986 and then declined to 1992. This decline has occurred owing to the decrease in the number of sheep not being compensated for by the increase in other pastoral activities. As for the number of sheep, they had increased from 1975 to 1982, probably supported by, among others, the development programmes for agriculture then in force. They then began to decrease rapidly in 1986, which corresponds with a relatively similar change in the number of sheep farms.

Figure 4.6. Number of Stock Units and Number of Sheep, New Zealand, 1970-1992.

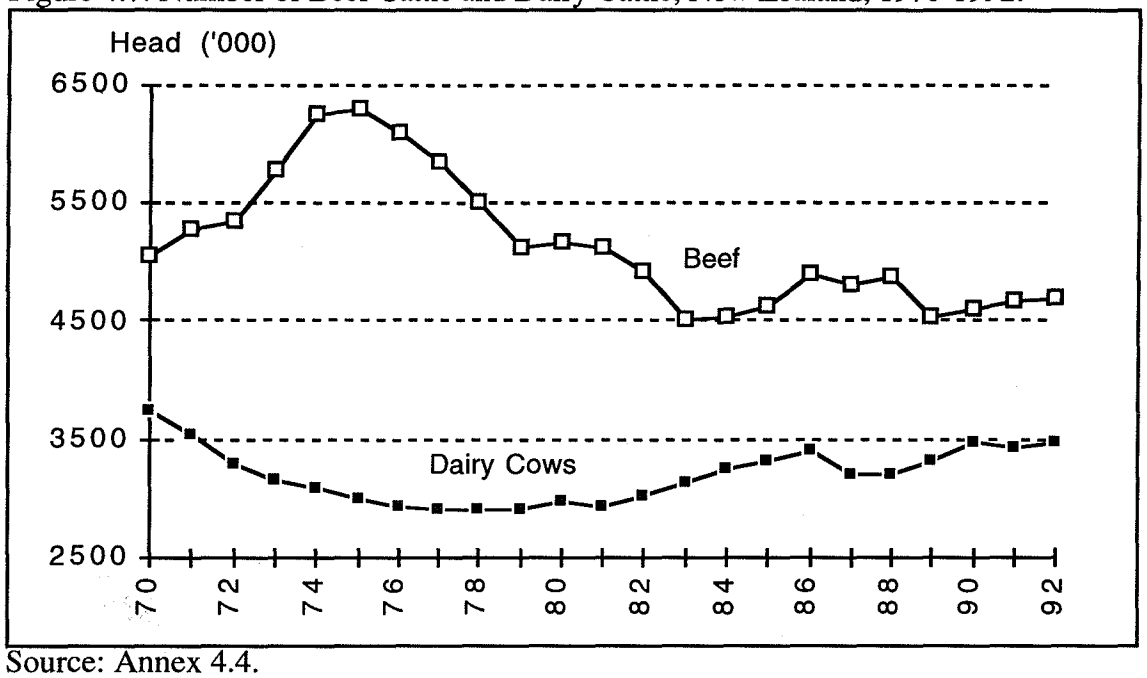


Source: Annex 4.4.

As for the change in beef cattle numbers (see Figure 4.7), it is the reverse of the number of sheep, steadily decreasing from 1975 to 1983, slowly increasing to 1988, and then levelling off. This confirms that these two types of production are substitutable but the increase in the beef cattle is less pronounced than the decrease in sheep for the recent period.

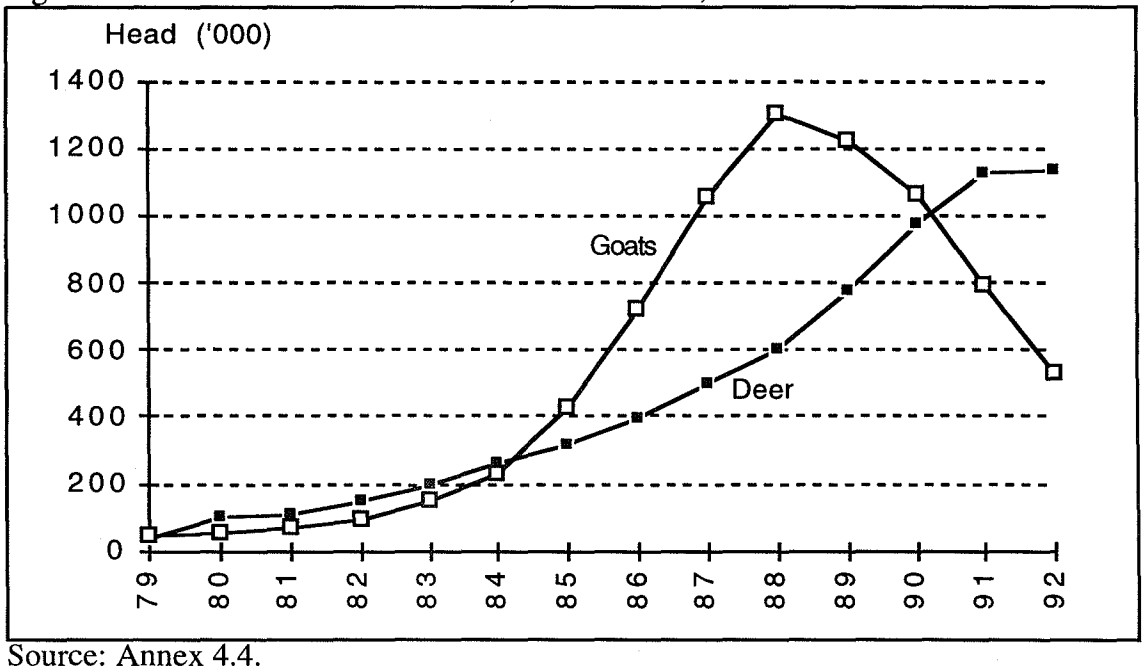
Dairy cattle numbers show a similar change as with the number of dairy farms seen earlier. These livestock had been decreasing for all of the 1970s then increased for most of the 1980s and early 1990s. Only a brief pause in 1986 and 1987 broke this increase, these two years being characterised by low dairy product prices on international markets.

Figure 4.7. Number of Beef Cattle and Dairy Cattle, New Zealand, 1970-1992.



Source: Annex 4.4.

Figure 4.8. Number of Deer and Goats, New Zealand, 1979-1992.



Source: Annex 4.4.

Finally, deer and goat numbers increased spectacularly from the beginning of the 1980s [1](see Figure 4.8). The increase in deer has been maintained for all of the period of observation, only slowing down in 1992. In contrast, the number of goats, after having shown one of the most spectacular increases, decreased just as rapidly since 1988. The profitability of this production did not meet initial expectations and this could explain the decrease in numbers.

The essential element which derives from this analysis is that overall, the number of stock units carried on the agricultural area began to decrease in a significant way in 1987. It is likely that this follows from the abolition of subsidies to the pastoral sector and, in particular, the sheep sector. But once again, the effects of the revision to agricultural policy do not seemed to have led to major changes in the tendencies already at work: trends in beef and dairy cow numbers were relatively unaffected by the policy changes and trends in sheep number were accelerated.

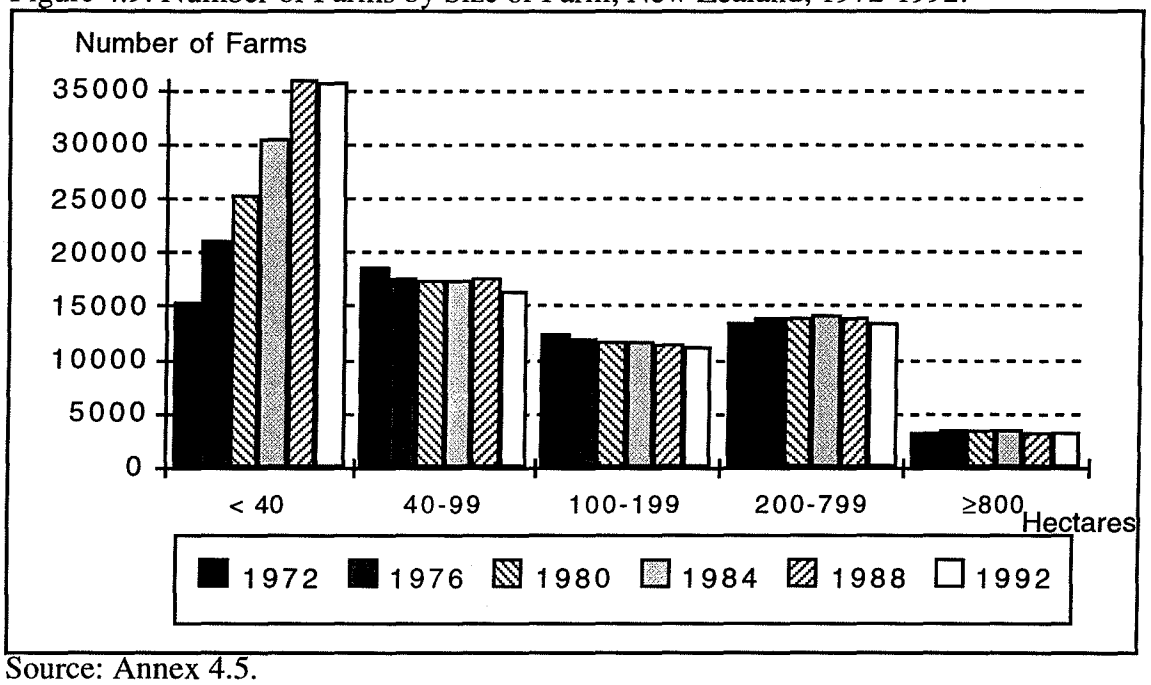
In total, the overall data do not seem to show that political and economic decisions affected the level of concentration in the farm sector. In fact, structural changes are the result of many factors. Of course, the abolition of subsidies can have an effect but one which is only a part of the more global question of the relative returns to different types of production. Another factor is the increase in lifestyle blocks, allowing initially non-farming people to experience rural living, and this is not directly related to the intrinsic profitability of the farm sector. In this way, even if from the analysis of the aggregated data for New Zealand, there has not been concentration of land in farming, however, there may have been concentration of production in some sub-sectors of production. An analysis of land areas and of the number of farms by size is necessary to address the complexity of all the factors at work.

4.2.3 An Analysis of the Farming Area and of Livestock by Size of Farm

Figure 4.9 shows that the increase in the total number of farms for most of the period of observation came above all from the increase in small farms, those with less than 40 hectares. Once again, the double phenomenon of increasing numbers of horticultural farms and of the lifestyle blocks seem here to be relevant causes. On the other hand, the number of mid -sized farms, from 40 to 199 hectares, has been generally decreasing since 1972. This fall has been compensated in part by an increase to 1984 in the numbers of large farms (more than 200 hectares). It is possible that this increase numbers of large farms meant a certain concentration of pastoral production, supported by the government programmes to increase production.

[1]Earlier, they did not appear in the official statistics.

Figure 4.9. Number of Farms by Size of Farm, New Zealand, 1972-1992.



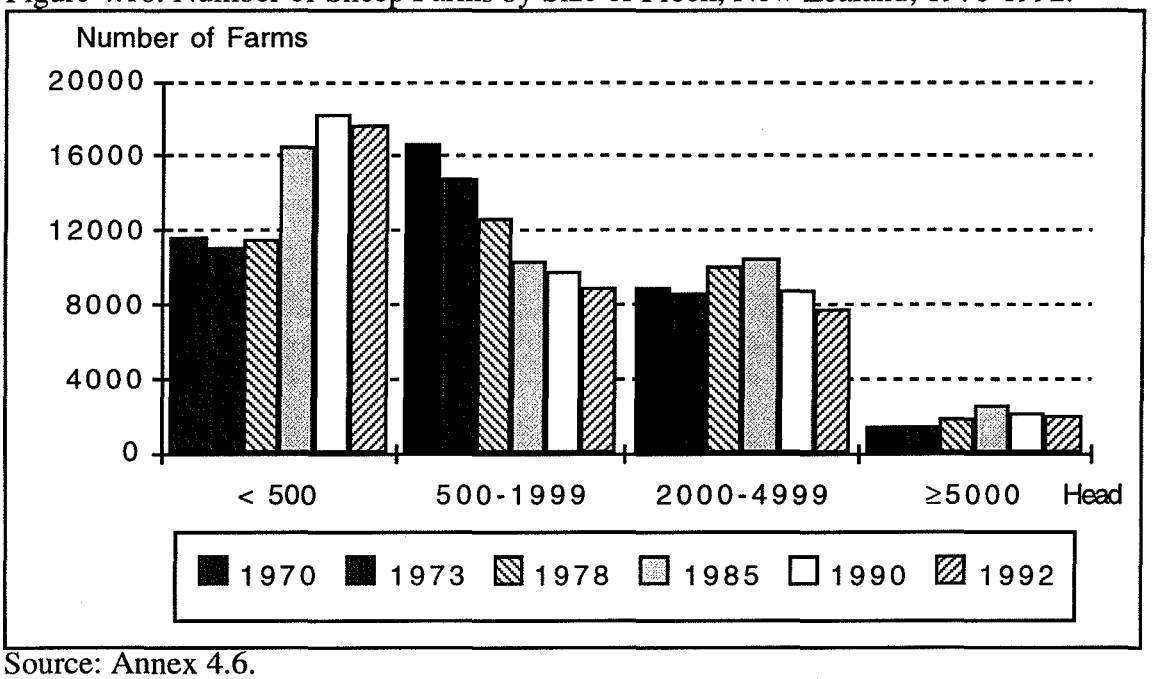
Source: Annex 4.5.

However, since 1984 only the category of small farms (less than 40 hectares) has continued to increase, and this only to 1989 (see Annex 4.5). In addition, it is necessary to note that for farms of less than 20 hectares, the "small" farms (Department of Statistics definition) have increased between 1986 and 1990 while the number of "significant" farms declined from 1988. In total, the "small" farms in 1990 accounted for 87.7% of this category, an increase of 3.1% since 1986 (our calculations from Fairweather 1992, p.27). The other categories of size of farm, more than 40 hectares, have all been dropping. Concerning the large farms, over 200 hectares, they show a reverse of the tendencies at work before 1985. Finally, we can conclude that the drop in the total number of farms since 1990 does not seem to be linked with an effect of size since decreases in number have occurred for all of the farm size groups. Thus, what concentration that is occurring is slight and is not a characteristic of any particular farm size. It is more a fact of the general process of adjustment to all categories of size.

In order to observe contradictory concentration phenomena (increase then decrease of the number of large farms) which have happened both before and after 1985 it is useful to look in detail at structural change in the sheep and dairy sectors, these being the two most important pastoral land uses. In the sheep sector, once again we note the increase in the small farms (less than 500 sheep) (see Figure 4.10). The small farms accounted in 1992 for nearly 50% of all sheep farms, compared to only 30% in 1970. For some authors, there is no doubt that the lifestyle blocks are again one of the causes: "Also of significance was a growth in small sheep and beef farms (especially during the late 1970s) as lifestyle blocks" (Sheppard and Lattimore

1993, p.5). These data on the proportion of small farms are in accordance with those on the partition of farms by economic category. The "small" farms accounted in 1990 for 50% of the aggregated total of sheep and beef farms (see Annex 4.2).

Figure 4.10. Number of Sheep Farms by Size of Flock, New Zealand, 1970-1992.



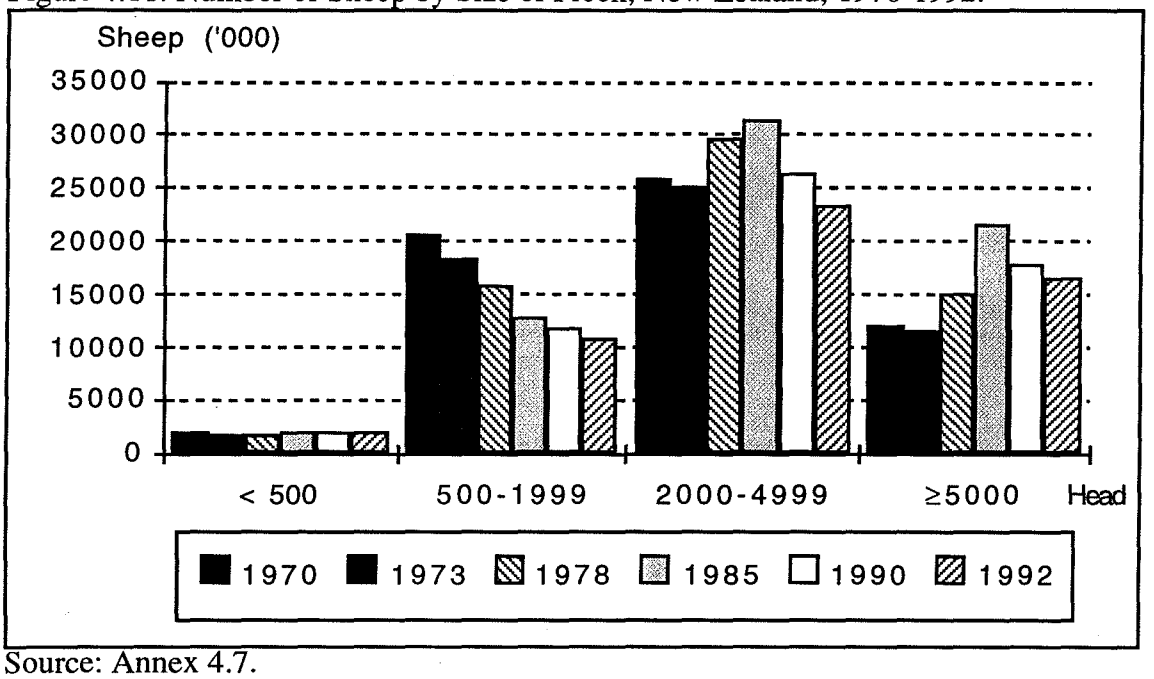
Source: Annex 4.6.

Contrarily, the number of mid-sized farms (500 to 1,999 sheep) has been in constant decline between 1970 and 1992, changing from 43% to 25% of the total number of sheep farms. For the large farms, those of 2,000 or more sheep, the change in their number has followed that of livestock: an increase in 1978 and 1985 compared to most of the 1970s, then a decrease following the abolition of support to that sector. It seems then that these are the farms most affected by the reforms in agricultural policy.

Moreover, Figure 4.11 confirms that the fall in sheep numbers noticed since 1985 come above all from the farms with large flocks. Farms with flocks over 2,000 sheep showed a marked decline in total number of sheep. As for the farms with small flocks, they seem little subjected to economic conditions since the stock number is constant for them since 1985 and little changed over the whole period of observation[1].

[1] We have to note that the number of sheep farms with less than 500 sheep is increasing significantly from 1970 to 1992 although this category of size has a constant number of sheep. It means probably that more smallholdings could be lifestyle blocks with fewer sheep.

Figure 4.11. Number of Sheep by Size of Flock, New Zealand, 1970-1992.



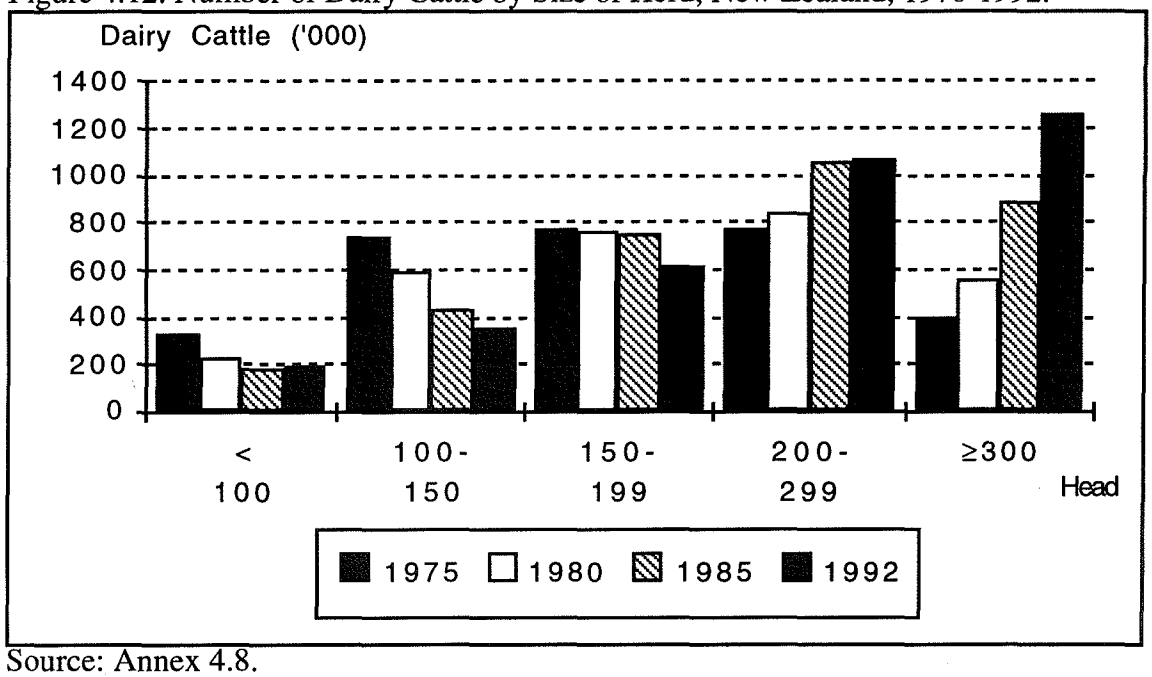
Source: Annex 4.7.

The dairy sector has increased importance since the beginning of the 1980s with overall gains in number between 1981 and 1992. Contrary to the sheep farms, on the dairy farms with large herds, those with more than 200 cows, they have been steady increases in total dairy cattle numbers (see Figure 4.12). In this sector too, the total number of dairy cattle in medium-sized herds (100 to 199 cows) has been declining. For dairying, the appearance of small production units does not seem possible. The milking equipment that has to be purchased is clearly more expensive than the capital expenses in the sheep sector, and it is likely that the dairy herds on lifestyle blocks must be very small in number. For that matter the grouping of dairy farms into "significant" and "small" shows that the latter count for only 14% of the total in 1990 (see Annex 4.2) Finally, in this sector, the tendencies at work seem to be constant since 1975. The changes in the agricultural policies after 1985 do not seem to have had major structural effects, unlike in the sheep sector.

In conclusion, we can note that the growth until 1990 in the number of farms in New Zealand come largely from the contribution of "small" farms. The phenomenon of lifestyle blocks seems to be of first importance at this level. The revision of agricultural policies since 1985 does not seem to led to the process of concentration in the farm sector. Conversely, since 1985, the number of large sheep farms, earlier increasing, has been decreasing. However, their part of the total flock has not changed noticeably, the farms with more than 5,000 sheep owning 31.5% of the livestock in 1992 compared to 31.9% in 1985. This sector is all the same relatively concentrated since these large farms account for only 5.4% of the total of sheep farms in 1992. At the other end of the scale of size, the farms with less than 500 sheep are

important in number, but they own only 3.8% of the livestock. The dairy cattle numbers are generally increasing. In terms of concentration, the dairy cattle owned by the farms with large herds, more than 300 cows, has doubled during the last ten years. It is a long term tendency that does not seem to be modified since 1985. However, the level of concentration is less in this sector than in the sheep sector: the farms with more than 300 cows account in 1992 for 15% of the total of dairy farms but own only 36% of the dairy cattle[1].

Figure 4.12. Number of Dairy Cattle by Size of Herd, New Zealand, 1970-1992.



Source: Annex 4.8.

4.3 The Use of Labour in Farming

Another important aspect of structural change in farming is indicated by the change in the use of labour. We have already mentioned that one element of the capacity of the farm family to resist falls in income levels is the possibility of reducing returns to its own resources, notably family labour. However, the available data do not permit a detailed analysis to be made. It is not possible to simply follow the number of different types of workers because of methodological problems. Fairweather notes on this subject that the method of collecting the

[1] The number of farm with large herds is however increasing according to the data from the Livestock Improvement. The number of herds of more than 300 cows increases from 1.5% to 9.0% of the total number between 1981 and 1993 (Fairweather 1994, p.8).

data has varied significantly in recent years (Fairweather 1992, p.30). Thus an analysis based solely on the official labour statistics could also reflect the changes in the collection methods rather than structural changes in farming.

Further, Fairweather notes that between 1981 and 1988, the form of the questionnaire used to count the number of workers on farms has changed (Fairweather 1992,p.30). In consequence, the data for the period before 1984 are difficult to compare to those of later years. From 1984 to 1987, the data seem consistent from one year to another. In contrast, from 1988, the form of the questionnaire changed again, which seemed to have led to an artificial decrease in the number of unpaid family workers. Finally, instead of attempting to reconcile the data, we have used for our analysis two distinct periods during which there does not seem to have been a significant change in method: 1984 to 1987 and 1988 to 1992. The data for these periods will be used to make some tentative assessments of changes in the use of farm labour.

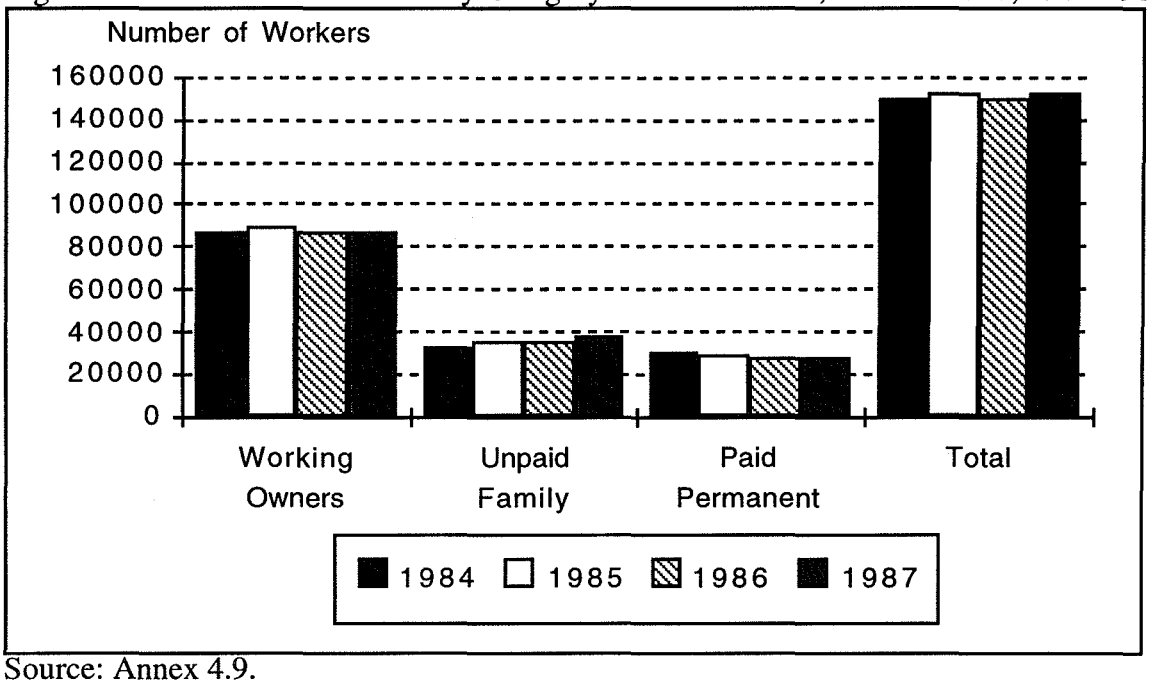
Figure 4.13 shows that between 1984 and 1985, there is an increase in total labour, and this comes from the increase in the number declaring themselves in the owner and unpaid family worker categories. The number of permanent paid workers decreased over this same time. From 1985 to 1987, there seems to have been a movement of workers between the different categories, since the total labour force returned in 1987 practically to the same level as in 1985. For this latter period, unpaid family workers increased in number to the detriment of the two other categories which decreased in number. A possible explanation of this phenomenon is that a certain number of permanent workers and owners were members of the family and had accepted that they would no longer be paid. It is perhaps an illustration of the possibility of the under remuneration of the family workers in a period of economic crisis.

For the second period, 1988-1992, the movements from one year to another are variable (see Figure 4.14). Notably, between 1988 and 1989, all the worker categories displayed a decrease in number, which is surprising since the number of farms increased (see Figure 4.1). That being said, it is interesting to note that between 1990 and 1992 the number of permanent workers increased, which could indicate a return to better conditions of return to resources and ability to pay or hire workers. Thus, despite the drop in the total number of farms, and the corresponding decrease in the number of farm owners from 1990, the total number of workers employed in the farm sector has slightly increased in 1992 compared to 1990.

The problems of the survey methods used to collect the data, among others, means that the analysis of the available data on the farm workers is not conclusive. However, without making a formal conclusion, we can suggest that following the abolition of agricultural support in 1985, there seems to have been a certain decrease in the number of paid workers. Part of this

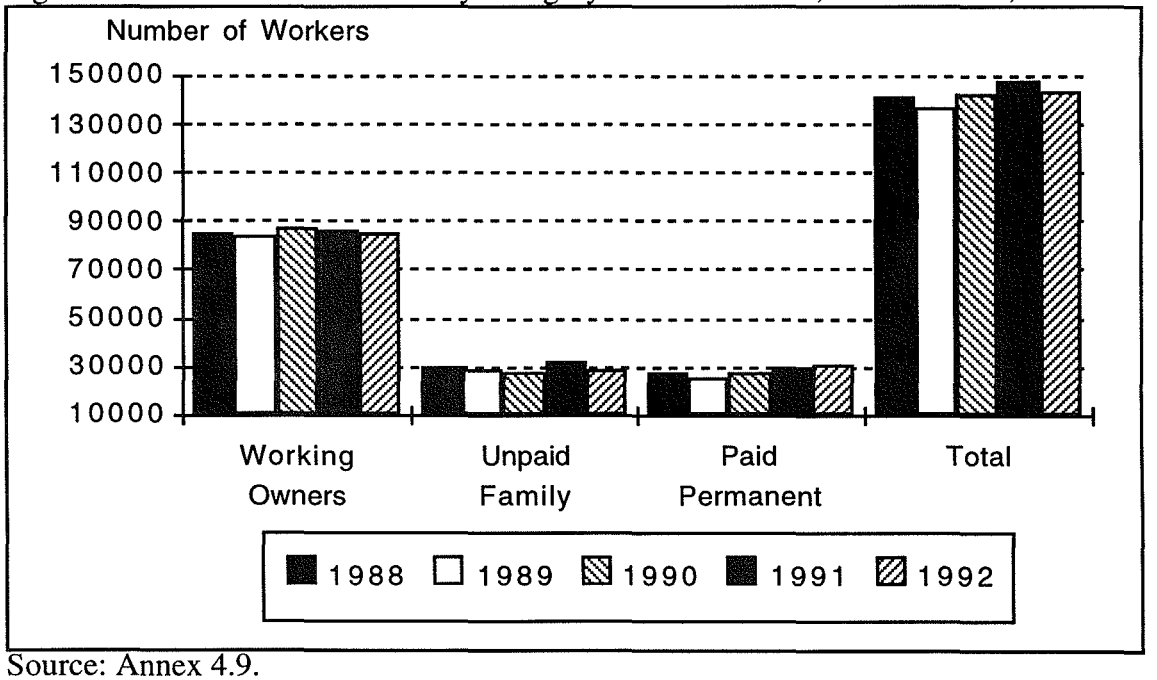
workforce has passed from owner operators and permanent workers to unpaid members of family. This observation supports the hypothesis of a possibility of reduction in the family worker income in a period of economic crisis.

Figure 4.13. Number of Workers by Category of Farm Labour, New Zealand, 1984-1987.



Source: Annex 4.9.

Figure 4.14. Number of Workers by Category of Farm Labour, New Zealand, 1988-1992.



Source: Annex 4.9.

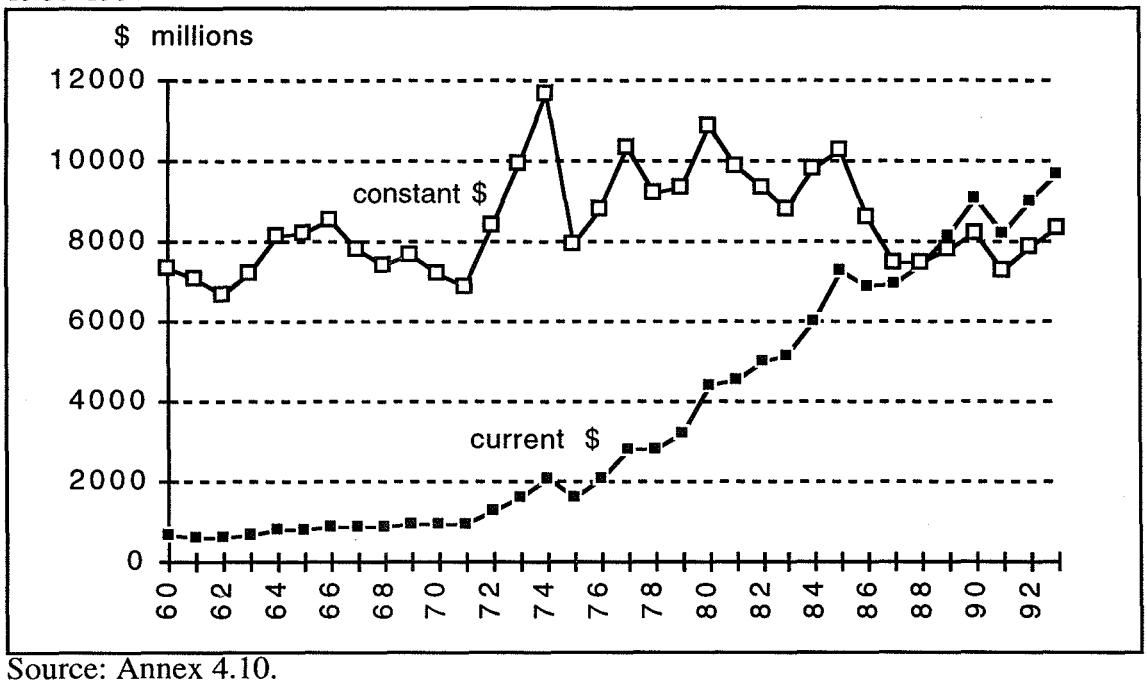
4.4 Change in the Levels of Production and Agricultural Exports

We have seen that during the period preceding the revision of agricultural policy in New Zealand, a certain number of programmes were put in place to encourage production. The objective was to improve the balance of payments by increasing agricultural exports. In consequence, we can examine if the removal of different programmes and the changes that we have analysed caused a fall in agricultural production and exports.

4.4.1 The Increase in Production Stopped

An overall measure of agricultural production is represented by the value of agricultural production shown in Figure 4.15. In current dollars, the tendency for the increase in the value of production is broken by a fall in 1986 and 1987 compared to the level attained in 1985. In constant dollars, the value of production has been above the level attained during the 1960s for all of the 1970s and until 1985. Afterwards it declined drastically in 1986 and 1987 and returned approximately to the same level as in 1960s. A decrease of this magnitude (-27% between 1985 and 1987) had already be observed in 1975 (-32%), but with the difference that since 1985, the drop occurred for a much longer period.

Figure 4.15. Agricultural Output in Current and Constant (Dec. 1988) Dollars, New Zealand, 1960-1993.



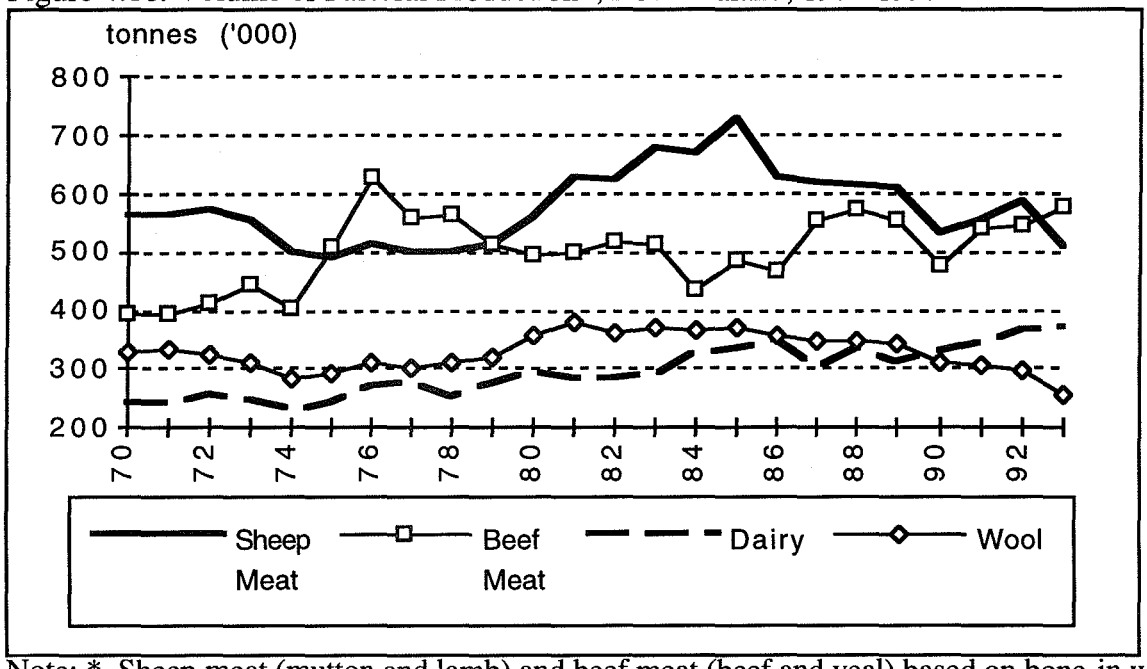
Source: Annex 4.10.

However, this total measure of the value of agricultural production combines production volumes and income obtained from the market. A rise or fall in value of production can be due

to variation in the market price and not reflect change in the volume of production. Figure 4.16 shows the change in the volume of agricultural production.

From the end of 1976 and again more in 1978, we can see a decrease in beef production and an increase in sheep meat production. In 1984, the production of beef attained a low which seems to correspond to the period of rebuilding breeding herds. It is in effect at that time that the beef herds began to increase (see Figure 4.7). Conversely, 1985 showed a peak of sheep meat production that could correspond with the beginning of the period of decrease in breeding herds. Equally, it was from the end of 1985 that production of wool began to decline. During all these years, sheep and beef production seemed to be in direct competition in the utilisation of resources, sheep production appearing more attractive, possibly because of the high level of government support which was accorded to it.

Figure 4.16. Volume of Pastoral Production*, New Zealand, 1970-1993.



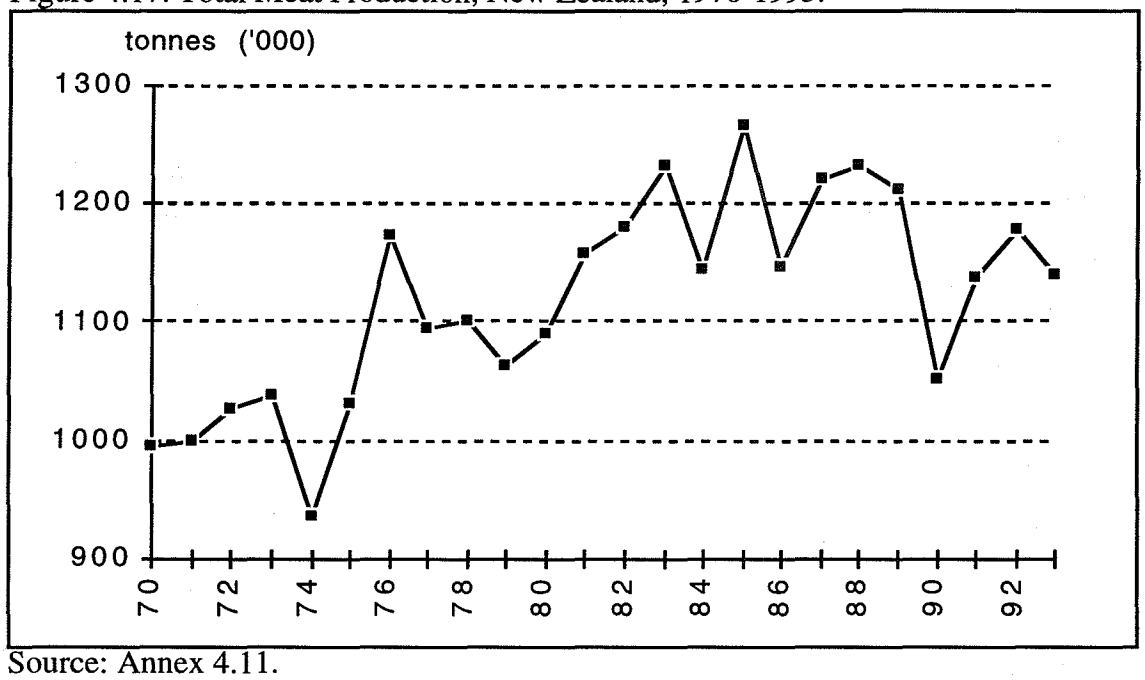
Note: * Sheep meat (mutton and lamb) and beef meat (beef and veal) based on bone-in weight, wool based on greasy and dairy based on milk fat.
Source: Annex 4.11.

From 1987 to 1992, these two sectors of production had evolved approximately in the same way. The drop in production from 1990 followed a period of drought which hit the main production areas and since then a certain increase in production can be seen. However, it is necessary to note that Figures 4.6 and 4.7 show that sheep flocks decreased while the beef herds increased in the same years. Maintaining the volume of sheep meat production has been due in part to selling breeding herds, which has led to a drop in production in 1993. In contrast, the increase in beef production turns out to be more durable since it seems to come

from an increase in breeding herds. The change in dairy production displays lesser annual variability than for the two other types of production. After having decreased at the beginning of the 1970s, dairy production has since regularly increased, to rise by 49% between 1978 and 1993.

In total, following the revision to agricultural policy, the value of New Zealand agricultural production, in real terms, has declined and returned to the level of the 1960s (see Figure 4.15). In contrast, in volume, the pastoral sector does not display a marked tendency to decline although it has declined slightly. Dairy production has carried on with an increase begun at the middle of the 1970s. Sheep production dropped strongly at first but this drop is compensated in large part by an increase in beef production. Moreover, the total meat production (see Figure 4.17) although considerably lower than the peak of 1985 and variable from one year to another, seems to have been maintained at a level higher than in the 1970s.

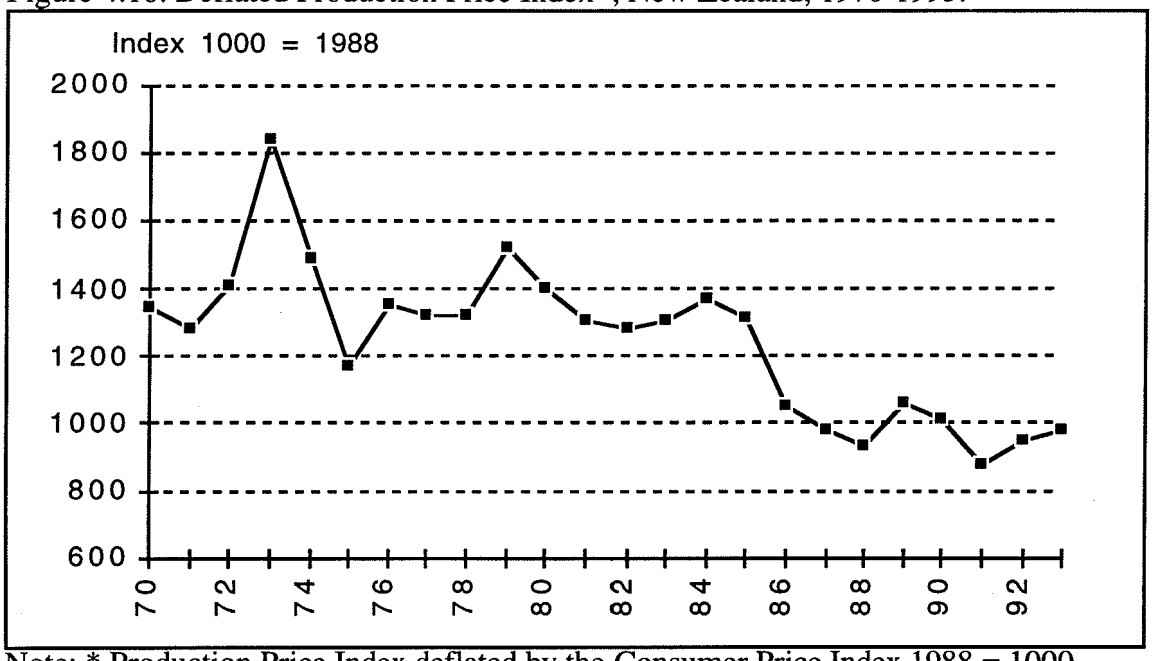
Figure 4.17. Total Meat Production, New Zealand, 1970-1993.



Source: Annex 4.11.

In consequence, as the value of production has decreased relatively more than the decrease in the volume of production, farm prices must also have been involved. In this way, according to Figure 4.18, the change in the deflated production price index indicates a sharp drop in 1986, of nearly 20%. Since a large part of the government payments to the agricultural sector were to support the price of sheep meat, the removal of subsidies could only lead to a lower market price. Without price support the drop in real prices from 1986 has continued on the international market.

Figure 4.18. Deflated Production Price Index*, New Zealand, 1970-1993.



Note: * Production Price Index deflated by the Consumer Price Index 1988 = 1000.
Source: Annex 4.12.

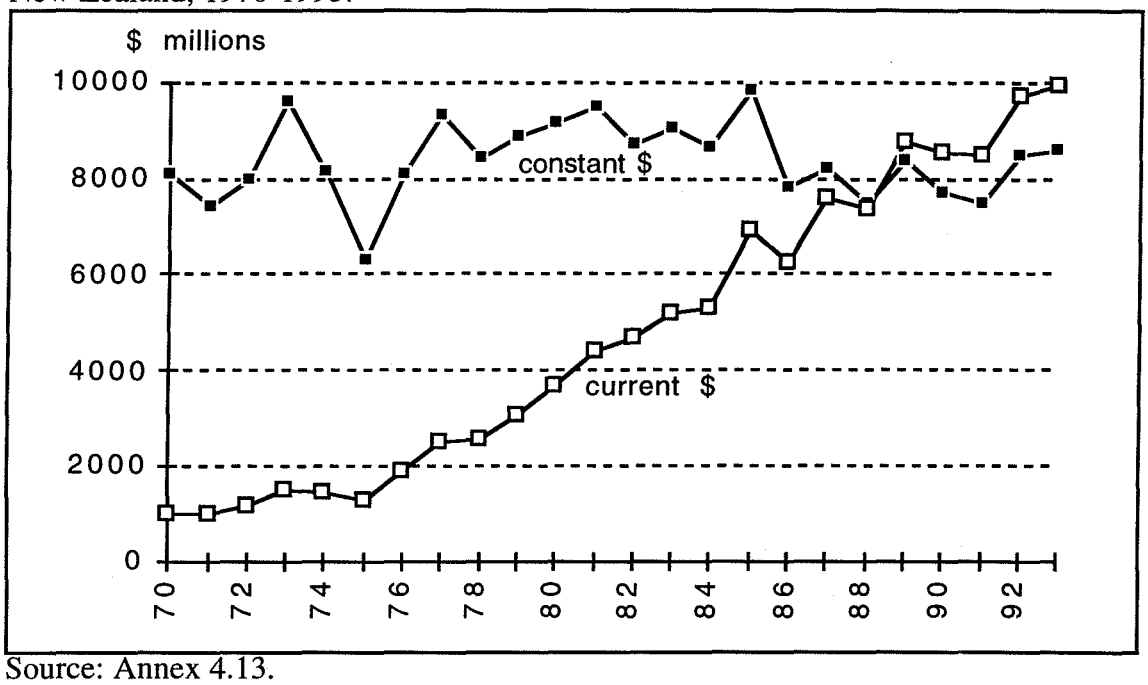
4.4.2 The Lowered Value of Food Exports

For New Zealand, having only a small internal market, the value of agrifood exports is closely linked with the value of agricultural production, which is shown in Figures 4.18 and 4.19. In the ten years which preceded the reform in agricultural policy, that is from 1976 to 1985, agrifood exports had been, on average and in real terms (Dec. 1988 $), close to nine billion dollars per year. Since then this figure has hovered around 7.9 billion per year. A recovery seems to have begun in 1992, but it is again to soon to see if this is a lasting occurrence.

Once again, the value of exports is reliant on, as for the value of production, by the change in its two components, the international market price and export volumes. These elements are shown in Figures 4.20 and 4.21 for the two main groups of products which constitute most of New Zealand agrifood exports, namely fruits and vegetables and pastoral products. Regarding fruits and vegetables, the export volumes have been increasing for all the period with however a certain upper limit since 1990. Conversely, the export price in real terms, which was relatively stable until 1978, has fallen continually since. This drop has accelerated since 1987 with new countries producing kiwifruit for the international market, as we have already noted.

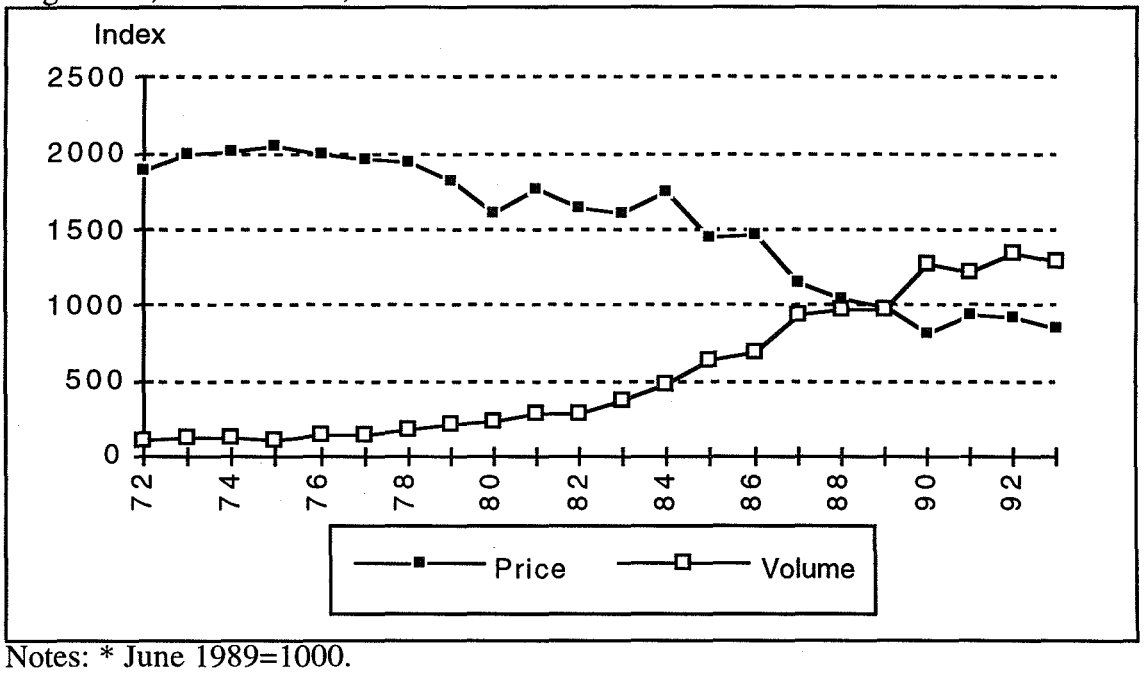
Pastoral agricultural products have also been less remunerated in real terms on the international market. This has not prevented a moderate increase in export volumes until 1985. Despite the sharp drop in export prices since that date, the volume of exports has been maintained.

Figure 4.19. Value of Agrifood Exports in Current and Constant (Dec. 1988 = 1000) Dollars, New Zealand, 1970-1993.



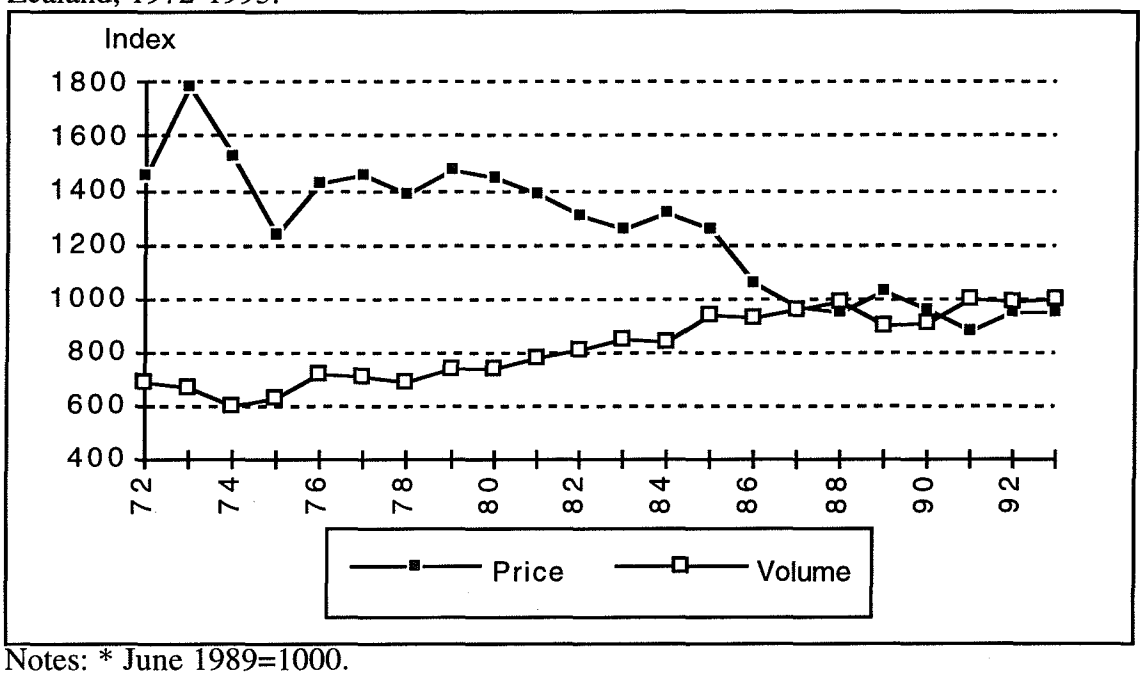
Source: Annex 4.13.

Figure 4.20. Index* of Volumes and Deflated** Price Index for Exports of Fruits and Vegetables, New Zealand, 1972-1993.



Notes: * June 1989=1000.
** Export Price Index deflated by the Consumers Price Index, December 1988=1000.
Source: Annex 4.14.

Figure 4.21. Index* of Volumes and Deflated** Price Index for Pastoral Exports, New Zealand, 1972-1993.



Notes: * June 1989=1000.
** Export Price Index deflated by the Consumers Price Index, December 1988=1000.
Source: Annex 4.14.

In consequence, in total, it seems that the drop in the value of New Zealand agrifood exports is due more to the deterioration in the international market price than to the total drop in export volumes. However, it is necessary to note that the exports in volume were increasing for a long period, whereas they have levelled off in recent years. Concerning the fruit and vegetable sector, there was not any direct connection to the revision in agricultural policy since the policy intervened little in this sector. On the contrary, the decline of the sheep sector, as indicated by livestock and meat production, was certainly accentuated by the removal of subsidies. Beef and dairy sectors have increased their exports at a level sufficient to compensate the drop in other sectors.

4.5 Conclusion

Structural tendencies have always been at work in New Zealand, even before the removal of agricultural subsidies. The sheep sector, the most affected, had began its decline in 1982, in response to a drop in the profitability of exports. The effect of policy revision, since 1985, seems to have accelerated the decline in this sector, but with a certain gap due to the delay in modifying the use of existing resources. This gap can also be due to the resistance capacity in the family farm organisation to lowered returns for their resources.

The fact that the main structural changes showed up before 1985 could indicate that the farm sector was not completely isolated from the effects of the market. In this way, some agricultural producers seemed to have been aware of the fact that the high levels of agricultural subsidies to the pastoral sector would one day end. They had therefore already began to change the use of their resources in those sectors of production more dependent on remuneration obtained from the market. This confirms, in a certain way, that the high level of support to the pastoral sector had only been for relatively short interlude in the economic history of New Zealand. Further, it is likely that a certain number of farmers who benefited from the supports probably realised that they were only to be expected for a short period of time, and this partially explains the relative inertia of the farm lobby during the revision of agricultural policy.

CHAPTER 5

THE EVOLUTION OF FARM INCOME

5.1 Introduction

In the previous chapter, we have assumed that the change of agricultural policy and the evolution of international market prices have contributed to lowering farm sector incomes. It is on this basis that we had discussed the question of structural change, taking into consideration the possible delay of adjustment caused by the resistance capacity characteristic of the family organisation of production. It is relevant now to discuss directly the issue of change in farm income.

At an overall level, we analyse the terms of exchange for the New Zealand farm sector. At a micro-economic level we have for a long period annual surveys of a sample of pastoral farms and we therefore analyse the results of these surveys to understand the evolution of sheep and dairy farm incomes. There is no distinct survey for beef farms. Nevertheless, beef and sheep products are substitutable and often produced concurrently, and therefore the sheep farm survey includes results which reflect the profitability of these two types of production.

5.2 The Terms of Exchange for the Farm Sector

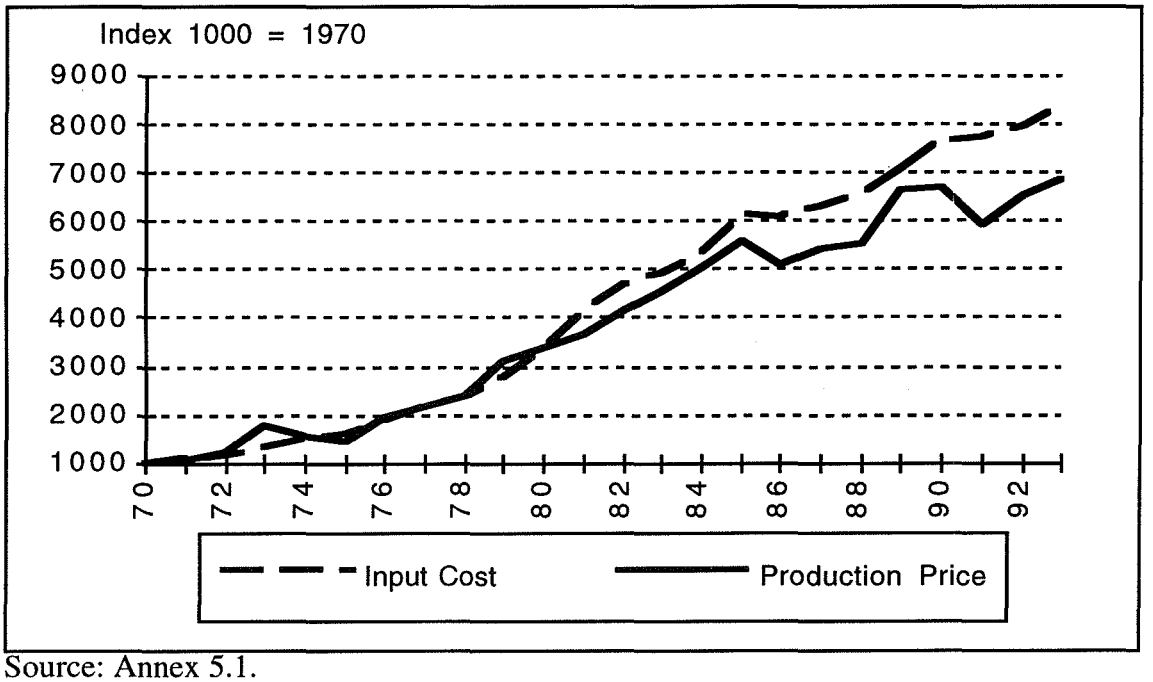
A direct total measure of net income is not published in the New Zealand official statistics[1] (Attwood 1984, p. 10). Nevertheless, the production price index and the input cost index are available for a long period and their ratio, being the terms of exchange, represent an indirect evaluation of net incomes for the New Zealand farm sector. However, such a measure does not consider productivity gains and must be therefore analysed with caution.

Figure 5.1 shows that until the beginning of the 1980s, the input cost index and the production price index remained in close relation. With the exception of the years 1973 and 1979, when agricultural commodity prices were especially high, the terms of exchange in the farm sector stayed constant. On the other hand, since 1981 the terms of exchange have worsened, with input costs rising more quickly than production prices. When support price and income programmes were abolished in 1986, the difference between prices and costs increased still

[1] For more precision on the different data available on the evolution of net income, see Attwood 1984.

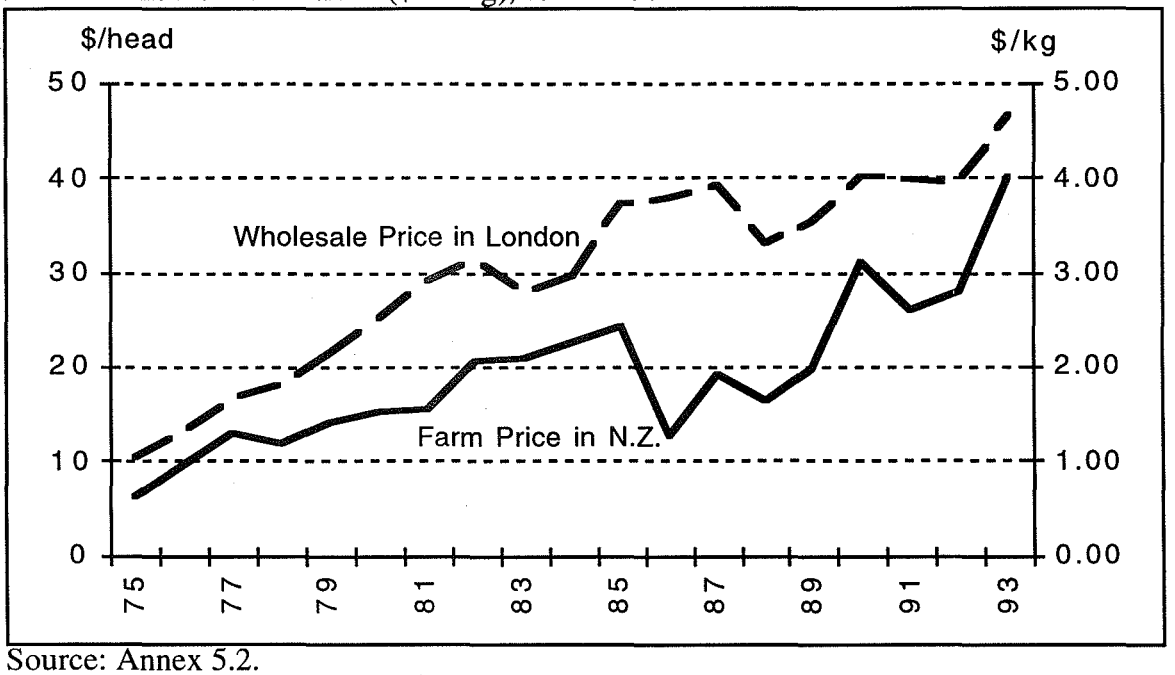
more. This deterioration in the terms of exchange, although variable from year to year, seems to have continued since 1986. Consequently, if New Zealand farmers had not changed their use of resources, they would have faced from 1981, and more since 1986, a decrease in their net farm income.

Figure 5.1. Input Cost Index and Production Price Index for Farming, New Zealand, 1970-1993.



Source: Annex 5.1.

Figure 5.2. Farm Lamb Price in New Zealand ($/head) and Wholesale Price for New Zealand Lamb on the London Market ($NZ/kg), 1975-1993.

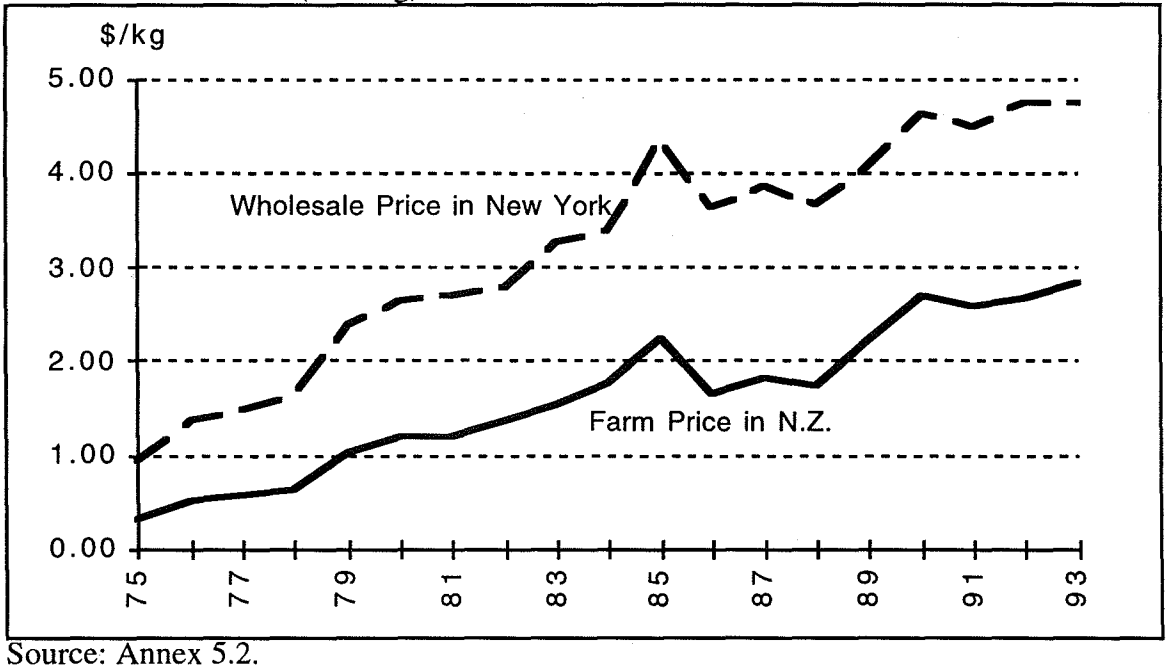


Source: Annex 5.2.

The production price index is an aggregate index of prices for different commodities. Nevertheless, the prices for different commodities do not move all in the same way at the same time as shown in the next four Figures. In regards to sheep production, 1986 seems to be important in the price formation process for lamb. In that year, the farm price for lamb dropped by around half (see Figure 5.2) for the New Zealand market. Because the wholesale price for lamb on the principal export market, United Kingdom, did not show a decrease in the same year, this drop in domestic farm price must be related to the abolition of price support and income programmes that began in 1986. On the other hand, the ensuing decrease in farm price in 1988 seems to result from the export market behaviour which was also decreasing.

The analysis of the decrease of farm prices for beef and milk is entirely different from that of the lamb market. In the case of beef, the decrease in farm price corresponds to a decrease of the wholesale price in New York for New Zealand beef (see Figure 5.3). For the dairy sector, the decrease in farm price in 1986, 1987 and 1991 corresponds to a decrease in the selling price of dairy products on the world market[1] (see Figure 5.4). As a matter of fact, for all of the period under observation, farm prices in New Zealand for both of these products are closely link to export prices. The abolition of state support programmes to the farm sector does not seem to have affected this relation.

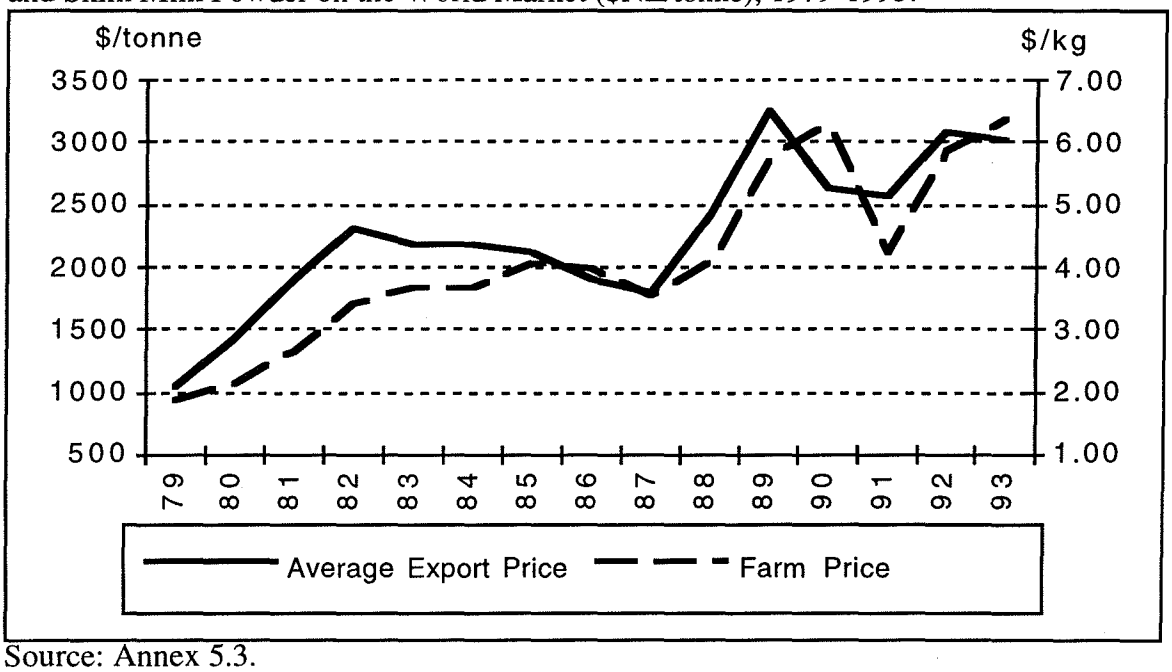
Figure 5.3. Farm Beef Price in New Zealand and Wholesale Price for New Zealand Beef on the New York Market ($NZ/kg), 1975-1993.



Source: Annex 5.2.

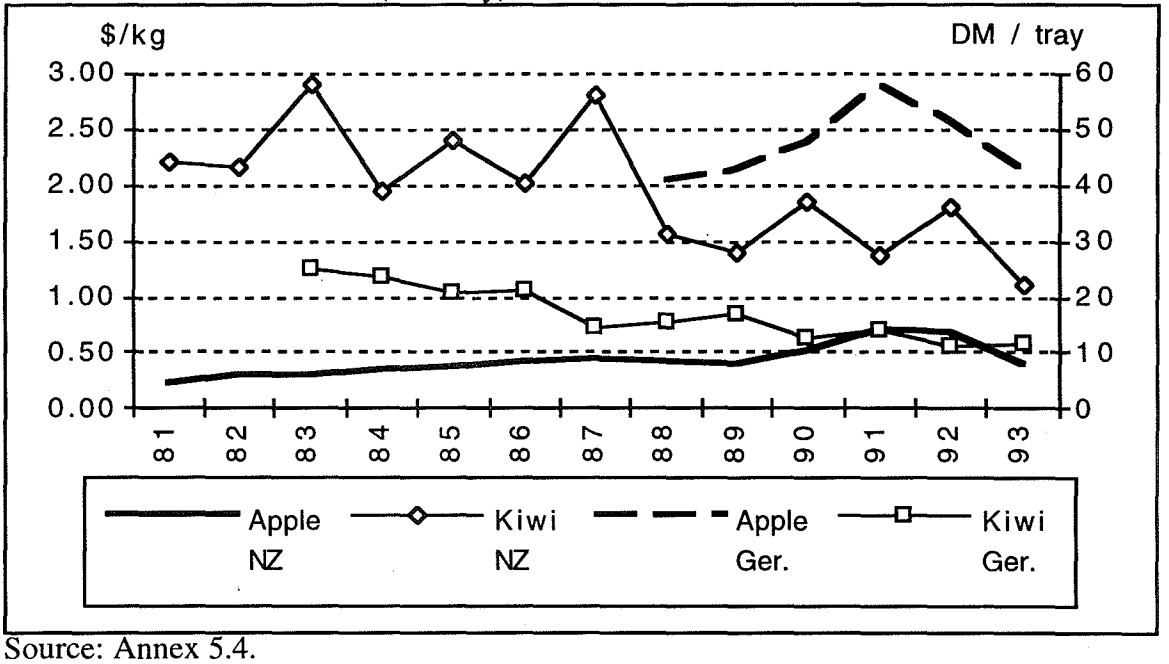
[1] To allow a better view of the evolution of the world price, the simple average of prices for the three main export dairy products (butter, cheddar cheese and skim milk powder) was calculated. The details of prices for each product is given in Annex 5.3.

Figure 5.4. Farm Dairy Price in New Zealand ($NZ/kg) and Average Price of Butter, Cheddar and Skim Milk Powder on the World Market ($NZ/tonne), 1979-1993.



Source: Annex 5.3.

Figure 5.5. Farm Prices for Apple and Kiwifruit in New Zealand ($NZ/kg) and Wholesale Price on the German Market (DM/tray), 1981-1993.



Source: Annex 5.4.

This review of the major components of the production price index would be incomplete without an analysis of the evolution of apple and kiwifruit prices. For these products, a brief examination of farm prices and of export prices on one of the major export markets, Germany, shows the strict dependence of the New Zealand farm sector on the world market (see Figure 5.5). The farm price for kiwifruit has been in decline for a long period, like the wholesale

price on the German market. As to farm price for apples, it reached a peak in 1991 but it has declined rapidly since that year, the price in 1993 being 44% lower than that in 1991. This evolution of New Zealand farm prices reflects, only with more magnitude, the observed price fluctuations on the wholesale German market.

All things considered, this brief analysis of the evolution of the major farm product prices confirms one more time that the sheep sector was the principal victim of the New Zealand agricultural reform policy. In other respects, the structural analysis conducted in the previous chapter shows that New Zealand farmers have reacted to the changing economic conditions by altering the types of production and the output levels. But, to have a better assessment of the adaptation strategies implemented at the farm level, a more detailed analysis of the evolution of incomes must be conducted for the major products of pastoral sector.

5.3 The Economic Results for Sheep Farms

The New Zealand Meat & Wool Boards' Economic Service (NZMWB) have carried out for more than forty years an annual survey based on a sample of sheep farms. This survey provides physical data on production and a financial description of the farms investigated. To qualify for inclusion in the sample, a farm has to winter at least 750 sheep[1]. Likewise, at least 70% of gross revenue must be derived from beef and sheep cattle. The sample is stratified on a geographical basis and by sheep flock size into eight farming subgroups (South Island High Country farms, North Island intensive finishing farms, etc.). The results for all the farms of the sample are presented on a weighted average basis reflecting the importance of each subgroup in the total population *(NZMWB 1993, pp. 6-7)*.

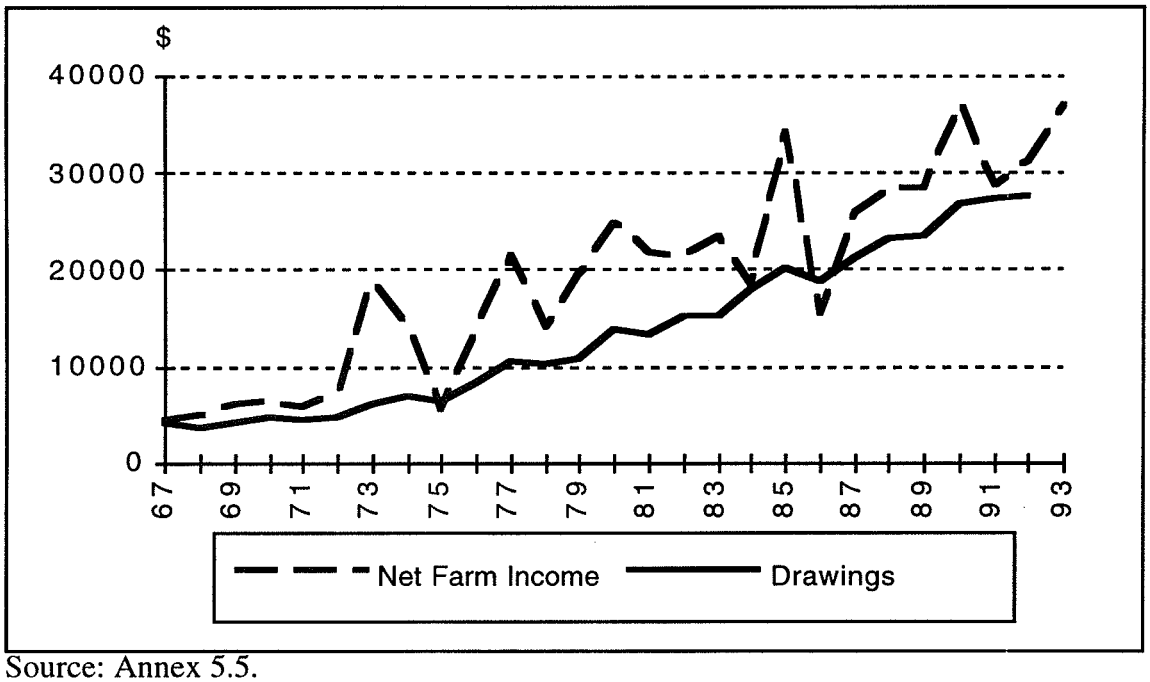
The sampling constitutes in itself a limit to the relevance of these data to assessing farmers' adjustment to the new policy. In fact, some farms that have largely modified the use of their resources are now excluded from the sample. For example, a farmer could have reduced sheep numbers to less than the minimum of 750 sheep wintered in order to keep other livestock or for increasing the commercial crop area where the climate allows it. Thus, the results of the survey can, in fact, minimise the effect of adjustment that farmers could have done because it includes only farmers for whom sheep production remains the most important activity. The survey provides however an economic and financial picture of specialised sheep farms and analysis of survey data remains relevant to our purpose.

[1] Prior to 1974, the minimum was 500 sheep.

5.3.1 The Long-Term Evolution of Incomes

The evolution of net income and of drawings by the owners for all the farms in the sample is shown in Figure 5.6 for the last 25 years. The net income is the amount available to the farmer and his family to remunerate the owner's equity and the non-paid labour, and to reduce the principal on borrowing. All the operational expenses have been accounted for, including depreciation and interest costs. As for the drawings by the owner, they include the amount withdrawn from the farm business during the year to provide for living costs.

Figure 5.6. Net Farm Income and Drawings in Current $ on Sheep Farms, New Zealand, 1967-1993.



Source: Annex 5.5.

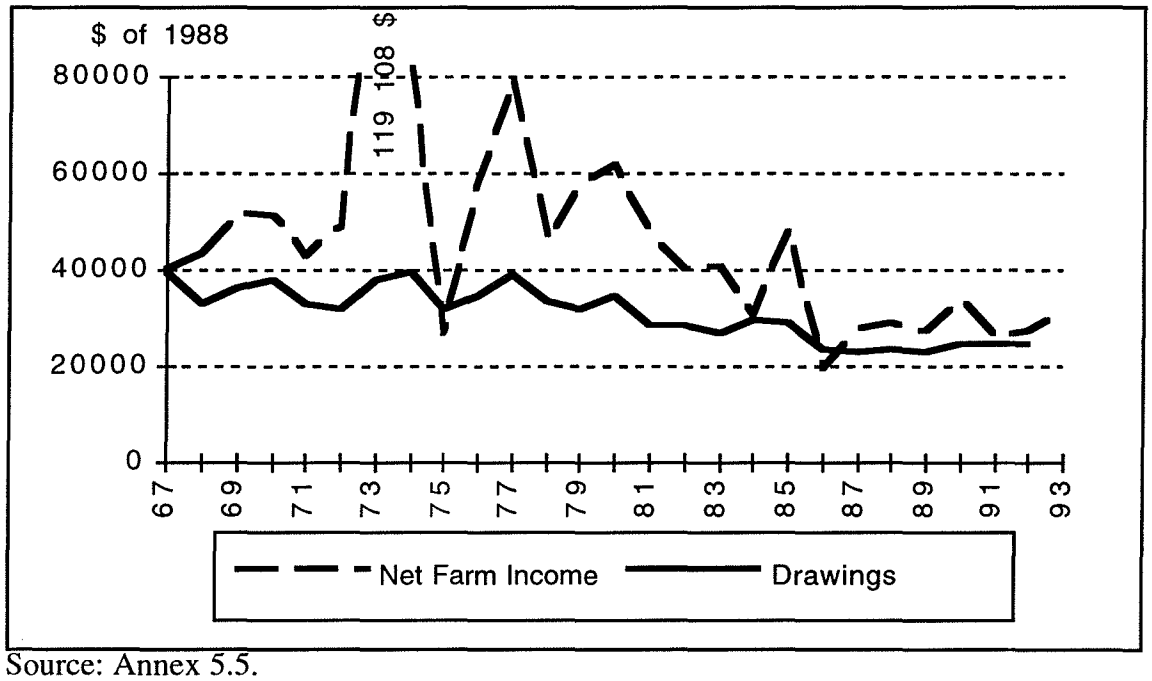
For the entire observation period, net income and drawings have been rising. However, we observe a large variability in the net income from year to year whereas the drawings are relatively less variable. Thus, the net income has increased by more than 50% many times during the observation period while the drawings have never increased by more than 30%. As regards the falls in net income, they are more than 50% only twice, in 1975 and 1986, at respectively 62% and 55%. For both years, the decrease in drawings is slightly more than seven per cent. The decline in net income noted in 1975 is explained first of all by an important price correction on the international market following the exceptional increase of 165% in 1973. On the other hand in 1986, the abolition of transfer payments to the farm sector, and particularly the end of support prices and income programmes in the sheep sector, had certainly an effect on income level.

In real terms, net income as well as drawings are inclined to decrease since the peak reached in 1973 (see Figure 5.7). The beginning of the liquidation of the sheep flock in 1982, that we have observed in the previous chapter (see Figure 4.6), coincides with net income falling below $40,000 from $60,000 in 1980, in constant 1988 dollars. Afterwards, the significant drop in net income noted in 1986, although important, is part of a long-term tendency begun in the early 1970s. This tendency occurred in spite of the increase in government support to the farm sector from the beginning of the 1970s and even with the exceptionally high levels of support from 1982 to 1985 (see Figure 3.5). The drastic drop in support and the end of stabilisation programmes, although having caused an additional decrease in income level in 1986, does not seem to have had long-term effects since then. In fact it is just the opposite, and this is rather paradoxical because, since 1987, without any stabilisation policy, net income has been more stable from year to year than in the remainder of the observation period. Even more, the tendency for long-term decrease in net income appears to break down. We cannot conclude, so far, that state intervention could have destabilisation effects. This stabilisation of income is rather the result of the market conditions and of the adaptation strategy of farmers, such issues will be discussed further later in this chapter.

The evolution of drawings in real terms shows a less significant annual variation than for net income (see Figure 5.7). Since 1987, a certain plateau seems to have been reached but at a level around 40% less than the peak reached in 1974. Consequently, the standard of living allowed by farming activity for the families involved in sheep farming has decreased for most of the period under review. The end of state support programmes to this sector has probably contributed to the last and important drop in the standard of living in 1986, but since, it seems to have stabilised.

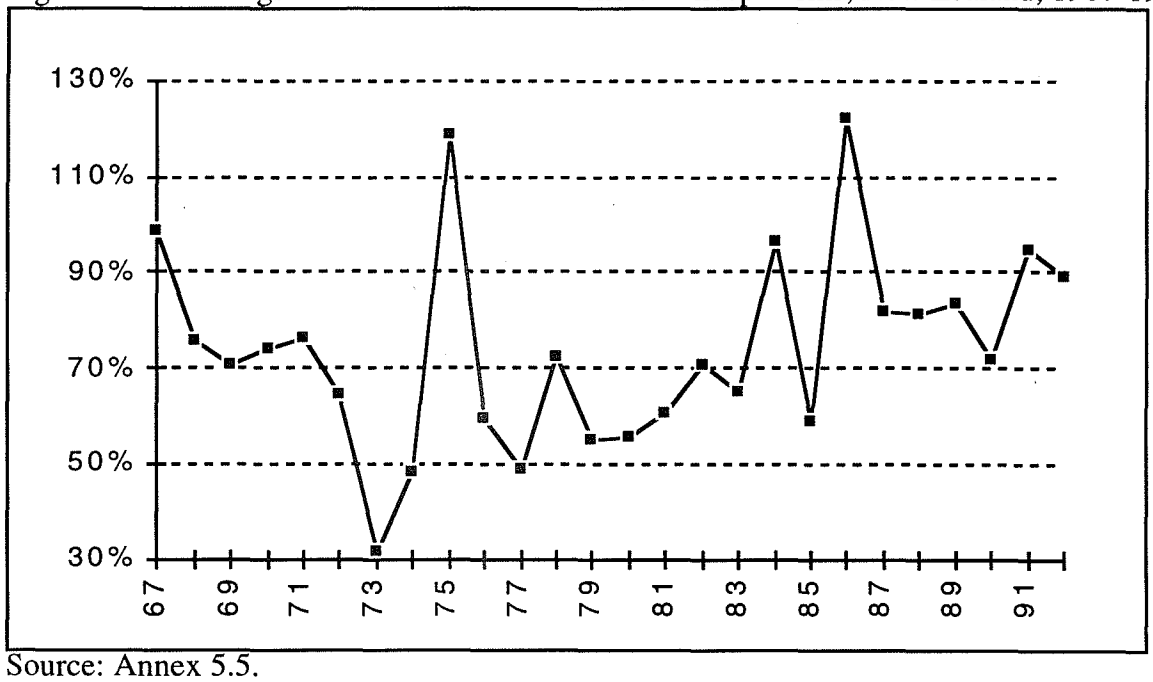
On the other hand, despite of this stabilisation of the standard of living, the drawings as a percentage of net income are relatively high for the recent years (see Figure 5.8). They have occasionally exceeded 90% during the observation period, and even 110% at the time of the most important drops in net income in 1975 and 1986. Nevertheless since 1987, the drawings remain steady typically at more than 80% of net income, a level above the range of 50% to 75% observed for most of the years since 1968. These data on farm income and drawings show that farming activity on sheep farms provides a low surplus for saving and capitalisation, for self-financing of investments or for refunding the principal borrowed. Further, it could mean that farmers have had increasing recourse to non-farm income to at least maintain their standard of living.

Figure 5.7. Net Farm Income and Drawings in Real Terms on Sheep Farms, New Zealand, 1967-1993.



Source: Annex 5.5.

Figure 5.8. Drawings as % of Net Farm Income on Sheep Farms, New Zealand, 1967-1992.



Source: Annex 5.5.

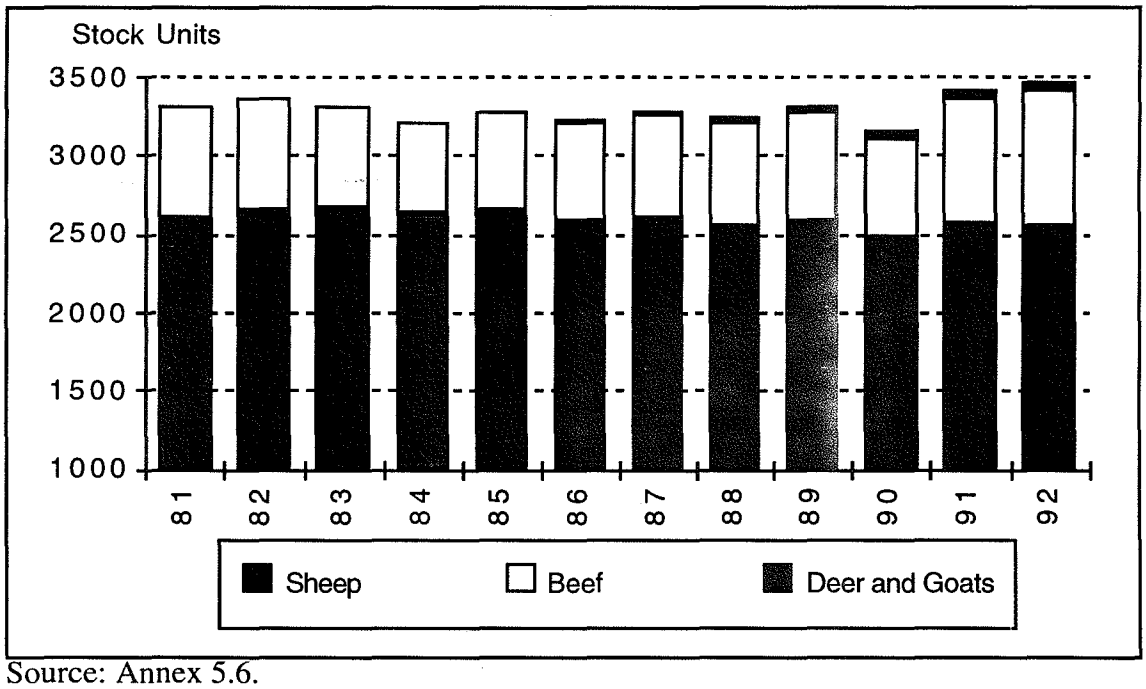
A more detailed analysis of the accounting data available for the recent years must be conducted in order to further examine the adjustments made by farmers to counter the drop in farm income.

5.3.2 An Increase in Productivity

As we have seen in Chapter 1 when we discussed adoption of new technologies, an increase in productivity, to produce more with less resources, is a first possible reaction to the drop in incomes. The results of the survey provide some physical data that allows us to appreciate the evolution of farm productivity. The total livestock carried, by farm and by hectare, provide a first measure of total productivity. As regards the utilisation of inputs, it is interesting to have a closer look at the use of fertilisers, which represent a major farm expense. Finally, we have already discussed the possibility of under-remunerating family labour and it is therefore necessary to scrutinise this issue in regards to the productivity of labour.

First, at the level of the total productivity of sheep farms, the total number of stock units has been relatively constant since 1981 (see Figure 5.9). However, the relative importance of the various types of livestock has changed at the expense of the sheep such that, although they remain the most important, they has been decreasing in number since 1982. The other livestock are growing, particularly beef which, for the last two years, more than counterbalances the drop in stock units caused by the reduction in the sheep. The total number of stock units for the years 1991 and 1992 is the highest for the entire observation period.

Figure 5.9. Total Stock Units and by Type of Livestock on Sheep Farms, New Zealand, 1981-1992.



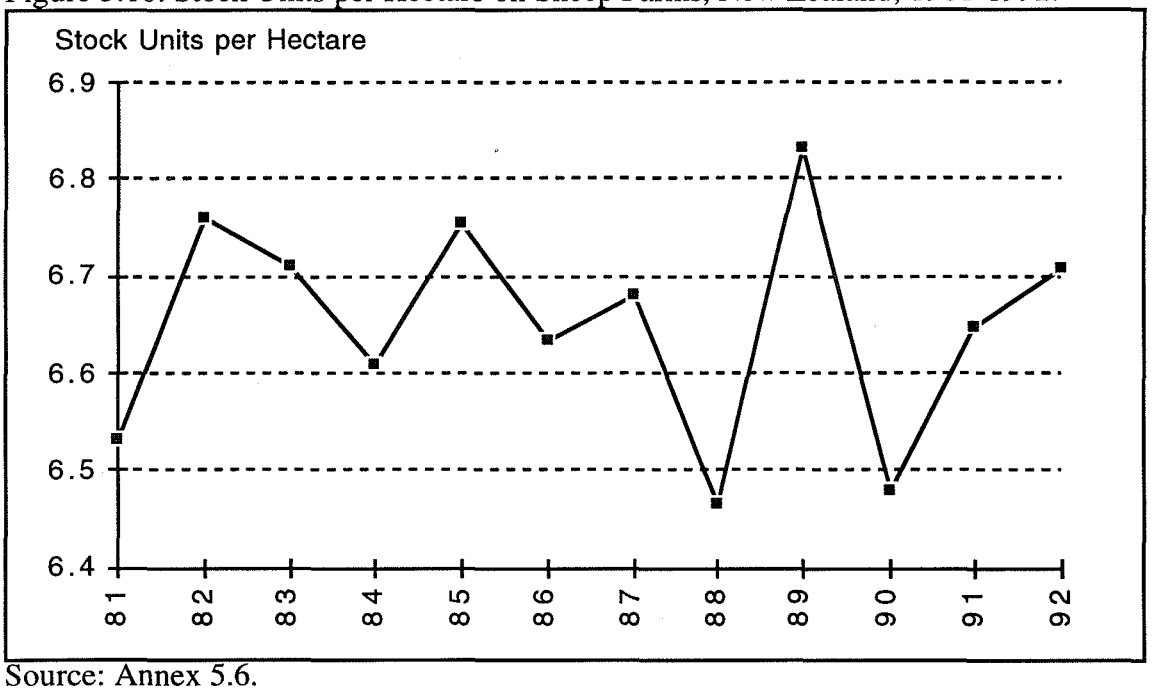
Source: Annex 5.6.

This results here are not entirely consistent with those observed for the livestock data for all New Zealand (see Figures 4.6 to 4.8). Here, the decrease in the number of sheep is less

important than that observed previously and the total number of stock units in New Zealand is decreasing, not growing. This divergence in the results can be explained by the sampling method that allows only the specialised sheep farms to be surveyed. Having said this, the tendency of the last ten years to substitute in part sheep livestock by beef livestock, observed in the previous chapter, is well shown by the results of the survey.

In terms of productivity, the evolution of the average livestock units per farm must be examined in relation to the area owned for estimating the carrying capacity per hectare, and these data are shown in Figure 5.10. The stock units per hectare fluctuates from year to year. For the years preceding the change in agricultural policy, from 1981 to 1985, the number of stock units per hectare was on average 6.67, against 6.64 for the years 1986 to 1992. In consequence, on the basis of this criteria, the policy change does not seem to have led to an increase in productivity during recent years.

Figure 5.10. Stock Units per Hectare on Sheep Farms, New Zealand, 1981-1992.

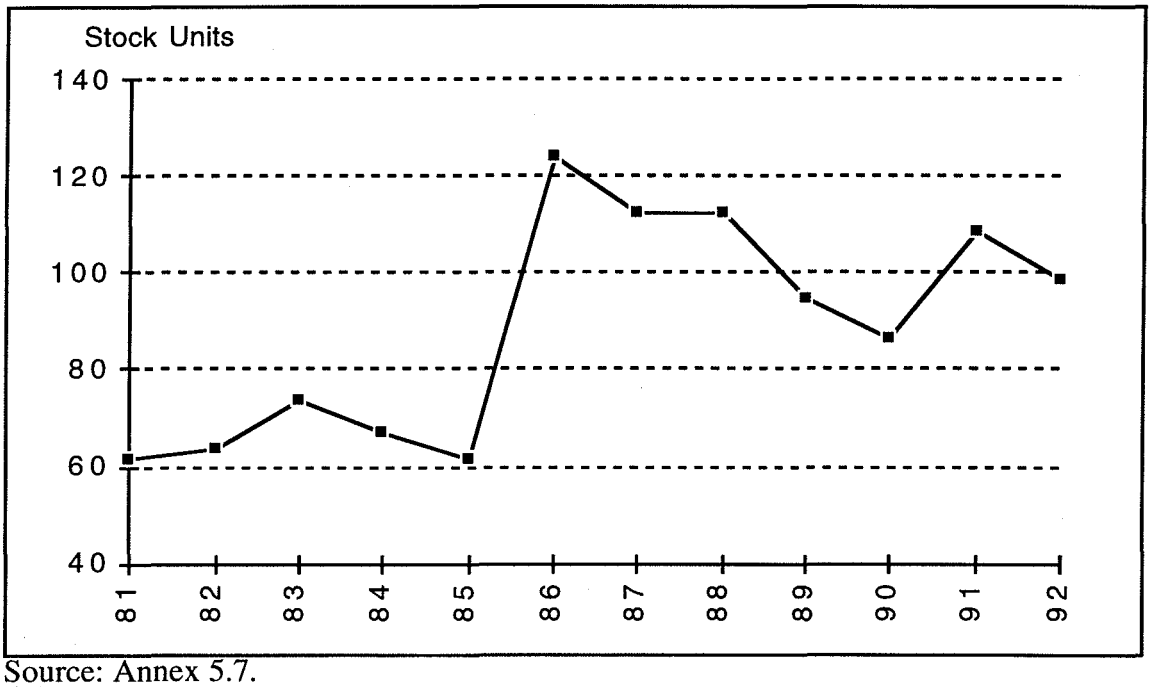


Source: Annex 5.6.

However, although the average stock units per hectare does not change after 1985, Figure 5.11 shows that the stock units per tonne of fertiliser practically doubled in 1986. First, the farmers chose to cut drastically the purchase of fertilisers. For the ensuing years, this ratio decreases to some extent but it maintains a level of 50% higher than the level observed in the years 1981 to 1985. The interpretation of this result can pose some difficulties: is it an improvement in productivity, or a potential deterioration in the long term fertility of land? We can say only at this stage, based on seven years of available data, that the effects of deterioration of the potential of production are manifestly not beginning to be felt. Until further proof, the post

1985 changes could more reflect a rationalisation of the use of fertiliser and therefore an improvement in productivity.

Figure 5.11. Stock Units per Tonne of Fertiliser Used on Sheep Farms, New Zealand, 1981-1992.



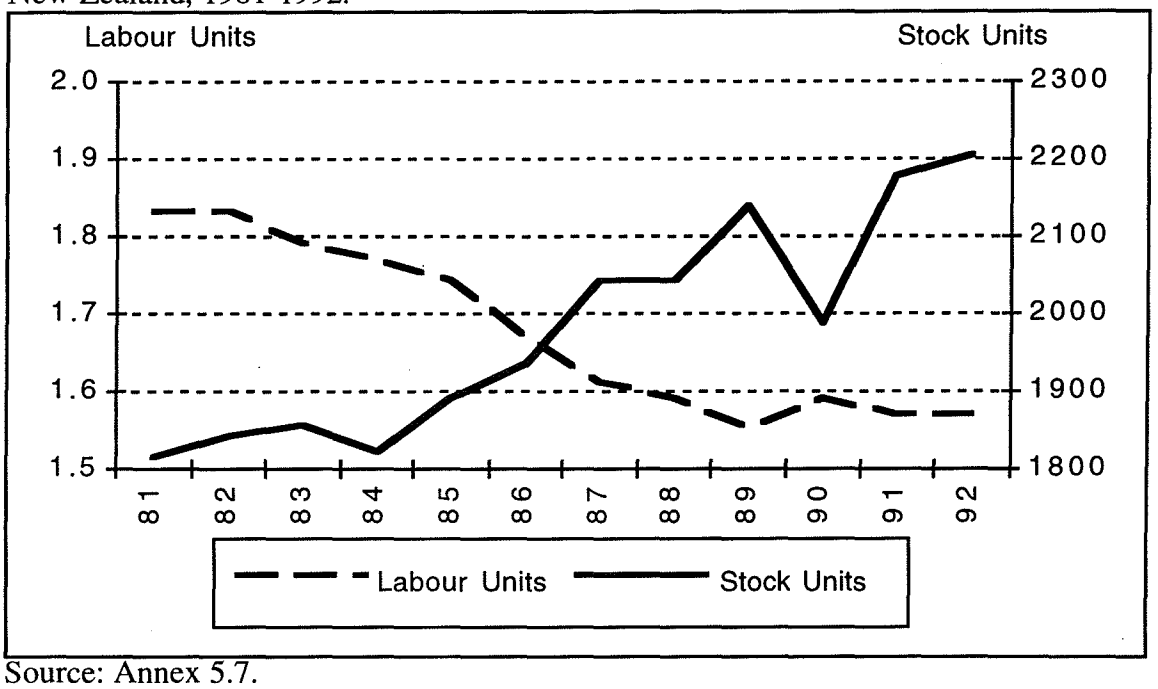
Source: Annex 5.7.

Concerning the availability of labour, the number of labour units per farm has decreased since 1982 (see Figure 5.12). However, this decrease was pronounced from 1985, resulting in a clear increase in productivity per labour unit, calculated by the number of stock units per labour unit. This increase seems to be maintained, although for 1990 the total livestock per farm decreased leading to a drop in labour productivity. Thus, the number of stock units per labour unit in 1992 is 20% higher than the average for the years 1981 to 1985, and that means an important gain in labour productivity.

Nevertheless, the measure used has an important limit: the labour unit is defined on a basis of 12 months labour input by one person[1]. This measure is generally imprecise because it is calculated on the declaration of the farmer who must estimate the number of person per year equivalent for the total work done on the farm during the year. Having said this, in the present case, the drop in the number of labour units declared is sufficiently important and particularly solid from one year to the other for qualifying this measure as a valid indicator.

[1] *"This includes the owner's labour and all permanent and casual labour, but excludes all contract labour such as shearing, fencing and scrub cutting" (NZMWB 1993, p. 13).*

Figure 5.12. Total Labour Units per Farm and Stock Units per Labour Unit on Sheep Farms, New Zealand, 1981-1992.



Source: Annex 5.7.

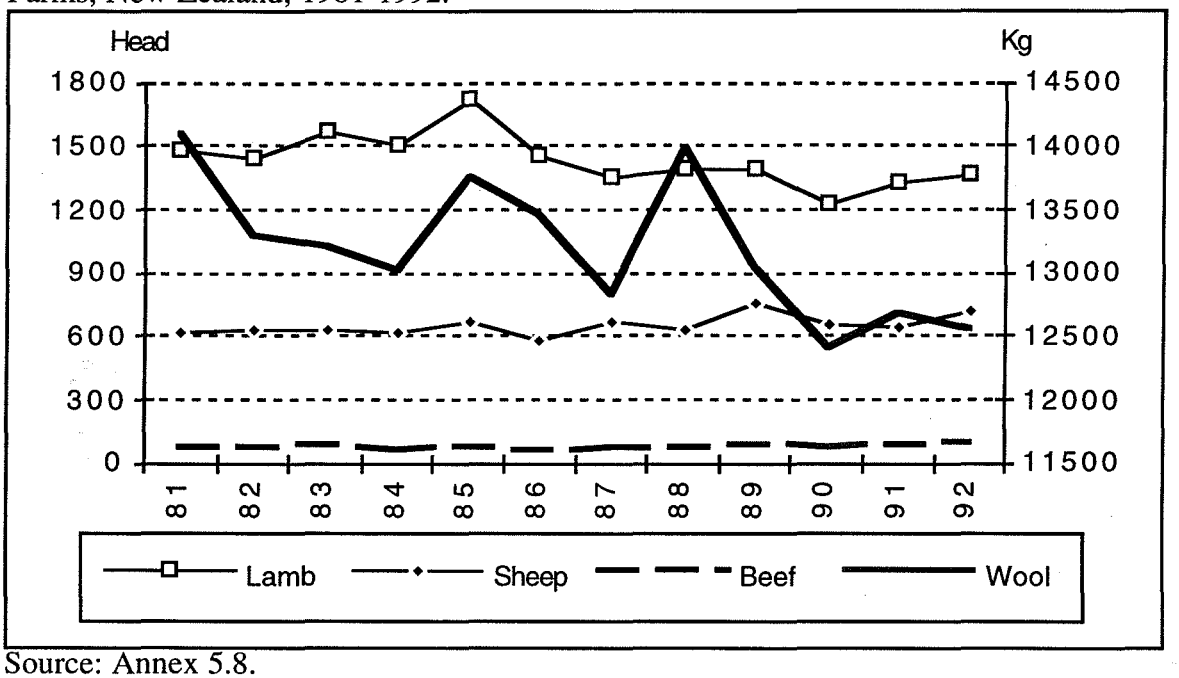
At another level, this measure does not provide accurate information about the productivity per hour of work. In fact, in reacting to the drastic drop in income seen in 1986, farmers could have managed without their paid workers and consequently increased unpaid family work. This was pointed out in the analysis of data on the variation of number of workers by category provided in the previous chapter. In making such an adjustment, the number of hours of work per labour unit could have increased, allowing for an improvement in the ratio of stock units per labour unit. Is this response a labour productivity gain or rather a deterioration of living conditions of the farmers' family, or a mix of both of them? With the data available, it is not possible to further examine this question. Consequently, although it is not inexact to conclude that the labour productivity per labour unit has increased since the middle of the 1980s, the interpretation of this result requires some caution.

In short, the productivity of land calculated by the number of stock units per hectare did not fluctuate in spite of an important drop in the use of fertiliser. There is an apparent gain of productivity in the use of fertiliser. Likewise, the per labour unit productivity has increased considerably in the recent years. Consequently, productivity, in the sense of less inputs used for slightly increasing livestock numbers, has risen since 1986.

5.3.3 Incomes and Expenditures

An analysis of incomes and expenditures allows us to understand the internal strategies used by sheep farmers to face the decrease in market prices. First of all, the physical data on livestock and wool sales show a decline in sheep production (see Figure 5.13). Lamb and wool sales decreased since 1985 even though there was an increase in mutton sales reflecting a partial liquidation of breeding stock. Beef production substituted sheep production with an increase in the number of head of beef sold per year since 1987.

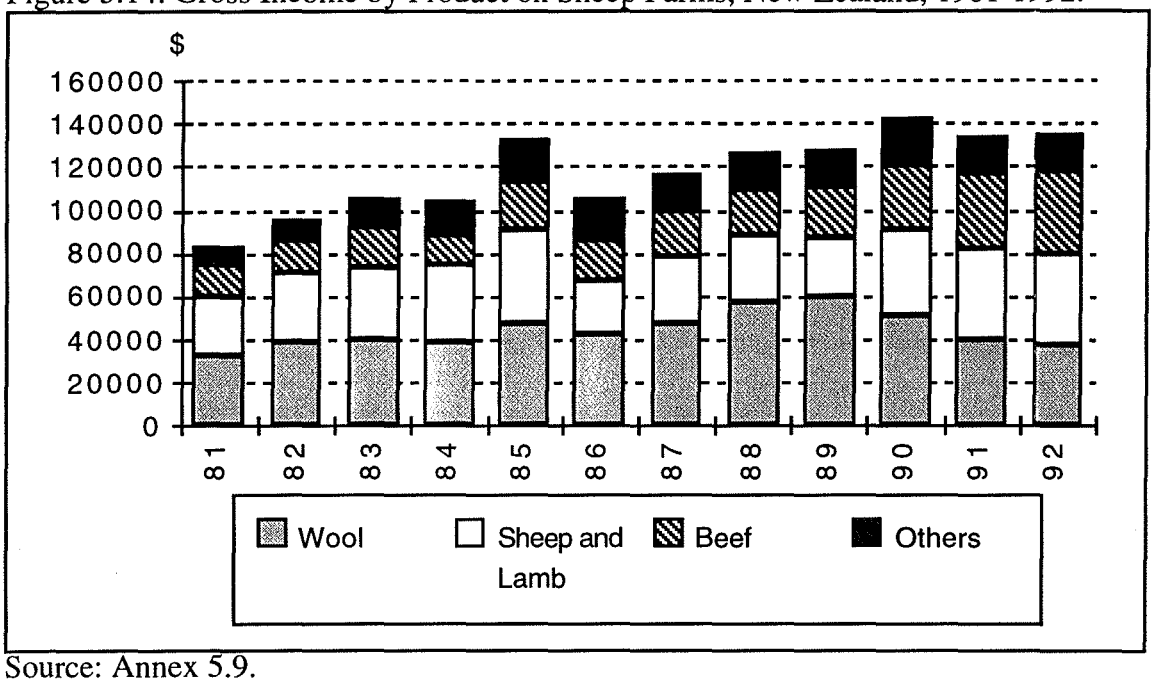
Figure 5.13. Sales of Lamb, Sheep and Beef (number of head) and Wool (in kg) on Sheep Farms, New Zealand, 1981-1992.



Source: Annex 5.8.

This fluctuations in stock sales partially affected the level of gross income (see Figure 5.14). Indeed, the respective contribution of wool and lamb sales has varied significantly during the observation period, because of the fluctuations in market prices. Despite a decrease of that part of gross income which came from sheep production, wool and sheep and lamb meat, from a maximum of 74.4% in 1982 to a minimum of 58.6% in 1992, this sector remains the main one in the composition of gross income. This result is not surprising since the sample includes only sheep farms. Despite this, gross income from beef production, which was around 16% of the total from 1981 to 1985, has increased to 28.7% in 1992. It has more than doubled in absolute value between 1986 and 1992, increasing from $18,800 to $38,800. As for incomes from other products, principally generated by commercial crops, they have varied between 12.7% and 15.8% of gross income since 1987.

Figure 5.14. Gross Income by Product on Sheep Farms, New Zealand, 1981-1992.



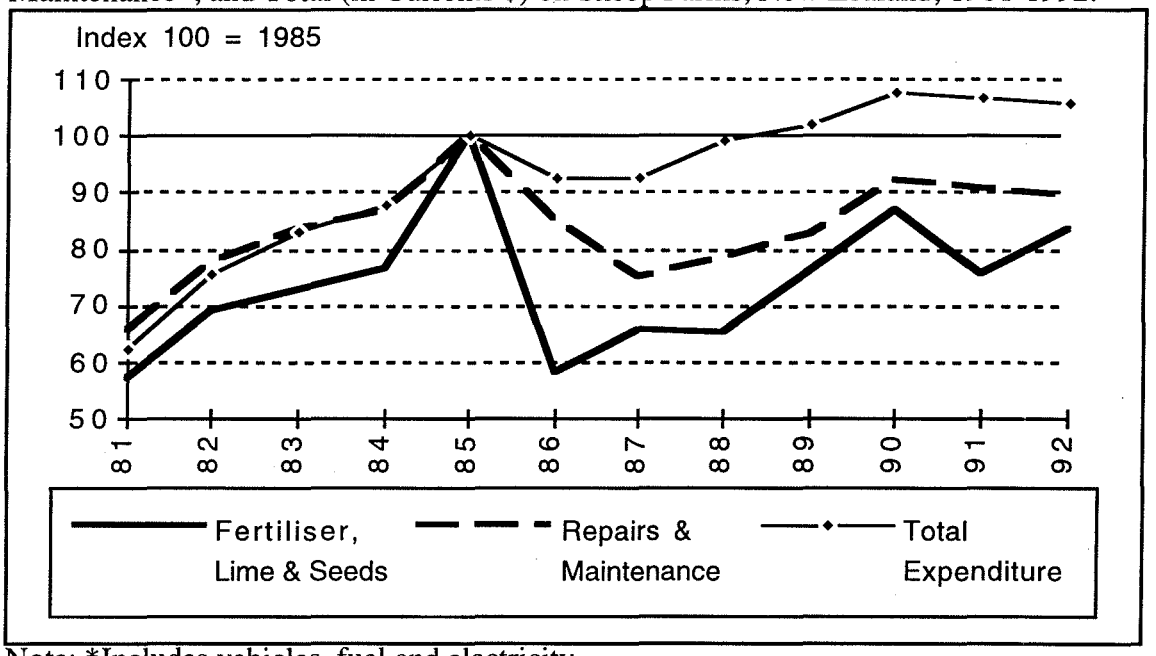
Source: Annex 5.9.

Therefore, sheep farmers' medium-term adaptation strategy as regards to their income has been one to partially replace sheep production by beef production. As regards expenditures, their reactions were faster with a sudden change in 1986. For the first time, total expenditure in current dollars decreased (see Figure 5.15). In fact, all types of expenditure that could be decreased seems to have been. First of all, as we have already seen, fertiliser expenditure was drastically cut, as were the expenditure for repairs and maintenance. Despite a recovery of both these expenditures, their level remains lower in 1992 than the level reached in 1985 in current dollars. These expenditures as part of the total expenditure decreased from 35% in the beginning of the period to 29% at the end.

The charges for labour, animal health (including weed and pest control), and for contract work also decreased in 1986 (see Figure 5.16). Afterwards, they have recovered somewhat in current dollars and their part in total expenditure is maintained around 30%. However, if we take into account the 30% increase in the general input cost index in farming (see annex 5.1) between 1985 and 1982, the expenditures in real terms for these three charges are decreasing.

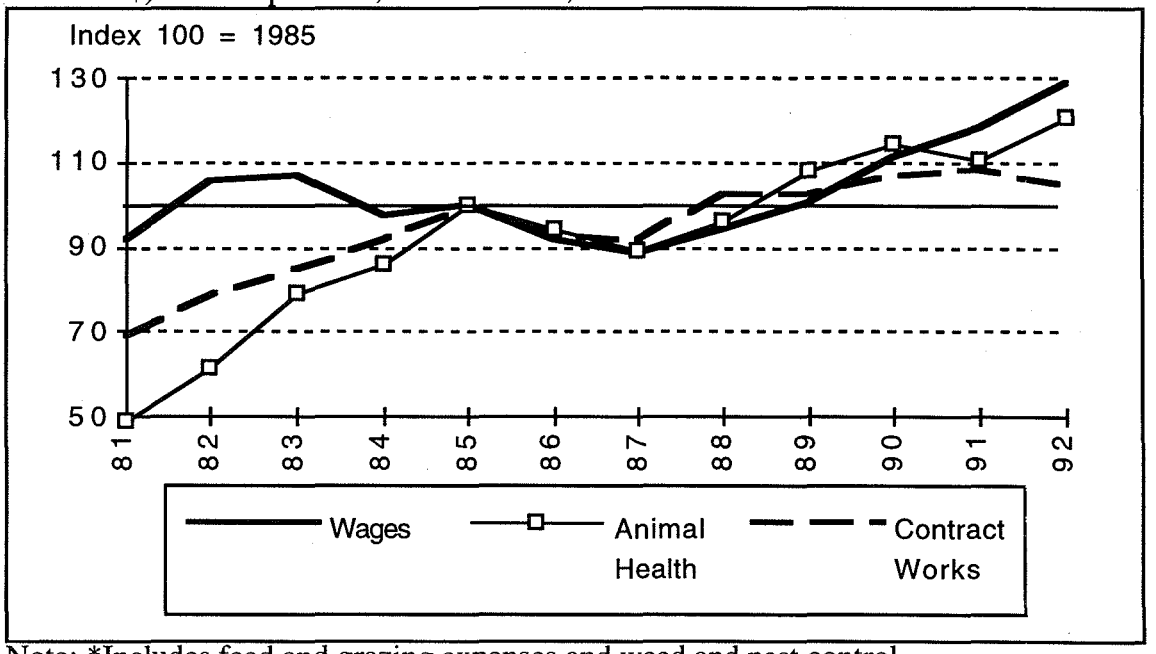
Finally, standing charges and interest charges seem to be, in the short-term, out of the farmer's immediate control. Both these charges are the only ones that rapidly grow after 1985 (see Figure 5.17). For the whole period, they have increased from 24% to 32% of the total expenditure. The initial increase in the interest charges resulted from the removal of subsidised interest rates and the general increase in interest rates. Similarly, the decrease in interest charges from 1988 must be attributed to the general decrease in interest rates.

Figure 5.15. Evolution of Expenditures in Fertiliser, Lime and Seeds, Repairs and Maintenance*, and Total (in Currents $) on Sheep Farms, New Zealand, 1981-1992.



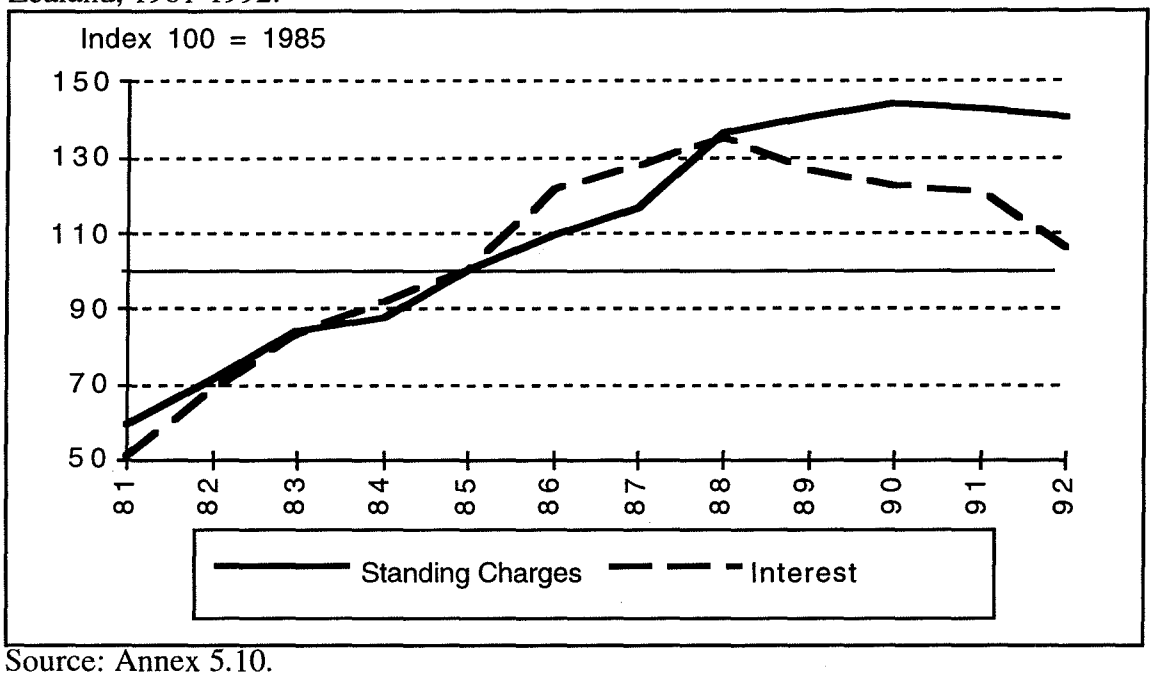
Note: *Includes vehicles, fuel and electricity.
Source: Annex 5.10.

Figure 5.16. Evolution of Expenditure in Wages, Animal Health* and Contract Work** (in Currents $) on Sheep Farms, New Zealand, 1981-1992.



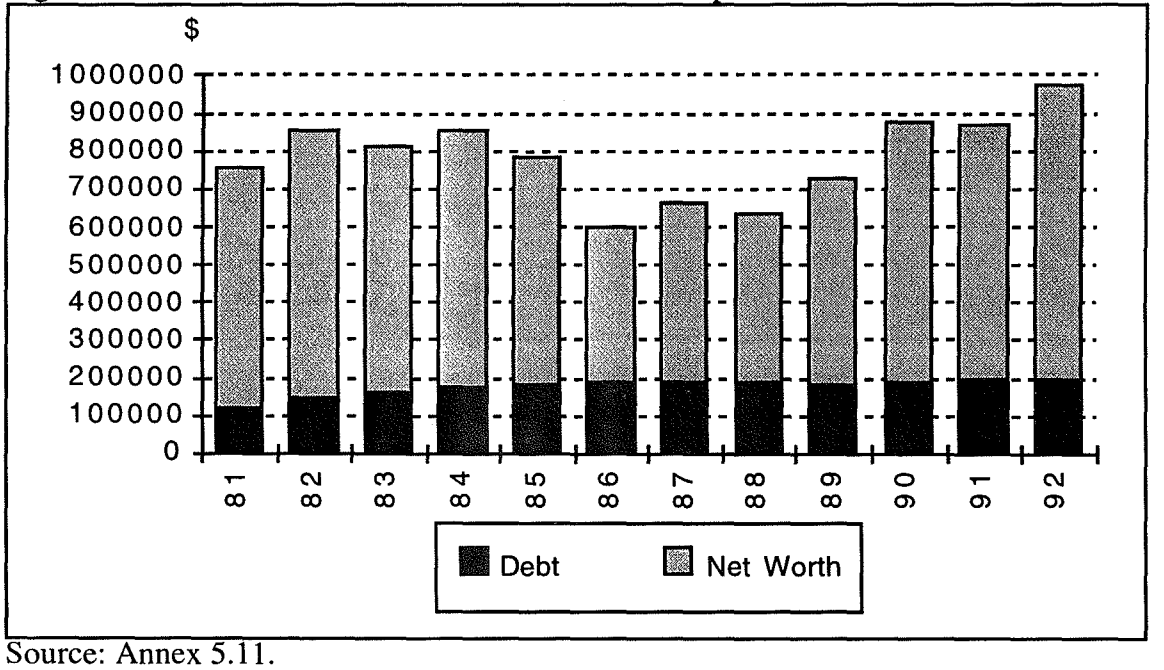
Note: *Includes feed and grazing expenses and weed and pest control.
** Includes shearing expenses.
Source: Annex 5.10.

Figure 5.17. Evolution of Standing and Interest Charges (in Current $) on Sheep Farms, New Zealand, 1981-1992.



Source: Annex 5.10.

Figure 5.18. Debt and Net Worth in Current $ on Sheep Farms, New Zealand, 1981-1992.



Source: Annex 5.11.

It is important to notice that the control of expenditure has been also extended to control of debt. Although from 1981 to 1985 indebtedness in current dollars increased by 55%, since 1986 it has been relatively stable (see Figure 5.18). As the level of assets, livestock or land, does not change a lot, it is true to say that the variation of net worth is attributable essentially to the variation of the market value of these assets. The net worth decreased from 78% in 1985 to

69% in 1986 and that must be compared with the decrease of the total asset value of 23% for the same year. The contrary motion that occurs between 1986 and 1992, the net worth then going back to 80%, coincides with an increase of more than 60% in the total asset value in current dollars.

In total, it appears that farmers' adaptation strategy has allowed them to control the evolution of total expenditure. In current dollars, expenditure only increased by six per cent between 1985 and 1992 even when from 1981 to 1985, it increased nearly by 60%. In real terms, total expenditure clearly fell because the input cost index has increased by 30% between 1985 and 1992. This control of expenditure has broadly contributed to stop the drop in net farm income in real terms (see Figure 5.7).

5.3.4 High Pressure on Cash Flow

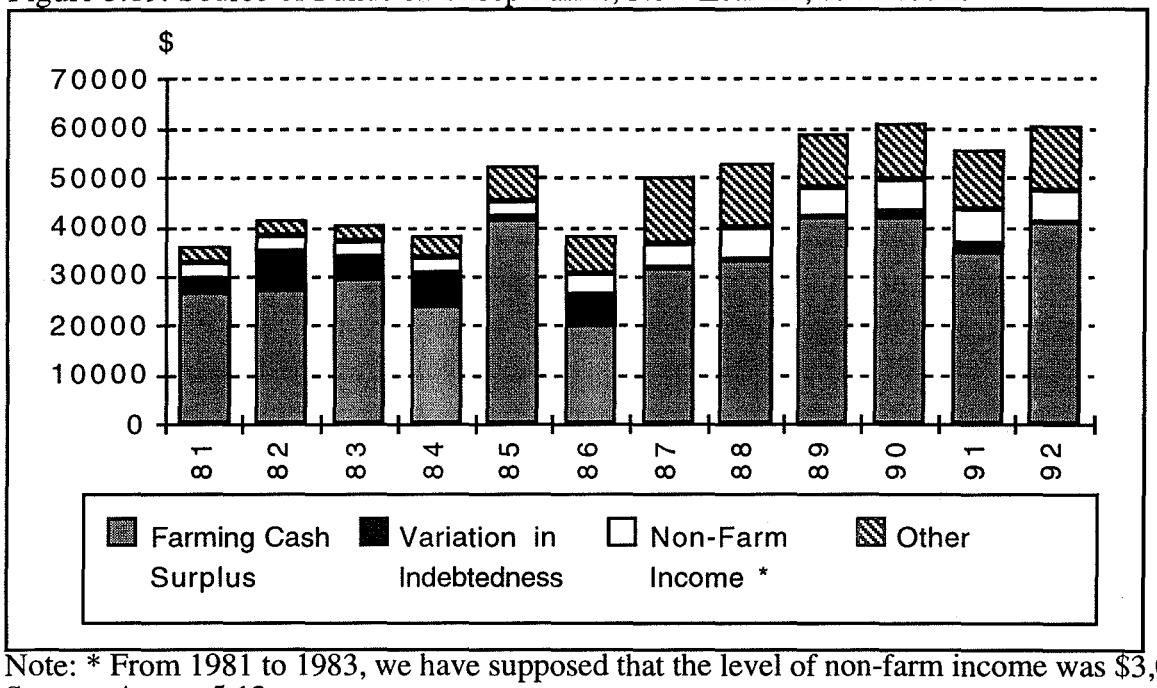
Even when the analysis of the evolution of income and expenditure allows us to understand internal farm strategies, the analysis of the cash flow shows in part the external strategies, especially the use of family savings and off-farm work. Unfortunately, the data on non-farm income are not available before 1984. For the purpose of the present analysis, we have made the assumption that non-farm income before 1984 was at the same level as in 1984, at $3,000 per year.

We observe from Figure 5.19 that the cash surplus provided by farming activities reached a peak in 1985 and reduced by half in 1986. From 1981 to 1986, the level of indebtedness increased from one year to the other, making a net contribution to funds. Since 1987, debt was more controlled and a part of the cash surplus was used for reducing it in four out of six years. So, the fluctuation in indebtedness resulted in a small contribution to funds only in 1990 and 1991. All things considered, until 1985, farming cash surplus and variation in debt contributed to more than 80% of the total funds available for each year. For the subsequent years this contribution has reduced to an average of 67%.

Non-farm incomes and the other sources of funds helped farmers cope with the reduction of farming cash surplus and the end of using loan for providing funds. In fact, while in 1984 and 1985 the non-farm income just reached $3,000 per year, it increased in 1986 and 1987 to $4,000 and since then it has maintained generally at over $6,000 per year. The other sources of funds have gone on average from $4,378 per year for 1981-1985 to $11,685 per year for 1986-1992. However, this latter category included government payments that were quite high for 1987 and 1988, at $2,750 and $5,448 respectively. These payments were provided to help farmers affected by bad climatic conditions of those years *(Fairweather 1992, p. 14)*. Having

said this, for the other years government payments were negligible and, consequently, the increasing contribution of other funds has come from mobilisation of additional funds provide by the farmer's family. The details of the source of these funds is not given in the available publications: they mention only that this category includes: *"farm and non-farm receipts, matured insurance endowments, insurance claim receipts, legacies, gifts and compensation receipts"*, which can include sale of farm assets that are not included in the farm accounts *(NZMWB 1993, p. 54).*

Figure 5.19. Source of Funds on Sheep Farms, New Zealand, 1981-1992.



Note: * From 1981 to 1983, we have supposed that the level of non-farm income was $3,000.
Source: Annex 5.12.

Whatever the causes, the maintenance of the level of drawings, that we have noticed earlier, in spite of the marked decrease in net farm income, was sustained by the increase use of off-farm funds. Figure 5.19 shows that non-farm income and other sources have been increasing in importance since 1985. Moreover, Fairweather observed that *"given that off-farm income may not be included in the accounts it is likely that the above measures of non-farm income and other sources underestimates off-farm sources of funds for the farm household" (Fairweather 1992, p. 15).* It is therefore obvious that sheep farmers have been since 1986 more dependant on off-farm funds.

5.3.5 A General Strategy of Adaptation

We have seen that the net farm income in real terms was clearly falling for a long period beginning in 1973. This drop was to some extent accentuated in 1986 with the end of

government price and income support. Faced with this declining income, sheep farmers have implemented a general strategy of adjusting to changing economic realities. In general terms this strategy can be seen as having two components: those that concern on-farm adjustments and those that concern off-farm adjustments. Regarding on-farm adjustments we have noted first an increase in the productivity of fertiliser and of labour. Afterwards at the level of the choice of type of production, beef production has been expanded at the expense of sheep production. And finally, there was close control of costs, principally fertiliser expenditure and repairs and maintenance. Despite these important adjustments at the production level, an external strategy had to be used, namely growing reliance on of off-farm funds. Thus since 1987, partially due to this general strategy of adaptation, net farm income as well as drawings have been maintained in real terms.

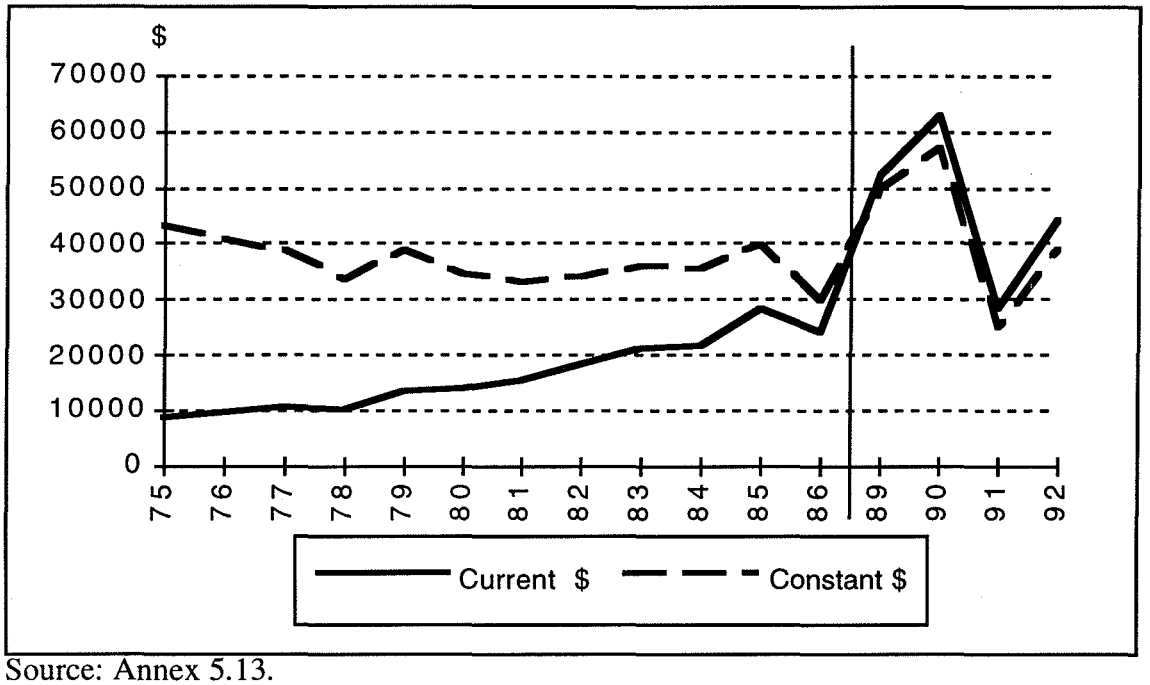
5.4 The Economic Results of Dairy Farms

From 1964 to 1985/86, the New Zealand Dairy Board (NZDB) has conducted an economic survey using an annual sample of factory supply dairy farms. This survey was interrupted during two years and was resumed in 1988/89 by the Livestock Improvement Corporation Limited (LICL). Despite this gap of two years in the data during an important time in the elaboration of New Zealand agricultural programmes, this survey provides relevant data for analysing the evolution of the economic results of dairy farms.

This survey is based on a random sample of factory supply dairy farmers. The data used here include only the farms operated by their owners and excludes the sharemilkers. To be included in the survey, until 1985/86 the farm must have had more than 30 cows and more than 75% of its income must have come from dairy production, and since 1988/89 the percentage of income must have been 50% *(LICL 1993, p. 21 and NZDB 1987, p. 2).*

As we have seen at the beginning of this chapter, the milk price at the farm gate has during the observation period moved closely in relation to the world market price for dairy products (see Figure 5.4). Thus, the decrease in agricultural subsidies did not seem to have affected the farm price, contrary to the situation observed in the sheep sector. The data regarding the evolution of net income for the dairy farms confirms this first observation (see Figure 5.20).

Figure 5.20. Dairy Farm Net Income in Current and Constant $ (1988 $), New Zealand, 1975-1992.

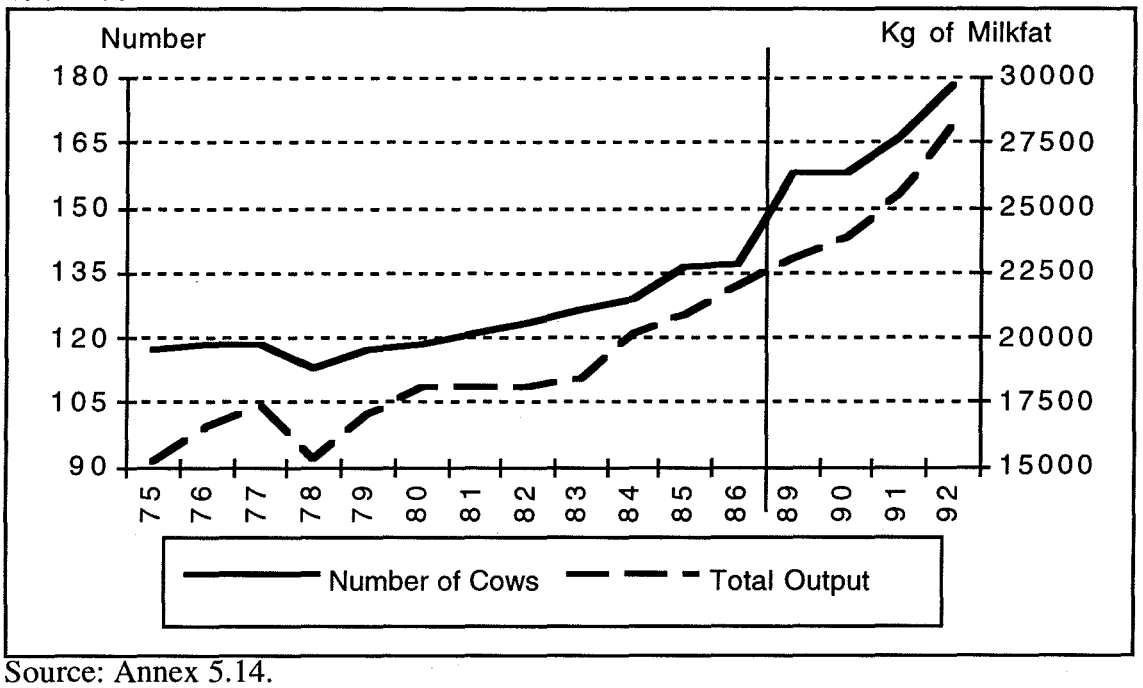


Source: Annex 5.13.

From 1975 to 1985, net income grew steadily in current dollars. In real terms, net income decreased from 1975 to 1981, and then increased until 1985. The year 1986 marks a break in this increase, following the decrease in the farm price derived from the decrease in dairy product prices on the world market. At the time of the resumption of the survey, net income was clearly increasing, reaching a record level in 1989 and 1990. Finally, net income significantly decreased in 1991, again following price deterioration on the international market. In the light of these results, the increase in the volume of dairy output observed since 1978 (see Figure 4.16) seems to be explained by the improvement of the absolute and relative profitability of dairy production, especially if it is compared with sheep production.

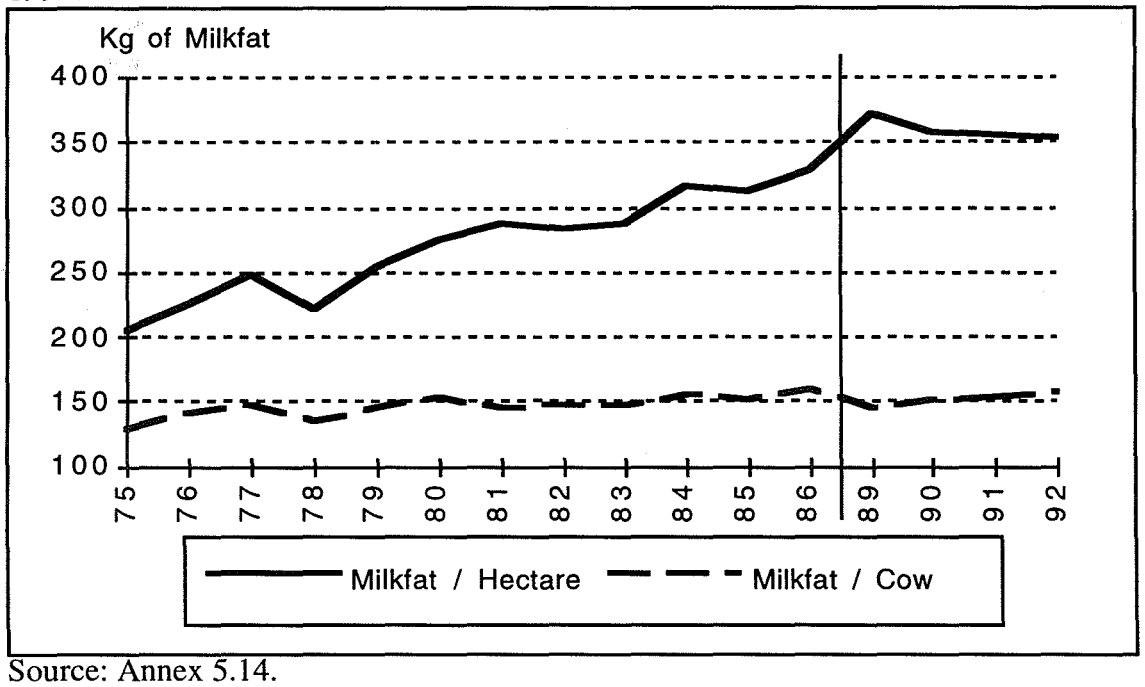
This increased profitability has allowed an expansion of average per farm dairy production (see Figure 5.21). The average number of cows per farm is increasing in a similar way to total milkfat output. However, the increase in total output does not result from an improvement of yield per cow, this being relatively constant since the beginning of the 1980s (see Figure 5.22). There are nevertheless apparent gains of productivity in the use of land because the output of milkfat per hectare grew more than 80% between 1975 and 1989. However, since 1990, this land productivity seems to have reached a maximum.

Figure 5.21. Average Number of Cows and Total Output by Dairy Farms, New Zealand, 1975-1992.



Source: Annex 5.14.

Figure 5.22. Average Output per Cow and per Hectare on Dairy Farms, New Zealand, 1975-1992.



Source: Annex 5.14.

To sum up, dairy production has been encouraged by a general increase in farm gate prices during recent years, which has lead also to an increase in net farm income. Consequently, the changes in agricultural policy seem to have had little effect in this sector. No specific adaptation strategy seems to have been implemented by dairy farmers apart only a steady

increase in output and a relative intensification of land use. A brief analysis of the evolution of dairy farm expenditures does not show any major adjustments in the relative emphasis given to different types of expenditure. The only appreciable change was an increase in interest charges as a percentage of total expenditure from 18% in 1985 to a peak of 24% in 1991 (see Annex 5.15). In contrast, the repair and maintenance charges have shown a relative decrease in total expenditure, from 21% in 1985 to 16% in 1991.

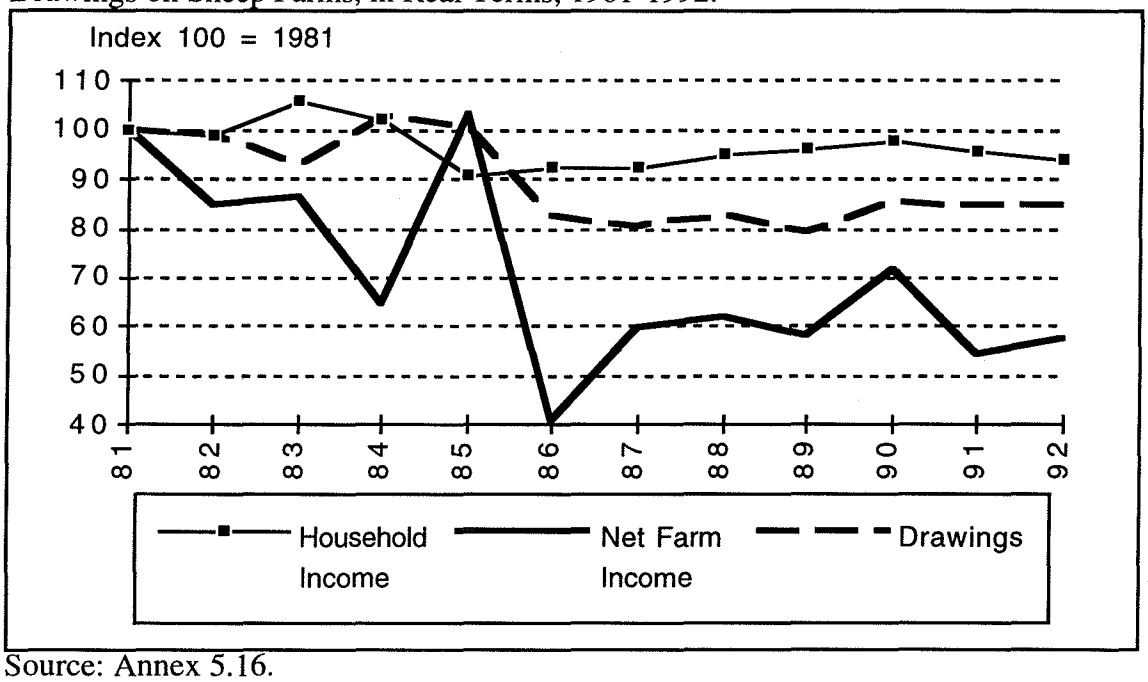
5.5 The Evolution of Farm Incomes in Relation to Average Income in New Zealand Economy

The analysis of the evolution of farm income in the sheep and dairy sectors shows two different realities. It is obvious that the dairy sector has benefited from a relatively good situation allowing an increase in net farm income in real terms since 1981 (see Figure 5.20). Conversely in the sheep sector, net farm income and drawings have been decreasing for a long period (see Figure 5.7).

But to conclude this analysis of the evolution of incomes, it is relevant to consider the evolution of household income for the New Zealand economy as a whole. Indeed, it is not only the farm sector that has been affected by the reform of New Zealand economic policy and by the economic crisis at the beginning of the 1980s and the 1990s. Therefore, despite a certain deterioration, the evolution of farm incomes could be relatively favourable when compared with the rest of the economy. However, this is not the case for the sheep sector since net income has been declining significantly since 1981 in comparison with the average household income (see Figure 5.23). From 1981 to 1992, the average household income displays a decrease in real terms of only six per cent, while the net income of sheep farms drops by 42%. On the other hand, as we have seen previously, the drawings have less variation than net income, but they have, all the same, been decreasing by 15% on the whole period.

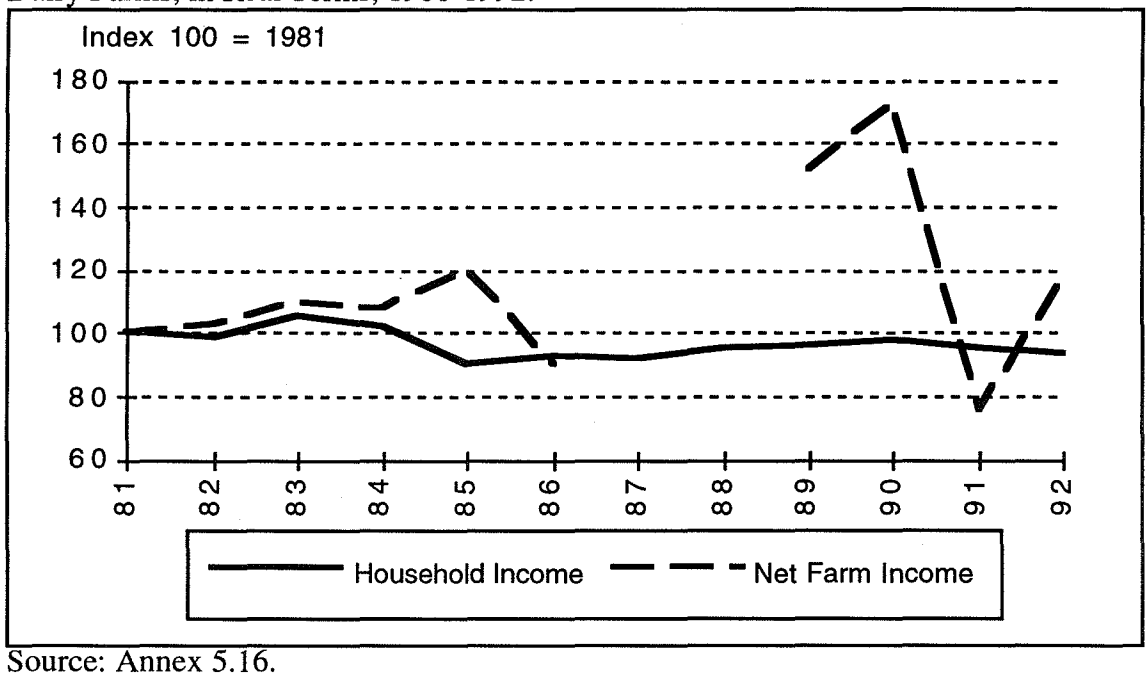
The dairy sector shows better performance than the whole economy. Since 1981, except for 1986 and 1991, net farm income shows a relatively favourable evolution compared to average household income (see Figure 5.24).

Figure 5.23. Evolution of New Zealand Average Household Income, Net Farm Income and Drawings on Sheep Farms, in Real Terms, 1981-1992.



Source: Annex 5.16.

Figure 5.24. Evolution of New Zealand Average Household Income and Net Farm Income on Dairy Farms, in Real Terms, 1981-1992.

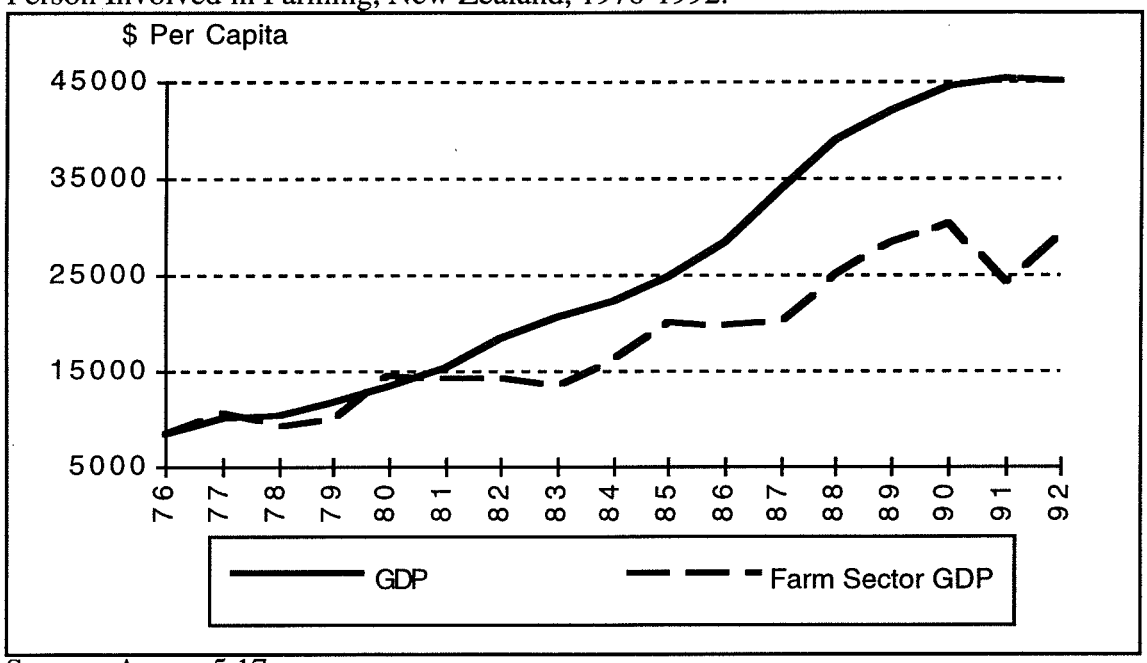


Source: Annex 5.16.

For the other types of agricultural production, we do not have data from surveys on the evolution of income, like in the sheep and dairy sectors. We know all the same that for the farm sector as a whole, like we have seen at the beginning of this chapter, terms of exchange deteriorated since 1981. However, this measurement does not allow a comparison between the evolution of agricultural income and income in the rest of the economy. Figure 5.25 addresses

this question in comparing GDP per person in labour force with farm sector GDP per person involved in farming. It is an indirect and incomplete measurement of the evolution of farm income [1], but it give all the same, some information about the direction of this evolution.

Figure 5.25. Evolution of the GDP per Person in Labour Force and the Farm Sector GDP per Person Involved in Farming, New Zealand, 1976-1992.



Source: Annex 5.17.

We note that the farm sector GDP per capita was in 1976 at the same level as the total GDP per person in labour force. It is only from 1981, with the beginning of the deterioration in the terms of exchange for the farm sector, that farm sector GDP has shown an unfavourable evolution relatively to total GDP, always on a per capita basis. The gap between these two data sets widened from 1985 to 1987, at the height of the reform of general economic policy and agricultural policy. On this basis, the economic situation of the farm sector seems thus to have deteriorated relative to total gap.

[1] Notably, GDP per person in the labour force has changed favourably in relation with the average household income. This can be explained by the fact that the participation rate of the population in the labour force has decreased during the economic crisis, from 67.4% in 1985 to 63.7% in 1994. That means that the increase in GDP per person in the labour force is based in part on an increasing number of people left out of work. Also, the total number of household includes a number of households that are not in the labour force. These households could have been more affected by the decrease in social programme expenditures.

5.6 Conclusion

The analysis in this Chapter shows a deterioration of incomes in the farm sector compared with the rest of the economy. The sheep sector was particularly affected by the abolition of price support in 1986 and by the decrease of farm gate prices that resulted from it. However, this sector was already engaged, since the beginning of the 1970s, in a negative evolution of farm incomes, and the year 1986 emphasised this tendency. Also, the evolution of kiwifruit market prices indicates the difficulties in this production sector. On the other hand, the dairy sector has benefited from some recovery in prices on the international market. For this sector, incomes in real terms have been on average higher since 1987 than those obtained during the period 1981-1986.

As for the sheep sector, the most affected by the reform of agricultural policy, the detailed results from the surveys show that the farmers implemented an overall strategy to counter the decrease in their income. First, on the farm, they undertook actions to increase their productivity, to diversify towards the beef production and to control expenditure. Resorting to off-farm funds was also important for allowing farmers to maintain their standard of living. This adaptation strategy combined with an amelioration of export prices allowed sheep farmers to stabilise their income since 1987, despite the abolition of all kinds of support price and income programmes.

As for the dairy sector, the analysis of the survey results does not allow us to detect a particular strategy of response, if only a constant increase in the number of cows and in the level of production per farm. This increase results from the relatively favourable evolution of dairy product prices and farm income.

CHAPTER 6

GENERAL CONCLUSION

6.1 Introduction

The objective of this research was to analyse the effects on the farm sector of the 1985 reform of the New Zealand agricultural policy. We have framed this analysis at a more general level as an issue relating to the specificity of the farm sector, and as part of the elaboration of agricultural policy in developed countries. Before presenting the summary of our research and a discussion of the results regarding this issue, we note some limitations to our analysis.

6.2 The limitations of this Research

The first limitation of this research is that the methods applied do not allow us to formally reach a conclusion on the effects of the change of agricultural policy. We have favoured an approach that has put together many long-term indicators and only examined if the tendencies observed were either modified or not following the change of agricultural policy. But too many elements are involved in the case of the New Zealand farm sector to establish a formal link of cause and effect between the reform of agricultural policy, the structural and the economic changes in this sector. Notably the general internal and external economic conditions in New Zealand have a major impact on the farm sector, including: the exchange rate, interest rates, the level of inflation and international market prices. Having said that, the summation of partial indicators that we have collected shows the nature and the extent of effects, or the lack of effects in some cases, of the reform of the agricultural policy.

At another level, we have to note that our analysis emphasises the measurement of easily quantifiable structural and income data. However, in doing this, our research neglects the effects that could occur at the level of the farmers' families who have suffered a period of heavy stress. Also, we have not quantified the social and economic consequences suffered by the rural communities following the reform of agricultural policy. Notably, Walker and Bell emphasise that the service industry was heavily affected by the farmers' decrease in input expenditure, and this factor led to a major restructuring of this industry. This process has contributed significantly to reducing the economic activity of rural communities (Walker and Bell 1994, p.30). Despite these considerations, our research has important lessons, to our

mind, about the structural and economic changes that have taken place in the recent years in the New Zealand farm sector. But this research does not intend to go beyond this level.

Finally, it is relevant to ask what can be learnt for other developed countries from this analysis of the New Zealand case. On that subject, Cloke emphasised that:

> *Information here might be relevant when comparing the New Zealand case with the political economy arena of agriculture elsewhere in the developed world. Certainly various specificities of the New Zealand example make such comparisons very difficult. For example, the state in New Zealand is extremely centralized and the political class is very small, in line with the scale of society... Nevertheless a study of the New Zealand example does at least illustrate the types of policy-making conditions under which agricultural deregulation has been embraced" (Cloke 1989, p. 35).*

But it was in the limited context of the process of formulation of economic policies that Cloke made his comment. Regarding the effects obtained in the farm sector following the reform of agricultural policy in New Zealand, it is not relevant to think that they are entirely reproducible in another national context. The economic and political environment in New Zealand is specific enough to invalidate generalisation. In addition, the farm sector in New Zealand has some distinctive characteristics, as we will see later. However, this limitation does not mean that there are no lessons for other countries to be learnt from research on New Zealand case. We note here that such extrapolation must be cautiously made.

6.3 Summary

In New Zealand, the economic crisis led to a reform of the government intervention in the whole economy. At the end of the 1970s and at the beginning of the 1980s, all macro-economic indicators converged to show the mediocre performance of the economy. Annual deficits and public debts were increasing and the balance of payments deteriorated quickly. Full employment was not guaranteed anymore and unemployment became a significant problem. Finally, inflation was high. Major economic reforms have been implemented from 1984. Because of its historical importance in economic development of the country, the New Zealand farm sector was at the centre of the reforms, all the more so since government support expenditures given to this sector had been increasing quickly in recent years.

The farm sector, and in particular the heavily subsidised sheep sector, was hit strongly by general economic policy changes and by the reform of agricultural policy. Programmes to develop investment, income support and stabilisation policies, and input subsidies were all

quickly dismantled. The expenditure of the Ministry of Agriculture and Fisheries (MAF) that had been maintained in general at more than six percent of the value of agricultural output between 1972 and 1985 was drastically reduced. From 1990, the level of expenditure returned at a level equivalent to that of the 1960s, at two percent of the value of agricultural output.

In order to help farmers through the unfavourable economic conditions and to adapt to the new economic environment of agricultural policy, the government put in place some transitional programmes. These programmes had the objective of lightening the burden of farmers' debt and a part of this debt was written off. It seems that such transitional programmes were effective and fewer than expected farmers left the farm sector.

The agricultural policy remaining in the 1990s consists of programmes of research, advisory service, animal health and inspection. Most of these programmes have been subjected to a policy of recovering costs from the users. Also maintained is the power of the marketing boards to intervene on the export markets with a central role for exporting some agricultural products. This power of intervention by the marketing boards has been maintained despite the large deregulation undertaken in the whole economy. Thus the New Zealand farm sector has not been entirely deregulated. In other respects, it is important to note that the period when the transfer payments to the farm sector were high was relatively short in the history of agricultural development of New Zealand, at about ten years from the middle of 1970s. It is in this way that the New Zealand experience in state intervention in the farm sector appears unique among the developed countries.

At the structural level, the reform of agricultural policy did not lead to major disruption. The abolition of transfer payments did not seem to modify noticeably the structural trends which were already occurring. The total number of farms had been increasing during most of the observation period beginning in 1970. Only from 1990, has the number of farms begun to decrease. The increase in the number of farms over such a long period seems due to two main causes. First, the growing importance of horticulture that occurs on smaller units of production than the traditional pastoral production is certainly responsible. Second, the increasing number of small farms classed as lifestyle blocks is an important factor.

However, the sheep sector has decreased in importance since 1982. The number of sheep farms and the sheep flock then reached a peak and since then has been decreasing. This decline was accelerated at the end of the 1980s, with a delay of some years after the drastic cuts of transfer payments to the sheep sector. This situation seems to have lead at growth of other sectors of traditional pastoral production, namely beef and dairy. Also, the diversification of

the New Zealand farm sector already undertaken in the 1970s was pursued in the horticultural sector and in deer and goat production.

During the years following the reform of agricultural policy, the value of agricultural output in real terms declined to the level of the 1960s. On the other hand, this decrease of the value of output is mostly related to the evolution of farm prices rather than a drop in volume of production. Indeed, sheep production was decreasing but this decrease has been compensated in part by the growth of the beef and dairy sectors. Concerning the price of farm products, it is obvious that the end of the support price programmes led to a drop of sheepmeat farm prices, since these were the most subsidised. The decrease in price that occurred in 1986 has not been recovered yet on the international markets.

As for exports, they decreased in real terms throughout the observation period. This decrease accelerated in the middle of the 1980s but it was more related to a deterioration of export prices than a marked decrease of export volumes. However, regarding export volumes, whereas they have been increasing for a long period, they have levelled off in recent years. The increase in volumes of dairy and beef products has compensated the decline of sheep production but not at a level allowing a resumption in the growth of exports.

It is necessary to emphasise yet again the essential element of the analysis of structural change of the New Zealand farm sector. Following the reform of agricultural policy in 1985, the structural trends observed at the end of the 1970s and the beginning of the 1980s were not significantly modified. Only the decline of the sheep sector, accelerated with a delay of some years, is the unusual structural trend, and one that is linked to growth in the beef sector.

With regard to the evolution of farm incomes, once again the analysis over a long period shows that the main trends were at work before the reform of agricultural policy. The terms of exchange for the farm sector as a whole began to deteriorate at the beginning of the 1980s. However the production price index showed an important drop in 1986, which accentuated the deterioration of the terms of exchange. It is necessary to note that for the beef, dairy and fruits sectors, the evolution of farm prices in New Zealand follows closely the fluctuations of prices on international markets. On the other hand in the sheep sector, the abolition of support price programmes produced a considerable effect in 1986. The farm price then greatly decreased even if the price on the principal export market was increasing. Since then, the international market became, like for other sectors, the principal factor in the formation of farm domestic price.

The analysis of economic and financial results of sheep farms shows, at first, that net farm income decreased strongly in 1986. However this decrease in net income in real terms is part of a long-term trend which began in the middle of the 1970s even when the transfer payments to the sector were increasing. Thus, considering this perspective, the year 1986 only intensified the decrease in net income already experienced over the long term.

Afterwards, sheep farmers adopted an overall strategy for facing the changing economic environment, and the strategy contributed to reducing the decline in their incomes. Farm productivity increase in the sense that output per unit of fertiliser and labour increased. The part of income coming from beef production increased to the detriment of sheep production. Concerning expenditure, it seems that all that could be cut were cut. In particular, expenditure for fertiliser and for repairs and maintenance have decreased permanently. In fact, only the standing and interest charges have increased and these were out of farmers' control in the short term. In total, a better control of the total expenditure led to their decrease in real terms. Finally, for allowing maintenance of the level of drawings by the farm owner, which fluctuated clearly less than net farm income, other sources of funds external to farming have been used.

In the dairy sector, the analysis of economic results of farms shows that the reform of agricultural policy seems to have had little effect. Indeed, during recent years, milk prices at the farm gate have generally increased, that has led to an increase of net farm income as well.

Finally, in comparison with the evolution of income in the rest of the economy, given by the evolution of average household income, net farm income obtained on dairy farms has evolved favourably since 1984. On the contrary, the situation is the reverse for sheep farms which suffered a deterioration since 1986 of their income relative to the rest of the economy.

6.4 The Specificity of the Farm Sector Questioned

The analysis of the effects of the revision of agricultural policy in New Zealand shows that the farm sector could maintain its level of economic activities despite an important reduction of state support. Does this analysis question the specificity of the farm sector as peculiar to each developed country as we described it in Chapter 1 ? It is important here to take up each of the issues of specificity and discuss it for the New Zealand case in the light of the results that we have obtained in the present research. There are four elements to the specificity of agriculture that we discuss here: the nature of demand, cyclical supply, asset mobility, and climate.

First, it is generally admitted that demand is inelastic to price in developed countries. It is certainly true within the context of domestic demand in New Zealand. But it is not necessarily the case with regard to the demand for the whole New Zealand farm output which is exported in major part to international markets. Therefore, as for the individual farmer who faces a perfectly elastic demand for his own production[1], the supply of agricultural products originating from New Zealand does not necessarily face conditions of inelastic demand on the international markets.

Be that as it may, the New Zealand marketing Boards which sell farm products on international markets have powers and the will to counter the characteristics of demand. Operating as the only exporter of New Zealand dairy products on the international markets, the Dairy Board can thus practice control of supply and price discrimination according to the capacity of each market. These are definitely some of the practices used in order to maximise the receipts obtained from the markets where demand is inelastic. The Kiwifruit Marketing Board uses the same instruments to maximise its export receipts, just as in the sheep meat sector there is a consortium of companies sharing the different markets and co-ordinating their actions.

Thus, despite a context of generalised deregulation of the New Zealand economy, marketing Boards maintain their power of exclusive or major seller on the international markets. In that sense, the state regulation framework is still in force in New Zealand for the marketing boards and this is always justified on the basis of the characteristic of inelastic demand. However, this inelastic demand does not refer to the global international market but rather at each national sub-market that constitutes it.

The second characteristic of the farm sector is that supply is generally cyclical in the short term but maintained in the long term. New Zealand farm products are selling on a number of distinct markets which do not behave in the same way nor in the same time, and this reduces the cyclical effect of prices. For example, in the sheep sector, New Zealand paid dearly for its large subordination to the United Kingdom market when that country joined the EEC. But now, New Zealand has diversified its export markets, so that the diversity balances adverse prices on any one particular market. In the dairy sector, the evolution of prices on the world market is not strongly characterised by cyclical behaviour because it is rather dependent on the national dairy policies of the large producer countries such as the EEC and the USA.

[1] In the context of competition where there is a large number of small farmers in comparison with the size of the market, it is really the aggregate supply of all farmers that faces an inelastic demand, and not the individual supply of one farmer.

With regard to maintaining supply in the long term even in period of economic difficulties, the analysis indicates that it has been maintained during recent years. Nevertheless, this assertion is not true for each type of production but rather for the whole farm sector. In fact, sheep production has been decreasing but other production sectors, including dairy, beef, and fruits and vegetables have been increasing. Thus since 1986, despite the abolition of the transfer payments and the difficult economic conditions, the volume of agricultural exports has not been decreased.

A lack of mobility of assets involved in farming is the third characteristic of the farm sector. It is at this level that our analysis of the New Zealand experience seems to be the most useful. The mobility of assets towards the off-farm sector was effectively little. As we have seen, despite the particularly difficult economic conditions in the sheep sector, exit from farming was less than expected. Having said that, many sheep farms (the only ones for which we have relevant data) have resorted to external sources of funds. In particular, off-farm incomes have increased appreciably and this implies a relative mobility of a part of human resources involved in farming families. However, this process is quite different from the exodus of this resource from the farm the sector.

On the other hand, and this probably explains what we have written before, the farm sector has demonstrated considerable capacity for internal adjustment. There has been a considerable movement of resources from one production sector to another. It is true that this movement of resources could be facilitated by the fact that sheep and beef production uses approximately the same set of resources. The change from one to the other does not require important investments, other than of course changing the type of livestock. But this does not explain all of the adjustments: there has also been diversification towards non-traditional production of deer, goats and horticulture. Thus, the production process has moved towards increasing productivity, and to control and reduce production costs. In this way, the family organisation of production has shown its capacity of resistance to declining prices and above all its adaptation to lower returns from its resources.

Fourth, the exposure of farm sector to climatic conditions is the last important characteristic of the nature of farming. The New Zealand farm sector is no exception in this matter. It is relevant to note however that in this matter, the government intervened by ad hoc programmes during recent years when the climatic conditions required some intervention.

The combination of the four characteristics of farm sector that we have just discussed is used to justify elsewhere the institution and the maintenance of agricultural policies of stabilisation and support of prices and incomes. These policies, as we have seen, have been abolished in New

Zealand and the effects on the farm sector in the medium-term do not seem to have been catastrophic. Nevertheless, the New Zealand farm sector is also affected, like everywhere else, by the destabilisation effect of these characteristics, even if they do not act necessarily with the same intensity than in other developed countries. In this case, is there anything specific in New Zealand and which is not present in other developed countries which might explain the lack of need for state intervention?

First, the historical conditions are different from elsewhere. In a country where the farm sector has been for a long time and until recently the mainspring of the economy and of exports, the issues of land occupation and food security have less importance. An island country located at more than 2,000 kilometres from its nearest neighbour does not have any significant threat to its territory that needs to be resolved by means of land occupation. Also, a country that exports about 85% of its dairy products, 95% of its sheepmeat and 80% of its kiwifruit does not have to consider the question of its food security. Having said that, the importance of farm employment and the essential part of the farm sector in the balance of payments of the country have played a role in the growth of support expenditure to this sector beginning in the middle of the 1970s, like in the other developed countries. But the economic and political environment for the years 1984 and 1985 led to sweeping away these considerations which in any case had been manifested by significant intervention only for a relatively short period of New Zealand history. Thus the first specificity of New Zealand in comparison to other developed countries is the historical conditions that led other countries to permanent government intervention in the farm sector, but do not lead to pronounced financial intervention in the New Zealand case.

But, what more fundamentally explains the specificity of New Zealand is the capacity of the production process in pastoral agriculture to be based only on the world price for its products while ensuring that the farming population receives an appropriate standard of living. In the dairy sector, for example, the farm gate price in New Zealand is more than half that of the Northern Hemisphere countries. At this price, New Zealand dairy farmers have been encouraged to increase their production during recent years. In the sheep sector, the withdrawal of transfer payments led to an important liquidation of livestock and a major reallocation of resources. But the farmers remaining in sheep production succeeded in stabilising the level of their income in real terms since 1987. We did not make an international comparative analysis of production costs which included New Zealand. It is more than probable that such a study would illustrate the competitive capacity of New Zealand farm sector and would explain its marked presence on the international markets despite its distance from the markets.

Finally, do the characteristics of the farm sector in New Zealand justify specific intervention by the state? It seems that the answer is no. But the case of New Zealand is itself sufficiently particular so that the results obtained in the present research should not be directly generalised to other developed countries. However, the large capacity of adaptation of the family organisation of farming to changing economic conditions has been clearly demonstrated by the analysis of the New Zealand case. And it is probably at this level that some analogies can be established with the farm sector situation in other developed countries. Thus, three elements of the present research merit attention. First, the mobility of resources away from the farm sector was relatively unimportant in the New Zealand case. Second, farmers adapted rapidly and efficiently to the new economic environment by modifying the use of their resources in order to mitigate the decrease in their incomes and to maintain their standard of living. Third, the long-term trends that were already apparent at both the level of the evolution of structures of production and the level of farm incomes were not drastically modified by the new policies, despite the extent of the reform of policies and the economic crisis suffered by the farm sector. Such results, are they only relevant to the New Zealand farm sector, with its unique specificity, or are they related to some characteristics of family organisation of farming that are not specific to New Zealand? If the latter case then the implications of the results from the present research would have some relevance outside New Zealand.

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ANNEXE 1

LIST OF ANNEX TABLES

Annex 2.1. Balance of Payments on Current Accounts, Current $ in Millions, and as a % of GDP, New Zealand, 1960-1993.

	Balance of Payments			Balance of Payments	
Year	$ millions	as % of GDP	Year	$ millions	as % of GDP
1960	81	3.2%	1977	-786	-5.5%
1961	-109	-4.1%	1978	-694	-4.6%
1962	-113	-3.9%	1979	-471	-2.8%
1963	-46	-1.5%	1980	-825	-4.2%
1964	-30	-0.9%	1981	-823	-3.6%
1965	-37	-1.0%	1982	-1628	-5.8%
1966	-186	-4.6%	1983	-1914	-6.1%
1967	-173	-4.1%	1984	-1917	-5.5%
1968	-110	-2.5%	1985	-3119	-7.9%
1969	25	0.5%	1986	-3998	-8.8%
1970	12	0.2%	1987	-2823	-5.1%
1971	-227	-3.9%	1988	-2235	-3.6%
1972	2	0.0%	1989	-273	-0.4%
1973	153	1.9%	1990	-2397	-3.4%
1974	-84	-0.9%	1991	-1571	-2.1%
1975	-1367	-13.5%	1992	-1583	-2.2%
1976	-1017	-8.7%	1993	-1398	-1.8%

Sources: Department of Statistics, Overseas Balance of Payment; Department of Statistics, PCInfos ECON-1.01, BOPQ.STOT168; Annex 2.3; and our calculations.

Annex 2.2. Unemployment Rate, New Zealand, 1970-1993.

Year	Unemployment	Year	Unemployment	Year	Unemployment
1970	0.1%	1978	1.7%	1986	4.0%
1971	0.3%	1979	1.9%	1987	4.1%
1972	0.5%	1980	2.7%	1988	5.6%
1973	0.2%	1981	3.5%	1989	7.2%
1974	0.1%	1982	3.6%	1990	7.9%
1975	0.3%	1983	5.3%	1991	10.3%
1976	0.4%	1984	4.5%	1992	10.3%
1977	0.6%	1985	3.5%	1993	9.8%

Sources: Department of Statistics, PCInfos OECD-C5-NZL-Y.NZL.UNR.

Annex 2.3. Contribution of Farm Sector to Gross Domestic Product (GDP), New Zealand, 1972-1993.

	Total GDP		Total GDP	Farm Sector GDP	Farm Sector as
Year	$ millions	Year	$ millions	$ millions	% of total GDP
1960	2482	1972	6880	793	11.5%
1961	2687	1973	7900	1062	13.4%
1962	2872	1974	9199	1129	12.3%
1963	3114	1975	10131	852	8.4%
1964	3397	1976	11744	1116	9.5%
1965	3721	1977	14201	1483	10.4%
1966	4012	1978	14997	1339	8.9%
1967	4190	1979	16972	1415	8.3%
1968	4375	1980	19797	2122	10.7%
1969	4642	1981	23089	2136	9.3%
1970	5133	1982	27991	2220	7.9%
1971	5832	1983	31536	2101	6.7%
		1984	34896	2430	7.0%
		1985	39528	3040	7.7%
		1986	45435	2956	6.5%
		1987	55088	3046	5.5%
		1988	61867	3515	5.7%
		1989	66403	3877	5.8%
		1990	71435	4280	6.0%
		1991	73601	3559	4.8%
		1992	73378	4160	5.7%
		1993	77067	4468	5.8%

Sources: New Zealand Official Yearbook, various years; PCInfos, ECON-1.11, SNBA.SF9AA; and our calculations.

Annex 2.4. Agrifood Sector Exports* and Total Exports, New Zealand, 1970-1993.

	Exports		
	Total	Agricultural Based	
Year	$ millions	$ millions	as % of Total
1970	1 086.7	1 002.7	92.3%
1971	1 131.7	1 011.5	89.4%
1972	1 375.0	1 162.9	84.6%
1973	1 792.0	1 518.4	84.7%
1974	1 787.3	1 426.6	79.8%
1975	1 621.5	1 266.7	78.1%
1976	2 386.9	1 901.1	79.6%
1977	3 228.7	2 504.8	77.6%
1978	3 313.5	2 536.3	76.5%
1979	4 067.4	3 034.4	74.6%
1980	5 152.2	3 663.2	71.1%
1981	6 065.3	4 391.9	72.4%
1982	6 940.3	4 660.4	67.2%
1983	7 935.4	5 202.6	65.6%
1984	8 623.9	5 305.7	61.5%
1985	11 315.8	6 939.6	61.3%
1986	10 571.7	6 251.2	59.1%
1987	12 107.2	7 580.3	62.6%
1988	12 451.5	7 365.0	59.1%
1989	14 905.4	8 737.2	58.6%
1990	15 163.5	8 514.7	56.2%
1991	15 768.4	8 488.9	53.8%
1992	17 890.6	9 695.9	54.2%
1993	19 006.2	9 957.5	52.4%

Note: * Exclude Carpets, Leather and Dressed Skins.
Sources: Department of Statistics, Overseas Trade 1992, cat. 010170092; MAF, New Zealand Agricultural Statistics; MAF, Situation and Outlook for New Zealand Agriculture; and our calculations.

Annex 2.5. Annual Budget and Financial Government Surplus as % of GDP, New Zealand, 1960-1992.

	Government Surplus			Government Surplus	
Year	Budget	Financial	Year	Budget	Financial
1960	-3.7%		1977	-3.8%	0.0%
1961	-2.9%		1978	-4.7%	-0.6%
1962	-2.4%		1979	-8.6%	-4.5%
1963	-3.9%		1980	-5.2%	-2.6%
1964	-3.2%		1981	-6.7%	-4.1%
1965	-2.4%		1982	-6.6%	-4.8%
1966	-2.9%		1983	-6.9%	-5.4%
1967	-3.2%		1984	-9.0%	-7.0%
1968	-2.5%		1985	-7.2%	-6.4%
1969	-2.4%		1986	-4.2%	-3.2%
1970	-1.5%		1987	-3.6%	-3.8%
1971	-1.4%		1988	0.8%	-2.1%
1972	-1.1%	1.2%	1989	2.7%	-1.8%
1973	-2.7%	-1.2%	1990	4.0%	-1.3%
1974	-2.7%	0.1%	1991	2.4%	-3.5%
1975	-4.0%	0.1%	1992	-1.7%	-3.3%
1976	-9.1%	-3.4%			

Sources: Dalziel and Lattimore 1991, p. 56, for the years from 1960 to 1989. After, our calculations from data in Annex 2.3 and Appendix to the Journal of the House of Representatives Document B6, Tables 2 and 2a.

Annex 2.6. Public Debt, Overseas and Domestic, New Zealand, 1960-1993.

	Debt in currents $ (millions)		Debt as % of GDP	
Year	Overseas	Domestic	Overseas	Domestic
1960	273	1416	11%	57%
1961	253	1483	9%	55%
1962	279	1529	10%	53%
1963	314	1620	10%	52%
1964	322	1700	9%	50%
1965	331	1809	9%	49%
1966	333	1923	8%	48%
1967	391	2021	9%	48%
1968	500	2117	11%	48%
1969	515	2261	11%	49%
1970	526	2351	10%	46%
1971	576	2431	10%	42%
1972	654	2533	9%	37%
1973	564	2939	7%	37%
1974	465	3269	5%	36%
1975	863	3337	9%	33%
1976	1463	4095	12%	35%
1977	1827	4463	13%	31%
1978	2447	5037	16%	34%
1979	2920	5899	17%	35%
1980	3568	6779	18%	34%
1981	4236	7381	18%	32%
1982	5549	8832	20%	32%
1983	7765	10968	25%	35%
1984	8226	13652	24%	39%
1985	12410	15837	31%	40%
1986	14726	17276	32%	38%
1987	21735	20744	39%	38%
1988	17257	21855	28%	35%
1989	16953	23008	26%	35%
1990	20586	23761	29%	33%
1991	20491	23445	28%	32%
1992	20727	26378	28%	36%
1993	19866	27612	26%	36%

Sources: New Zealand Official Yearbook, various years; NZ Pocket Digest of Statistics, cat. 01.101.0091; Department of Statistics, PCInfos: ECON-6.03-CGSA.SS and ECON-6.03A-CGSA.SJR; and our calculations.

Annex 2.7. GDP in Constant $ and Consumers Price Index, New Zealand, 1960-1993.

Year	Total GDP constant (Dec. 88) $ millions	CPI Dec. 1988 = 1000	CPI Annual Change
1960	29200	85	
1961	30885	87	2.4%
1962	32270	89	2.3%
1963	34220	91	2.2%
1964	36138	94	3.3%
1965	38361	97	3.2%
1966	40120	100	3.1%
1967	39528	106	6.0%
1968	39414	111	4.7%
1969	40017	116	4.5%
1970	41395	124	6.9%
1971	42882	136	9.7%
1972	47123	146	7.4%
1973	50000	158	8.2%
1974	52566	175	10.8%
1975	50403	201	14.9%
1976	49974	235	16.9%
1977	52792	269	14.5%
1978	49824	301	11.9%
1979	49626	342	13.6%
1980	49369	401	17.3%
1981	49976	462	15.2%
1982	52125	537	16.2%
1983	54655	577	7.4%
1984	57020	612	6.1%
1985	55909	707	15.5%
1986	56794	800	13.2%
1987	59490	926	15.8%
1988	62809	985	6.4%
1989	63788	1041	5.7%
1990	64647	1105	6.1%
1991	64904	1134	2.6%
1992	64086	1145	1.0%
1993	66437	1160	1.3%

Sources: GDP, Annex 2.3; CPI, Department of Statistics, PCInfos: ECON-3.02, CPIQ.SE9A; and our calculations.

Annex 3.1. MAF Expenditure and Breakdown, Excluding Fishing Sector, New Zealand, 1960-1992.

Year	Total****	General * Administration	Research and ** Advisory Services	Animal Health and Inspection	Transfer Payments ***
1960	11320	6334	2946	2040	4882
1961	11204	6292	3038	1874	2666
1962	12180	7066	3146	1968	2684
1963	12702	7284	3368	2050	3100
1964	13584	7792	3672	2120	3276
1965	15768	8776	4212	2780	2044
1966	17834	10270	4534	3030	3476
1967	20286	10828	5544	3914	8700
1968	19222	9066	5930	4226	7050
1969	20578	9601	6472	4505	7520
1970	28839	14280	7070	7489	13869
1971	54480	36552	8572	9356	35701
1972	88663	66511	9909	12243	65813
1973	97122	67810	11763	17549	68149
1974	77655	42987	14380	20288	40412
1975	102890	61955	17050	23885	56202
1976	204649	160228	20163	24258	150521
1977	169693	119043	22203	28447	112728
1978	174404	114979	26365	33060	106331
1979	281558	212116	30825	38617	200056
1980	219762	137248	35992	46522	124139
1981	230170	127415	44750	58005	108802
1982	315576	189751	53636	72189	173674
1983	512348	375714	58562	78072	349985
1984	777885	635304	64690	77891	613311
1985	576251	417463	58429	100359	416336
1986	265948	99065	66316	100567	86469
1987	1708944	1536204	73674	99066	1518132
1988	230877	60216	87748	82913	41419
1989	348431	123686	135196	89549	127143
1990	182176	35583	65014	81579	39757
1991	189776	60228	62422	67126	60347
1992	141102	34250	52642	54210	28438

Notes: * Include general expenditures, management service, economics and public building and stabilisation and income support payments.
** Includes expenditures for research, advisory service, horticulture and soil conservation.
*** From 1960 to 1969, transfer payment costs are included in general administration; since 1970 transfer payments are attributed to each concern headings.
**** After 1985, the receipts of the departments are deducted from expenditures. Since 1990, the accounting methods have been fundamentally modified and we have done a reconciliation of data allowing for a comparison with previous years. These latter data must be used with caution.
Sources: Appendix to the Journals of the House of Representatives, Appendix B.7 Pt. 1, various years; and our calculations.

Annex 3.2. Level of Assistance to Pastoral Agriculture, New Zealand, 1970-1993.

Year	Research and Advisory Services	Animal Health and Inspection	General Adm. and Income Support	Taxation Concessions	Total
1970	6	8	- 3	13	24
1975	13	15	180	25	233
1980	38	67	221	78	404
1981	45	77	143	76	341
1982	51	94	553	79	777
1983	58	103	964	67	1192
1984	62	102	825	104	1093
1985	64	100	775	96	1035
1986	69	102	524	168	863
1987	77	98	322	22	519
1988	72	75	340	17	504
1989	70	73	99	14	256
1990	63	66	63	11	203
1991	65	48	49	3	165
1992	60	42	24	0	126
1993	61	41	14	0	116

Sources: from 1970 to 1987, Tyler and Lattimore 1990, pp. 72-73; from 1988 to 1992, MAF 1992, p. 95, MAF 1993, p. 134, MAF 1994, p. 118; and our calculations.

Annex 3.3. Trade Weighted Exchange Rate Index of New Zealand $, January 1982-December 1990.

Month and Year	Index	Month and Year	Index	Month and Year	Index
01/82	84.3	01/85	61.0	01/88	66.5
02/82	84.0	02/85	61.3	02/88	66.7
03/82	83.8	03/85	61.3	03/88	64.1
04/82	82.9	04/85	61.7	04/88	65.7
05/82	82.8	05/85	60.5	05/88	66.8
06/82	82.9	06/85	64.0	06/88	67.1
07/82	83.1	07/85	66.2	07/88	66.1
08/82	83.3	08/85	68.8	08/88	60.8
09/82	83.4	09/85	67.7	09/88	61.7
10/82	83.3	10/85	71.2	10/88	60.5
11/82	82.6	11/85	68.8	11/88	61.1
12/82	82.4	12/85	60.7	12/88	59.9
01/83	81.9	01/86	63.5	01/89	57.8
02/83	81.9	02/86	60.3	02/89	61.2
03/83	77.3	03/86	61.7	03/89	60.9
04/83	77.3	04/86	64.9	04/89	61.5
05/83	77.1	05/86	64.6	05/89	61.7
06/83	77.1	06/86	62.2	06/89	60.2
07/83	77.2	07/86	59.6	07/89	59.8
08/83	77.5	08/86	56.0	08/89	61.6
09/83	77.1	09/86	55.7	09/89	60.6
10/83	76.9	10/86	58.6	10/89	60.4
11/83	76.8	11/86	58.7	11/89	60.9
12/83	76.8	12/86	59.5	12/89	60.8
01/84	76.7	01/87	59.8	01/90	61.2
02/84	76.7	02/87	61.6	02/90	61.2
03/84	76.3	03/87	60.3	03/90	61.7
04/84	76.3	04/87	61.0	04/90	61.5
05/84	76.3	05/87	61.0	05/90	60.1
06/84	76.6	06/87	63.0	06/90	60.5
07/84	61.5	07/87	60.7	07/90	59.8
08/84	61.4	08/87	63.8	08/90	61.0
09/84	61.3	09/87	69.2	09/90	60.0
10/84	61.2	10/87	61.5	10/90	59.6
11/84	61.0	11/87	65.7	11/90	59.7
12/84	61.1	12/87	64.6	12/90	58.2

Sources: Department of Statistics, PCInfos: 6.10 - Exchange rate Mid-Rate Basis by Currency.

Annex 3.4. Interest Rates on Medium Term Government Bonds*, New Zealand, 1975 -1993.

Year	Interest Rate	Year	Interest Rate
1975	5.7%	1985	18.6%
1976	7.5%	1986	17.4%
1977	8.9%	1987	16.3%
1978	9.8%	1988	13.5%
1979	12.2%	1989	12.8%
1980	13.0%	1990	12.5%
1981	12.7%	1991	10.0%
1982	12.5%	1992	7.9%
1983	11.9%	1993	6.7%
1984	12.3%		

Note: * Government Securities Yields. From 1975 to 1977, 3 to 10 years; from 1978 to 1985, 2 to 5 years; since 1986, 5 years.
Sources: Reserve Bank New Zealand Bulletin, various years; PCInfos: 6.05 - Key Market rates, Government Stock Yields, 5 years (since 1986); and our calculations.

Annex 4.1. Number of Farms per Type of Production *, New Zealand, 1970-1992.

Year	Total	Sheep	Dairy	Beef	Other
1970	59294	26631	20359	3897	8407
1971	63036	26178	20824	5732	10302
1972	62789	20122	19296	7387	15984
1973	63196	21822	18142	7602	15630
1974	63455	20933	17162	8944	16416
1975	67063	22011	17523	9137	18392
1976	67774	22080	17192	8592	19910
1977	68571	23150	16749	8073	20599
1978	69401	24234	16459	7861	20847
1979	70452	24753	16082	7991	21626
1980	71505	25931	15619	8085	21870
1981	72515	27859	15313	8233	21110
1982	73925	28532	15357	8041	21995
1983	75745	28129	15711	8141	23764
1984	76633	27560	15934	8540	24599
1985	78808	26664	15978	9493	26673
1986	79824	25738	16019	10879	27188
1987	80796	25296	15618	11459	28423
1988	82063	25008	16020	10224	30811
1989	82687	24387	16672	10562	31066
1990	80904	21785	16858	11694	30567
1991	80439	20358	16757	13383	29941
1992	79666	18651	16482	14133	30400

Note: * To be classified in a type of production, the farm must obtain more than 50% of its gross income from this type of production.
Sources: Department of Statistics, Agricultural Statistics; and our calculations.

Annex 4.2. Number of Farms by Type and Economic Category, New Zealand, 1986-1990.

Type of production	Economic Category	Years		
		1986	1988	1990
Dairy	Significant	13895	13476	14523
	Small	2124	2544	2335
	Total	16019	16020	16858
Sheep and Beef	Significant	17782	18314	16708
	Small	18835	16918	16771
	Total	36617	35232	33479
Other Types	Significant	9053	10220	9363
	Small	8074	9020	11168
	Total	17127	19240	20531
Other Land *	Significant	1414	884	965
	Small	8647	10687	9071
	Total	10061	11571	10036
Total	Significant	42144	42894	41559
	Small	37680	39169	39345
	Total	79824	82063	80904

Note: * Other land includes beekeeping, plantations, other farming, agricultural contracting, research and educational farms, and idle land.
Sources: Fairweather 1992, p. 28; and our calculations.

Annex 4.3. Agricultural Area, Total and by Type of Land Use, and Average Size of Farm, New Zealand, 1972-1992.

Year	Total ('000 hec)	Pasture * ('000 hec)	Grain and Horticulture ('000 hec)	Plantations of Exotic Trees ('000 hec)	Average Size per Farm (hec)
1972	14482	13529	406	547	231
1973	14814	13840	387	587	234
1974	14913	13890	398	625	235
1975	15042	13936	406	700	224
1976	15159	13923	430	806	224
1977	15125	13844	446	835	221
1978	15267	14066	433	768	220
1979	15250	13990	453	806	216
1980	15470	14156	435	879	216
1981	15578	14173	452	953	215
1982	15622	14190	470	963	211
1983	15592	14109	482	1001	206
1984	15514	13978	495	1041	202
1985	15490	13881	512	1098	197
1986	15490	13833	507	1150	194
1987	15435	13810	447	1178	191
1988	15455	13770	419	1265	188
1989	15351	13676	425	1249	186
1990	15205	13490	411	1304	188
1991	15135	13405	400	1329	188
1992	15122	13382	405	1335	190

Note: * Improved and non-improved pasture.
Sources: MAF 1993, p. 110; MAF (various years) NZ Agricultural Statistics; Annex 4.1 and our calculations.

Annex 4.4. Livestock by Type ('000 Head) and Stock Units* ('000), New Zealand, 1970-1992.

Year	Stock Units	Sheep	Dairy Cows	Beef	Deer	Goats
1970	101635	60276	3729	5048		
1971	96548	58912	3539	5280		
1972	100691	60883	3288	5344		
1973	98233	56684	3159	5765		
1974	99258	55883	3074	6237		
1975	100728	55320	2998	6294		
1976	100005	56400	2930	6087		
1977	100963	59105	2899	5839		
1978	101996	62163	2911	5507		
1979	101684	63523	2900	5122	42	49
1980	106891	68772	2969	5162	104	53
1981	107394	69884	2922	5113	109	68
1982	107577	70301	3007	4906	151	93
1983	106618	70263	3134	4497	196	150
1984	107327	69739	3246	4531	259	230
1985	107020	67854	3308	4613	320	427
1986	108236	67470	3398	4881	392	723
1987	104271	64244	3195	4804	500	1054
1988	104710	64600	3200	4858	606	1301
1989	100309	60569	3302	4526	780	1222
1990	99929	57852	3464	4601	976	1063
1991	96824	55162	3429	4671	1130	793
1992	95625	52568	3468	4676	1135	533

Note: *The basis of the stock units is ewe.
Sources: Department of Statistics, Agricultural Statistics, cat. 14.101 and 01.018.0091 and Annual Review of the New Zealand Sheep and Beef Industry 1992/93.

Annex 4.5. Number of Farms by Size of Farms, New Zealand, 1972-1992.

	Hectares				
Year	< 40	40-99	100-199	200-799	≥800
1972	15302	18545	12390	13374	3178
1973	16593	17783	12044	13420	3356
1974	17168	17436	11922	13538	3391
1975	20163	17774	12015	13702	3409
1976	20994	17639	11955	13754	3432
1977	21990	17576	11818	13764	3423
1978	22900	17490	11771	13811	3429
1979	24057	17376	11793	13802	3424
1980	25221	17321	11717	13821	3425
1981	26246	17275	11679	13872	3443
1982	27647	17271	11607	13988	3412
1983	29424	17272	11616	14047	3386
1984	30470	17233	11519	14031	3380
1985	32461	17351	11478	14147	3371
1986	33419	17460	11476	14127	3342
1987	34623	17523	11440	14034	3176
1988	35924	17560	11447	13952	3180
1989	36827	17407	11456	13830	3167
1990	35652	17062	11317	13708	3165
1991	35559	16750	11266	13699	3165
1992	35701	16305	11091	13425	3144

Sources: Department of Statistics, Agricultural Statistics; Fairweather 1992, p. 37; MAF, special order; and our calculations.

Annex 4.6. Number of Sheep Farms by Size of Flock, New Zealand, 1970-1992.

	Size of Sheep Flock (head)			
Year	< 500	500-1999	2000-4999	≥5000
1970	11582	16581	8930	1468
1971	11374	15856	8814	1471
1972	10166	15587	9509	1564
1973	10990	14751	8646	1453
1974	13573	13560	8513	1528
1975	11348	13937	8502	1448
1976	11082	13415	8895	1512
1977	10141	13025	9388	1742
1978	11501	12649	10053	1915
1979	10688	12031	10158	2089
1980	15499	11109	10737	2564
1981	15439	10740	10803	2659
1982	17004	10588	10897	2701
1983	16770	10613	10815	2700
1984	15846	10398	10638	2729
1985	16447	10380	10417	2568
1986	17299	10280	10198	2618
1987	16930	10291	9799	2395
1988	17781	10028	9789	2469
1989	17874	10021	9112	2243
1990	18169	9725	8736	2106
1991	18432	9430	8198	2020
1992	17627	8924	7687	1947

Note: * Including all farms carrying one sheep and more. These data count all farms with sheep while the data in Annex 4.1 count only sheep farms with more than 50% of gross income from sheep.
Sources: Department of Statistics, Agricultural Statistics; NZ Official Year Book; and our calculations.

Annex 4.7. Number of Sheep ('000) by Size of Flock, New Zealand, 1970-1992*.

	Size of Sheep Flock (head)			
Year	< 500	500-1999	2000-4999	≥5000
1970	1965	20557	25820	11933
1971	1890	19625	25479	11918
1972	1687	19258	27663	12275
1973	1766	18273	25168	11476
1977	1634	16236	27546	13689
1978	1790	15738	29595	15039
1984	1983	12706	32219	22831
1985	2031	12689	31499	21635
1990	1986	11814	26265	17787
1992	1995	10780	23248	16545

Note: * The data for the missing years are not available.
Sources: Department of Statistics, Agricultural Statistics; MAF, special order; and our calculations.

Annex 4.8. Number of Dairy Cattle by Size of Herd, New Zealand, 1975-1992*.

	Size of Dairy Herd ('000 head)				
Year	< 100	100-150	150-199	200-299	≥300
1975	331	740	768	766	393
1976	311	730	750	748	390
1977	280	697	765	752	406
1978	252	654	771	788	446
1979	242	625	768	787	478
1980	221	585	764	840	558
1981	203	529	766	855	569
1982	195	521	755	905	630
1983	190	483	762	968	730
1984	192	456	771	1015	811
1985	178	434	750	1059	887
1992	187	349	610	1065	1257
Number of Dairy Farms by Size of Heard **					
1992	6216	2770	3506	4403	2891

Notes: * The data for the missing years are not available.
** Data available for only one year.
Sources: Department of Statistics, Agricultural Statistics; MAF, special order; and our calculations.

Annex 4.9. Number of Workers by Category of Farm Labour, New Zealand, 1984-1992.

	Working	Unpaid Family	Paid Permanent	Total *	Paid Casual
Year	Owners	Members	Employees		Workers
1984	86981	33138	30130	150249	11837
1985	88748	34795	28719	152262	12242
1986	86653	35680	27061	149394	11913
1987	87311	37986	26872	152169	12761
* *					
1988	85045	29212	27028	141285	9924
1989	83921	27986	25180	137087	9364
1990	87203	27578	26960	141741	9928
1991***	86389	31872	29663	147924	24325
1992***	84515	28257	30435	143207	20756

Notes : * Excluding paid casual workers.
** The basis of the survey changed between 1987 and 1988, see discussion in text.
*** Until 1990, at 30 June; after, at end of February.
Sources: Fairweather 1992, p. 31; New Zealand Official Yearbook, 1993 and 1994; and our calculations.

Annex 4.10. Agricultural Output in Current and Constant Dollars, New Zealand, 1960-1993.

	Agricultural Output $ millions			Agricultural Output $ millions	
Year	Current $	Constant $ *	Year	Current $	Constant $ *
1960	624	7335	1977	2771	10301
1961	614	7056	1978	2765	9186
1962	595	6685	1979	3180	9298
1963	654	7187	1980	4354	10858
1964	764	8123	1981	4549	9846
1965	792	8166	1982	5000	9311
1966	853	8525	1983	5092	8825
1967	824	7775	1984	5986	9781
1968	818	7368	1985	7264	10274
1969	886	7636	1986	6882	8603
1970	894	7208	1987	6902	7454
1971	935	6874	1988	7365	7477
1972	1230	8425	1989	8132	7812
1973	1565	9905	1990	9080	8217
1974	2038	11646	1991	8216	7245
1975	1588	7900	1992	9027	7884
1976	2070	8809	1993	9667	8334

Notes: *December 1988 dollars.
Sources: New Zealand Official Yearbook, various years; MAF 1994; and our calculations.

Annex 4.11. Volume of Pastoral Production*, New Zealand, 1970-1993.

	Total Meat	Sheep Meat	Beef Meat	Dairy	Wool
Year	tonnes ('000)	tonnes ('000)	tonnes ('000)	tonnes ('000)	tonnes ('000)
1970	994	563	393	244	328
1971	999	564	393	244	334
1972	1025	575	410	258	323
1973	1037	556	446	247	309
1974	937	498	405	228	285
1975	1030	490	507	244	294
1976	1174	513	628	268	312
1977	1094	498	558	275	303
1978	1101	502	562	251	311
1979	1061	514	512	274	321
1980	1090	560	496	291	357
1981	1157	626	498	282	381
1982	1179	623	516	282	363
1983	1232	680	512	290	371
1984	1144	668	434	324	364
1985	1266	731	487	332	373
1986	1146	630	468	349	358
1987	1220	620	555	301	350
1988	1232	615	572	333	346
1989	1211	610	556	311	341
1990	1051	530	478	330	309
1991	1138	555	539	342	305
1992	1178	585	545	365	296
1993	510	580	373	373	256

Note: * Sheep meat (mutton and lamb) and beef meat (beef and veal) based on bone-in weight, wool based on greasy and dairy based on milk fat. Total meat includes sheep meat, beef meat and pork meat but excludes offal and other meats.

Sources: Situation and Outlook for New Zealand Agriculture, MAF, various years; Department of Statistics, Agricultural Statistics, cat. 14.101 and 01.018.0091; New Zealand Dairy Board, Annual Report, various years; New Zealand Meat and Wool Boards' Economic Service, Annual Review of the Sheep and Beef Industry; and our calculations.

Annex 4.12. Production Price Index (Dec. 1988 = 1000), New Zealand, 1970-1993.

	Production Price Index			Production Price Index	
Year	Current	Deflated*	Year	Current	Deflated*
1970	167	1347	1982	687	1280
1971	174	1282	1983	754	1307
1972	206	1412	1984	837	1368
1973	290	1837	1985	928	1312
1974	260	1487	1986	844	1055
1975	235	1168	1987	905	977
1976	317	1351	1988	921	935
1977	355	1320	1989	1106	1063
1978	399	1324	1990	1116	1010
1979	519	1519	1991	990	873
1980	562	1401	1992	1089	951
1981	604	1306	1993	1140	982

Note: *Price Production Index deflated by the Consumers' Price Index, December 1988 =1000.
Sources: Department of Statistics, PCInfos: PPIQ.SOA; and our calculations.

Annex 4.13. Value of Agricultural Based Exports *, New Zealand, 1970-1993.

	Agrifood Exports			Agrifood Exports	
Year	$ millions		Year	$ millions	
	Current $	Constant $**		Current $	Constant $**
1970	1003	8086	1982	4660	8679
1971	1012	7438	1983	5203	9017
1972	1163	7965	1984	5306	8669
1973	1518	9610	1985	6940	9816
1974	1427	8152	1986	6251	7814
1975	1267	6302	1987	7580	8186
1976	1901	8090	1988	7365	7477
1977	2505	9312	1989	8737	8393
1978	2536	8426	1990	8515	7706
1979	3034	8873	1991	8489	7486
1980	3663	9135	1992	9696	8468
1981	4392	9506	1993	9958	8584

Notes: *Value of exports excludes carpets, leather and dressed skins.
**December 1988 $.
Sources: Situation and Outlook for New Zealand Agriculture, MAF, various years; Department of Statistics, Agricultural Statistics, cat. 14.101 and 01.018.0091; and our calculations.

Annex 4.14. Exports Volume and Price Index for Fruits & Vegetables and for Pastoral Products, New Zealand, 1972-1993.

	Fruits & Vegetables			Pastoral Products		
Year	Volume Index	Price Index		Volume Index	Price Index	
	*	Current *	Deflated **	*	Current *	Deflated **
1972	102	276	1890	692	213	1459
1973	122	315	1994	669	282	1785
1974	121	352	2011	595	267	1526
1975	109	411	2045	632	248	1234
1976	144	471	2004	714	335	1426
1977	146	526	1955	705	391	1454
1978	169	586	1947	691	418	1389
1979	218	620	1813	738	506	1480
1980	234	648	1616	741	578	1441
1981	273	814	1762	774	642	1390
1982	287	881	1641	806	702	1307
1983	364	927	1607	845	726	1258
1984	471	1068	1745	835	808	1320
1985	629	1026	1451	933	885	1252
1986	683	1169	1461	931	842	1053
1987	927	1060	1145	959	900	972
1988	970	1026	1042	987	930	944
1989	979	1025	985	901	1070	1028
1990	1270	897	812	906	1058	957
1991	1212	1057	932	995	990	873
1992	1334	1051	918	985	1088	950
1993	1287	983	847	996	1098	947

Notes: * June 1989=1000.
** Export Price Index deflated by the Consumers' Price Index, December 1988=1000.
Sources: Department of Statistics, PCInfos: OTIA.SE2AV2, .SE2BS2, .SE1AV2, .SE1BS2; and our calculations.

Annex 5.1. Input Cost Index and Production Price Index in Farming, New Zealand, 1970-1993.

	Input Cost	Production		Input Cost	Production
Year	Index	Price Index	Year	Index	Price Index
	1970 = 1000	1970 = 1000		1970 = 1000	1970 = 1000
1970	1000	1000	1982	4695	4114
1971	1083	1043	1983	4919	4513
1972	1160	1234	1984	5343	5010
1973	1298	1738	1985	6119	5552
1974	1470	1558	1986	6063	5052
1975	1605	1405	1987	6286	5416
1976	1846	1900	1988	6556	5513
1977	2128	2126	1989	7051	6622
1978	2361	2386	1990	7658	6682
1979	2732	3109	1991	7706	5925
1980	3380	3362	1992	7959	6517
1981	4110	3612	1993	8411	6821

Sources: Department of Statistics, PCInfos: PPIQ.SOA and PPIQ.SIAF; Department of Statistics, Monthly Abstract of Statistics; and our calculations.

Annex 5.2. Farm and Export Prices for New Zealand Lamb and Beef, 1975-1993.

	Lamb Price		Beef Price	
Year	Farm Price	Wholesale in London	Farm Price	Wholesale in New York
	$NZ / head	$NZ / kg	$NZ / kg	$NZ / kg
1975	6.10	1.03	0.32	0.92
1976	9.52	1.32	0.52	1.36
1977	13.03	1.66	0.57	1.47
1978	11.87	1.80	0.62	1.65
1979	14.06	2.15	1.01	2.37
1980	15.19	2.51	1.20	2.63
1981	15.39	2.90	1.18	2.70
1982	20.67	3.13	1.36	2.79
1983	20.81	2.79	1.52	3.25
1984	22.64	2.96	1.74	3.38
1985	24.21	3.72	2.24	4.34
1986	12.74	3.78	1.63	3.63
1987	19.06	3.91	1.81	3.84
1988	16.34	3.29	1.72	3.67
1989	19.78	3.53	2.21	4.06
1990	31.13	4.01	2.68	4.63
1991	26.04	3.98	2.57	4.48
1992	27.97	3.94	2.65	4.73
1993	40.16	4.65	2.84	4.72

Sources: Situation and Outlook for New Zealand Agriculture, MAF, various years; Department of Statistics, Agricultural Statistics, cat. 14.101 and 01.018.0091; NZMWB Economic Service, Annual Review of NZ Sheep and Beef Industry; and our calculations.

Annex 5.3. Farm Dairy Price in New Zealand ($NZ/kg), and Prices of Butter, Cheddar and Skim Milk Powder on the World Market ($NZ/tonne), 1979-1993.

	New Zealand	World Price ($NZ / tonne)			
Year	Farm Price	Butter	Cheddar	Skim Milk	Average of These
	$/kg of Milkfat			Powder	Three Prices
1979	1.85	1106	1369	633	1036
1980	2.13	1649	1600	1014	1421
1981	2.65	2497	1921	1255	1891
1982	3.40	3031	2473	1384	2296
1983	3.67	2914	2349	1239	2167
1984	3.64	2838	2363	1298	2166
1985	4.06	2418	2511	1424	2118
1986	3.98	2030	2074	1565	1889
1987	3.55	1776	2087	1485	1782
1988	4.07	1922	2760	2547	2410
1989	5.70	3119	3427	3184	3243
1990	6.30	2383	2858	2628	2623
1991	4.24	2499	2711	2488	2566
1992	5.84	2604	3402	3251	3086
1993	6.38	2486	3430	3091	3003

Sources: Situation and Outlook for New Zealand Agriculture, MAF, various years; Department of Statistics, Agricultural Statistics, cat. 14.101 and 01.018.0091; MAF, data unpublished; PCInfos, OECD data; and our calculations.

Annex 5.4. Farm Prices for Apple and Kiwifruit in New Zealand ($NZ/kg) and Wholesale Price on the German Market (DM/tray), 1981-1993.

	Apple Price		Kiwifruit Price	
Year	Farm Price	Wholesale in Germany	Farm Price	Wholesale in Germany
	$NZ / kg	en DM / 18.5 kg	$NZ / kg	DM / 3.5 kg
1981	0.23		2.21	
1982	0.30		2.17	
1983	0.30		2.89	25.17
1984	0.34		1.95	23.66
1985	0.37		2.39	20.55
1986	0.42		2.02	21.30
1987	0.43		2.80	14.35
1988	0.42	41.03	1.57	15.47
1989	0.40	42.70	1.40	16.99
1990	0.51	47.70	1.85	12.46
1991	0.70	57.32	1.36	14.06
1992	0.68	51.45	1.79	11.13
1993	0.39	42.23	1.10	11.89

Sources: Situation and Outlook for New Zealand Agriculture, MAF, various years; Department of Statistics, Agricultural Statistics, cat. 14.101 and 01.018.0091; MAF, data unpublished; PCInfos, OECD data; and Coopers & Lybrand 1988.

Annex 5.5. Net Farm Income and Drawings on Sheep Farms, New Zealand, 1967-1993.

	Net Farm Income		Drawings		Net Income as
Year	$ Current	$ Constant *	$ Current	$ Constant *	% of Drawings
1967	4226	39868	4158	39226	98%
1968	4778	43045	3630	32703	76%
1969	5956	51345	4199	36198	71%
1970	6338	51113	4697	37879	74%
1971	5822	42809	4451	32728	76%
1972	7108	48685	4570	31301	64%
1973	18819	119108	5926	37506	31%
1974	14258	81474	6913	39503	48%
1975	5368	26706	6383	31756	119%
1976	13625	57979	8092	34434	59%
1977	21371	79446	10486	38981	49%
1978	13888	46140	10071	33458	73%
1979	19495	57003	10736	31392	55%
1980	24771	61773	13739	34262	55%
1981	21697	46963	13144	28450	61%
1982	21401	39853	15071	28065	70%
1983	23395	40546	15262	26451	65%
1984	18491	30214	17831	29136	96%
1985	34208	48385	20179	28542	59%
1986	15338	19173	18716	23395	122%
1987	25857	27923	21178	22870	82%
1988	28487	28921	23117	23469	81%
1989	28257	27144	23522	22596	83%
1990	37285	33742	26785	24240	72%
1991	28784	25383	27285	24061	95%
1992	31065	27131	27604	24108	89%
1993 **	36800	31724	-	-	-

Notes: * Indexed by CPI, December 1988 = 1000.
** Provisional.
Sources: NZ Meat and Wool Boards' Economic Service, Sheep and Beef Farm Survey, various years; and our calculations.

Annex 5.6. Number of Stock Units, Total and per Hectare, on Sheep Farms, New Zealand, 1981-1992.

	Number of Stock Units				
Year	Sheep	Beef	Deer and Goats	Total	per Hectare
1981	2602	716	-	3318	6.53
1982	2658	709	-	3367	6.76
1983	2669	653	-	3322	6.71
1984	2631	581	7	3219	6.61
1985	2649	628	12	3289	6.75
1986	2588	627	15	3230	6.63
1987	2595	671	21	3287	6.68
1988	2541	674	31	3246	6.47
1989	2579	702	33	3314	6.83
1990	2476	642	37	3155	6.48
1991	2572	791	54	3417	6.65
1992	2553	858	50	3461	6.71

Sources: NZ Meat and Wool Boards' Economic Service, Sheep and Beef Farm Survey, various years; and our calculations.

Annex 5.7. Total Tonnes of Fertiliser and Labour Units, and Stock Units per Tonne of Fertiliser and per Labour Unit on Sheep Farms, New Zealand, 1981-1992.

	Fertiliser	Stock Units	Labour Units	Stock Units
Year	Total	per Tonne of	Total	per
	Tonnes	Fertiliser		Labour Unit
1981	54	61	1.83	1813
1982	53	64	1.83	1840
1983	45	74	1.79	1856
1984	48	67	1.77	1819
1985	53	62	1.74	1890
1986	26	124	1.67	1934
1987	29	112	1.61	2042
1988	29	112	1.59	2042
1989	35	95	1.55	2138
1990	37	86	1.59	1984
1991	32	108	1.57	2176
1992	35	99	1.57	2204

Sources: NZ Meat and Wool Boards' Economic Service, Sheep and Beef Farm Survey, various years; and our calculations.

Annex 5.8. Stock Sales, Sheep and Beef (number of head), and Wool Sales (kg) on Sheep Farms, New Zealand, 1981-1992.

	Lamb	Sheep	Beef	Wool
Year	nb	nb	nb	kg
1981	1478	620	77	14082
1982	1436	630	80	13282
1983	1564	631	86	13215
1984	1502	624	59	13018
1985	1721	672	69	13747
1986	1458	575	66	13456
1987	1346	672	74	12823
1988	1387	631	76	13996
1989	1384	756	92	13037
1990	1228	654	73	12398
1991	1324	645	87	12668
1992	1368	725	97	12562

Sources: NZ Meat and Wool Boards' Economic Service, Sheep and Beef Farm Survey, various years; and our calculations.

Annex 5.9. Gross Income by Production (in current $) on Sheep Farms, New Zealand, 1981-1992.

	Wool	Sheep and	Beef	Others
Year		Lamb		
1981	32040	28317	13875	9020
1982	39046	32086	14650	9804
1983	39434	34521	17811	13608
1984	38448	36154	14023	16150
1985	46954	44411	21745	19513
1986	42400	24957	18824	20138
1987	47657	30793	20999	17678
1988	57112	30856	20877	17333
1989	59974	26684	24385	17493
1990	51284	39894	29585	22593
1991	39938	42548	34606	16561
1992	37650	41477	38758	17192

Sources: NZ Meat and Wool Boards' Economic Service, Sheep and Beef Farm Survey, various years; and our calculations.

Annex 5.10. Expenditure per Item (in current $) on Sheep Farms, New Zealand, 1981-1992.

Year	Wages	Feed, Grazing & Animal Health	Contract Works & Cartage	Fertiliser, Lime & Seeds
1981	6015	3812	9515	8074
1982	6951	4770	10793	9785
1983	6995	6145	11664	10275
1984	6397	6671	12617	10801
1985	6567	7752	13730	14146
1986	6011	7312	12695	8201
1987	5813	6934	12577	9279
1988	6168	7432	14052	9258
1989	6582	8358	14033	10776
1990	7287	8867	14633	12311
1991	7741	8573	14860	10697
1992	8450	9333	14323	11827

Year	Repairs & Maintenance	Standing Charges	Interest	Depreciation	Total Expenditure
1981	13766	6114	8964	5294	61554
1982	16349	7376	12137	6024	74185
1983	17485	8705	14782	5927	81978
1984	18214	9085	16305	6194	86284
1985	20940	10396	17736	7148	98415
1986	17790	11377	21509	6085	90980
1987	15764	12067	22619	6217	91270
1988	16451	14125	23862	6343	97691
1989	17321	14583	22379	6247	100279
1990	19311	14970	21642	7050	106071
1991	19040	14804	21398	7756	104869
1992	18812	14616	18729	7922	104012

Sources: NZ Meat and Wool Boards' Economic Service, Sheep and Beef Farm Survey, various years; and our calculations.

Annex 5.11. Total Assets, Debt and Net Worth (in current $), on Sheep Farms, New Zealand, 1981-1992.

Year	Total assets	Debt	Net Worth	
	$	$	$	%
1981	753681	112488	641193	85.1%
1982	858047	137744	720303	83.9%
1983	815147	153715	661432	81.1%
1984	856356	167572	688784	80.4%
1985	783126	173916	609210	77.8%
1986	601927	185469	416458	69.2%
1987	662397	182336	480061	72.5%
1988	633804	182438	451366	71.2%
1989	727363	179301	548062	75.3%
1990	874053	181695	692358	79.2%
1991	868375	190008	678367	78.1%
1992	975011	191437	783574	80.4%

Sources: NZ Meat and Wool Boards' Economic Service, Sheep and Beef Farm Survey, various years; and our calculations.

Annex 5.12. Source of Funds (Current $) on Sheep Farms, New Zealand, 1981-1992.

Year	Farm Cash Surplus	Variation in Indebtedness*	Non-farm Income **	Other ***	Total Available Funds
1981	26991	2680	3000	3468	36139
1982	27425	7426	3000	3629	41480
1983	29322	4449	3000	3765	40536
1984	24247	6476	3028	4463	38214
1985	41149	1015	3230	6567	51961
1986	20066	6098	4604	7130	37898
1987	31872		4766	13535	50173
1988	33339		6406	13188	52933
1989	41765		5977	11116	58858
1990	42157	753	6579	11337	60826
1991	35078	1380	6889	12283	55630
1992	40990		6270	13209	60469

Notes: * Is considered as a source of funds only when the difference between new loans and principal refund on debt is positive.
** Non-farm income is arbitrarily set to $3,000 for the years 1981, 1982 and 1983 in the absence of these data being collected; this item includes interest, dividends, off-farm wages, rents, etc.
*** The other sources of funds includes family transactions, family care and spouse's earnings, if mentioned.
Sources: NZ Meat and Wool Boards' Economic Service, Sheep and Beef Farm Survey, various years; Fairweather 1992, p. 16; and our calculations.

Annex 5.13. Net Farm Income* in Current and Constant $ ($ of 1988) on Dairy Farms, New Zealand, 1975-1992.

Year	Current $	Constant $ December 1988	Year	Current $	Constant $ December 1988
1975	8645	43010	1983	20808	36062
1976	9596	40834	1984	21714	35480
1977	10493	39007	1985	28047	39670
1978	10155	33738	1986	23756	29695
1979	13341	39009	1989	52057	50007
1980	13742	34269	1990	62853	56881
1981	15188	32874	1991	28170	24841
1982	18190	33873	1992	44156	38564

Note: * The standard value change is not considered.
Sources: Livestock Improvement Corporation Limited, 1993, Economic Survey of Factory Supply Dairy Farmers; New Zealand Dairy Board, An Economic Survey of Factory Supply Dairy Farms in New Zealand, various years; and our calculations.

Annex 5.14. Average Number of Cows and Total Output, per Cow and per Hectare, on Dairy Farms, New Zealand, 1975-1992.

	Number	Output (in kg of Milkfat)		
Year	of Cows	Total	Per Cow	Per Hectare
1975	117	15138	129	205
1976	118	16484	140	226
1977	118	17296	146	247
1978	113	15302	135	222
1979	117	17000	145	254
1980	118	18105	153	274
1981	121	18041	144	286
1982	123	18107	147	283
1983	126	18407	146	288
1984	129	20138	155	315
1985	136	20848	152	311
1986	137	22009	160	328
1989	158	22986	145	371
1990	158	23870	151	356
1991	166	25515	154	354
1992	178	28149	158	352

Sources: Livestock Improvement Corporation Limited, 1993, Economic Survey of Factory Supply Dairy Farmers; New Zealand Dairy Board, An Economic Survey of Factory Supply Dairy Farms in New Zealand, various years; and our calculations.

Annex 5.15. Expenditure per Item in Current $ on Dairy Farms, New Zealand, 1975-1992.

Year	Wages	Animal Health	Pasture & Supplements	Fertiliser	Repairs & Maintenance
1975	1961	1019	1171	1507	3173
1976	1850	1156	1043	1737	3553
1977	2112	1328	1227	2308	4530
1978	2092	1406	1458	2451	4505
1979	2268	1691	1823	2471	5328
1980	2965	1990	2189	3549	7186
1981	3480	2545	2498	4653	8894
1982	4114	3219	3466	6121	10824
1983	4495	3903	3941	6368	12142
1984	5295	4593	4528	6686	13732
1985	5465	5537	5296	8424	15800
1986	5916	6174	5194	7972	15773
1989	8509	7821	8159	10222	18357
1990	10396	9398	11405	12498	21760
1991	10486	9502	10962	11324	19064
1992	12078	10774	12005	15924	21256

Year	Standing Charges	Interest	Other	Depreciation	Total Expenditure
1975	1449	1764	983	1819	16821
1976	1547	1882	1008	2282	18034
1977	1891	2567	1130	2400	21470
1978	2016	3031	1400	2397	22734
1979	2516	3345	1693	2908	26022
1980	2866	4781	2142	3537	33185
1981	3312	6650	2368	4138	40519
1982	4225	8465	2948	5180	50544
1983	4786	10087	3417	6029	57151
1984	6196	12057	3656	6965	65692
1985	7586	13764	4910	8256	77023
1986	8034	16481	3919	7099	78548
1989	11771	22022	4928	7224	101002
1990	11582	25552	6416	8370	119367
1991	13086	28077	5975	9254	119721
1992	13868	25874	6375	10217	130363

Sources: Livestock Improvement Corporation Limited, 1993, Economic Survey of Factory Supply Dairy Farmers; New Zealand Dairy Board, An Economic Survey of Factory Supply Dairy Farms in New Zealand, various years; and our calculations.

Annex 5.16. New Zealand Average Weekly Household Income, Net Farm Income and Drawings on Sheep Farms, and Net Farm Income on Dairy Farms, in Real Terms (Index 100 = 1981), 1981-1992.

	Average Weekly	Sheep Farms		Dairy Farms
Year	Household Income	Net Farm Income	Drawings	Net Farm Income
1981	100	100	100	100
1982	99	85	99	103
1983	106	86	93	110
1984	102	64	102	108
1985	90	103	100	121
1986	92	41	82	90
1987	92	59	80	-
1988	95	62	82	-
1989	96	58	79	152
1990	98	72	85	173
1991	96	54	85	76
1992	94	58	85	117

Sources: Department of Statistics, Cat 04.001; Annexes 2.7, 5.5 and 5.13; and our calculations.

Annex 5.17. Evolution of the GDP per Person in Labour Force and the Farm Sector GDP per Person Involved in Farming, New Zealand, 1976-1992.

	Per Person in Labour Force		Labour Force	Farm Workers *
Year	Total GDP	Farm Sector GDP		
1976	8247	8355	1424089	133566
1977	9807	10596	1448098	139965
1978	10307	9137	1455048	146543
1979	11477	9778	1478742	144713
1980	13288	14321	1489830	148177
1981	15261	14180	1512960	150636
1982	18313	14131	1528477	157103
1983	20482	13319	1539675	157740
1984	22247	16173	1568558	150249
1985	24590	19966	1607473	152262
1986	28251	19787	1608275	149394
1987	33945	20017	1622850	152169
1988	38734	24879	1597225	141285
1989	42003	28281	1580925	137087
1990	44481	30196	1605975	141741
1991	45204	24060	1628200	147924
1992	44866	29049	1635475	143207

Note: * Total number of working owners, unpaid family members, and permanent labour, excluding casual labour.
Sources: Department of Statistics, PCInfos, OECD data; Annex 2.3; Fairweather 1992, unpublished data; and our calculations.

ANNEX 2

The Deregulation of the Domestic Market : the Case of the Town Milk Industry[1]

Three production sectors, town milk, eggs and wheat, essentially oriented toward the domestic market were totally deregulated following the economic reforms. The analysis of the case of the town milk industry allows us to understand the specific issue of these sectors of production.

Too Many Regulations Until 1984

The town milk industry was under complex regulation at the beginning of the economic reform. The basic principle was home delivery for the entire population seven days a week, with the New Zealand Milk Board regulating every phase. The system operated on daily production quotas, exclusive market zones for each processing plant - hence no competition between plants - and a consumer subsidy. In addition, the price of milk was set at each level, from the farm to the retail store, and even the home-delivery routes were precisely defined.

Consumers could get their milk only through home delivery or at a dairy (corner convenience store). The convenience stores had to obtain their supplies from the seller assigned to their area. As for the supermarkets, they were not allowed to sell milk. And the only authorised container was the reusable 600 ml glass bottle. We hardly need to add anything more to show how complex the rules were.

In 1985, 1,288 producers delivered milk to 41 pasteurisation plants and 1,125 sellers handled the distribution (IDC 1985b, p.92). The convenience stores held 35% of the town milk market and the remainder, 65%, was home-delivered at that time. All milk was pasteurised and delivered in 600 ml glass bottles; most of the milk was non-standardised and non-homogenised. Total consumption was dropping, having declined by nearly 20% between 1975 and 1985 (Moffit and Sheppard 1988, p.20).

Following a report released by the Industries Development Commission, the town milk sector was gradually deregulated and was completely open by 1993. This commission had been

[1] This text was first published in the May 1994 Edition of "Le Producteur de Lait Québécois", review of the Québec Dairy Marketing Board.

asked to examine the operation of the town milk sector with a view to promoting competition and efficiency at all levels of the industry in the "public interest" (IDC 1985a, p. 1).

Gradual Deregulation from 1985 to 1993

Even before the Commission tabled its report, the government had decided to abolish the consumer subsidy (Gilmour 1992, p.60). Then, all existing controls were gradually dismantled. First of all, alternative containers were rapidly authorised as was the sale of milk by the supermarkets. But the most significant move was the abolition of the New Zealand Milk Board. At the same time, price setting was abolished at all levels except the supermarket retail price, which could not be more than three cents lower than the price of home-delivered milk. Most of the powers previously exercised by the Milk Board were left to market forces but the basic principle of the system, i.e. home delivery for everyone, remained (Moffit and Sheppard 1988, pp.15-17).

At the production level, the processing plants were given the responsibility for seeing that adequate supplies were available throughout the year. Therefore the production quotas that guaranteed supplies up to then were abolished [1]. Producers in each zone had to negotiate the new market supply rules with their processing plants. Contracts between the producers and the plants could vary from one region to another. In some cases, the supply system and the payment of milk at an average price higher than that of industrial milk for the whole year were maintained. In others, only milk produced in the winter is now paid at premium (Moffit and Sheppard 1988, p. 32).

As for the processing plants, competition between zones was introduced but only with regard to supplying the supermarkets. Hence, competition was very limited, especially since the plants were assigned specific zones for home delivery. However, since mergers and take-overs were now permitted, the plants focused on competing in this area. In effect, the number of plants dropped from 41 to 23 in only five years.

At the distribution level, control of the sellers was transferred from the Milk Board to the processing plants, which then signed private contracts with the sellers, eliminating those that did not appear to give good service to consumers.

[1] It should be noted that there was no quota market. Although the price of town milk was higher than that of factory milk because of higher production costs, its profitability did not appear to be higher, and factory milk production was never based on a quota system.

Did the Partial Deregulation Benefit the Consumer ?

There is no unanimous answer to this question. The consumer has a greater choice of containers and sales outlets. While the glass bottle was the only available container in 1985, it now accounts for only 16% of the market, compared to 23% for one-litre cartons and 55% for two-litres plastic containers (NZMA 1992, p.9). As for the sales outlets, although the price difference was only three cents per litre with home delivery, the supermarkets rapidly took a greater share of the market - 25% in 1992 - to the detriment of home deliveries, which now account for only 32% of purchases (NZMA 1992, p.10). One very interesting fact is that, on the whole, although consumption had been declining, it has stabilised since 1987.

The results are less clear, however, as far as consumer prices are concerned. According to some observers, the power of the market, which had been in the hands of producers through the Milk Marketing Board has been transferred to the processors with the industry's deregulation (Sandrey 1990, p.121). For example in the Auckland region, where more than one half the country's population is concentrated, as a result of mergers and take-overs, a single plant now supplies the market. To justify the rationalisations, the plants claimed there would be greater savings for the consumer. However, the price of milk in the Auckland region is just about the same as elsewhere in the country. Sandrey concludes that the consumer doesn't appear to have benefited from lower prices as a result of the industry's reorganisation (Sandrey 1990, p.121).

Total Deregulation as of 1993

The industry has been totally deregulated since March 1993. Milk is still delivered to the homes but it is not compulsory. This means that service can decline if it is no longer profitable. On occasion, milk is even used as a "loss leader" to attract consumers to a particular store. But this practice is not very widespread as yet.

On the other hand, competition is beginning to be seen on supermarket shelves in certain areas with products from other regions. However, as yet this competition has not been translated into better prices which, in general, are the same. But, oddly enough, competition is seen in the expiry date of the product where the selection of a "best before" date for the shelf life of a product is left to the discretion of the processing plants. Therefore, some companies indicate a later "best before" date on their product to make consumers believe it is fresher than that of the competition. Moffit and Sheppard have noted that quality control has become more lax with deregulation and conclude that the quality of some products is sometimes poor (Moffit and Sheppard 1988, p.25).

Conclusions to Be Drawn from the New Zealand Deregulation Experience

First of all, it should be said that the reorganisation of the milk industry is not completed yet. The current situation could very well change once the impact of total deregulation has taken hold. According to Sally-Ann Fraser, former marketing director for the Canterbury Dairy Farmers Cooperative, and currently lecturer in the Economics and Marketing Department at Lincoln University, the market power that is now in the hands of the processors could shift to the supermarkets if they develop their own in-house trade brands. Some have already begun to do this since they can now get their supplies wherever they wish. This gives them the ability to use their huge purchasing power to force competition among processors.

In short, producers have lost their market power to the processors. Consumers have a wider choice of containers, products (whole milk, 2%, skim, etc.) and sale outlets, but quality is not as well controlled, and there is no real price competition. Based on the above, can one reasonably conclude that New Zealand's town milk sector, which had too many regulations at the outset, is now too open, or that the public interest is not better served than before ?

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