Prospects:

ECONOMIC AND
SECTORAL TRENDS
TO 1997

NEW ZEALAND

Planning
Council

Te Kaunihera Whakakaupapa
Mo Aotearoa

PROSPECTS: ECONOMIC AND SECTORAL TRENDS TO 1997

National Sectoral Working Group

NATIONAL SECTORAL WORKING GROUP

This is the fourth set of medium-term economic forecasts prepared within the National Sectoral Programme of the New Zealand Planning Council.

The NSP Working Group thanks the large number of people and organisations which helped in bringing together the information used in these forecasts. It hopes the results will be useful to them and looks forward to further exploration of related issues in the future.

The National Sectoral Programme is one of the Planning Council's framework of monitoring programmes. The members of the group are:

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CONTENTS

LIST OF INFOGRAMS BY CHAPTER

Page

PART ONE

CHAPTER ONE

INTRODUCTION AND SUMMARY

The structural changes occurring in the New Zealand economy are influenced by a number of factors:

- the continuing change in world markets, technology and institutions which alter the conditions faced by investors, exporters and importers

- a need to correct fundamental imbalances in the macro economy: in particular, high relative inflation, unemployment and external debt arising from accumulating current-account deficits

- a radical reform of institutions and protective structures within New Zealand aimed at correcting those imbalances.

The implications of these forces for the New Zealand economy during the next ten years are assessed in this report.

Our analysis draws on an extensive round of consultations with business and sectoral groups, on supporting research, and on the use of two computer-based economic models to project plausible future scenarios.

The models used are designed to analyse medium-term trends, not to forecast short-term fluctuations. They depend on the information provided to them - about past and present economic performance and expected future developments - and they use that information to produce internally consistent projections of the implications of that information over periods of five and ten years. Obviously they cannot foresee events and changes about which they have no information - such as oil shocks or shifts in the behaviour of investors, employers, workers or politicians. What they can tell us is where current behaviour and expectations are likely to lead us in the medium term.

The details of our consultations and model runs are presented in the body of the report. In this introductory chapter we reflect on some of the main findings of our analysis.

1.1 Major Findings

1.1.1 Imbalances and Adjustment

In the base period from which our projections are made (the three years ended March 1987), the New Zealand economy was growing quite strongly but faced major problems in terms of inflation, the balance of payments, the accumulated level of overseas debt, and the level of unemployment.

An increasing level of external indebtedness pointed to the need to bring the external balance to a position which enabled debt repayment rather than requiring further borrowing. This placed a premium on reducing demand for imports, improving export performance, and generally increasing efficiency and competitiveness in the economy.

1

The restraint needed to stem inflation and improve the external balance of payments pointed to the need for a sharp reduction in economic activity, despite the costs that this would impose in terms of output and unemployment.

Taking account of that, our models suggest the need for a prolonged period of adjustment. They forecast that the rate of growth in the economy will drop from unsustainable rates of about 3% a year in the base period, through a four-year trough with rates around 0.5% to 1% a year, before rising gradually again, after 1991, to rates in excess of 3% on a more sustainable basis.

As noted above, all projections are sensitive to changes - in world trade and in the economic behaviour of New Zealanders - but the need for a prolonged period of adjustment is evident in all the scenarios that we have tested. It is possible to envisage more rapid changes in economic behaviour and faster improvements in productivity and competitiveness which would shorten the period of adjustment to sustainable higher growth rates - but the information available to us at present provides little evidence of that. On the evidence available in mid 1988, the models tell us that the period of adjustment will be long and the costs considerable.

1.1.2   The Cost of Adjustment

Adjustment at the level which New Zealand has been experiencing imposes costs in two main areas: lower living standards and higher unemployment.

A slowing in the economy, a reduction in demand for imports, and the diversion of output to exports all imply lower levels of final spending than would otherwise have occurred. Our macro-economic model suggests that Gross National Expenditure will increase in real terms by only about 0.7% per annum over the period 1986-92. This implies that spending will remain static in per-capita terms. Beyond 1992, the picture changes dramatically. Sustainable growth in output and balance on the main policy variables enables rapid growth in final spending.

The other and more visible cost of economic adjustment is unemployment. Job loss and job creation are ever present, but in periods of rapid change redundancy rates rise. If, at the same time, new investment is inhibited by uncertainty or constrained by high costs, unemployment is likely to rise sharply - as at present.

Our forecasts draw an unhappy picture of medium-term trends in employment. The initial period of slow growth depresses demand for labour so that total employment increases only slowly. This occurs at a time when demographic change and a tendency to increased labour-force participation suggest that the numbers of people seeking work will continue to increase by some 20,000 persons per year.

Although the rate of increase in numbers of people seeking work slows throughout the period of our forecasts, it remains higher than the level of net new-job creation until around 1992. In consequence the rate of unemployment continues to rise until then.

Our models thus support those who argue that New Zealand's unemployment problem is deeply entrenched. Our projections also support the view that the restructured economy will, in time, begin to generate significant increases in employment. The basic precondition for such increases is an improved international performance, in terms of greater competitiveness in production for domestic and export markets.

Increased efficiency can reduce demand for labour in the short term. It is, however, a necessary condition if longer-term competitiveness is to be enhanced, setting the scene for sustainable increases in employment at high incomes.

A comprehensive employment policy requires action in many areas. In addition to issues relating to the structure and general management of the economy, there is a need to look at appropriate responses in labour-market policies, education and direct assistance to the unemployed. These matters lie outside the scope of this report but aspects of them will be dealt with in a supplementary report within the National Sectoral Programme in early 1989. Employment issues are also being examined by a newly established working group within the New Zealand Planning Council's network of monitoring programmes.

1.1.3   The Changing Sectoral Pattern - Growth in the Services Sector

The dominant impression that emerges from our analysis of the sectoral pattern of output - particularly investment, employment and exports - is that service activities will continue to become increasingly important.

Generally this means that the basic production of goods - agricultural or manufactured - has become more efficient world-wide. Producing more goods is easier and less time consuming - so that even although output and incomes continue to rise in the basic-goods sectors, they provide less additional employment than before. What does take more time and therefore provides more employment are the services which make goods saleable: in research, financing and design; in transport, packaging and distribution; in marketing, advertising and sales. Personal services are also in more demand - for tourism, entertainment and fashion, and for education, health and welfare. Many of these rely heavily on information and on communication services. In some cases these services are seen as industries in their own right - such as tourism and advertising. In others service activities are an integral part of traditional agricultural and manufacturing industries. Generally, however, the growth area is the service activity rather than the basic physical production.

These trends have a substantial impact on our forecasts for the patterns of sectoral growth in New Zealand. In 1960, service industries accounted for 58% of total employment; by 1997 this proportion is expected to increase to nearly 68%.

The comparative growth in services employment reflects a number of factors. For example, productivity improvements in services are slower than in agriculture and manufacturing so that services require more labour and capital to meet increases in demand. (However, this pattern is not uniform: some service industries, such as banking and communications, are experiencing rapid technical change through computerisation, information networking and deregulation. In these industries, cost reductions and the introduction of new services are leading to an expansion in demand for service outputs.) In addition, consumer demand for services tends to increase more than proportionally as incomes rise. Finally, our forecasts suggest a strong growth in service exports, particularly tourism.

Despite growth in the relative importance of service industries, primary and manufacturing output and employment are also forecast to increase over the projection period. In the case of primary industries, the effects of forecast declines in meat and dairy exports is more than offset by increases in other farm exports (particularly horticulture) and by increases in exports from the fishing,

mining and forestry sectors.

Manufacturing-export volumes are forecast to increase over the decade, but at rates generally below projections of growth in international trade in manufactured goods. Our forecasts imply that the share of manufactured goods within New Zealand's total pattern of exports is likely to stabilise at around 30%. This contrasts with the rapid increase in the relative importance of manufactured exports over the period 1960-80.

1.1.4. Increasing Productivity

The level of total factor productivity (the proportion of real output growth from increases in the efficiency with which labour and capital inputs are used in production) is forecast to increase at faster rates than seen in the past.

The sectoral estimates of likely future rates of change in total factor productivity, (that is, technical change) have been derived from our sectoral consultations rather than generated within our model. The forecast rates of technical change vary considerably between sectors, with particularly high rates being forecast for mining and communications. The latter change reflects the revolution in information technology and is also symbolic of an emerging divergence within the traditionally low-productivity service industries. On one hand we have a group of industries with a high emphasis on the delivery of labour-intensive personal services, while on the other we have a group of major capital-intensive industries such as transport, banking and communications which are undergoing radical change. This divergence carries important implications in terms of future employment generation. The basic question here is whether growth in demand stimulated by radical innovation will continue to be sufficient to offset the tendency of such innovations to displace labour.

More generally, it is important to acknowledge the fundamental role of productivity increases in raising competitiveness, sustainable output levels, and consumption standards. We work and trade in a world environment dominated by changes in technology and trading arrangements. The relevant comparison in this area is not how well an industry's rate of technical change compares with what was achieved in the past but how it compares with present and likely future changes in similar industries overseas.

1.2 The Nature of the Forecasts

The forecasts aim to present a broad picture of possible developments in the economy in the period 1992 to 1997, and are intended to highlight major issues and trends. They will be of use to corporate planners and others who need to form a view on likely developments in the economy.

All forecasts are conditional on the information available for modelling future developments. The forecasts presented in this report depend upon a very wide range of information drawn from consultations and research, and on the structure and design of our computer-based models. We have aimed for realism both in the assumptions and model design, and we suggest that the main pattern of the findings is relatively robust.

Our detailed forecasts are presented in terms of sectoral averages and we

acknowledge that in every case these averages will embody a wide range of outcomes for different enterprises. As always, but arguably to a greater extent in the new policy environment, success or failure depends at least as much on the efficiency of an enterprise as on the general fortunes of the sector within which it works.

In this context, it is appropriate to comment briefly on the implications of a prolonged period of relatively strong growth in the latter half of the forecast years. This could be substantially affected by any of a number of developments - a major downturn in the world economy, technologically induced mass unemployment, or simple policy failure.

While worse outcomes are possible, we suggest that it is useful to think of this forecast period of growth as reflecting what would be feasible in an economy which had corrected the major macro imbalances noted at the beginning of this chapter.

Correction of those imbalances, the development of a more competitive economy through increased productivity, the reallocation of capital in response to emerging international forces, and regulatory and protective reforms all help to set the scene for a renewed expansion in output.

How that develops at the time will depend on a range of factors including the short-term course of the world economy, the response of New Zealanders to the challenges and opportunities, and the successes and failures of macro-economic management. In this context it is important to emphasise that our forecasts of major macro variables are expressed as trends from which short-term fluctuations will invariably occur.

The emphasis on trends means that we pay particular attention to changes which impact in the medium rather than the short term. Our models are not designed to explore the detailed design of short-term macro policies, and they assume a reasonable degree of success in the design and execution of such policies. It is appropriate to note that in our consultations we frequently encountered concern as to whether our export forecasts were feasible given the exchange rates current at the time. As discussed in Chapter Six, our sectoral model confirms the importance of this issue, underlining the conditional nature of the forecasts which are sensitive to both external conditions and the degree of success in domestic-policy formation - not only in the future but at all points along the way.

CHAPTER TWO

FORECASTING METHOD

The National Sectoral Programme's forecasts combine widespread industry consultation and discussion with mathematical modelling of relationships within the economy. Two models have been used to prepare the forecasts: SDMACRO, a system-dynamics macro-economic model of the New Zealand economy; and JULIANNE, a non-linear general-equilibrium model. Both models have been discussed in detail in previous Planning Council publications.[1] Nevertheless, a brief overview of the forecasting process helps place the results in context.

The SDMACRO model is used to set a broad view of the economy, forecasting annual changes in major economy-wide indicators to 1997 - in particular Gross Domestic Product (GDP), the balance of overseas payments, overseas debt, employment, and capital formation.

The broad forecasts produced by SDMACRO are used to prime the JULIANNE model - which then provides a more detailed sector-by-sector picture of the economy, with forecasts of employment, output, exports, and capital.

In order to produce these internally consistent forecasts, the models require information about:

- growth in the world economy
- changes in world prices for exports
- inflation in New Zealand compared with other countries
- available volumes of New Zealand exports
- productivity changes by sector
- labour-force growth.

As mentioned in Chapter One, estimates of these are obtained from extensive consultations with business leaders and other forecasting agencies, from research, and from analysis of trends in official statistics.

Each of these preliminary estimates is discussed in some detail in the following chapter. Information about some other factors, including depreciation of capital stock by sector and forecasts of government expenditure, are set out in Appendix I.

In some cases, the models accept the information provided. In others, they have difficulty reconciling one set of information with another. The JULIANNE model in particular may find it difficult to combine the output or export forecasts provided by sectors with relative price and productivity information. The model has the capacity to reallocate resources to achieve better, or more realistic, results.

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1. E. Haywood & R. Cavana, *A Macro-Economic Model and Scenarios to 1995* (New Zealand Planning Council, February 1986).
   National Sectoral Working Group, *Towards 1995: Patterns of National and Sectoral Development* (New Zealand Planning Council, July 1986).

The preliminary results from the model runs were presented at a series of seminars for manufacturers and other interest groups in July 1988. Feedback from these seminars led to adjustments in the information provided to the models for the final runs.

The forecasting process is illustrated in Infogram 2.1

INFOGRAM 2.1

The NSP Forecasting Process

Projections of:
- labour force growth
- export growth
- major projects investment

→ SDMACRO model → macro forecasts

Forecasts of:
- employment
- capital stocks
- balance of payments

Sectoral estimates of rates of:
- export growth
- technical change
- depreciation

→ JULIANNE model → macro and sectoral forecasts
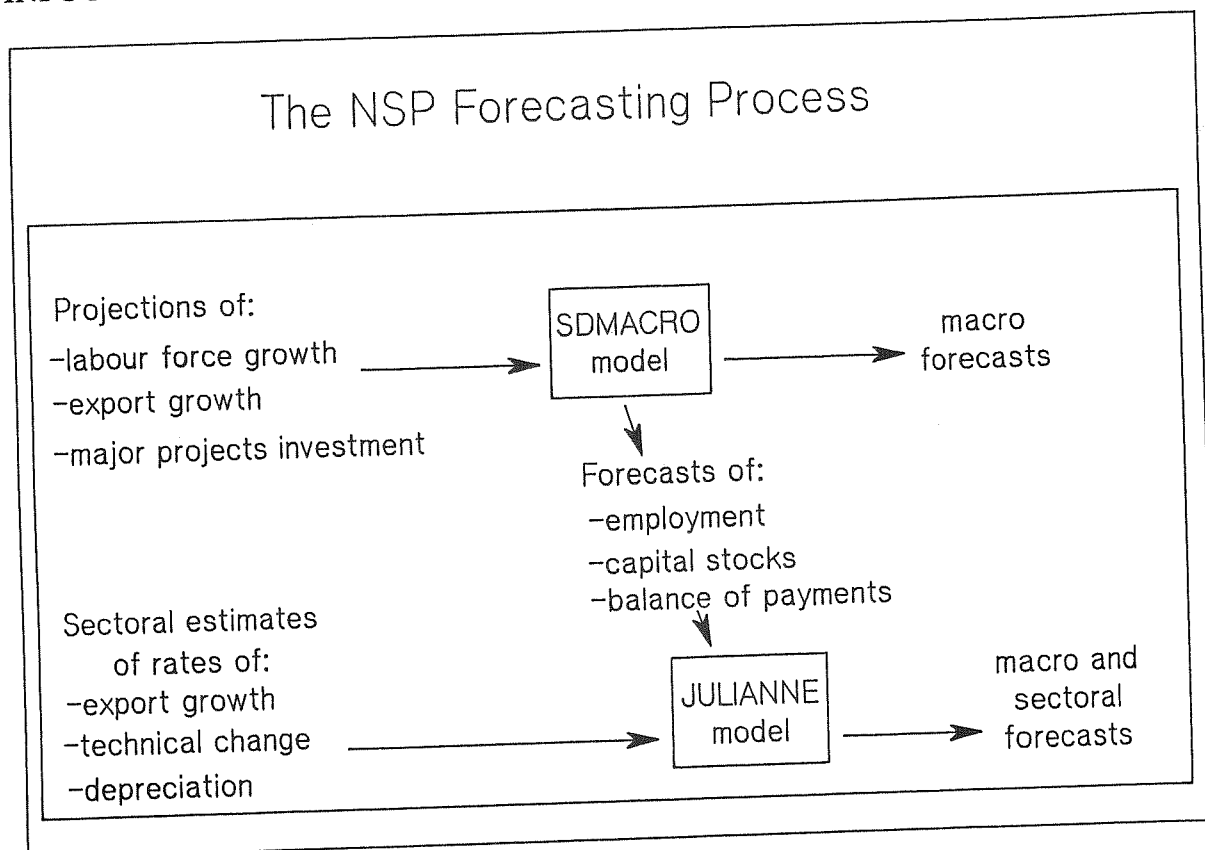
As with all models, a variety of scenarios and relationships can be tested. In the current exercise many of our respondents were sceptical about the likelihood of achieving our forecast rates of growth in exports. Our JULIANNE model suggested that their achievement depended on some combination of a further decline in nominal exchange rates and further improvements in efficiency and competitiveness. Accordingly, we include the results of an alternative scenario with lower rates of growth in exports and we discuss briefly the results and implications of that scenario (see Chapter 6).

The data for the modelling exercise was collected over a five-month period from March to August 1988, with the final data set in place for model runs in mid August.

PART
TWO

PRELIMINARY ESTIMATES –
NEW ZEALAND AND THE WORLD ECONOMY

3.1. The World Economy

As a small internationally oriented country with slow population growth, New Zealand's economic prospects are strongly influenced by international trade and particularly by the performance of our main trading partners.

In 1960 New Zealand's trade was heavily dependent on one country, Britain, which took about 80% of our exports and provided nearly 50% of our imports. In the last thirty years, a remarkable diversification has taken place. Even in 1977 Britain's share of our exports and imports had dropped to around 20%, with 70% of exports spread over four major markets: the European Community, the United States, Japan, and Australia. The pattern of imports showed a similar mix, but with slightly more emphasis on imports from Australia. In addition there was a small but growing trade with a number of Asian countries by 1977 - particularly China, Taiwan, Hong Kong, the Philippines, and Singapore.

INFOGRAM 3.1

Major Export Markets – 1977 and 1987
% of total exports

1977

1987

%

Destination

Source: Department of Statistics

9
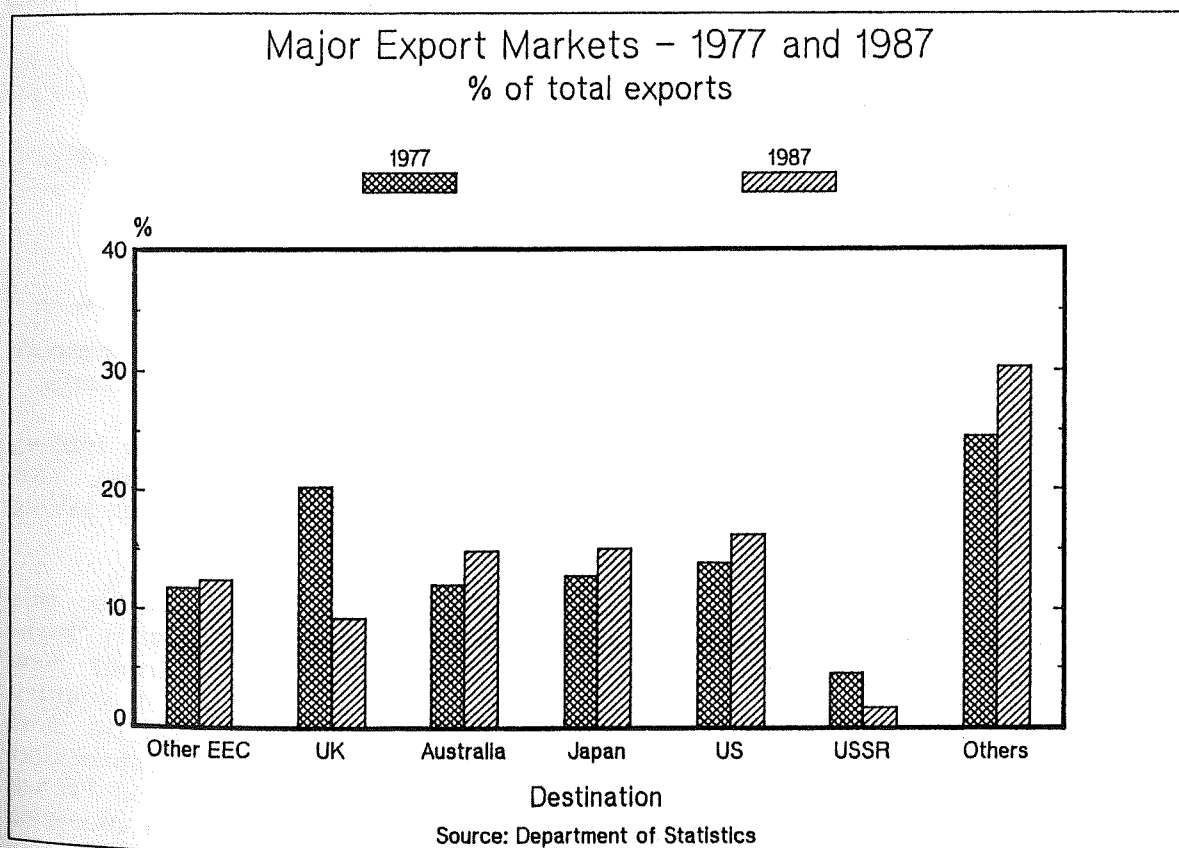
In the decade 1977 to 1987 - as shown in Infograms 3.1 and 3.2 - the dominance of Britain had declined further, although the EEC as a whole still took 21.8% of exports and provided 23.5% of imports. Japan had in turn strengthened its position as a major trading partner, becoming the second largest export market, and the major supplier of imports.

INFOGRAM 3.2

Major Sources of Imports – 1977 and 1987
% of total imports

Source: Department of Statistics
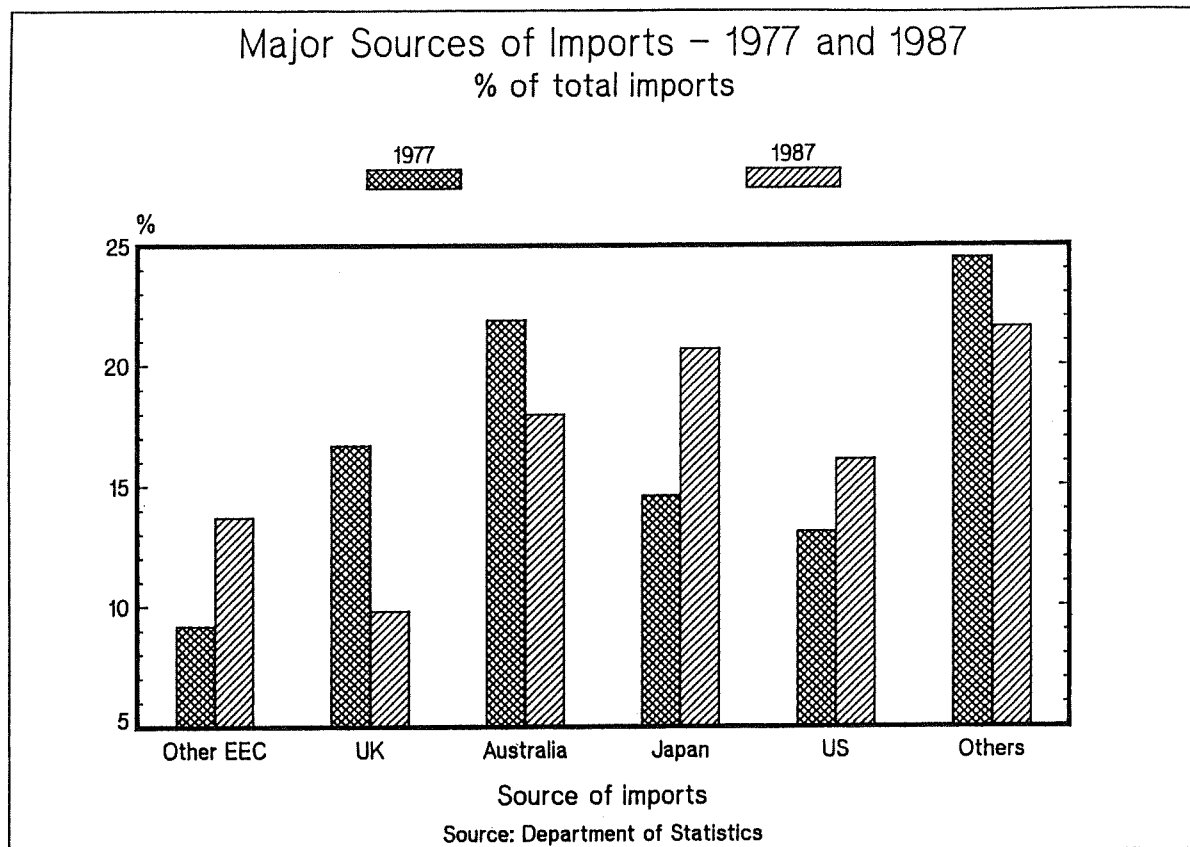
Other Asian countries - particularly China, Taiwan, the Philippines, and Singapore - have increased trade, and as a group now take over 14% of New Zealand exports.

By comparison with our position in the 1950s, and along with many other trading countries, New Zealand now has a well diversified set of trading links. This provides a good spread of our risks and a wide range of opportunities for taking advantage of growth in different parts of the world economy.

Looking forward to the 1990s, the pattern of trade is likely to continue this change. The New Zealand Market Development Board has attempted to identify "high-potential" countries, by looking at a range of factors including current New Zealand exports, previous growth, GNP growth of the country, and country difficulty. It concluded that "Australia, U.S.A. and Japan appear to have the most potential for New Zealand exporters over the coming five years - Continental Europe also comes through strongly, with West Germany, Italy, Belgium and France all among the top 15 markets. As well as Japan, the other North Asian countries

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1   *Directions in Foreign Exchange Earnings* (New Zealand Market Development Board, October 1987) p. 58.

come out strongly: Hong Kong, China, Taiwan and South Korea. Aside from Singapore, the ASEAN countries come out relatively poorly. Affluent countries, rather than those in close proximity, are growth markets".[1]

In this context, OECD forecasts of economic activity are an appropriate measure of the "world" - with particular emphasis placed on Australia, Japan, the United States, the United Kingdom, and Germany.

Strong domestic growth - as measured by GDP - within the larger OECD economies has the potential to create additional demands for New Zealand products. However, there are still strong tariff and non-tariff barriers to free trade, particularly in the area of agricultural products. In addition, an increase in per-capita GDP alters individual consumption patterns. For example while consumers in the more affluent OECD countries may wish to purchase more woollen carpets, their consumption of red meat and full-cream milk products is likely to fall. By contrast, economic growth and the spread of affluence in the developing markets of the Pacific rim mean consumers there are likely to add meat and milk to their diets - offering opportunities to exporters able to adapt to the distribution systems and the product requirements of those markets.

Growth in OECD countries has been better than expected since the sharemarket fall in October 1987, being particularly strong in Japan and the United Kingdom. Increased domestic demand is the primary reason for growth in industrialised countries although this has also raised fears of increasing inflation, particularly in the United States.

Infogram 3.3 shows GDP growth for New Zealand's four major trading partners, and the OECD as a whole.

INFOGRAM 3.3

Real GDP Growth Rates
1977–1989

Source: OECD Economic Outlook, June 1988
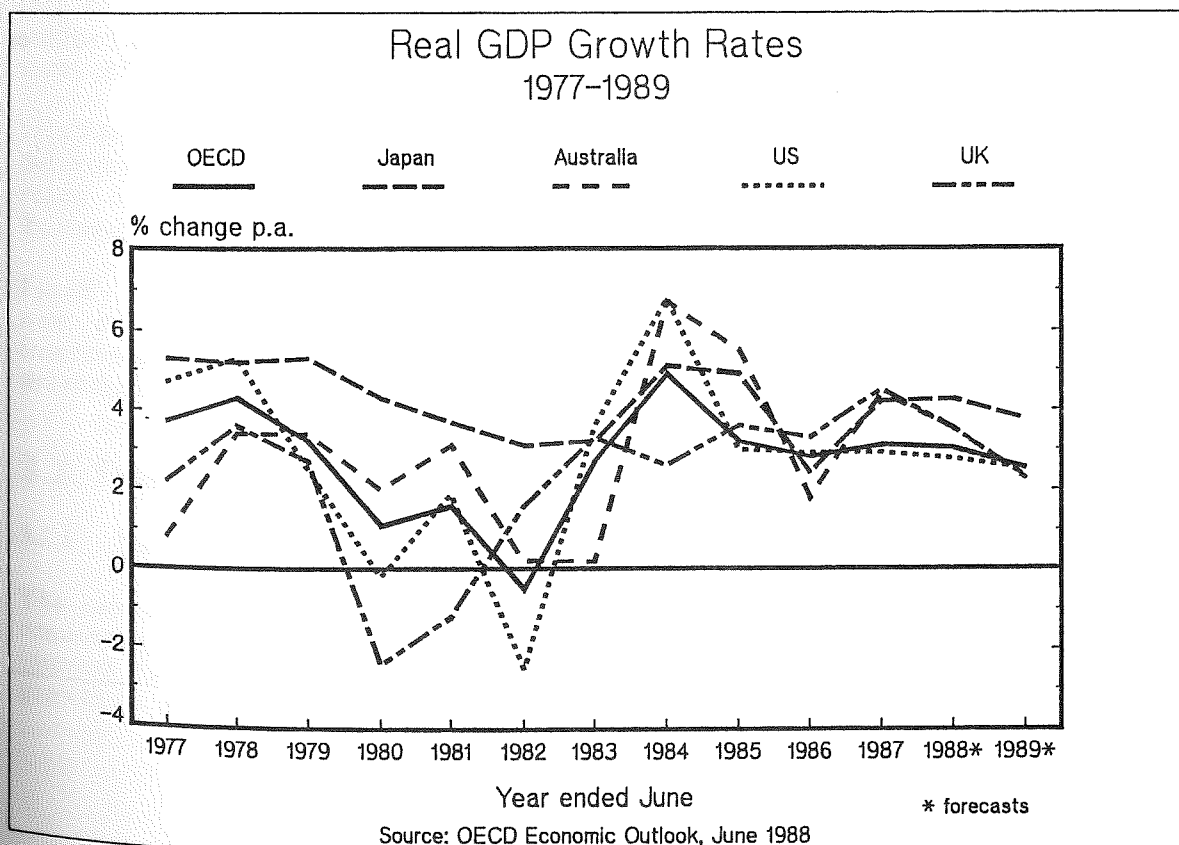
The World Bank estimates economic growth in the industrialised countries in the 1980s at 2.5% a year - little more than half the rate projected at the end of the last decade. The growth rate for developing countries is estimated at 4%, about two-thirds the projection in 1979. According to the bank, "the slower than expected rates of growth for developing countries reflects the effects of oil price fluctuations, anti-inflationary policies in industrial countries, and a deterioration in the international environment - slower growth of trade, falling commodity prices, reduced access to foreign financing, and higher real interest rates".[1]

The World Bank's long-term projections (Infogram 3.4) now forecast growth in industrial countries for the period 1987-1995 at between 2.3 and 3% a year - although the base case suggests some continuing difficulties in the adjustment process taking place in the world economy.

INFOGRAM 3.4

Growth of Real Output in Industrial Countries
% change per annum

1973-80	1980-87	Base Case 1987-95	High Case 1987-95	
Industrial countries	2.8	2.5	2.3	3.0

Source: World Bank World Development Report, 1988

Directly related to GDP growth is the growth in world trade. The OECD provides historical data, and some forward estimates, which are set out in Infogram 3.5.

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1.   *World Development Report* (World Bank 1988).

12

Merchandise Trade Volumes (OECD and Selected Countries)
seasonally adjusted at annual rates, % change

Aggregated data:	1986	1987	1988	1989
OECD imports				
Manufactured goods	9.7	8.7	8.5	6.5
Non-oil commodities	3.1	6.2	4.0	2.5
Intra-OECD trade	6.8	7.8	7.3	5.3
World trade	5.0	5.2	6.8	6.0
Individual country import growth				
United States	13.5	5.6	5.8	5.0
Japan	9.7	9.1	14.5	6.9
Germany	6.0	5.0	6.0	5.3
United Kingdom	6.6	7.8	8.5	4.3
Australia	-3.7	1.3	8.0	7.5

Source: OECD Economic Outlook, June 1988 (tables 27 and 45)

The continuing strong growth in the short term in international trade indicates that New Zealand has the potential to increase exports significantly. However, the strongest growth has been in manufactured products. There is a much lower growth rate in non-oil commodities - which include much of New Zealand's primary sector trade. The World Bank base-case scenario of GDP growth, however, suggests there is some potential for a slowing of the growth in world trade in the next five years.

In addition to GDP and trade growth, a number of other factors are important in determining trade opportunities. These include terms of trade, relative inflation rates, and exchange rates. These factors are discussed in the section on New Zealand's domestic economy (Chapter Four).

Finally, while attention naturally focuses on trade flows, capital transactions now exert increased influence on foreign-exchange dealings. This reflects the internationalisation of the New Zealand economy, and has a major influence on the movements in exchange rates (see Chapter Six).

3.2 Trade Forecasts

3.2.1 New Zealand Exports

The rate of growth of exports is a key factor in determining the rate of growth in economies, by increasing demand for output and by permitting an increase in imports for use in production. Infogram 3.6 indicates the historical links between growth of real GDP and exports in a group of OECD countries.

INFOGRAM 3.6

Growth of Exports and Real GDP
% change per annum

Source: World Bank; World Development Report, 1987

Average growth rates for France, Germany, Italy, Japan, UK, and US

To forecast GDP growth for New Zealand, therefore, both our models required projections of exports. These were provided for individual sectors after an extensive consultation process involving industry observers and participants.

In the 1988 round of consultations, respondents were asked to estimate likely annual rates of growth in the volume of exports for the two five-year periods from 1987 to 1992 and from 1992 to 1997. In some industries, respondents were very confident of forecast volumes but a notable feature of the consultations was a high level of uncertainty in many areas of the economy, reflecting the restructuring process still taking place.

Pastoral farming (dairy, meat and wool)

In 1984, the first round of forecasts showed relatively strong growth for this sector. A significant slowing in growth rates was predicted in 1986, and the 1988 forecast reflects a general lack of confidence.

The pastoral industry is facing problems of high interest rates, a reduction in asset values, and high levels of debt. In addition, the rise of the New Zealand dollar against the United States dollar has placed pressure on the industry. The result has been a significant slowdown in the investment in new production, and a decline in stock numbers. In the first consultations undertaken in March/April 1988, primary-sector participants were very pessimistic about the prospects for meat, wool and dairy exports, with declines forecast through to 1997. Subsequent consultations in July/August revealed a reversal of this feeling in the dairy

sector, and moderated pessimism in meat and wool. Short-term dairy forecasts were very optimistic, with export growth rates of 3% per annum suggested. Over a five-year period, this forecast has been moderated to a 1.5% per annum growth rate. Some participants in the meat industry are optimistic about reversing the decline in exports of sheep meat, but this is seen as depending on widespread improvements in marketing and in the productivity of processing and transport. Evidence of these improvements is so far scattered and weak. Growth in numbers of deer and goats provides potential for significant future exports, but recent evidence - including a substantial loss of confidence - gives little ground for forecasting. Our forecasts are therefore based on a continuing decline in meat exports at about 2.5% per year until the early 1990s and stabilising thereafter. If the meat industry did achieve substantial improvements in its performance, this could make a significant difference to our overall forecasts. Infogram 3.7 shows the forecast rates of change in exports for the three major pastoral industries.

INFOGRAM 3.7

Forecast Export Volume Growth (Wool, Dairy and Meat)
% change per annum

	1987-92	1992-97
Wool	-1.5	0
Dairy	1.5	1.5
Meat	-2.5	0

Continuing world debate on agricultural subsidies can be seen as a positive element in the forecasts, but the final outcome of negotiations for access of New Zealand products (notably lamb and butter) to European markets, and the potential for low productivity countries such as Russia to boost production significantly, are potentially negative. Biotechnology advances could also have a significant effect and this is discussed in the section on productivity forecasts (primary sector) in Chapter Four.

Fishing

The fishing sector has had strong growth over the past five years, with much of the increase coming from the orange roughy catch. Despite exchange-rate and interest-rate pressures, and the restructuring and uncertainty over Maori rights following the introduction of Individual Transferable Quotas (ITQs), the fishing industry is forecast to continue growing. The consultation process indicated a possible growth rate of 3% per annum over the next five years, increasing to 5% per annum from 1992 to 1997. The strongest growth area is seen to be hoki, particularly its use as a base for surimi. The industry is also confident of adding value to increased volumes through further processing.

Horticulture

Horticulture is also facing downward economic pressures, relieved slightly by significant sales in the stronger currencies of Germany and Japan. As in pastoral

farming, there has been a large drop in investment in new production. Despite the reduction in new plantings, a large proportion of those already in place - particularly apples, kiwifruit, stonefruit and new exotics such as nashi - have still to reach full production. Growth in export volumes is therefore forecast to be strongly positive over the first five-year period at 12% per annum, with the growth rate dropping to a still strong, but lower, rate of 3% per annum in the latter period. The forecasts assume that further trade barriers, such as the volume restriction on apple exports to Europe, are not widened.

Energy

The energy sector consists primarily of coal and methanol exports, although in recent times there have been significant one-off exports of products such as synthetic petrol. The forecasts assume that in the future the major products in this sector will be coal and methanol, and, in the latter period, oil.

It is clear from consultations that there is potential for coal exports in the forecast period from good-quality, large-scale resources. Most likely is a joint Japanese-New Zealand venture to export around two million tonnes of coal a year from the West Coast of the South Island. Any difficulties over the carrying capacity of current transport arrangements via train to Lyttelton are assumed to be overcome if necessary by alternatives such as an off-shore buoy or deepwater port at Westport.

Methanol exports are expected to remain stable throughout the forecast period. Oil exports have the potential to grow strongly in the 1992-97 period because of new finds. Ministry of Energy data indicate that New Zealand could be exporting between 8,000 and 56,000 barrels of oil per day. For our forecasts, we have assumed a level of 25,000 barrels per day.

Assuming that the joint coal venture goes ahead, energy exports may increase at the high rate of 13% per annum to 1992, and thereafter at 12% per annum to 1997.

Mining

The major exports from the mining sector are gold and ironsands, with titanium a potential addition in the forecast period.

A large proportion of New Zealand's exported gold now comes from small West Coast alluvial operations. New Zealand has large gold reserves, with the potential to dramatically lift exports if a number of large-scale and capital-intensive hard-rock and alluvial projects go ahead. However, the gold mining industry appears to be in a state of uncertainty while environmental legislation changes are considered. The issue is further complicated in that an estimated 70% of New Zealand's mineral resources lie under Department of Conservation land.

The forecasts assume that the legislative reforms will still make it possible to export 320,000 ounces of gold per annum by 1992, as against current estimates of 20,000 ounces in 1987. A further lift to 350,000 ounces is forecast to 1997.

Fletcher Challenge is exploring the potential for exports of titanium ore from the West Coast and it is forecast that trial exports will begin in 1990 with levels of 3,000 tonnes per annum through to 1992, rising to 250,000 tonnes per annum

thereafter.

Ironsand exports have dropped since the last forecasts from around 1.9 million tonnes to 1.5 million tonnes per annum because of the closing of the Waipipi ironsand operation. The only exporter now left is New Zealand Steel Mining. They estimate that current export levels will continue through to 1990, expecting levels to rise again to 1.9 million tonnes by 1997. This implies no export growth in the period covered.

The forecast export gains in goldmining significantly boost prospects for the mining sector, with most of the growth occurring in the first five-year forecast period. A growth rate of 44.5% per annum is estimated in the period 1987-92, dropping to 3.5% per annum in 1992-97. Although the growth rate in the first forecast period seems very large, the increase is from a relatively low base of export earnings.

Forestry

The forestry sector is undergoing major restructuring. Forest owners are re-examining growing, harvesting and pricing regimes, and this in turn will have a significant influence on the level and source of future export earnings. There is also considerable uncertainty about future markets, particularly for sawn timber. This has resulted in a diversity of opinion among industry commentators about forecasts of exports - particularly the division between logs, sawn timber, pulp and paper, and other forest products. The one area of agreement, however, is that raw-material supplies will remain tight (particularly in the central North Island) through to the mid 1990s but, by the end of the forecast period, supplies will be increasing rapidly.

For forecasting purposes forestry exports are divided into two broad categories: wood (including logs, sawn timber/mouldings, particleboard, fibreboard, and plywood); and pulp and paper (which includes pulp, paper and newsprint). Infogram 3.8 shows the estimated growth rates expected by the sector itself.

INFOGRAM 3.8

Forecast Export Volume Growth (Wood and Pulp and Paper) % change per annum		
	1987-92	**1992-97**
Wood	4	9
Pulp and paper	3	7

It is assumed that an additional pulp mill is put in place towards the end of the forecast period. Given a resource constraint, the overall growth rates suggest a very efficient use of available resources.

17

Manufacturing

Forecasts of manufactured exports are taken from a New Zealand Manufacturers'
Federation survey of members undertaken in February/March 1988, followed up by a
series of seminars in July. A total of 120 firms responded to the survey,
accounting for 14% of the total manufactured exports. Firms were asked to estimate
the yearly percentage change in volume of exports between 1987 and 1990. The
estimates to 1990 were extrapolated out to 1992 and, with further consultation,
provided the estimates from 1992 to 1997.

INFOGRAM 3.9

Forecast Export Volume Growth (Other Sectors)		
% change per annum		
	1987-92	1992-97
Non-primary food processing	3.9	3.9
Textiles, clothing, footwear, leather	2.3	2.3
Chemicals, plastics, rubber, petroleum	1.5	1.5
Non-metallic minerals (ceramics)	-0.8	-0.8
Basic metals	4.8	0.3
Machinery, and metal products	7.1	5.0
Other manufacturing	3.0	3.0

The non-primary food processing category excludes traditional foods, in particular
meat and dairy exports (which have already been covered in a separate section in
this chapter). Strong growth is forecast in the non-primary food sector as firms
develop niche markets and add further processing to an increasing range of non-
traditional products.

The textile industry consultations in March/April 1988 indicated positive but
relatively slow growth. By the time of further consultations in July, the industry
had become much more pessimistic about growth potential, particularly for those in
the clothing and footwear areas. Textiles represent a wide range of products,
within the already diverse major groups of basic textiles (including yarn and
rope), carpets and rugs, clothing, furs/leather/tanning, and footwear. The value
of exports in all these groups (with the exception of the furs/leather/tanning
area) had declined in the year to May 1988. Infogram 3.10 shows combined domestic
and export sales.

Textiles – Sales and Other Income
real income $1983/84

Output – Sales and Other Income

Source: Quarterly Economic Survey of Manufacturing
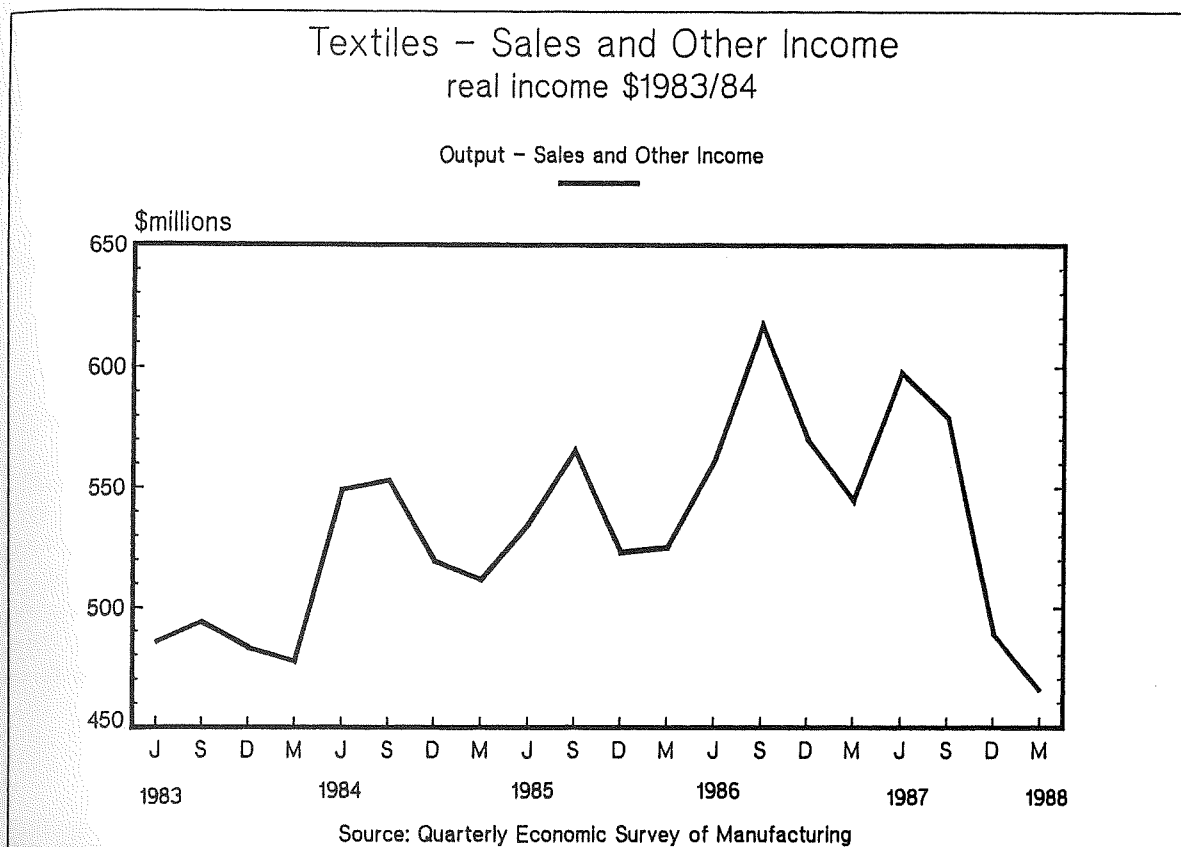
Against these trends there is some evidence of a marked rise in investment in textiles as shown in Infogram 3.11. This may represent a short-term fluctuation, but it lends some support to the moderate-export-growth scenario presented in March/April 1988. The modelling exercise therefore uses the more optimistic forecasts, but with the knowledge that these depend on improved export competitiveness.

Chemicals, plastics, rubber, and petroleum represent a very wide range of activities which can expect slow but steady export growth over the forecast period. Exports of ceramics - a range of products from pottery to glass and insulators - are forecast to decline through to 1997.

Textiles – Additions to Fixed Assets
real expenditure $1983/84

Additions
——

Source: Quarterly Economic Survey of Manufacturing
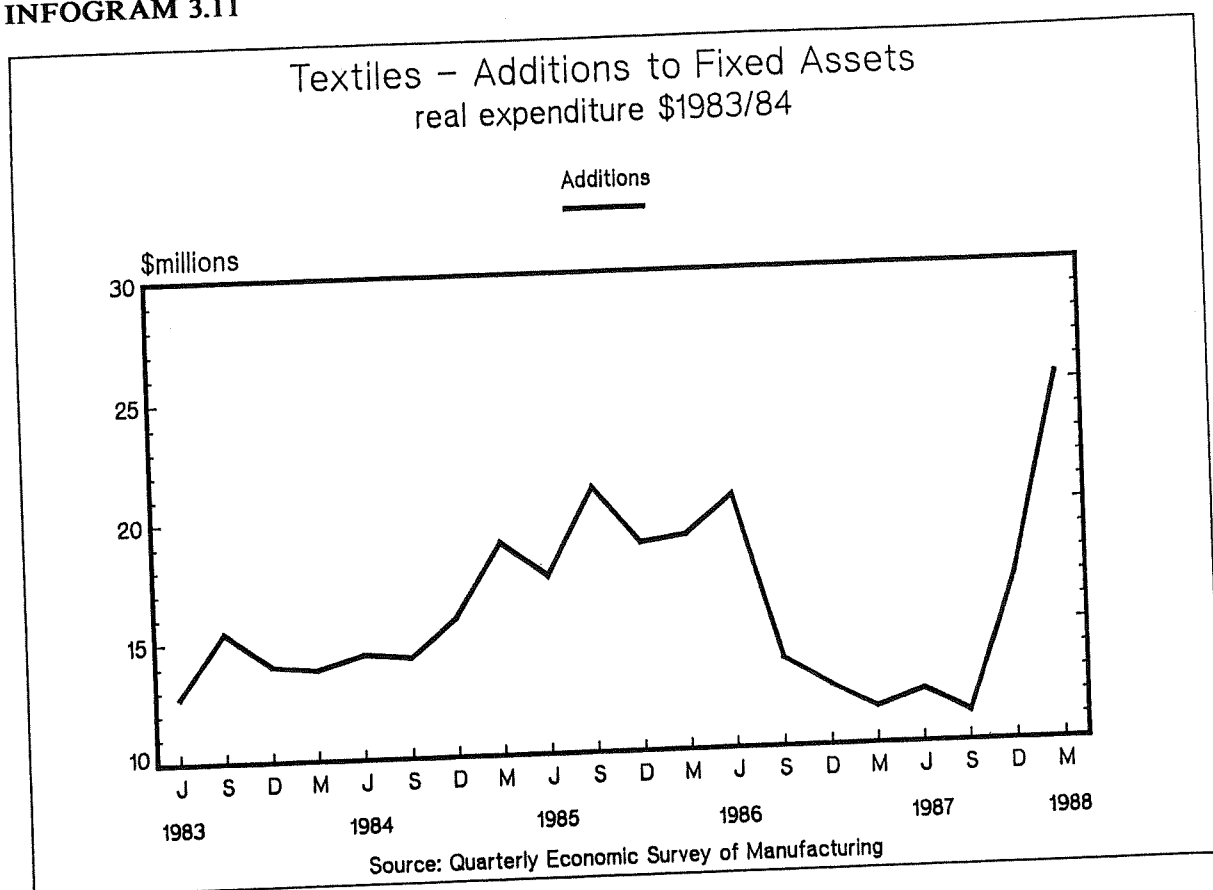
The base-metals sector covers two of New Zealand's larger industrial plants - Comalco's aluminium smelter and New Zealand Steel - plus a range of smaller firms. With very strong aluminium prices the Tiwai Point plant is operating at full capacity, and minor technical changes over the forecast period should marginally increase output volumes. Although a number of firms have, at various times, expressed interest in building another smelter, this is not expected to occur in the forecast period. New Zealand Steel has just completed a two-stage expansion programme which will significantly boost exports in the period to 1992, with smaller gains expected in 1992-97.

The machinery and metal-products group has shown strong export growth in recent years and this is expected to continue. A diverse range of industries is covered in this grouping - from refrigerators, heaters and stoves in the domestic electrical section, to vehicle parts and marine jet-propulsion units in transport equipment, lawnmowers in agricultural machinery, and artificial limbs, milking-machine parts, wool-scouring machines, switchboards, and sunglasses in non-electrical machinery. In the year to June 1987 some of these sub-categories, while being relatively small export items, had shown very strong export-value growth. For example: wool scouring machines were up 103% to $7.2 million; milking machine parts up 29% to $12.6 million; radiotelephonic or radiotelegraphic receivers up 72.6% to $13.9 million; stoves and ranges up 405% to $5 million; mains-operated electric-fence controllers up 34% to $8 million; and other parts of motor vehicles up 45% to $31 million. A high proportion of exports (53% in the year to April 1988) go to Australia, with the United States being another significant market.

The category of "other manufacturing" covers all those items not easily allocated

elsewhere, and is expected to grow at 3% per annum through to 1997.

Some time after incorporating all these sector forecasts into the modelling process it became clear (from the seminars with manufacturers in July) that respondents had become significantly more pessimistic about prospects in virtually all areas of manufacturing, particularly textiles. The forecasts should therefore be seen as the manufacturers' response, assuming a decline in interest rates and an improvement in competitiveness in relation to their major markets. Some of these improvements have occurred and, as will be seen in Chapter Five, our SDMACRO forecasts include a fall in the exchange rate.

Services

In the Department of Statistics 1983/84 inter-industry study, the services sector is divided into tourism, trade, transport, communications, finance, and miscellaneous services. Trade covers the margins earned by exporters (excluding those of the tourism sector) and transport covers all non-tourist related external transport. An attempt was made to estimate these individual categories to 1986/87 using balance of payment statistics as a guide but this was not feasible, firstly because of the unreliability of recent statistics, and secondly because it was not possible to directly relate categories in each series. Instead, services have been divided into two broad categories: tourism, and other services.

Tourism

Estimates for the tourism sector rely heavily on forecasts made by the New Zealand Tourist and Publicity Department. At the time our modelling runs were carried out, the department had published preliminary estimates of expected growth in tourist arrivals through to 1993.

INFOGRAM 3.12

Estimated Tourist Arrivals
% growth

1987/88*	1988/89	1989/90	1990/91	1991/92	1992/93
12.1	5.5	10.3	9.1	8.0	7.9

* Actual

Source: New Zealand Tourist and Publicity Department

The strong growth that is forecast for 1989-91 reflects the 1990 Commonwealth Games in Auckland, and the 150-year-commemoration of the signing of the Treaty of Waitangi. For the modelling exercise, it was assumed that the growth in the 1987-92 period is 9% per annum, falling to 8% per annum in 1992-97. This suggests an increase in arrivals from over 850,000 in the year ended March 1988, to nearly 1.2 million in the year ending March 1992. In the New Zealand context, this is a large

number - but it contrasts with an estimated 11.5 million tourist arrivals in Switzerland in 1985. In absolute volume terms, these forecasts place tourism as the fastest growth sector in the economy. It is important to note, however, that this assumes Air New Zealand will not be sold to a foreign buyer as this would remove a significant proportion of the tourism export earnings from the national account.

Other services

In 1983/84, according to the Department of Statistics, other-service exports totalled $1494.4 million. These comprised: trade $685.0 million; transport $531.9 million; communications $63.3 million; finance $190.2 million; and miscellaneous services $24 million. It appears that between 1983/84 and 1986/87, growth in earnings from trade and transport had declined significantly. Again, the sale of the New Zealand Shipping Corporation to overseas owners would remove some export income from the national accounts, while improved competitiveness might lead to growth. The remainder of this sector includes finance, computer-software sales, communications, business consultancy, and health and education services. The Market Development Board has undertaken a number of studies in this area, and sees strong growth prospects in most of these industries starting from a relatively low base.

For our forecasts we have assumed a growth rate of 1% per annum in both trade and other transport, while communications and finance are both expected to increase by 5% per annum during the forecast period. Miscellaneous services - covering consulting, computer-software and sales of education services - has been assumed to be growing very strongly with a rate of 20% per annum through to 1997. This implies an overall growth rate of about 2.5% per annum for services through to 1992, rising to 3.2% per annum from 1992 to 1997. As an acknowledgement of the unreliability of the data, this has been rounded to 3% per annum in both periods.

Infogram 3.13 brings together the estimates for all sectors, and shows overall growth rates for total exports at 3.5% a year for 1987-92 and 3.3% for 1992-97. Growth rates for the export of goods (divided into manufactured and commodity exports) can be compared with OECD forecasts of imports to give a broad indication of the potential demand for our exports.

INFOGRAM 3.13

Forecast Export Volume Growth (All Sectors)
% change per annum

	1987-92	1992-97
Wool	-1.5	0.0
Dairy	1.5	1.5
Meat	-2.5	0.0
Fishing	3.0	5.0
Horticulture	12.0	3.0
Food	3.9	3.9
Textiles	2.3	2.3
Wood	4.0	9.0
Paper	3.0	7.0
Chemicals	1.5	1.5
Energy	13.0	12.0
Mining	44.5	3.5
Ceramics	-0.8	-0.8
Basic metals	4.8	0.3
Machinery	7.1	5.0
Other manufactured goods	3.0	3.0
Total goods	**2.9**	**2.6**
Tourism	9.0	8.0
Other services	3.0	3.0
Total exports	**3.5**	**3.3**
Traditional	-1.0	0.5
Non-traditional	5.7	3.8
Services	5.6	5.5

Infogram 3.14 shows the forecast growth rate of New Zealand's manufactured exports is relatively low compared with the corresponding OECD imports; our commodity exports, however, face a tougher challenge matched against the slower OECD import growth. (The figures for OECD imports are the 1989 forecast extrapolated out to 1997.)

INFOGRAM 3.14

Forecast Merchandise Trade Volumes
% change per annum

Source: World Development Report 1988 and NZPC

Commodities are meat,wool,dairy,forestry,fishing,horticulture,mining,energy
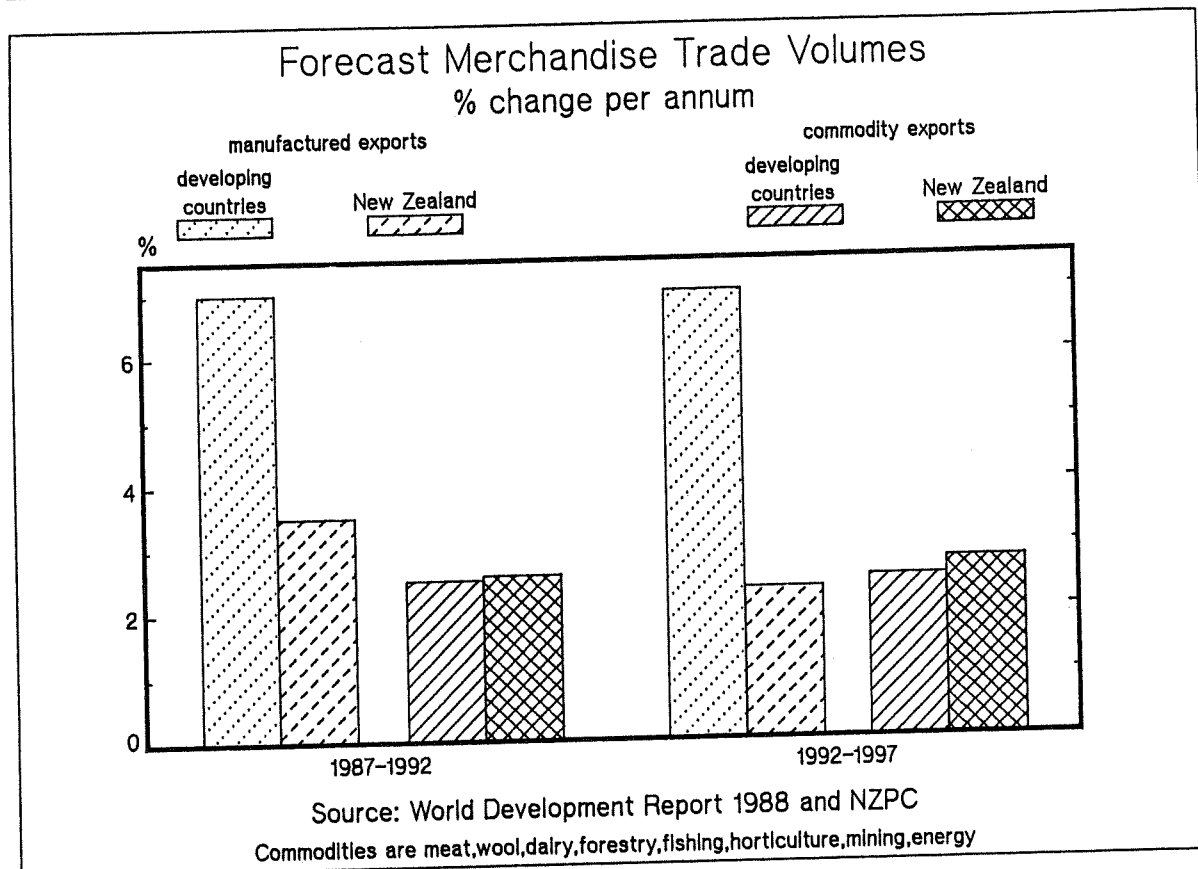
3.2.2 New Zealand Imports

In our SDMACRO model, exports are a major determinant of GDP growth while imports are viewed as being driven by changes in the level of GDP.

A range of additional policy factors is also influencing the level of imports - in particular the removal of import licensing, a reduction of tariffs. and the agreement for Closer Economic Relations with Australia.

These changes, while already having a significant effect on the economy, are expected to continue over the forecast period. In the February/March survey of manufacturers, respondents were asked to take such policy changes into account when predicting the import share of the local market for goods produced in their industry. Infogram 3.15 sets out these predictions, compared with a base level for 1983/84.

Import Penetration of the Domestic Market
% of domestic market

	1983/84	1988/89	1992/93
Non-primary food Processing	1	5	14
Textiles, clothing, footwear, leather	7	22	37
Wood and wood products	2	4	5
Paper and paper products	2	9	21
Chemicals, plastics, rubber, petroleum	6	23	31
Non-metallic minerals	5	10	13
Basic metals	6	13	14
Machinery and metal products	16	51	62
Total	5	16	25

In each industry, respondents foresee an increase in the degree of import penetration. The scale of the change varies markedly, with particularly large movements forecast in metal and metal products, textiles, clothing, footwear and leather, chemicals, plastics, rubber, and petroleum. Overall, the import share of the domestic market in these categories is forecast to rise from 5% in 1983/84 to 16% in 1988/89 and 25% in 1992/93.

Since the survey was undertaken, some manufacturers have perceived an even greater potential for import penetration although it is not clear what the net result of this will be. In some industries it will result in closures, while in others production will focus more on export markets. Manufacturers in the paper industry, for example, have indicated that they will concentrate on export products in which they have a comparative advantage, and not try to supply the full range of New Zealand's paper needs. Some, like New Zealand Steel, believe they are now capable of going against this trend with products that can increasingly replace imports.

The issue of increasing import penetration is discussed in detail in our previous publication,[1] where the historical relationship between GDP growth and import levels was adjusted within SDMACRO to reflect the change in import penetration.

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1. National Sectoral Working Group, *Towards 1995: Patterns of National and Sectoral Development* (New Zealand Planning Council, July 1986).

With rapid change still occurring today, a further adjustment to the equation - which would reflect an even higher level of import penetration - was considered but was ruled out for the following reasons:

-   as productivity of New Zealand firms increases, New Zealand goods and services become more competitive and thus more able to compete with imports

-   improved productivity should also result in imports being used more efficiently, and therefore proportionately fewer imports will be needed.

It was finally decided that the altered import equation used in the previous publication should be adopted for the first five-year period (1987-92) to reflect continued change in import penetration, but that once this period of adjustment is completed the historical relationship between GDP and imports should be used again.

In comparison with SDMACRO, the JULIANNE model provides a framework for detailed analysis of the impact of tariffs. Within JULIANNE, the demand for imports is affected by sector-specific tariff rates built into the model. For the 1983/84 year, these reflect the tariffs then prevailing plus estimated tariff-equivalent values for items still subject to import licensing. For 1991/92, sectoral tariff rates are reduced by the formula adopted by the Government on the recommendation of the Tariff Working Party. Under this formula, tariff rates reduce year by year to 1992 with the largest reductions being concentrated on the highest tariff rates. Import-licensing tariff equivalents are removed from the model for 1991/92. Tariff rates in 1996/97 are assumed to be the same as those in 1991/92.

3.3 Export-Price Forecasts

Forecasts of movements in export prices are expressed as terms-of-trade movements. The terms of trade for 1983-87 are based on the Department of Statistics' export-price series, divided by the all-groups-import-price index. The export categories used in the JULIANNE model are not exactly matched by this series, so the JULIANNE subgroups were aggregated in the following way:

-   wool, dairy, meat, and fishing all have separate categories, but horticultural products are assumed to be moving in the same direction as the overall agricultural index

-   other food, textiles, chemicals, ceramics, base metals, machinery, and other manufacturing are all in the manufacturing category

-   wood and paper are included in the forestry sector

-   mining is placed in the minerals category

-   energy equates to fuel and power.

The movement in terms of trade is closely aligned to the trend shown in the previous round of forecasts. Up until 1986/87, there had been a decline for most agricultural products - two notable exceptions being wool and fishing. Minerals also declined, but there were positive gains in both forestry and manufacturing, with the overall index rising to 1023 from the 1983/84 base of 1000. The fall in oil prices up until 1986 also helped to improve the terms of trade by lowering

import costs. Infogram 3.16 sets out the changes between 1983/84 and 1986/87.

INFOGRAM 3.16

	Terms of Trade (1983/84 = 1000)		
	1984/85	1985/86	1986/87
Wool	1023	1033	1164
Dairy	902	848	841
Meat	972	886	912
Agriculture	962	928	991
Fishing	1169	1173	1470
Forestry	1068	1027	1131
Energy	1299	883	623
Minerals	920	854	958
Manufacturing	986	1016	1054
All Groups	980	955	1023

Source: Department of Statistics, June years

Recent World Bank and International Monetary Fund reports indicate that while real (inflation-adjusted) prices of food, non-food agricultural commodities, metals, and minerals have been declining steadily from 1950 to 1988 (see Infogram 3.17), there has been a strong upturn in current-dollar values of commodities in 1987 to mid 1988 (Infogram 3.18).

Discussing this rise, an IMF report notes that "high demand, especially in the United States, Japan, and the newly industrialising economies of Asia, led to a reduction of stocks of metals, and to a lesser degree, of agricultural raw materials. Much of the excess capacity that had characterised the metals market earlier in the decade disappeared by 1987, and thus stocks of metals were not rebuilt quickly. The recovery of oil prices from 1986 levels, which led to a rise in prices of petroleum-based synthetic products, stimulated the demand for several raw materials".[1]

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1. *Primary Commodities: Market Developments and Outlook* (International Monetary Fund, May 1988) p. 161.

INFOGRAM 3.17

Weighted Index of Commodity Prices 1950–1988
(constant US dollars)

Non-food Agricultural — Foods — Metals and Minerals

Index 1979/81=100

*estimate

Source: World Bank Quarterly Review of Commodity Markets, February 1988
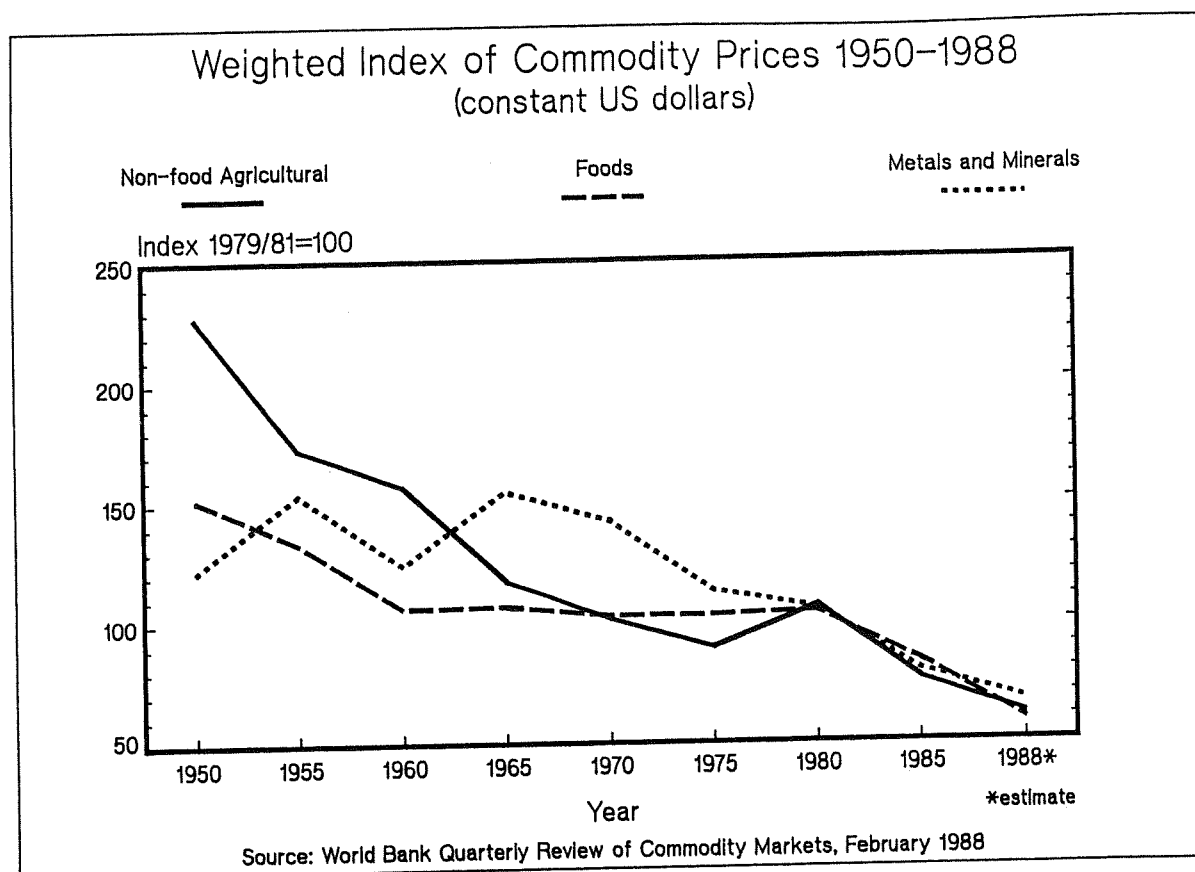
INFOGRAM 3.18

Weighted Index of Commodity Prices
(current US dollars)

1979-81 = 100

Quarters		Food	Non-food agricultural	Metal and minerals
1987	I	71.3	77.5	72.4
	II	71.8	83.3	77.3
	III	70.6	90.9	83.9
	IV	78.1	87.2	98.8
1988	I	82.5	85.0	105.0

Source: World Bank Quarterly Review of Commodity Markets, June 1988

Since March 1987, export price growth has been seen in New Zealand in aluminium, pulp and paper products, wool, some dairy products, and beef. However, in forecasting to 1992, the IMF states that "prices of industrial inputs, agricultural raw materials and metals are projected to rise at a slower pace during 1988 than 1987 and to remain constant in real terms during 1989-92. Food prices are expected to remain weak over the medium term, after a brief recovery in 1988. The projected weakness in food prices stems, to a considerable degree, from the excess supplies generated by the protected agricultural sectors in the industrial countries".[1]

Taking the IMF views and New Zealand industry perceptions into account, the following price movements in international trade are forecast:

- Meat and fishing product prices are forecast to decline at 1% per annum over the whole 1987-97 period, although sensitivity testing is undertaken for meat and dairy products

- Forestry, wool and dairy products have continued to gain strength through to mid 1988, but are forecast to decline again before 1992 and so to give no overall change between 1987 and 1992. In the case of dairy prices, the Dairy Board suggested substantially higher prices for this period, although the working group decided to take a more cautious approach. This caution reflects uncertainty about issues such as EEC subsidies and access, the potential use of growth hormones, health concerns about dairy products in Western diets, and the potential increases in production in other countries (notably Russia). The effects of significantly higher prices are, however, tested in the JULIANNE model. Forestry, wool and dairy products are forecast to decline at 1% per annum in the 1990s

- Strong growth in horticultural volumes, both in New Zealand and other Southern Hemisphere suppliers, is expected to place continuing downward pressure on prices, with a 2% per annum decline forecast from 1987 to 1992. A decline of 1% per annum thereafter is predicted

- Manufactured goods have been taken as a homogenous group, and no decline is expected in the forecast period

- No decline is forecast in the mining and energy sectors.

The forecasts assume no major shocks to the system - such as a very large increase in oil prices. While there are a range of factors which have the potential to increase oil prices, the current IMF, World Bank and OECD forecasts are all based on relatively stable oil prices in the medium term.

In this scenario the overall terms of trade decline from 1023 in 1986/87 to 1002 in 1991/92, declining further to reach 975 in 1996/97.

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1.   *Ibid.* p. 167.

Terms of Trade Forecasts
(1983/84=1000)

	1986/87	1991/92	1996/97
Wool	1164	1164	1107
Dairy	841	841	801
Meat	912	867	825
Fishing	1470	1398	1329
Horticulture	991	896	852
Manufacturing	1054	1054	1054
Forestry	1131	1131	1076
Mining	958	958	958
Energy	623	623	623
All groups	**1023**	**1002**	**975**

Note: Export weightings are based on consultation forecasts

In order to provide world-price forecasts for each of the JULIANNE model's export categories, the terms-of-trade projections have been further stylised. To avoid spurious accuracy with regard to the numerous categories which constitute manufactured exports, the prices of all manufactured goods are set at 1000 throughout the forecast period. This establishes the world price for a basket of manufactured goods as the benchmark against which all other prices are measured. Since the model acts on relative prices, and not on absolute price levels, this procedure effectively raises the relative prices of the other export categories. The addition of tourism and other services - not measured in the Department of Statistics' terms-of-trade series - gives rise to the set of forecasts seen in Infogram 3.20.

Price Projections Over Forecast Period
(1983/84=1000)

	1991/92	1996/97
Wool	1164	1107
Dairy	841 (1000)*	801
Meat	867 (1000)*	825
Fishing	1398	1329
Horticulture	896	852
Food, beverages	1000	1000
Textiles	1000	1000
Wood and wood products	1131	1076
Paper and paper products	1131	1076
Chemicals	1000	1000
Energy	623	623
Mining	958	958
Ceramics	1000	1000
Basic metals	1000	1000
Machinery	1000	1000
Other manufacturing	1000	1000
Total goods	**1001**	**973**
Tourism	1000	1000
Other services	1000	1000
Total exports	**1001**	**981**

Note: Export weightings are based on consultation forecasts

*Alternative scenarios

The world prices for both dairy and meat exports have been increased significantly in alternative JULIANNE runs to assess the sensitivity of the forecasts. This is reported on in Chapter Six.

CHAPTER FOUR

PRELIMINARY ESTIMATES – THE DOMESTIC ECONOMY

4.1 Productivity Growth

4.1.1 Introduction

Restructuring of the New Zealand economy has been aimed at improving productivity in the allocation and use of resources. Productivity growth, technical change, and total factor productivity (TFP) are often seen as interchangable terms describing that proportion of real output growth which comes from increased efficiency in the use of labour and capital inputs. If suitable quantitative measures of output, employment and capital are available, then TFP can be estimated as the weighted sum of the growth in labour productivity (that is, real output per person) and capital productivity (real output per unit of capital), with the factor shares as weights. Productivity growth is often seen by individual business managers as a measure of gains in the efficiency in production, with output normally measured against labour inputs only. In the consultation process, a mixture of techniques were used to establish percentage TFP gains - including production-function analysis of forecast data, and expert opinion on likely trend figures.

Total-factor-productivity gains can come from a number of sources including technological breakthroughs, improvements in production techniques, and - in the recent New Zealand context - managerial restructuring and labour shedding. These gains should theoretically flow through to improved competitiveness, but such gains will only improve New Zealand's comparative advantage if competing firms overseas have a slower rate of TFP. The relatively high levels of productivity change in some sectors of the New Zealand economy estimated during these forecasts need to be viewed in this context, as most competing nations are also endeavouring to increase productivity. For an exporting sector such an increase is also often counterbalanced by unfavourable movements in the terms of trade of that sector. Alternatively, falling terms of trade can stimulate productivity and production to prevent a fall in income.

The OECD suggests that growth in total factor productivity is a key element in determining overall economic growth - and, in particular, the scope for a non-inflationary increase in real incomes. In a recent study of TFP, it states that "should labour or owners of capital attempt to raise their real incomes above what is made possible by productivity performance, the likely outcome would be higher inflation and social tension. On the other hand should trend productivity growth increase, this would serve to raise per capita income and ease inflationary pressures while also allowing higher real wages and employment".[1]

4.1.2 Past Performance

In forecasting productivity changes, it is useful to place them in a historical context. The OECD has recently provided comparisons of total factor productivity between OECD countries in the period 1960 to 1986. As part of the continuing Project on Economic Planning (PEP) at Victoria University, Professor Bryan

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1. *OECD Economic Outlook* (OECD, December 1987) p. 39.

33

Philpott has also calculated productivity estimates for the period 1978 to 1988, and some comparisons with OECD estimates are possible. In addition, both the New Zealand Institute of Policy Studies and the Economic Monitoring Group of the Planning Council are examining productivity changes.

The OECD indicates that TFP growth in industrialised countries has slowed from an average annual rate of about 3% per annum in the period from the mid 1960s to the early 1970s, to around 0.7% per annum in 1973-79, with a further overall decline to 0.6% per annum in 1979-86. Infogram 4.1 shows TFP growth in some key countries. (Note: developing industrial countries such as Taiwan and Korea are not included in this analysis.)

INFOGRAM 4.1

Production, Output and Input Growth
business sector: average % change at annual rates

OECD	average	US	Japan	Germany	Australia	New Zealand
1960s to 1973*						
Output	5.2	3.8	9.7	4.6	5.6	3.9
Factor input	2.4	2.3	3.5	1.8	3.5	3.3
TFP	2.8	1.5	6.1	2.8	2.1	0.6
Labour productivity	4.1	2.2	8.6	4.9	3.2	1.8
Capital productivity	-0.4	0.3	-2.4	-1.1	0.1	-1.0
1973-79						
Output	2.9	2.8	3.8	2.4	2.2	0.1
Factor input	2.2	2.9	2.0	0.6	1.6	2.7
TFP	0.7	-0.1	1.8	1.8	0.6	-2.5
Labour productivity	1.6	0.3	3.2	3.4	1.8	-1.0
Capital productivity	-1.4	-0.9	-3.0	-1.1	-1.8	-4.6
1979-86						
Output	2.3	2.2	3.8	1.6	2.9	2.6
Factor input	1.7	2.2	2.1	0.8	2.4	2.0
TFP	0.6	0.0	1.7	0.8	0.5	0.6
Labour productivity	1.4	0.6	2.8	2.0	1.1	1.6
Capital productivity	-1.3	-1.0	-2.0	-1.3	-0.6	-0.8
1985 Capital share	32.2	34.3	22.6	34.8	34.0	42.3

Source: OECD Economic Studies, No. 10, Spring 1988

*Note: Starting year: U.S. 1960, Japan 1967, Germany 1961, Australia 1961
New Zealand 1963

The procedures normally used by PEP differ in some respects from those used in the OECD study, but the PEP figures have been adjusted to give as close a comparison as possible. In particular, the PEP figures have been adjusted to exclude housing and government sectors, and the PEP estimates of capital stock in New Zealand have been amended in line with the methodology reported by the OECD. With regard to the latter, it is clear that some differences remain. These differences - which relate primarily to the method of retiring old capital - are being explored further with the OECD.

INFOGRAM 4.2

Comparisons of Productivity Growth with OECD Estimates
average % change at annual rates

	OECD 1979-86 Excludes housing and government	New Zealand PEP* 1978-86 Includes housing and government	New Zealand PEP* 1978-86 Excludes housing and government	New Zealand PEP* 1978-86 Excludes housing and government Capital measures by OECD method
Output	2.6	2.4	2.6	2.6
Factor input	2.0	1.3	1.5	1.5
TFP	0.6	1.1	1.1	1.1
Labour productivity	1.6	1.5	1.1	1.5
Capital productivity	-0.8	0.7	0.5	0.3

*Project on Economic Planning, Victoria University

In forecasting TFP it is useful to look not only at individual industry groups, but also to view trends in terms of major sectors - particularly primary, manufacturing and services (see Infogram 4.3).

Total Factor Productivity Growth - Industrial Countries
average % change at annual rates

	1970-73	1973-79	1979-85
Primary Sector			
Agriculture	1.8	0.2	0.9
Mining	4.9	-3.8	-3.1
Manufacturing			
Food	4.0	0.7	1.5
Textiles	3.7	3.2	2.7
Paper	5.1	0.1	0.9
Chemicals	5.5	1.4	1.7
Primary metals	4.6	-0.5	-2.1
Machinery and equipment	4.5	2.2	3.4
Construction	-1.0	-1.3	-1.7
Other	-6.3	1.7	1.0
Services			
Trade	2.9	0.2	0.1
Transport	2.6	1.3	0.5
Finance	1.2	0.5	-0.3
Social and community	0.8	-0.2	-0.1

Source: OECD Outlook, December 1987 (tables 21 and 22)

Infogram 4.3 indicates that TFP has been particularly slow in the services area. It is interesting to note that in New Zealand, and in most industrialised countries, the services sector has had a very high public-sector involvement, has been growing rapidly in importance as a proportion of GDP, and has been a strong provider of employment.

Our forecasts of productivity change are discussed in the context of primary, manufacturing and services sectors.

4.1.3   Productivity Forecasts

(a)   **Primary sector**

Agriculture

It is clear from this round of forecasting that the traditional agricultural sector is under considerable pressure, with total output expected to decline in the first five-year forecast period and to grow only slowly over the following

36

five years. Agriculture is discussed in some detail here because of the very significant contribution it still makes to export income.

In pastoral farming, particularly meat and wool, productivity in the short term can be seen to be increasing at a very rapid rate. This reflects a high output of meat, combined with firm prices for wool, and is set against a dramatic decrease in farm inputs - especially fertiliser. The reduction in the use of fertiliser is likely to have long-term implications in terms of livestock output per unit area of land, but in the medium to long term it may not have a significant effect on the value of output per person. This is because of a move to specialised wool farming or to less intensive farming. There is also the question of capital investment in agriculture. Since 1984 prices of land, plant and (in some cases) stock have declined significantly. In marginal farming areas land prices could still face downward pressure, with a strong likelihood that some land will go out of production. This reduction in capital would have an effect on productivity if it is taken strictly as a measure of output against a mix of labour and capital inputs. In general, by setting these one-off adjustments aside, a possible 1% per annum gain could be achieved through standard methods of genetic gain, and up to 0.5% per annum could be gained through improved management techniques. The previous round of Planning Council forecasting suggested a 1.5% per annum gain and this has been adopted for the pastoral area of agriculture.

This productivity gain in the ten-year forecast period could be further upset by biotechnology advances. For example, bovine somatotropin (a growth stimulant) can boost milk production in dairy cattle by up to 30%, with about 6% more feed. This stimulant is under trial in most Western farming nations including New Zealand, and is being developed by at least four different agricultural-chemical companies in the United States. Growth stimulants are also under trial for other animals. While potentially significant, the effect on world agricultural production (and ultimately on New Zealand) is still uncertain and has not been assessed as part of the estimates.

In horticulture, volume growth continues but productivity gains seem less likely. Mechanical harvesting for most fruit species, particularly the major exports of kiwifruit and apples, remains very difficult to implement but there has been strong interest by corporate business in the horticultural sector in the past two years, suggesting there are economies of scale to be achieved. Productivity growth is particularly important in this industry as it is labour intensive, but the industry is competing directly against the low-labour-cost economies of Chile and South Africa. Some productivity gains may be possible through traditional methods of genetic improvement, but without rapid replacement of long-term plantings such gains are likely to be slower than for pastoral farming. By including packhouses in this sector, there is more scope for productivity increases through better and cheaper packaging and through computer-image grading of fruit.

The forecast for horticulture does not take into account any quantum leaps in productivity through genetic engineering techniques such as research on systems for a wider range of plants to fix nitrogen, to make better use of oxygen, or to improve pest and disease resistance. Any major breakthrough in these areas could have a significant effect on productivity within the latter part of the forecast time period.

Overall it is assumed there will be an annual increase of 1.5% in productivity for agriculture in the period 1987-97, while overseas competitors will be increasing their own productivity by at least this rate. The OECD estimated that in 1987 the

37

United States spent $US1400 million on biotechnology research, compared with Japan spending $US664 million, and Germany $US284 million. In the United States over 90% of biotechnology research is estimated to go into the health and agricultural-food sectors, indicating the strong potential for New Zealand productivity increases to be overshadowed by more rapid improvements in other countries.

Fishing

Fishing has been growing rapidly during its restructuring from small-scale inshore fishing to large capital-intensive inshore and offshore activities. Productivity has been steadily increasing during this period, and is forecast to continue. No major technological breakthroughs are foreseen, but a combination of better catching systems, improved management in resources and in individual operations, and better processing techniques should slowly improve productivity levels. A 1% per annum increase is forecast in the period 1987-97.

Forestry

The forestry sector covers the actual growing and harvest of forests, with processing in a separate category. Restructuring has seen both private and public sector operations reassessing their planting programmes, silviculture practices, harvesting, and sales options. The largest single forest owner, New Zealand Forestry Corporation, is in the early stages of operating as a profit-motivated business based on new asset values and a staffing structure significantly changed from its earlier status as a government department. The pressure to restructure and increase productivity comes from two sources - the government's desire to improve efficiency of state-owned trading operations, and the competitive pressures from more efficient forestry operations in North America and Chile. New Zealand ownership of overseas forestry operations now makes international comparisons easier.

Survey respondents felt that productivity growth should be raised above the previous estimate of 1.7% per annum to reflect this restructuring, although the benefits of factors such as labour shedding, technological improvements, better plant utilisation, and improved management structures will be partly offset by smaller trees and harvesting on more difficult terrain. It was therefore decided to adopt a 2% per annum growth rate for the period 1987-97.

Mining

Mining covers three major export activities, coal, gold and ironsands, with titanium mining a strong possibility in the forecast period. Coal mining is undergoing major restructuring, with the principal participant - state-owned Coalcorp - being converted from a subsidised government department to a profit-conscious corporation, eventually to be privatised. This has not only involved management restructuring and shedding of labour and plants, but also a re-evaluation of mining techniques. A move from underground to opencast mining has the potential to boost productivity significantly, but at some environmental cost. In addition there is likely to be more competition from private-sector firms for both domestic and export contracts, placing further pressure on productivity.

Productivity in the gold-mining industry is extremely difficult to measure, as

most gold is produced from alluvial sites using relatively unsophisticated operations. A move to large-scale dredging and open-cast mining, while initially capital intensive, has the potential to increase productivity significantly. But it also could involve environmental costs.

Little technical change is forecast for ironsands, while the titanium operations will only have significant exports in the latter part of the forecast period and will be using "state-of-the-art" technology.

For the mining sector as a whole, a 6% per annum growth in productivity is forecast for 1987-92 (an increase on the previous forecast of 4%), with a 3% growth rate predicted for 1992-97. Although these rates are high, they represent a catching-up to productivity levels of more efficient overseas competitors.

(b) Manufacturing

Forecast rates of change in total factor productivity for the manufacturing sector were drawn from the New Zealand Manufacturers' Federation survey undertaken as part of the consultation process. Participants were asked to estimate increases in capital and labour required for a 20% and a 50% rise in output, and these were used to estimate TFP. Where an industry was highly concentrated - such as pulp and paper or metals - consultations with major firms were undertaken and, in the case of pulp and paper, the estimates were revised upwards. The food and beverages sector was also examined further, because of the limited coverage of the survey.

In many areas of manufacturing, exporters were feeling pressure from high interest rates, from a firm $US/NZ exchange rate and from imports - particularly true of those with a traditionally strong domestic base. Productivity growth was being sought, with gains initially through management restructuring and labour shedding. The wood-manufacturing sector came under additional pressure from large New Zealand operators now owning overseas plants (which provide them with direct international comparisons of labour/capital productivity levels).

Infogram 4.4 compares the expected productivity gains in manufacturing industries with previous forecasts.

39

Forecast Rates of Total Factor Productivity
average % change at annual rates

	(a)	(b)	Manfed Survey & Consultation 1987-92	1992-97
Food	0.4	0.4	3.0	2.0
Textiles	0.8	3.9	2.5	2.5
Wood	2.0	0.1	3.0	3.0
Paper	2.0	2.3	3.0	2.5
Chemicals	1.4	2.7	1.0	1.0
Ceramics	0.0	1.9	1.0	1.0
Metals	0.0	2.8	2.5	2.5
Machinery	2.0	3.4	2.0	2.0
Other manufacturing	2.0	2.3	2.5	2.5

(a) *Towards 1990* (New Zealand Planning Council, 1983)
(b) *Towards 1995* (New Zealand Planning Council, 1986)

The infogram shows that estimates made for individual industries vary between forecasts, often because of changes in samples between forecasts. A decrease is more likely to be due to a previous overestimation of productivity rather than an expected decrease in the rate of productivity improvement.

Very strong productivity growth is expected in wood processing - from sawmilling to furniture manufacturing - and in the pulp and paper industry. The wood industry is facing uncertainty as forest owners and processors reassess harvesting/processing options. However, it is forecast that the industry as a whole will undergo major changes over the next decade with construction of new high-technology low-labour integrated sawmills. Included in this area are the processing sectors of the New Zealand Forestry Corporation, which is likely to be privatised.

The pulp and paper industry faces major labour shedding, with some additional capital inputs forecast over the first five-year period as mills catch up with higher-productivity plants overseas.

Productivity growth is also forecast to be strong in textiles, metals, machinery, and other manufacturing as these industries are restructured to improve their international competitiveness.

Under the food category, the survey covered non-primary food establishments - for example, canneries and bottling plants - but not freezing works and dairy companies. With meat and dairy products still providing nearly a quarter of total export income, high productivity in these plants is of major significance to the economy. The meat industry in particular is under considerable stress and a massive programme of restructuring is underway. This includes large-scale labour shedding (both at worker and management levels), closure of older plants and the building of new (and often smaller) high-technology plants, the introduction of

new work practices including shift work, and a reassessment by both management and labour of traditional attitudes. The potential productivity gain in this industry could be very large but, as indicated in Chapter Six, large increases are needed to prevent a continuing decline. However, any gains in the meat industry are likely to be moderated by slower productivity increases in dairy and non-primary food processing. Overall a 3% per annum growth rate has been adopted for the period 1987-92, reducing to 2% per annum in 1992-97.

(c)   Services

It is difficult to provide meaningful measures of output from the services sector. However, most studies - both overseas and in New Zealand - indicate that this has traditionally been a low-productivity sector of the economy. It has also been strongly regulated, with significant public sector involvement. Recent government policies have been directed at creating a more competitive environment by encouraging the accountability and transparency of operations, and by decentralising activities so that they are closer to the marketplace. This has, in turn, placed pressure on the sector to increase productivity - with much of the initial gain in efficiency coming from labour shedding. It is interesting to note that in New Zealand, as in most industrialised countries, it is the services sector which has been the major creator of employment over the last few decades. Higher productivity has the potential, at least in the short term, to slow this employment growth.

Electricity, gas and water

The electricity sector is also being restructured, with the formation of Electricorp and with changes at the local supply level. This has resulted in labour shedding, and a slowdown in capital expenditure. The other utilities are also facing restructuring: in gas through the sale of Petrocorp to Fletcher Challenge; and in water and other utilities through changes to local body structures. Overall productivity gains are expected to be relatively high, with 2.3% forecast for 1987-92, and a further increase to 2.7% per annum for 1992-97.

Construction

Of all the areas in the services sector, construction has probably been the most competitive. Current high interest rates, and more recently a downturn in activity (particularly in civil engineering), are focusing attention on productivity. Consultation with the industry indicated that steady gains in productivity of up to 2% per annum are possible over the forecast period. This is expected to come from areas such as improved technology in design/construction techniques, changing attitudes and practices in management and labour, and increased prefabrication - which has a side effect of moving activity from the construction industry to the manufacturing sector.

Trade

Trade covers a variety of activities, particularly hotels, restaurants, and the retail/wholesale trade. While no significant gains in productivity are expected in the hotel/restaurant area, retail/wholesale trade has undergone major structural

41

change. Over the last decade the distinction between importer/wholesaler and retailer has become increasingly blurred. In addition, there is strong pressure for retailing to move in two directions. It is possible that by the end of the forecast period the bulk of consumer items will be supplied through large, highly automated, low-personal-service supermarket operations. In the larger centres there will be hypermarkets servicing large population catchments. The move of the Australian firm Coles Myers K-Mart into New Zealand may speed up this trend. At the opposite end of the scale, the central business districts will contain specialist, high-personal-service boutiques.

Advances in information technology will allow a move to highly automated wholesale/ retail networks, with most of the employment impact falling on middle management. In the short term, new technology and larger shopping centres will mean an increase in capital investment. The final gains in total factor productivity (rather than in sales per person, which is the common productivity measure in the industry) may be a few years away. An increase of 0.5% per annum in 1987-92, rising to 1% per annum in 1992-97, has been suggested.

Transport

Until recently, the transport industry has been highly regulated. The road and rail areas were the first to be deregulated and this resulted in significant restructuring of both industries, including major labour shedding by New Zealand Railways. The aviation industry is being partially deregulated, and shipping is on the Government agenda. The consultation process suggested a 2.3% gain in 1987-92, dropping to 1% per annum in 1992-97, to reflect this.

Transport - particularly that of bulky agricultural products - makes up a significant proportion of the total cost of an export product, so that productivity gains in this area should have a positive effect on exporters. Transport is also a major component of the tourist industry, so an increase in efficiency will also benefit that sector.

Communications

The level of technology and its efficiency in the communications sector are significant factors in the potential growth rate of information-technology (IT) industries. Information technology is seen by many overseas forecasters as a major growth area in industrialised economies, as it is a key to increasing productivity in most sectors of the economy.

The communications sector has been traditionally dominated by the Post Office - a government department covering both telecommunications and postal services. The splitting of this body into New Zealand Post and Telecom Corporation has involved the restructuring of operations, labour shedding and - particularly in telecommunications - an increase in investment in new technology. Further deregulation of the communications industry is planned, placing more pressure on productivity. A high rate of total factor productivity of 5.5% per annum is therefore forecast for the whole period through to 1997. This improvement in the quality and efficiency of communications services should provide significant benefits to most other sectors of the economy.

Finance

The finance sector covers insurance, banking, real estate, and business services.

Banking is of particular interest as it was one of the first sectors to face deregulation and, until recently, has been rapidly expanding its activities and employment. It is also seen to have potential for strong export growth, and has been one of the first industries to extend its activities world-wide. In addition, the position taken on domestic interest rates and - in particular - on foreign exchange levels has a major influence on productivity and output in other sectors.

For the industry as a whole, there has been little real productivity growth from the mid 1970s to the mid 1980s. New Zealand is now considered overbanked, and this is being accentuated by the current economic downturn. Productivity can be expected to increase, particularly in the retail sector, for the following reasons:

-      Point-of-sale technology (either adapted EFT-POS or smart cards) is likely to be much more widely accepted once a common delivery system is put in place, and agreement is reached on who gains the benefits. Both problems should be resolved within the timeframe of our forecasts.

-      An increase in point-of-sale transactions will see a decrease in the use of cheques, which are labour intensive. The current increase in the use of cheques is likely to slow over the next five years and then decline.

-      Cheque truncation (storing a cheque at the branch where it is deposited) will be introduced during the forecast period and will significantly reduce paper flows.

-      Banking networks will be improved, by using machines such as automatic tellers and automatic statement-producers. This will reduce the need for relatively low-skilled transaction staff in branches.

In other sections of the banking industry, improved communications technology and improved databases for accounting and general management information should also lead to some productivity increases. Banks, broking firms and insurance companies are now also placing considerable emphasis on restructuring management, with the aim of increasing productivity.

Placing figures on productivity gains is difficult, but New Zealand trading banks suggest that one-off productivity gains through restructuring could be as high as 3-4%, with steady but lower annual gains thereafter. This sort of gain is thought possible by the more efficient New Zealand banks, while for those such as Postbank and the Rural Bank (which start from a much lower base) one-off productivity gains can be expected to be greater. This has already been seen in staff layoffs, with the current economic downturn forcing middle-management redundancies in a range of financial institutions. Natural attrition will tend to disguise reduced employment opportunities for junior staff.

All this suggests that productivity gains in the banking area could be relatively high, with perhaps a one-off gain of 3-5% across the sector, and slower growth thereafter. An overall 2% per annum growth rate in the period 1987-92 has been adopted, with a slowing in the latter period.

43

Productivity gains should also be seen in the insurance industry, which is now closely linked with banking and is facing overcapacity. In some areas real estate is also linking with finance, and it is likely there will be some small productivity gains as larger firms develop computerised sales networks. Information technology should assist in the diverse business-service sector, from architects to management consultants, but it is difficult to foresee large-scale productivity leaps.

Overall it is forecast that the finance sector will increase productivity at 1.5% per annum from 1987-92, dropping to 1% in 1992-97. This compares with a zero gain that was forecast during the last round of consultations (1986).

Dwellings

The dwellings sector is included in the modelling exercise as it utilises a significant proportion of New Zealand's investment capital. Its output is also an important component of GDP and is measured by the imputed rental earned by the owner, which in turn is a monetary measure of the functions of a dwelling such as shelter, comfort and aesthetic appeal.

TFP in this sector, as in other areas, attempts to measure the output of dwellings for inputs of labour and capital. The most obvious way this output can be improved is if the same (or greater) output or service from a dwelling can be achieved for a lower cost of construction or subsequent maintenance and repair. New and improved construction materials, factory-built standard homes, and more flexible building codes all have the ability to improve productivity in this sector, although econometric work and consultation with the industry suggests a zero productivity rate should be adopted. This was also the rate of change adopted for the last two rounds of forecasting (1986 and 1983).

Government

This is a major sector within the economy - it covers the activities of central and local government and of a wide range of institutions which include government departments, catchment boards, hospitals and universities. It excludes state-owned trading operations such as Electricorp or the Railways Corporation. Virtually all central-government institutions are undergoing major restructuring, and a similar programme is being developed for local government. The objective is to improve the efficiency of the use of the two major inputs (capital and labour) but not to significantly reduce output. This implies an increase in total factor productivity, but changes are extremely difficult to measure. It is therefore estimated that a 1% per annum one-off gain in productivity will take place in the period 1987-92, reverting to zero in the latter period.

Other services

This sector covers a very wide range of activities including trade unions and business groups, theatres, racing and lotteries, household domestic staff, charities and sporting bodies. The diversity of activity and the nature of output again make measurement of productivity difficult, and it is hard to foresee major technological or managerial advances. Therefore, as in previous rounds, no productivity gain is forecast.

44

(d)   **Productivity Forecasts: Summary**

The individual sector forecasts are brought together in Infogram 4.5.

INFOGRAM 4.5

Historical and Forecast Rates of Total Factor Productivity Change (By Sector)
% per annum

	1978-84[1]	1984-88[1]	Consultations forecasts 1987-92	1992-97
Primary Sector				
Agriculture	2.0	2.7	1.5	1.5
Fishing	N/A	N/A	1.0	1.0
Forestry	4.5	7.2	2.0	2.0
Mining	-8.6	17.2	6.0	3.0
Manufacturing				
Food	1.6	0.9	3.0	2.0
Textiles	2.1	4.1	2.5	2.5
Wood	1.9	-1.4	3.0	3.0
Paper	1.8	4.7	3.0	2.5
Chemicals	-4.6	-1.4	1.0	1.0
Ceramics	N/A	N/A	1.0	1.0
Metals }			2.5	2.5
Machinery }	0.3	-1.7	2.0	2.0
Other manufacturing }			2.5	2.5
Services				
Electricity	1.9	1.3	2.3	2.7
Construction	2.5	5.0	2.0	2.0
Trade	-1.7	-2.8	0.5	1.0
Transport	2.3	3.1	2.3	1.1
Communications	5.0	5.0	5.5	5.5
Finance	0.2	0.0	1.5	1.0
Dwellings	0.7	0.5	0.0	0.0
Government }	0.0	-0.9	1.0	0.0
Service }			0.0	0.0
Total Economy	0.8	1.1	1.66[2]	1.46[2]

N/A = Not Available
1 Project on Economic Planning estimates
2 Weighted by 1983/84 output

45

4.1.1　International Productivity

As is already apparent from the earlier sections of this chapter, forecasted New Zealand productivity gains appear to be very strong in some key sectors of the economy - but it is likely that productivity in competing industries overseas will also grow at a rapid rate. The level of research and development (R & D) undertaken by competing nations suggests potential gains in their productivity through technological breakthroughs and improvements in production techniques. Infogram 4.6 shows aggregate levels of expenditure on R & D in 1985.

INFOGRAM 4.6

Gross Domestic Expenditure on Research and Development (Selected Countries) 1985

	% of GDP	% financed by industry
Japan	2.81	68.9
US	2.77	47.9
Germany	2.67	61.8
UK	2.32	46.1
NZ	1.01	19.2*

Source: Data base of the OECD Scientific, Technological and Industrial
Indicators Division
Note: * 1983

In comparison with New Zealand, only 7 out of 25 OECD countries surveyed had lower R & D expenditure as a percentage of GDP - those being Greece, Ireland, Iceland, Portugal, Spain, Turkey and Yugoslavia. Of the total expenditure, New Zealand also ranked the lowest of all surveyed countries in terms of the proportion financed by industry. A New Zealand Manufacturers' Federation survey of New Zealand manufacturing spending on R & D (undertaken in mid 1988) indicates that, in real terms, industry R & D has declined by 50% in the period 1983-88. Given the reduction in government spending on R & D over this period, New Zealand's total R & D is likely to be at an extremely low level relative to the industrialised world. The Government is unlikely to significantly increase R & D in the medium term, and, if total R & D is to rise, manufacturers will need to dramatically increase their contribution. Even if this happens, the major source of new technology will be that coming from overseas - so that while the forecast high rates of productivity growth will assist New Zealand in keeping up to world levels, overall there may be little change in its competitive position through technology-induced productivity gains. The technology content of New Zealand's export industries is further discussed in Chapter Six.

4.2　Inflation

For the past decade, New Zealand's inflation rate has been consistently above those of our major trading partners. This has been particularly pronounced in the past four years, where on average New Zealand's increase in consumer prices has

been about four times that of the United States, nearly twenty times greater than Japan, seventeen times that of Germany, over one-and-a-half times that of Australia and nearly four times the rate of the whole OECD (see Infogram 4.7).

INFOGRAM 4.7

Movements in Consumer Prices
March years

Source: OECD and Department of Statistics
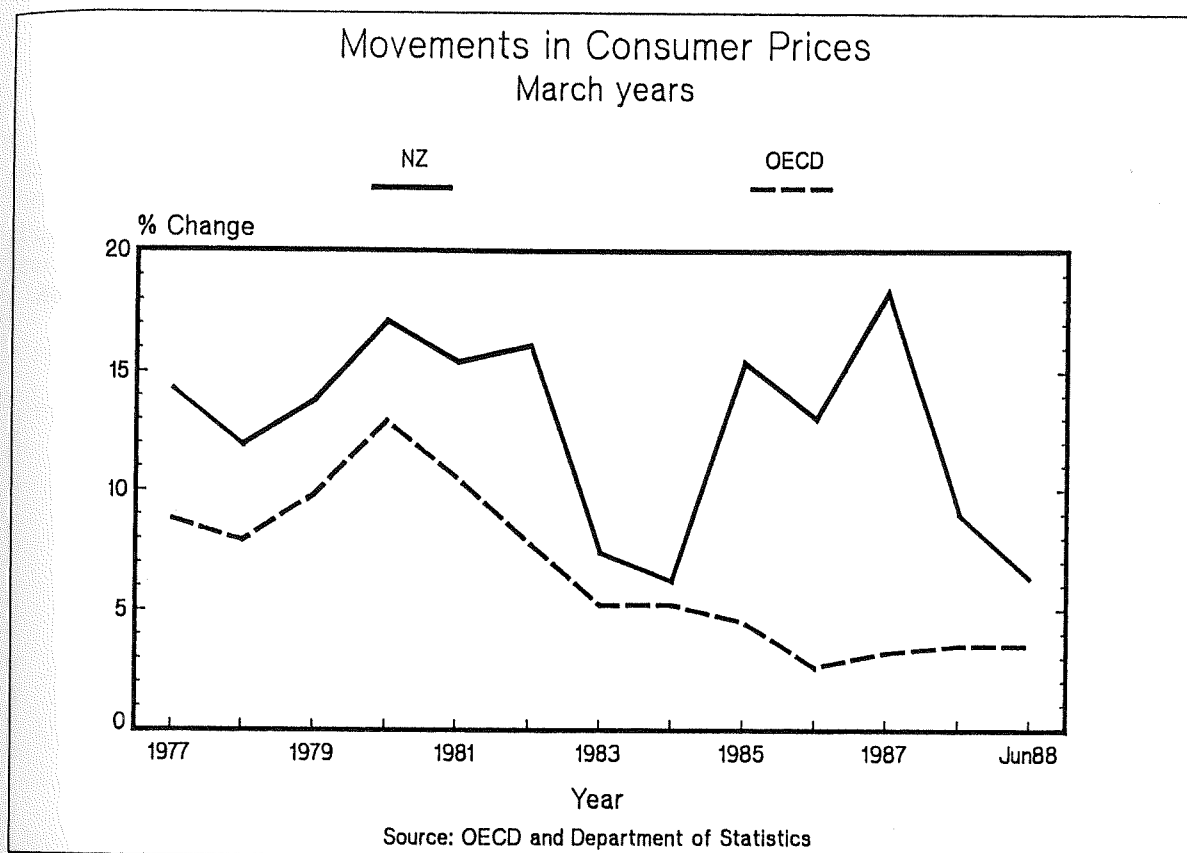
The detrimental effect of a high inflation rate relative to one's trading partners is generally acknowledged. In order to bring down this high level of inflation, the Government has adopted a range of anti-inflationary policies centred on a tight monetary policy. Inflation as measured on a yearly basis has reduced from a peak of 18.9% in the year to June 1987, to 6.3% in the year to June 1988. On a quarterly basis, the June increase was 0.8% - a rate which, if it can be repeated in forthcoming quarters would indicate an underlying inflation rate of around 3%, very much in line with the OECD average. The modelling exercise, however, uses a moving three-year-average measurement of inflation, thus building into the estimates any previous high (or low) price increases. Because of this, the forecast reduction in inflation seems slower than would appear from comparing quarterly outcomes.

The forecasting models used do not provide estimates of future inflation rates. Instead a Planning Council view of inflation trends relative to those of our trading partners is required. In forecasting out to 1997, it is assumed that the inflation rate of our trading partners will remain at about the 3% level for the entire forecast period. New Zealand's three-year-moving-average rate is forecast to match our partners' rate by 1990, although a rise in the rate of our trading partners may speed this convergence.

47

Although the SDMACRO model requires an external view of relative inflation rates, the model itself can adjust these relativities further. It is assumed that high unemployment places pressure on wages and ultimately on inflation, while a low level of unemployment loosens the inflationary restraints.

Relative inflation rates in turn are seen, in the modelling exercise, as the prime determinant of exchange rates.

4.3 Exchange Rates

Since the floating of the New Zealand dollar there has been much discussion on exchange rate movements, particularly by primary producers and exporters of manufactured goods, on the level of the New Zealand dollar against the United States. Infogram 4.8 shows the path of the United States dollar and the currencies of New Zealand's other major trading partners, from March 1970 to September 1988.

INFOGRAM 4.8
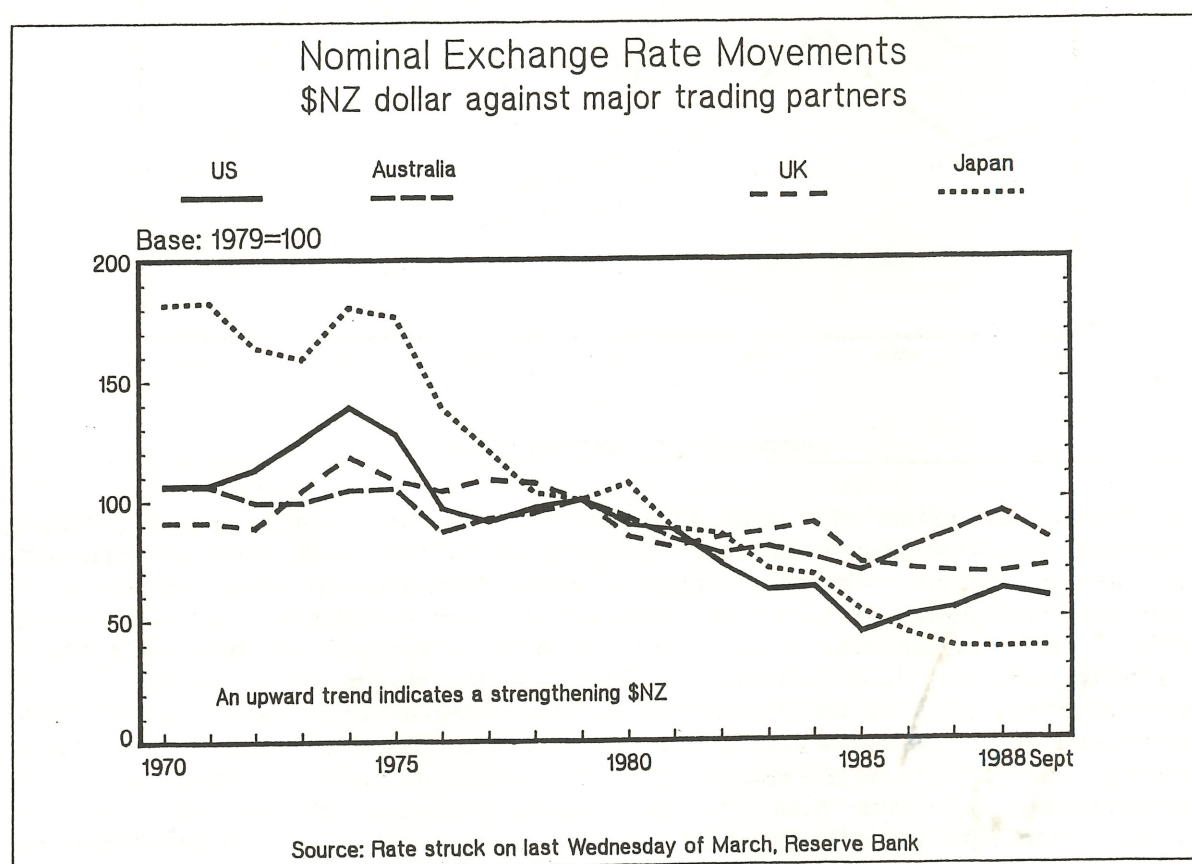
Infogram 4.8 indicates that, while there has been a progressive devaluation of the New Zealand currency against all major trading partners through to 1988, there has in recent times been an upsurge in strength against both the United States and Australian dollars. During the consultation process, this factor was regularly cited as a major factor in holding back export growth.

This upsurge in the strength of New Zealand's currency against major trading partners following devaluation is shown more clearly in Infogram 4.9 which plots

<u>real</u> (inflation-adjusted) exchange rate movements over time.

INFOGRAM 4.9

Composite Real-Exchange-Rate Index
March 1979 to September 1988

Index

An upward trend indicates a strengthening $NZ

Sep79 Sep80 Sep81 Sep82 Sep83 Sep84 Sep85 Sep86 Sep87 Sep88*

Quarterly averages

* estimate

Source: Reserve Bank Bulletin, Vol 51, No 3, 1988
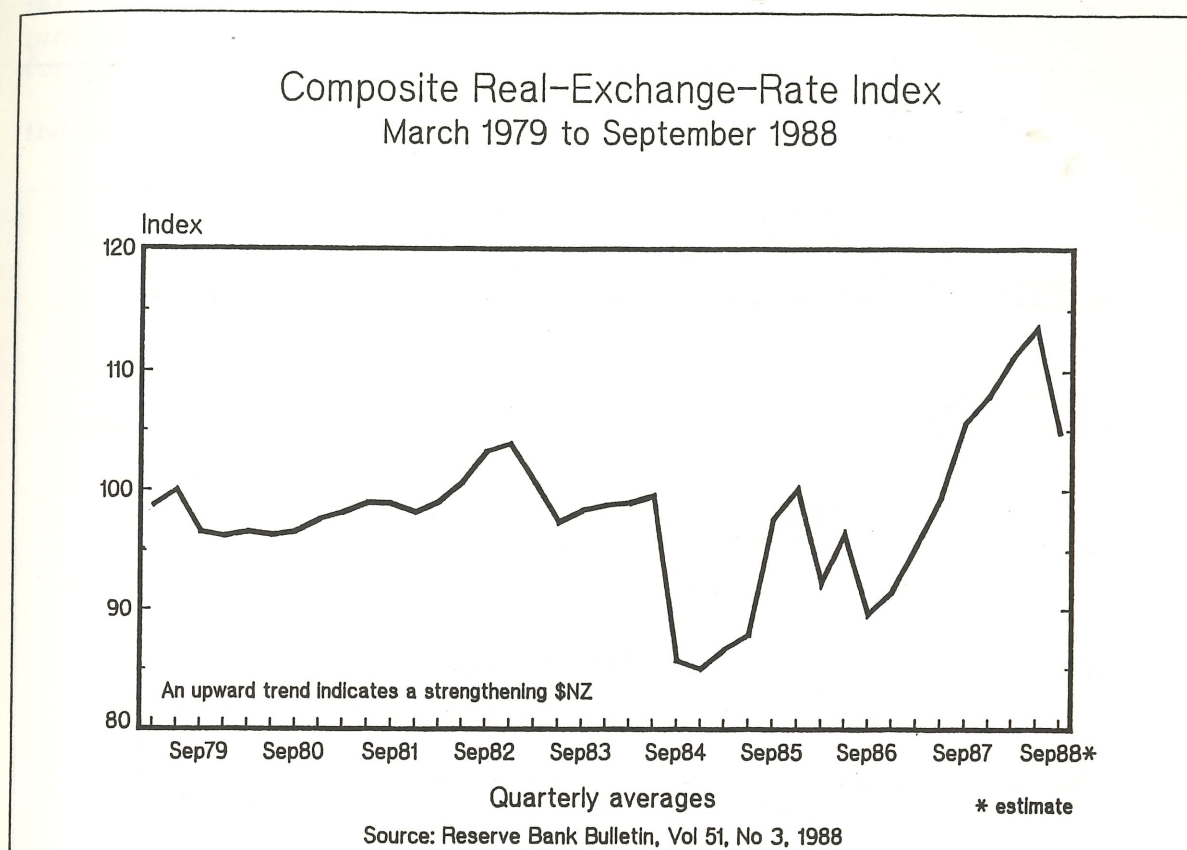
In forecasting real exchange rates, the relatively simplistic theory of Purchasing Power Parity is used. This theory implies that movements in real exchange rates are dictated by movements in relative inflation rates of trading countries. It suggests that if inflation (that is, increases in the cost of labour and other inputs to production) is higher for New Zealand exporters than for firms in competing countries, then the exchange rate will need to depreciate over time to ensure that the price of New Zealand exports remains competitive for foreign purchasers and that local production remains competitive with imports. Equally importantly, a lower relative inflation rate should cause a strengthening of one's currency relative to that of the trading partner. This point should be particularly noted as it indicates that an exchange rate of, say, 70 New Zealand cents to one United States dollar could at some time in the future be a very attractive exchange for exporters <u>if</u> New Zealand's inflation rate had for some time been lower than that of its trading partners.

Productivity plays an important part in maintaining and developing competitiveness. For any given set of input prices (including wage rates), an ability to cut costs of production significantly through improved productivity will enable lower output prices and so will increase an exporters' ability to compete.

As indicated in the previous section on inflation, inflation rates in our forecasts also vary slightly according to unemployment assumptions, and therefore

exchange rate movements will also vary slightly in different model runs. Infogram 4.10 shows the trade-weighted exchange-rate index which is forecast for the base-case scenario discussed in Chapter Five and Chapter Six.

INFOGRAM 4.10

Nominal Exchange Rate Movements
$NZ dollar against major trading partners

RBNZ Trade Weighted Index   NZPC PPP Forecasts

Base:June 1979=100

20 September 1988

Average rate March year

Source: Reserve Bank
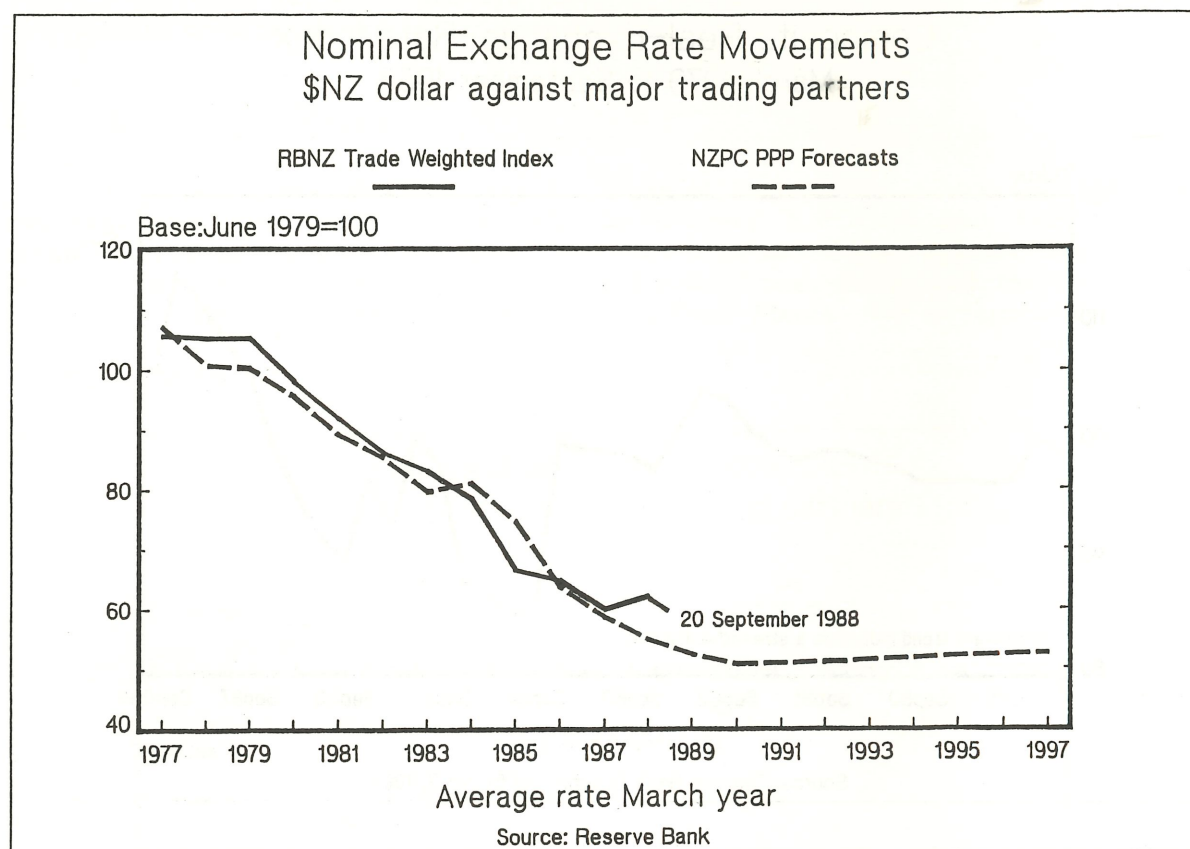
Infogram 4.10 demonstrates that the model would have expected a decline in the trade-weighted index from 1986 to 1990, when New Zealand's inflation rate converges with that of our major trading partners. In cases like this, where the model appears to be "off-course", the modeller has two choices: the first, to force the model to adapt temporarily to the trends indicated in the real world; the second, to assume that the model trends indicate the likely movement of exchange rates in the longer term. The latter philosophy has been adopted and therefore, according to the SDMACRO model, the New Zealand dollar has been overvalued from early 1987 until the finalisation of these forecasts.

Convergence between actual and optimal real exchange rates can be achieved either by changing the nominal exchange rate or by controlling general inflation and achieving better productivity.

4.4   Labour Force Projections

In determining future levels of paid employment and unemployment, forecasts of labour-force growth are needed. In turn, such projections are based on population forecasts and on assumed workforce participation rates.

The labour-force forecasts used in the SDMACRO model are based on adapted Department of Statistics' projections. These assume medium fertility rates and high outward migration from the base year of 1985 until 1988, then zero net migration for the remainder of the forecast period. Although the projections use the March 1985 year as a base, they have been revised to take account of provisional 1986 Census labour-force data. Infogram 4.11 illustrates the labour-force projections.

INFOGRAM 4.11

Cumulative Increase in Labour Force
1988 to 1997

Male

Female

Total

Additional people available for work

Year ended March

Source: Department of Statistics
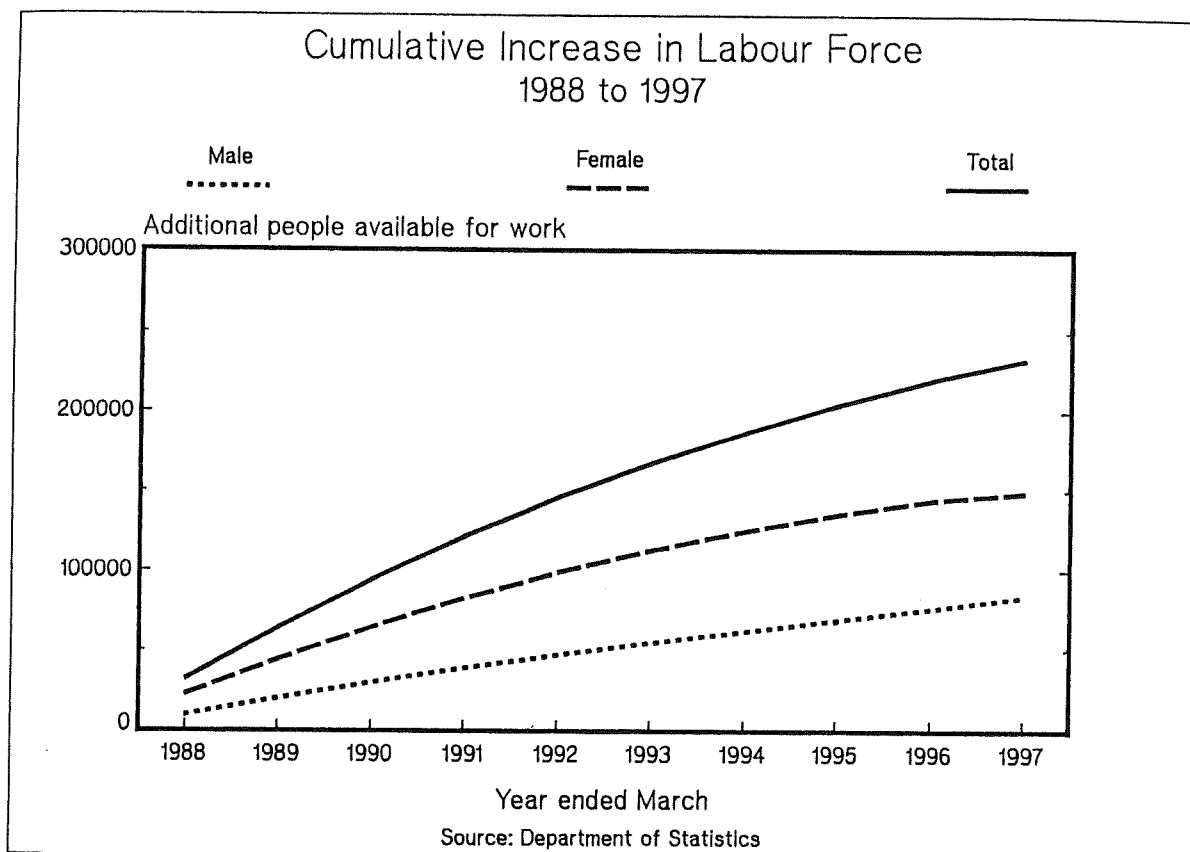
Infogram 4.11 illustrates a number of important issues. There is very strong growth of the total labour force over the whole forecast period, even though the rate of growth decreases in the latter period. This requires the creation of new work opportunities, whether they be part-time or full-time jobs. Over 145,000 new work positions will be required in the period 1987-92, with a further 87,000 required in the five years to 1997. This is, of course, in addition to the jobs that need to be created for those currently unemployed if unemployment rates are to be reduced.

The pressure that these growth rates will create can be indicated by looking at historical trends. Again for comparative purposes total employment is used, combining full-time and part-time positions to give an overall employment figure. According to Census data, between March 1981 and March 1986 there was a net increase of just over 112,000 jobs. Nearly 85% of these were created in the services sector. The Department of Statistics' Household Labour Force Survey gives some indication of trends beyond March 1986.

51

In the two years to March 1988, growth in employment in service industries continued, with a net increase of over 35,000 jobs, but the very strong decline in employment in both the primary and manufacturing sectors led to a total decrease in employment of over 16,000 people.

The relative employment growth of the three main sectors of the economy are illustrated in Infogram 4.12.

INFOGRAM 4.12

Employment Growth
December 1985 to June 1988

Primary   Manufacturing   Services   Total

Index June 86=100

Note: Full-time equivalent employment (Full-time=1, part-time=.5)

Dec   Mar   Jun   Sep   Dec   Mar   Jun   Sep   Dec   Mar   Jun
1985   1986   1987   1988

Source: Household Labour Force Survey, Department of Statistics
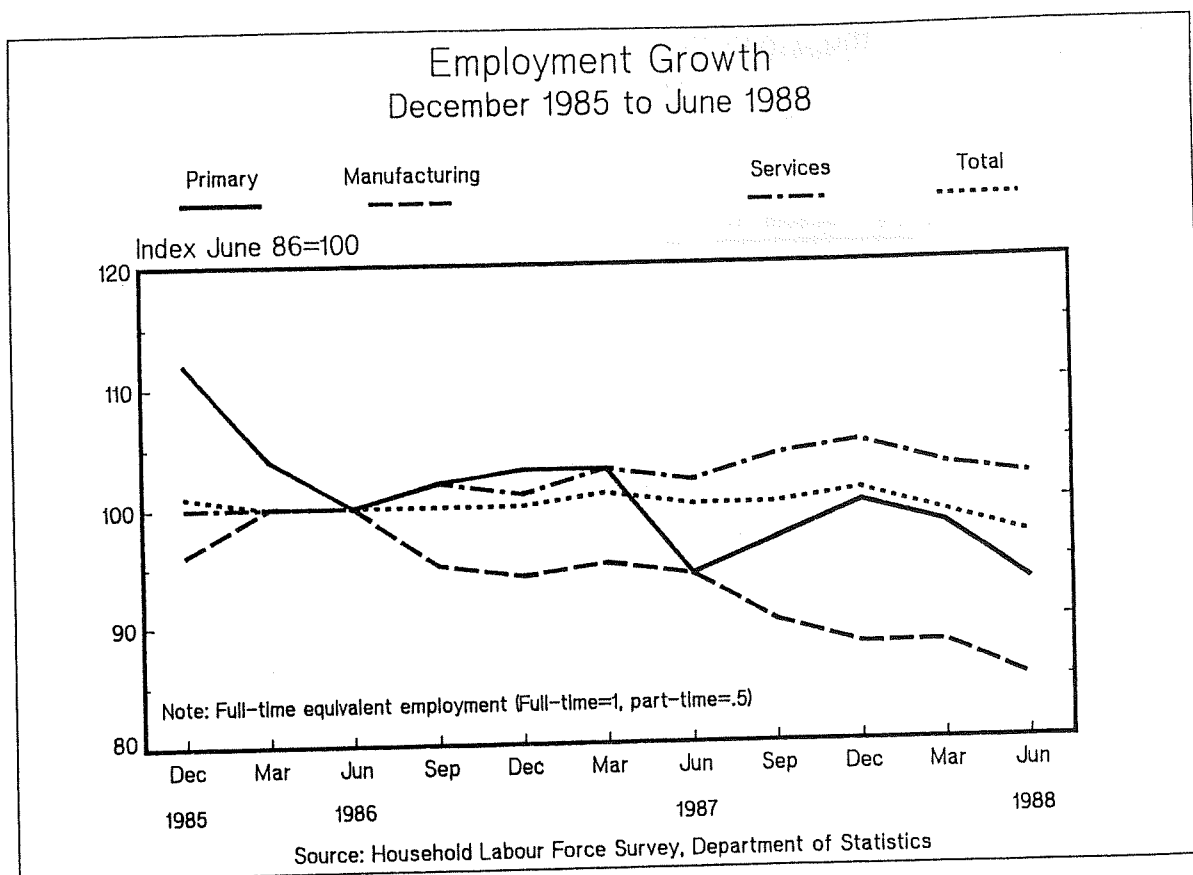
As discussed earlier, restructuring of the services sector aims to increase productivity, and there are already indications that - at least in the short term - the strong growth of employment in this sector is unlikely to continue. This is discussed in more detail in the next chapter.

The comparisons shown in the graph are for the total labour force but, for modelling purposes, employment is measured in terms of full-time equivalents with two part-time jobs counted as equal to one full-time position. The definition of full-time work has changed over time, but the current definition is 30 hours or more per week.

Finally, it is worth noting that the Department of Statistics' forecasts assume that female participation in the paid workforce and the incidence of part-time work both increase over the forecast period. The projections show strong growth in numbers of females entering the workforce - nearly 70% of new entrants to the labour force in 1987-92 will be women, and nearly 60% in 1992-97. In terms of

total numbers, 54% of females over 15 years of age (and 77% of males) were classified as being in the labour force in 1987, but by 1997 the participation rate is forecast to change to 59% (76% for males). While the increase in female entrants appears strong, female participation rates in New Zealand are not high compared with some countries - particularly those of the Nordic region. According to OECD figures, 1986 female-participation rates in Norway were 71%, Finland 74%, Denmark 77% and Sweden 78%. Any further increase in participation rates in New Zealand will therefore increase the labour force at an even faster rate.

PART
THREE

MODEL FORECASTS – DEVELOPMENTS IN THE ECONOMY AS A WHOLE

5.1 Introduction

This chapter presents forecasts of economic developments in the period to 1997. The forecasts are generated within our two economic models and are based on the estimates and assumptions discussed in the preceding chapters. A different outcome would result from any variation in those data sets.

In the interests of clarity we present our forecasts with minimum qualification. The base scenario is seen as central to a wide range of possibilities. Limiting attention to only one scenario assists discussion of the inter-connections between exports, output, employment, imports, overseas debt and other variables. However, in section 5.4 we illustrate the capacity of the model to generate different scenarios, by exploring the implications of a lower rate of growth in exports.

Our forecasts reach forward to 1997, from a base period set as the three years ended March 1987. All variables are expressed as three-year moving averages and are intended to portray the broad trend of developments rather than to give precise forecasts for particular variables or of turning points in the economy. For data underlying the infograms see Appendix III.

5.2 The Macro Forecasts

5.2.1 1987 to 1992

In the base period (the three years ended March 1987), the New Zealand economy was in the midst of far-reaching economic reform. Financial sector reform was associated with a devaluation and then the floating of the New Zealand dollar. Monetary and fiscal policy were focused on medium- rather than short-term objectives, with a primary emphasis on reducing inflation. Programmes of industry-assistance reform were accelerated and broadened.

These changes occurred in an economy characterised, during the three years ended March 1987, by:

- GDP growth at a rate 3% per annum, which is above the long-term average (2.7% per annum 1960-85)

- an inflation rate several times that of our trading partners

- an external balance of payments deficit in excess of 6% of GDP

- accumulated overseas debt equivalent to 66% of GDP

- continuing unemployment at a rate of about 4%.

High inflation, substantial overseas debt, and the prospect that continuing

balance-of-payments deficits would add to the debt burden all pointed to a slowing in economic activity. This could be expected to follow either as a result of deliberate policy choice or from market responses to clearly unsustainable imbalances.

Against these pressures stood the cost of forgoing the consumption and other benefits which might otherwise flow from higher levels of output, and the prospect that reduced activity would add to the problem of unemployment. This, in an economy with a demographic increase in the number of people of working age and a tendency to increased labour force participation.

In the SDMACRO model, these conflicting pressures are resolved through a set of policy rules which accord distinct weights to the major economic objectives. These rules are discussed in Appendix II. In this presentation price and employment objectives carry equal weight, with each being set a little below the combined value attached to the two external objectives - balance of payments and overseas debt. In the early years of the projection, contractionary pressures predominate: the annual rate of growth in GDP falls from 3% in 1986 to only 0.5% in 1988 and 1989.

By 1990 an improvement in the balance of payments and a sharp reduction in the rate of inflation (clearly evident at time of writing and built into our model by assumption) reduce those pressures which point to contraction. At the same time, increasing unemployment strengthens the case for expansion. As a result the GDP growth rate begins to recover - slowly at first, but rising gradually to a reasonably strong 2.8% per annum by 1992 when indicators other than unemployment are looking very much better and the economy is well set to continue its expansion. As already noted, New Zealand's inflation rate is assumed to have reduced to that of its trading partners by 1990 and to remain near to that in the period thereafter.

By 1992, the current-account external balance has moved from deficit to a surplus equal to 1.8% of GDP. This positive balance is made up of a surplus on trade in goods (equal to 6% of GDP) and a small surplus on trade in services (equal to 0.5% of GDP), offset in part by a net outflow in respect of international investment income equal to 4.2% of GDP. This balance-of-payments surplus enables repayment of debt. The effective burden of debt is also reduced by the forecast growth in real GDP and by inflation in creditor countries. As a result of these forces, the ratio of debt to GDP is forecast to fall - from a peak level of 69% in 1988 to about 57% by 1992.

Against these positive developments has to be placed an increase in the rate of unemployment. In terms of our base run, the unemployment rate (which relates to Household Labour Force Survey measures for full- and part-time workers expressed as full-time equivalents, rather than to the number of registered unemployed) rises steadily from a 1986 level of 4% of the labour force, to a peak level of 6.5% in 1992.

This increase in the number of unemployed needs to be placed against a forecast that total employment will have increased quite substantially, by some 69,000 full-time equivalents, between 1986 and 1992. Rising unemployment in company with expanding employment reflects the fact that the total labour force is forecast to be rising quite strongly. Over the period 1986-92, the total labour force is forecast to increase by the equivalent of 140,000 full-time workers - that is, at an average annual rate of 1.5%.

The forecast increase in employment between 1986 and 1992 contrasts with the fall in employment as recorded during recent quarters by the Household Labour Force Survey. Our forecasts imply quite rapid growth in employment in the latter part of the 1986-92 period. We examine the relationship between employment and GDP growth more closely at a later stage in this chapter.

5.2.2   1992 to 1997

Any forecast beyond the year 1992 is particularly exposed to error - but nevertheless the broad shape of developments as suggested by our base run is interesting. We examine this before turning to a more detailed look at developments in some of the key macro variables.

The generally improved external position which our models suggest could be attained by 1992, together with an assumption of continued success in containing inflation, enables a sustained expansion in economic activity. Our SDMACRO model suggests GDP growth at a rate around 3.5% per annum from 1992 to 1997. Infogram 5.1 records the forecast rate of change for the full period of our forecasts.

INFOGRAM 5.1

Forecast Rate of Change in Real GDP
1986-1997

Centred three-year moving averages

March years
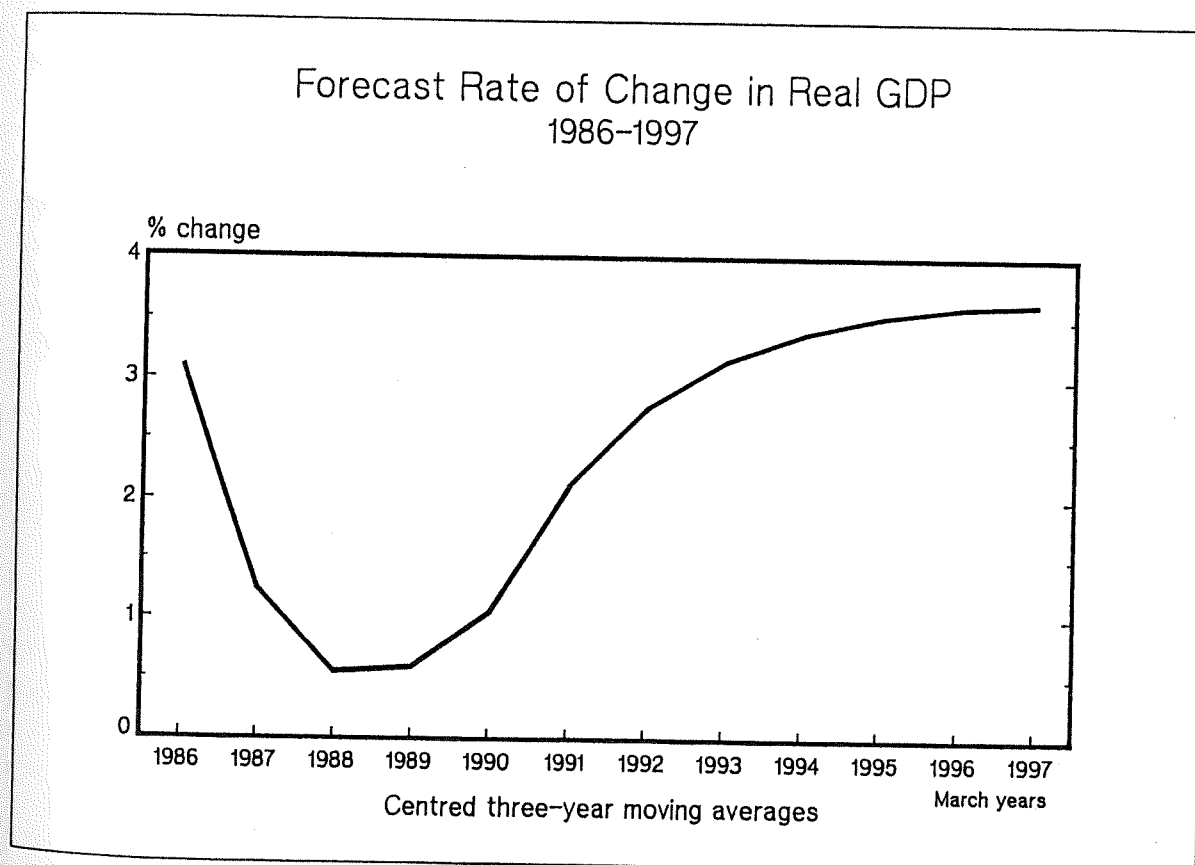
This rate of growth in GDP generates growth in employment opportunities faster than the forecast rate of increase in the labour force.

The provision of a net increase of 122,000 jobs over a period when labour-force growth declines to less than 1% per annum, enables a reduction in the unemployment rate (again referring to Household Labour Force Survey full-time equivalents rather than to registered unemployment). This falls from 6.5% in 1992 to 4.6% in 1997 - although at that level it is still a little higher than in 1986.

This sustained expansion in economic activity occurs without significant pressure on the balance of payments. In consequence the debt-to-GDP ratio continues to fall quite rapidly from 57% in 1992 to 28% in 1997.

5.3 The Forecasts in More Detail

5.3.1 Exports and Imports

As is evident from Chapter Three, our forecasts comprise sectorally based export forecasts. These imply compound growth in total exports of 3.5% per annum during 1987-92 and 3.3% per annum 1992-97. These export forecasts imply a marked increase in the ratio of exports to GDP in the period to 1992 and a fairly steady but slightly falling ratio during 1992-97. The ratio of exports to GDP is shown in Infogram 5.2 with the projected changes in the ratio of imports to GDP. Together these tell a clear story.

INFOGRAM 5.2

Forecast Ratio of Trade Flows Relative to GDP
1986-1997

Exports   Imports

Centred three-year moving averages

March years
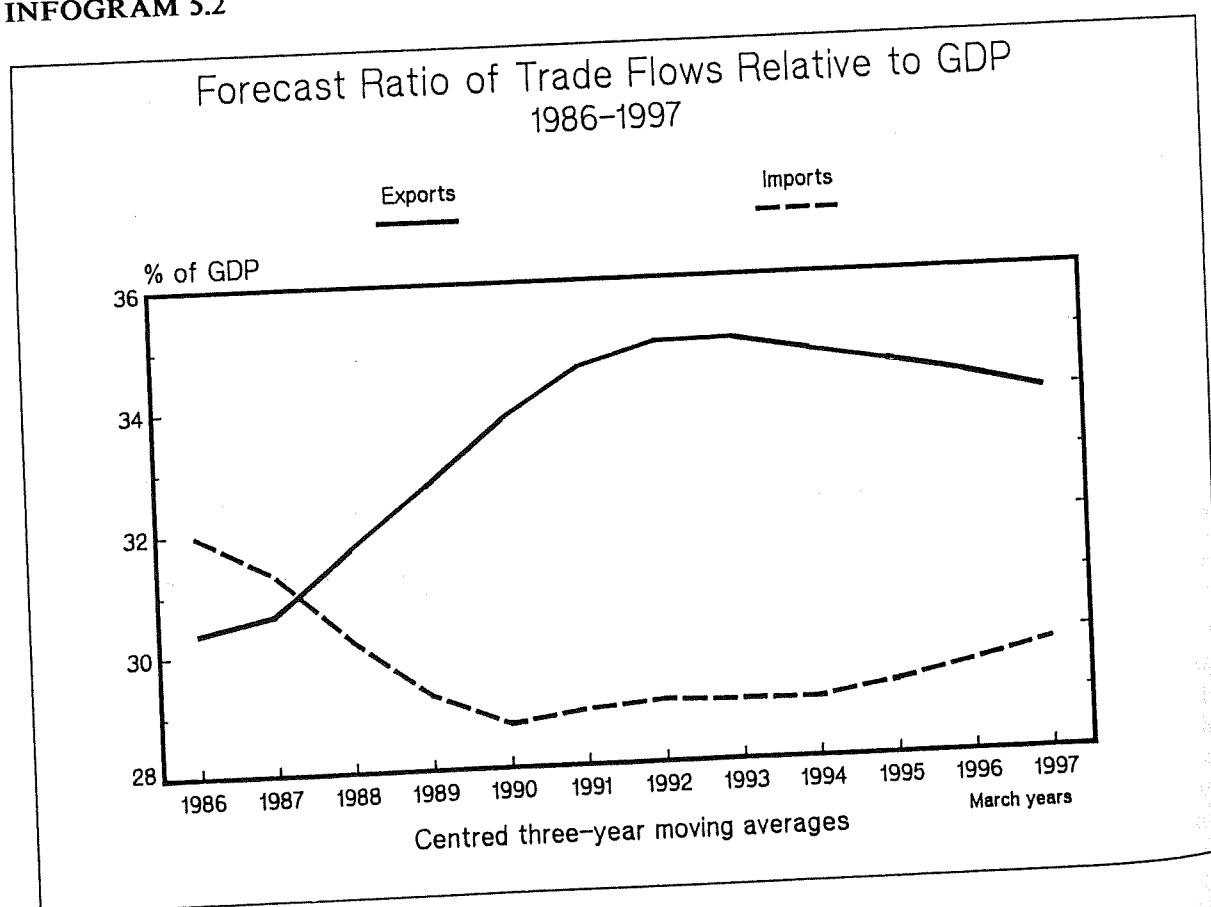
In the early part of our forecast period there is a need to contain the balance-of-payments deficit and to move into surplus, in order to enable a reduction in the external-debt ratio. It is probable that this will be secured through the combination of two factors. Firstly, a sustained expansion in exports during a period of slow growth in the economy as a whole implies growth in the relative importance of export activities. The ratio of exports to GDP rises from 30.2% in 1986 to a peak of 35% in 1992. From that point on, exports grow at a rate slightly less than that of GDP - leading to a slight fall in the relative importance of exports.

Secondly, the prolonged recession of the late 1980s dampens demand for imports so strongly that it more than offsets the effect of reduced tariffs and the removal of import licensing. The level of imports also falls because of the import substitution arising from the major projects. Imports as a ratio to GDP fall from a 1986 level of 32% to a trough of 28.7% in 1990, slowly recovering thereafter to reach a level of 29.8% in the last year of our forecast.

To summarise:

- In the early years, export growth and domestic retrenchment combine to produce a significant external trade surplus. That surplus enables a beginning to be made in reducing the level of external indebtedness.

- In the latter part of the projection, a recovery in domestic activity leads to annual rates of increase in imports of goods and services a little above the rate of increase in GDP, but at a level which enables continued debt redemption.

Our SDMACRO model highlights two other features of the external account. As noted in Chapter Three, New Zealand's export pattern has changed dramatically during the post-war decades. Sectoral responses suggest this process will continue strongly - as in Infogram 5.3, which shows traditional pastoral exports, other commodity exports and exports of services throughout the forecast period.

Forecast Export Volumes
1986–1997

$Billion

Service exports

Non-traditional exports

Traditional exports

EXPORTS

TOTAL

1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997

March years

Centred three-year moving averages
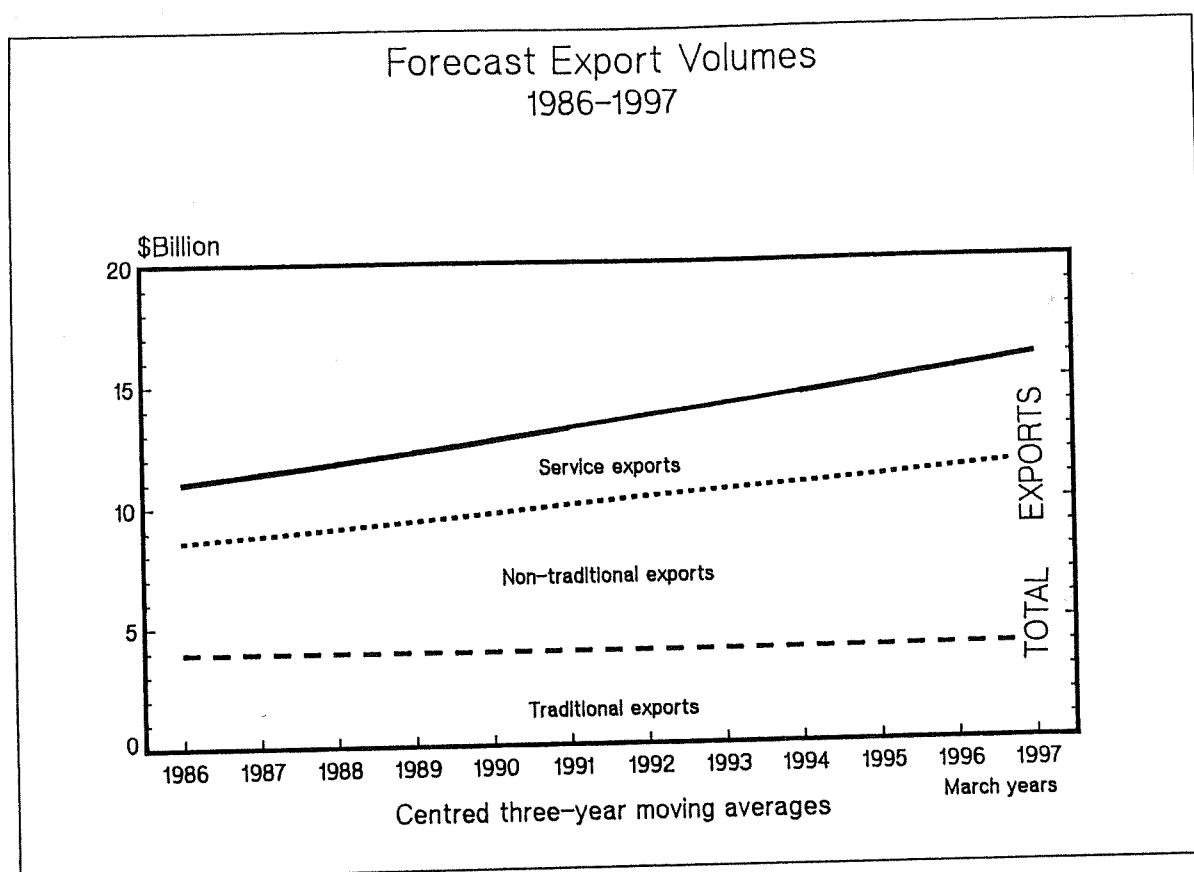
This highlights a continuing decline in the relative importance of traditional exports and a rise in the relative importance of other categories. By 1997 traditional exports, non-traditional goods exports, and exports of services are equal to 8.4%, 16%, and 9.2% of GDP respectively.

The forecasts also suggest an interesting pattern of developments within the balance of payments as a whole. As Infogram 5.4 clearly shows, the move to surplus arises from very different movements in trade in goods, trade in services, and international investment income.

Forecast Components of Balance of Payments
1986–1997

Goods Balance   Services Balance   Net International Investment Income

% of GDP

Centred three-year moving averages

March years
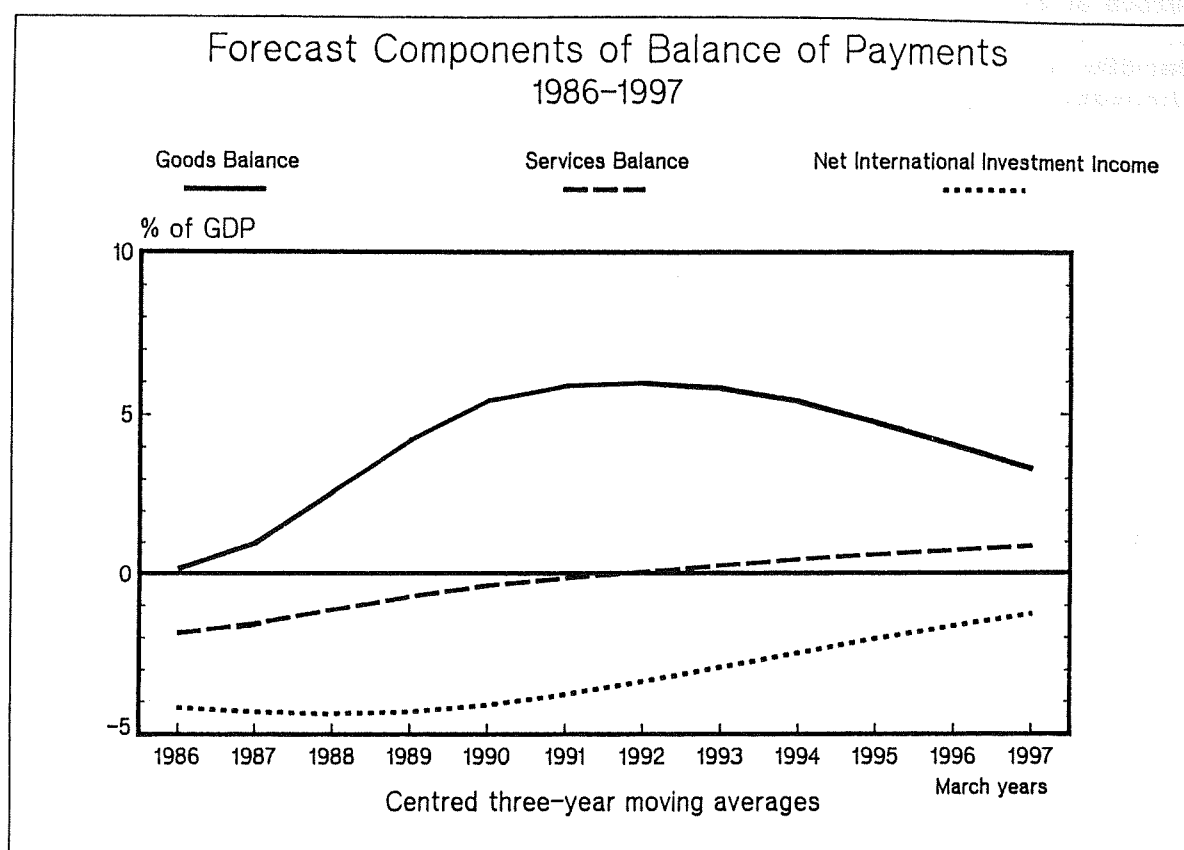
The balance of trade in goods is in surplus throughout the projection period and moves strongly to a peak equal to 6% of GDP before falling back to 3.3% in 1997. In contrast, the balance in services moves steadily from a small net deficit to a small surplus by the end of the period. Finally, the net deficit in respect of international investment income falls steadily from 1988 in response to the gradually reducing external-debt ratio.

5.3.2 External Debt

The high initial level of net overseas debt is a major factor restricting the economy to slow growth in the early part of the projection period. Reductions in debt to ease this constraint can be secured in a number of ways.[1]

The ratio of existing debt to GDP tends to reduce as real GDP increases. More directly, the level of overseas debt itself is added to and reduced by current borrowings and repayments. These annual flows of borrowings and repayments are closely related to the external balance of payments on current account. If that balance is negative then the country must borrow (or attract net direct

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1.   D. Webber, *Overseas Debt - An Assessment* (New Zealand Planning Council, September 1988).

investment) sufficient to cover the deficit. Similarly a debtor country which is running an external surplus is in a position to repay some of its debt. The real burden of existing debt is also reduced by inflation in creditor countries.

Our SDMACRO forecasts allow derivation of a consistent path for net overseas debt. The requirements for such a forecast are:

- forecasts of external annual balances for trade, service and investment income (excluding income on equity investment)

- forecasts of the rate of real GDP growth

- an estimate of the rate of inflation in creditor countries

- estimates of future changes in the exchange rate.

These forces combine in our base run to generate the outcome shown in Infogram 5.5.

INFOGRAM 5.5

New Zealand's Overseas Debt:GDP Ratio
1971–1997

Net Debt

Forecast

Forecast expressed as three-year moving average
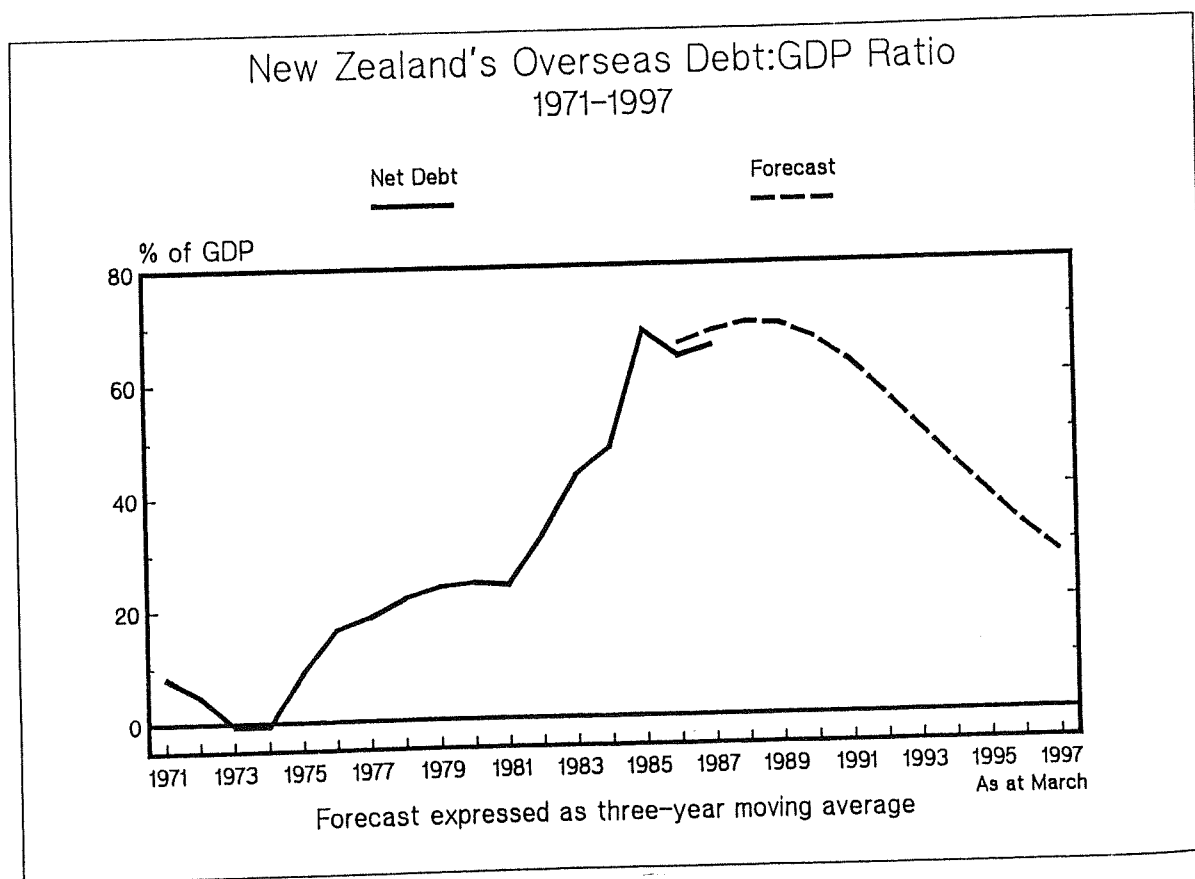
As can be seen in Infogram 5.5, the ratio of debt to GDP rises in the first two years, then starts to decline and, by the end of the projection period, has reduced to 28% of GDP - less than half the opening level. The major part of this reduction comes from the combined action of growth in real GDP (a 29% increase over the eleven-year period) and continued inflation at 3% per annum in creditor

countries. These two factors are strong enough to reduce the ratio to about 37%. The remainder of the fall comes about from net debt repayment.

In the early years of the projection period, the combined influence of trade, service and investment-income balances is such that it requires new net borrowing. It is only after 1990 that the current-account balance is sufficiently strong to enable debt repayments to exceed new borrowings. The uncomfortable fact is that the debt ratio remains at an awkwardly exposed level through most of the projection period. In this context, it is worth emphasising that the fundamental route to active repayment of debt (as distinct from reduction in its relative importance through real growth and creditor inflation) lies in the generation of balance-of-payments surpluses sufficient to enable such repayment to be financed from current income.

The potential for reducing external debt with finance secured from the sale of assets cannot be adequately modelled in our system as it requires a portfolio model set alongside a model such as SDMACRO. In the absence of a portfolio model we note that there are a number of offsetting factors which substantially reduce the impact that debt repayments through asset sales have on net national worth.

For example, a government sale of assets to a New Zealand company which finances part of its acquisition offshore would at least partially offset the government debt repayment. If, on the other hand, the New Zealand buyer financed the purchase locally, then government use of the proceeds to repay overseas debt is likely to impact on the exchange rate and so affect the valuation of remaining debt. Finally, direct sale to a foreign buyer creates the potential for a future stream of payments to the overseas owner which is equivalent to the capital cost of acquiring that stream and which would have to be accommodated within the balance of payments. Estimating the impact of these offsetting factors in any particular programme of asset sales is a complex task beyond our present resources. Essentially, control and management of external debt depends on the improvement of trading performance so that net overseas earnings are sufficient to service and reduce the debt.

5.3.3 Employment and Unemployment

As we have seen, GDP is forecast to grow in all the years to 1997. From a slow start, growth accelerates to an annual rate of more than 3% in the years 1992-97.

Because of productivity increases, growth in employment is usually at rates less than that in output. In years of slow GDP growth, employment may actually decline - as in the present. In our model the trend rates of growth are always sufficient to generate an increase in employment. Such increases are low in the early years of the projecion period but rise quite dramatically in the latter.

Over the whole period, employment is forecast to increase by some 190,000 persons: from 1,391,000 in 1986 to 1,604,000 in 1997. (Our base figure of 1,391,000 relates to full-time equivalents and is derived from the March 1986 Household Labour Force Survey on the assumption that one part-time worker is the equivalent of half a full-timer).

This quite dramatic and perhaps surprising increase is not, however, sufficient to prevent a significant rise in unemployment in the years to 1992. This is because of the expected rapid increase in the total labour force over this period: as

63

discussed in Chapter Four, the most recent labour-force projections prepared by the Department of Statistics envisage an increase of some 232,000 persons in the period 1987-97 (based on assumptions of medium fertility and zero long-term migration - and, for our purposes, converted to full-time equivalents).

In the early years of the projection period, net additions to the labour force are in the vicinity of 25,000 full-time equivalents a year, falling to about 10,000 in 1997. In contrast, our employment forecasts suggest that, in the early years, total employment will increase by less than 10,000 per annum and will rise to around an annual 25,000 in the years following 1994.

These marked differences in labour-force and employment growth rates generate sharp initial rises in unemployment. The unemployment rate (full-time equivalents on a Household Labour Force Survey basis) increases from 4% of the workforce in 1986 to a peak level of 6.5% in 1992, falling thereafter to 4.6% in 1997. Our base run therefore suggests that the unemployment rate will be somewhat higher than in 1988 for all years through to 1997. It is important to acknowledge that our model's method for forecasting employment and unemployment is relatively unsophisticated. In model terms, annual percentage changes in employment are a simple function of annual percentage changes in the volume of GDP. Unemployment is derived as the difference between model forecasts of total employment and modified Department of Statistics' forecasts of the total labour force.

In our base run we have modified the employment equation from that reported in earlier publications, in order to capture the effect of policy and technical changes that are likely to lead to faster rates of increase in output per person (and, conversely, to lower increases in required employment per unit of output). We have also modified the equation which relates changes in imports to changes in GDP, to reflect the increased exposure of the New Zealand economy to international competition during the period of tariff and licensing reform up until 1992. Both of these changes act to reduce the rate of increase in employment relative to that in GDP (see Appendix II).

Ideally our forecasts should also take into account such features as the responsiveness of total labour supply to variations in economic conditions, and the sensitivity (of aggregate demand for labour) to changes in the relative rates of return to labour and to capital. We are looking at the possibility of modelling such effects in the next revision of SDMACRO, but at the moment we can do no more than note them as second-order factors which could modify the outcome generated within the current model.

With these limitations acknowledged, the main picture presented by our projections seems reasonably robust. In a decade when demographic factors will lead to a substantial increase in the number of persons of working age, and during which the economy will be increasingly exposed to international competition and will probably experience accelerated technical change, it will be difficult to generate an increase in economic activity sufficient to lower the current unemployment rates. From the perspective of the model, it seems that unemployment is likely to stay high until the rate of increase in the total labour force slackens in the mid 1990s.

In the next chapter, we examine the likely future industrial distribution of the employed labour force as suggested by our sectoral model. We also note at this point that it is our intention to explore in a future publication the occupational implications of those industrial forecasts and to use the JULIANNE model's ability

to incorporate shifts in wage rates.

5.4 Variations from the Base Run

Computer-based economic models enable comparisons between alternative projections where one (or more) input of data is varied. In this section we illustrate this capacity by exploring the SDMACRO model's sensitivity to changes in the rates of increase in exports derived from our sectoral consultations. The model runs we have reported are built on the assumption that world trading conditions will permit growth at rates attainable by New Zealand exporters - and which are broadly in line with those forecast in the consultations. As will be seen in the next chapter, our sectoral model is sceptical about some of the individual export forecasts but generates a level of total exports generally consistent with our consultations.

To test the sensitivity of our projections to the export-growth assumption, we ran an alternative simulation with the export growth rates shown in Infogram 5.6. The lower rates of growth in total exports could be seen as flowing from any of a number of causes such as, for example, a major downturn in the United States economy, or exchange rate movements that depress industry expectations.

INFOGRAM 5.6

Forecast Export - Growth Rates (by Sector Type)

		Base Run	Lower Exports
		% per annum	
Traditional	1986/87 - 91/92	-0.2	-0.3
	1991/92 - 96/97	0.5	0.3
Non-traditional	1986/87 - 91/92	5.1	3.7
	1991/92 - 96/97	3.8	2.8
Services	1986/87 - 91/92	5.1	3.1
	1991/92 - 96/97	5.5	2.5
Total	**1986/97 - 91/92**	**3.4**	**2.3**
	1991/92 - 96/97	**5.5**	**2.5**

The effect of lower export growth in the model is to place pressure on the balance of payments, thus lowering the sustainable level of imports and the rate of growth in real GDP - as illustrated in Infogram 5.7. Lower GDP growth in turn implies reduced employment (below the levels that would otherwise occur) and therefore unemployment is correspondingly higher. Finally, because the lower level of exports is not fully compensated by reductions in imports, the balance of payments deteriorates, reducing the extent to which overseas debt can be repaid. Overseas debt thus stays at higher levels than under the base run.

INFOGRAM 5.7

Forecast Real GDP Growth
1986-1997

Base   Lower Exports

% Change

Centred three-year moving averages

1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 March years
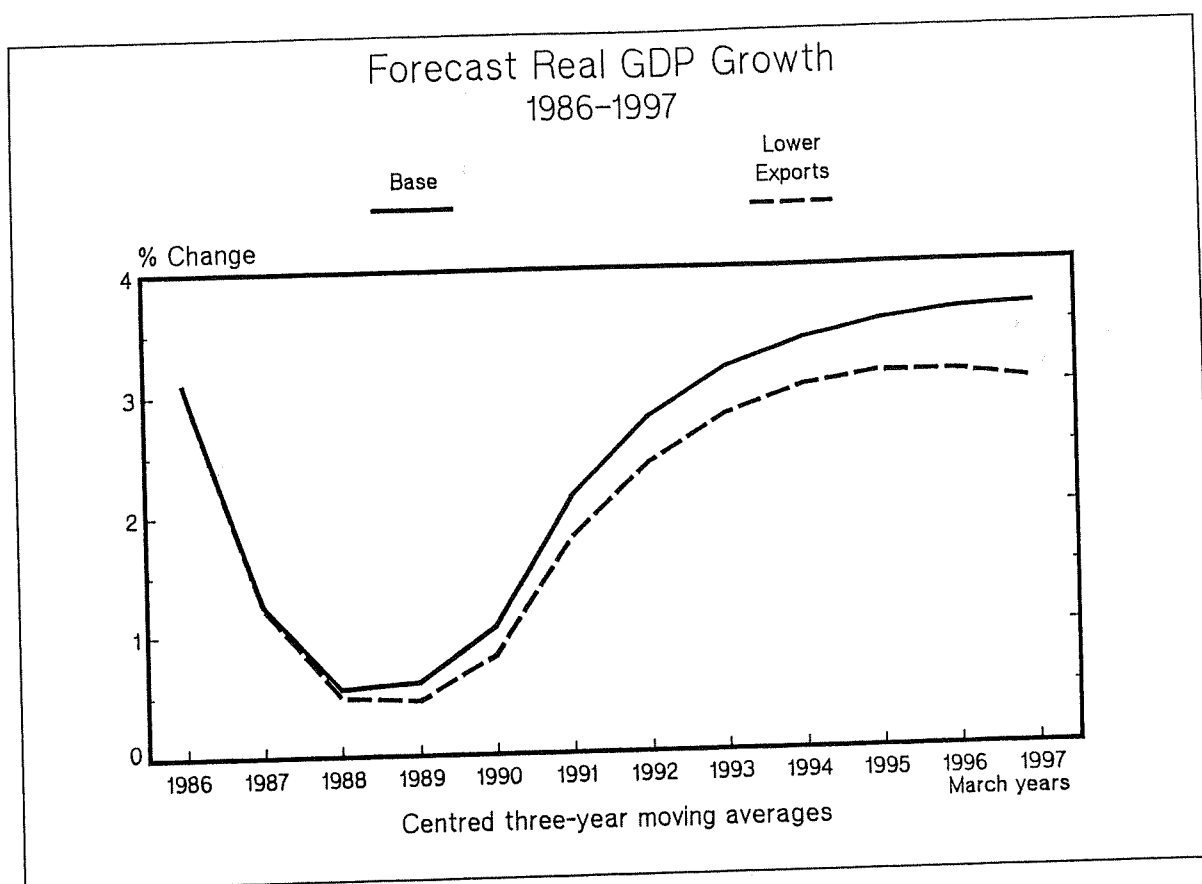
The results of the lower export runs are summarised in Infogram 5.8

INFOGRAM 5.8

Base Run and Lower-Export Scenario: Impact on Major Variables

	Base Run	Lower Exports
GDP in 1997 ($m 1984 prices)	47400	46000
Annual rate of increase in GDP (% per annum 1986-97)	2.3	2.0
Employment (000s)	1581	1561
Unemployment rate (%)	4.6	5.0
Imports (% of GDP)	30	28
Current account balance (% of GDP)	2.1	-0.5
External debt ratio (% of GDP)	28	42

Note: All figures refer to 1997 unless otherwise stated

The SDMACRO time profiles for GDP and other variables are similarly sensitive to changes which could be made at other points within the model. In the interests of clarity, we refrain from publishing results from a wide range of scenarios. We do, however, emphasise the conditional nature of our results which are designed to capture broad trends rather than to provide precise estimates of levels and turning points.

5.5 The Linkage to our Sectoral Model

5.5.1 Introduction

A central feature of our forecasting and analysis programme is the linkage of SDMACRO with the sectoral model JULIANNE. The general method of the link and its relation to our sectoral consultations has been briefly described in Chapter Two. In the current round, we have used the linked models to provide sectoral pictures of the economy in 1992 and 1997 (these appear in the following chapter). We conclude this chapter with comments on some macro-economic points highlighted by the JULIANNE run and by the linkage between the two models.

As noted in Chapter Two, the SDMACRO and JULIANNE models are primed with consistent sets of data derived from sectoral consultations and supporting research. In addition we use the SDMACRO base run to provide forecasts of a range of macro variables - including employment, investment, capital stock and the balance of trade - which are used to constrain JULIANNE in its forecasts of the economy in 1992 and 1997. Within these constraints, JULIANNE is free to allocate resources in ways which will enhance real incomes and increase real private consumption. In particular, JULIANNE is able to depart from the export forecasts generated in SDMACRO. The sectoral-forecast estimates arrived at from consultations are seen as measuring shifts in demand for the product concerned rather than simple changes in volume which will be attained regardless of price.

Two years ago, JULIANNE effectively rejected the export-volume forecasts suggested in the consultations as being inconsistent with income maximisation in an environment where export subsidies were being removed. On that occasion JULIANNE suggested much lower export volumes than the consultations and we made use of this information to generate new lower export growth scenarios within SDMACRO.

On this occasion JULIANNE generates levels of total exports which are much more closely aligned with the results of the consultations. Within these totals there is considerable variation, and this is reported on in Chapter Six. However, the close correspondence between total export levels has led us to accept the JULIANNE runs as providing broadly compatible pictures of the economy - thus avoiding the need for further runs where results are fed back and forth between the two models.

5.5.2 JULIANNE'S View of Macro-Economic Outcomes

Viewed from a macro context, the JULIANNE results highlight several points.

First, it provides another perspective on the nature of the adjustment in the period to 1991/92. As we have seen from SDMACRO, historic imbalances in the economy force a substantial move towards surplus in the balance of payments - a shift which itself induces a period of slow growth. The JULIANNE results remind us that a combination of slow growth and a positive shift in the balance of payments

generates slower increases in Gross National Expenditure (that is, the sum of consumption and investment expenditures). This is illustrated in Infogram 5.9.

INFOGRAM 5.9

Macro-Economic Outcomes (JULIANNE)

	1983-84	1991-92	% per annum
Private consumption	20512	23998	2.0
Government consumption	5923	6414	1.0
Gross capital formation	7927	8336	0.2
Increase in stocks	826	963	
Gross National Expenditure	35188	39407	1.4
Exports	10595	14086	3.6
less imports	10816	11756	1.7
Expenditure on GDP	34967	41141	2.1

Over the longer period (1984 to 1992) spanned by our sectoral model, the faster rate of increase in exports over imports implies that a 2% per annum increase in real GDP translates into an average 1.4% per annum increase in real national expenditure. The contrast is even more marked if the change is focused on the period following the boom of the early to mid 1980s. From 1986 to 1992 - the period covered by SDMACRO - an average GDP growth rate of 1.4% per annum suggests growth in national expenditure at only 0.7% per annum.

Over this same period, however, total population is also forecast to increase at 0.7% per annum. Our forecasts therefore imply a prolonged period during which total final expenditures per head of population remain static. This will be consistent with a rise in per-capita private consumption if capital formation and government consumption rise as slowly as suggested. During the period 1984 to 1992, private consumption rises at a faster average rate of 2% per annum, reflecting in part faster growth in the early period.

The near-static level of per-capita final expenditures occurs during a period of profound economic adjustment and reallocation, and sharpens differences between the winners and losers in the system. Such differences always exist but are more easily moderated and accommodated in a period when total real spending is expanding. In a time of low growth, the pressures and stress of economic and social adjustment are heightened.

The other macro feature of the JULIANNE results is that of the real exchange rate. JULIANNE is a price-sensitive model and is able, within established routines, to adjust most economic variables in ways which will enhance real incomes. In doing so, it adjusts both prices and quantities. Thus, in matching the imposed balance-of-trade constraint, JULIANNE scans possible volume and price adjustments with respect to every export and import category. In the process, it estimates compatible terms of trade. In an analogous way the model looks for what would be an appropriate movement - in terms of enhancing income - in the ratio between

domestic and import prices. JULIANNE thus generates a measure of the real exchange rate.

The model suggests that as compared with the base-period value of 1.0 in 1983/84, the real exchange rate could rise marginally to 1.027 in 1991/92. Infogram 5.10 records the composite real-exchange-rate index as published by the Reserve Bank, which is based on June 1979 = 100. Conversion to a 1983/84 base shows that for the year ended September 1988 the index would be at about 111, 8% above what our sectoral model suggests would be an appropriate level for 1991/92.

INFOGRAM 5.10

Reserve Bank Composite Real-Exchange-Rate Index

March years	June 1979 =100	1983/84 = 100
1983/84	98.4	100.0
1984/85	89.2	90.7
1985/86	94.5	96.0
1986/87	93.2	94.7
1987/88	106.0	107.7
Year to September 1988	109.3	111.1

Our sectoral model thus tends to support the view expressed by many respondents in consultations during the earlier part of 1988. This was that export growth over the period to 1992 - at the rates suggested in the consultations and included in the forecasts - implies movement to an exchange rate lower than that prevailing. Since our consultations, the exchange rate has in fact been trending down but was still, in the September quarter, above the level suggested in our sectoral model.

Finally, on this point, it is appropriate to note that achievement of any particular 1991/92 outcome is time-dependent, in the sense that there needs to be a feasible path between the present and the forecast (future) year. The real exchange rate provides a clear example of a variable where the actual path to the 1991/92 level is in many ways as critical as the final value itself. Thus a prolonged overvaluation of the exchange rate could, by inhibiting investment in exports and in import-substituting industries, prevent attainment of the forecast 1992 levels.

MODEL FORECASTS – THE SECTORAL PATTERN

The general pattern of sectoral development forecast by the JULIANNE model is outlined in this chapter.

The JULIANNE model is based on the 1983/84 input-output table, which records the various inputs needed by each sector to produce its particular output. This can be illustrated by looking at the composition of tourism export earnings set out in Infogram 6.1.

INFOGRAM 6.1

Input-Output Table
tourism exports 1991/92

Inputs (selected examples only)   Outputs

Inputs	Sector	Output
Lamb, honey	Agriculture	$23.5m
Sheepskin rugs	Textiles, leather	$82.3m
Paua shell jewellery	Fabricated metals	$39.2m
Kiwifruit		
Pottery	Trade, restaurants, hotels	$303.3m
Air New Zealand	Transport	$1440.5m
Newmans Coachlines		
	Personal services	$34.0m
	Other	$46.2m

Total tourism exports $1969.0m

The major contributors to tourism earnings are ticket sales to overseas tourists by Air New Zealand or domestic transport operators such as Newmans Coachlines, and the hotel and restaurant bills which tourists pay while they are in New Zealand. But tourists will also buy substantial quantities of agricultural goods such as carry-packs of lamb chops and jars of specialty honey - as well as sheepskin rugs from the textile sector, jewellery from fabricated metals, and haircuts from personal services. The hotels and restaurants which serve tourists will buy kiwifruit for their desserts and pottery to serve them on.

This illustrates the links between different sectors in the model, and the potential for output and productivity trends in one sector to affect the performance of others.

6.1 Exports by Sector

The sectoral exports forecast by the JULIANNE model are set out in Infogram 6.2. As noted in the previous chapter, these show considerable individual variation from our consultation forecasts within an overall picture of the economy which is consistent with both the consultations and the SDMACRO model.

INFOGRAM 6.2

JULIANNE Export Forecasts

Exports in 1983/84 prices

Sector	1987 $m	Annual growth rates 1987-92	Annual growth rates 1992-97	Base Case 1992 $m	Base Case 1997 $m	Price Sensitivity[1] 1992 $m
Dairy	1296	-2.7	1.8	1128	1233	1398
Meat	1868	-7.1	-0.7	1291	1250	1280
Wool	1160	-0.5	-0.2	1129	1116	1129
Fishing	432	4.0	6.0	526	703	526
Horticulture	641	7.4	0.8	918	955	902
Energy	122	-4.7	14.9	96	192	94
Mining	50	46.1	4.5	333	415	333
Other food	486	4.5	4.9	607	772	562
Textiles	770	3.9	4.1	934	1142	873
Wood	200	5.0	10.0	255	411	255
Paper	545	4.0	8.0	664	976	664
Chemicals	660	1.4	2.2	707	788	662
Ceramics	46	-3.2	-3.3	39	33	36
Base metals	706	3.7	2.0	847	935	800
Machinery	343	8.7	5.9	521	695	489
Other manufacturing	225	2.5	3.0	255	296	237
Tourism	1110	12.1	7.5	1969	2821	1826
Other services	1593	3.2	2.6	1866	2121	1724
Total Exports	**12257**	**2.8**	**3.7**	**14086**	**16854**	**13949**
Traditional	4324	-3.9	0.3	3547	3599	3807
Non-traditional	5229	5.1	4.4	6703	8313	6592
Services	2703	7.2	5.2	3835	4943	3550

The final column shows the impact of a 19% increase in dairy prices (see also Infogram 3.20)

The forecasts from our consultations with sectors (reported on in Chapter Three) indicated a strong increase in the importance of the services sectors in securing export income, with a comparable decline in the importance of exports of primary product commodities. Manufacturing exports - including a substantial group of

processed primary products - were expected to continue growing at about the same rate as total exports. The JULIANNE model (with its ability to compare world prices for the products of different sectors to take account of productivity and to reallocate resources to those sectors with better prospects for profitability) reinforces those trends, pulling back exports of agricultural commodities even further and boosting manufacturing and service exports, particularly tourism.

The reallocation of resources can be clearly seen in Infogram 6.3 which shows the differences between the levels of exports forecast by JULIANNE and by sector consultations.

INFOGRAM 6.3

Variation Between JULIANNE and Consultation Forecasts of Exports

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Sector	1992 % difference	1997 % difference
Dairy	-19.3	-18.1
Meat	-21.6	-24.1
Wool	5.0	3.8
Fishing	5.0	10.0
Horticulture	-18.8	-27.1
Energy	-57.5	-51.8
Mining	5.0	10.1
Other food	3.1	8.3
Textiles	8.2	18.1
Wood	4.9	9.9
Paper	5.1	10.0
Chemicals	-0.7	2.9
Ceramics	-13.3	-23.3
Base metals	-1.9	3.2
Machinery	7.9	12.6
Other manufacturing	-2.3	-2.3
Tourism	15.3	12.4
Other services	1.0	-0.9
Total exports	**-3.3**	**-1.9**
Traditional	-13.9	-14.8
Non-traditional	-2.8	0.2
Services	7.9	6.3

Note: A positive difference indicates that JULIANNE forecasts a higher
level of exports

JULIANNE favours export industries whose products meet strong world demand (reflected in rising prices) and industries with high productivity (which lowers their costs of production). Industries which rely heavily on inputs from other sectors with high productivity will also be favoured - for example tourism, which benefits from high-productivity growth in the transport industry. It should also

be noted that, in some sectors, export growth has been restrained by the modellers, because of perceived resource constraints. These are: wool, because of the biological limitations on turning the recent decline in sheep numbers into a rapid increase; fishing, where the resource limitations are still unknown; mining, where environmental criteria will ultimately provide a constraint; and wood and paper, which are also affected by biological factors.

Four of the sectoral forecasts deserve particular attention: - dairy products and meat, because of their size and their forecasted decline; and textiles and machinery, because of the apparent paradox between their current difficulties and the forecast strong growth.

6.1.1 Dairy

For the dairy industry there are significant differences between the forecasts received from the industry and those indicated by the JULIANNE model. These are illustrated in Infogram 6.4 which contrasts the consultation forecasts with the JULIANNE base case.

INFOGRAM 6.4

Dairy Export Growth
Volume Index June 1982=1000

Three-year moving averages
Source: Department of Statistics and NZPC
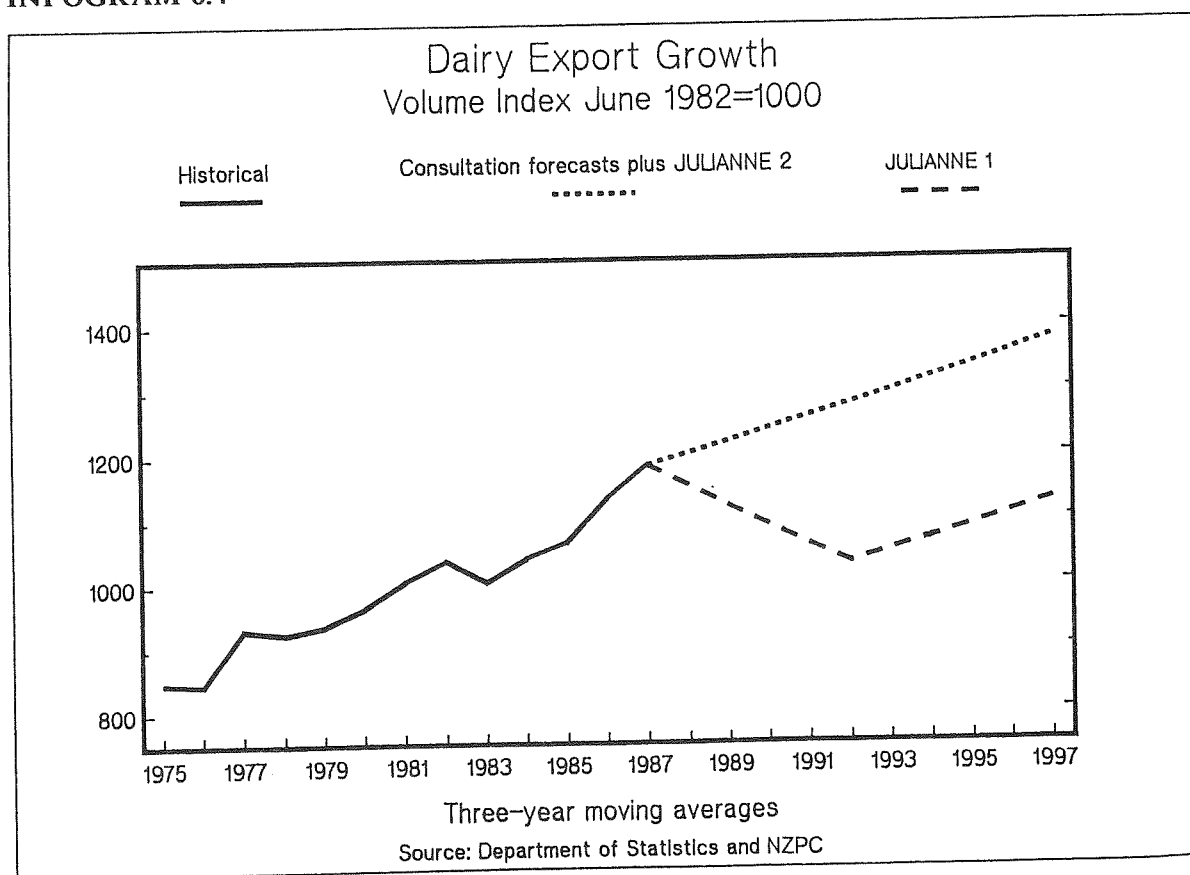
The industry is expecting a steady increase in exports while JULIANNE expects a decrease, followed by a return to growth in the second period. As mentioned in Chapter Three, the working group has taken a significantly more cautious view of world prices for dairy products than the industry has - and this is reflected in the JULIANNE forecast. If the industry's more optimistic view on prices is correct, then exports are forecast by JULIANNE to be closely aligned to

consultation forecasts. Within the sectoral model, such an increase in dairy exports impacts upon the exchange rate and marginally reduces the profitability of other exports - including, particularly, tourism, machinery and textiles. (These effects are illustrated by the final column in Infogram 6.2.) Trends in prices received by the dairy industry will be affected by several factors, including political decisions in trade negotiations and the ability of the industry to direct more of its output into higher-priced end uses rather than low-priced bulk commodities. It should be noted that, despite the initial decline, the JULIANNE base case still forecasts exports in the mid 1990s at levels similar to those in the early 1980s.

6.1.2   Meat

Our consultations with the industry led us to a preliminary forecast of a decline in meat exports of 2.5% a year in 1987-92 and stabilisation in 1992-97. The JULIANNE model, taking account of price and productivity movements in the meat industry in relation to those in other sectors, suggests a sharper and more persistent decline - at 7.1% a year in the first period and 0.7% a year in the second. This would take meat exports back from their subsidised peak in the early 1980s to a level in the late 1990s comparable with the late 1960s. In part, this reflects the continued decline in world prices for meat as a commodity in relation to world prices for manufactured and processed goods,. It also reflects the belief that, if lower volumes of meat were exported, prices per unit would increase and would compensate in part for the lower volumes.

It is worth remembering that even the JULIANNE forecasts rely on productivity improvements which would require further restructuring and writing-off of excess processing capacity.

Price-sensitivity tests were conducted to estimate levels of exports which might result if commodity prices for meat increased by 15.3% (see also Infogram 3.20). While this improvement would raise exports, the forecasts would, in 1992, still be 11.3% below the level suggested by our consultations with the industry. Improvements in prices and productivity would therefore need to be very substantial to prevent further decline.

Continuing decline in the meat industry would exert pressure for further change in management practices in sheep farming. Further moves towards farming sheep for wool rather than for meat production are likely - particularly since wool exports are not expected to decline as rapidly as meat.

The uncertainty surrounding the prospects for the meat industry and its significance for the New Zealand economy clearly warrants further attention. We intend to examine the agricultural sector in more detail following this study - but the forecasts presented here clearly reinforce the long-standing message that future growth in meat exports depends on improvements both in the presentation and marketing of the product (so that less of the output is tied to weak commodity prices) and in the productivity and performance of the processing and transport services.

6.1.3   Textiles

The discussion on the textile industry in Chapter Three takes the view that the

rates of growth forecast by the consultation process would be difficult to achieve at the levels of exchange rates and interest rates prevailing in early 1988. JULIANNE, however, sees even greater growth rates than the sector itself expects. There are two reasons for this. Firstly, that reasonably good productivity increases will reduce real capital and labour costs in the sector. Secondly, there are substantial reductions in the prices of imported supplies which represent a very large proportion of total inputs. This reduction stems from the large absolute cut in tariffs in this sector. It is also worth noting that the sector covers a wide range of exports (including rope, carpets, skins and hides, footwear, and clothing) and that in some major industries plant is underutilised. In the carpet industry alone it is estimated that output could increase by 50% with no additional plant needed if profitable export markets could be found. Furthermore, significant inputs for the textile sector come from farming, particularly from wool and skins. If meat exports continue to decline and textiles continue to demand more agricultural products, then meat production may be seen increasingly as a by-product of the fibre and leather industries.

6.1.3   Machinery

The machinery sector has been discussed in Chapter Three - and, again from current perceptions, it is difficult to envisage the strong growth forecast by JULIANNE. Ultimately, the capacity to expand exports from this sector depends on the ability of innovative designers and engineers to develop attractive products and to create efficient high-productivity processing. Like the textile industry, the machinery sector is assisted by good productivity, along with reductions in the price of inputs through tariff cuts.

6.1.4   Summary

Overall, the forecasts of exports from consultations and from the JULIANNE model both indicate rapid changes in the shape of the economy. Placed in a longer-term timeframe, the changes in composition of exports appear less dramatic. Although restructuring of the economy has gained momentum in the past few years, an underlying restructuring process has been occurring over the last 30 years - as illustrated by the summary in Infogram 6.5 of exports by major sectors since 1950.

Goods and Services Exports by Major Sector
% share by value

	1950	1960	1970	1980	1992	1997
Dairy	28.0	24.2	17.2	12.8	7.9	7.2
Meat	16.5	25.0	29.7	19.2	10.1	8.2
Wool	38.2	31.6	16.4	14.9	8.5	7.1
Fishing	0.4	0.5	1.3	1.5	3.7	4.3
Forestry	0.2	2.6	5.1	5.1	6.4	7.9
Horticulture	0.9	1.0	1.7	2.1	6.5	5.7
Manufacturing	9.9	8.2	16.1	27.2	30.4	30.7
Tourism	0.6	1.0	2.0	3.4	13.5	16.4
Other services	5.3	5.9	10.6	13.9	13.1	12.7
	100.0	100.0	100.0	100.0	100.0	100.0

Sources: Department of Statistics and JULIANNE model

Note: Forestry covers all forest products; meat covers meat and meat
preparations but not tallow and sausage casings; skins, furs and carded
wool are under manufacturing, and manufacturing is treated as a
residual - including, for example, energy exports

6.2. Output by Sector

Changes in the gross output of the primary, manufacturing and service sectors
between the base year and 1992 and 1997 are illustrated in Infogram 6.6.
Variations at this aggregated level (covering domestic as well as external
activity) are less pronounced than in the export sectors, but the continuing
dominance of the service sectors is evident.

INFOGRAM 6.6

Real Gross Output (Major Sectoral Groupings)

Output in 1983/84 prices

	1984 $m	Annual growth rates		1992 $m	1997 $m
		1984-92	1992-97		
Primary	8284	2.9	3.1	10417	12148
Manufacturing	24889	1.6	4.1	28264	34611
Services	43712	2.0	4.0	51209	62293
Total	76884	2.0	3.9	89890	109053

The aggregated primary sector is broken down in Infogram 6.7 into fishing, forestry, mining, and agriculture (which includes dairy, meat, wool, and horticulture). The faster rates of growth in fishing, mining and forestry are driven by the stronger export growth in these highly export-oriented sectors. In forestry there is both direct demand for log exports and indirect demand for logs as raw material for the wood and pulp-and-paper industries. Gross output from agriculture is forecast to grow - despite the decline in dairy and meat exports - because of continued growth in domestic consumption, in raw materials for further processing (notably for textiles), and in horticulture exports.

INFOGRAM 6.7

Real Gross Output (Primary Industries)

	1984 $m	Annual growth rates 1984-92	Annual growth rates 1992-97	1992 $m	1997 $m
Agriculture	6232	1.6	2.3	7088	7925
Fishing	311	3.6	4.3	414	512
Forestry	769	2.1	5.0	908	1161
Mining	971	9.5	4.9	2007	2550
Total primary	**8284**	**2.9**	**3.1**	**10417**	**12148**

Growth rates for the manufacturing sectors, set out in Infogram 6.8, illustrate the demand for primary-sector output as raw materials (notably for textiles and paper). This infogram also illustrates that the faster growth forecast for the later period 1992-97 is spread across all manufacturing sectors.

INFOGRAM 6.8

Real Gross Output (Manufacturing)

	1984 $m	Annual growth rates 1984-92	Annual growth rates 1992-97	1992 $m	1997 $m
Food, beverages	7395	0.6	2.5	7782	8823
Textiles	3050	2.4	3.8	3675	4425
Wood	1382	1.5	6.7	1558	2155
Paper	2369	2.7	5.1	2922	3744
Chemicals	3421	1.9	3.9	3976	4814
Ceramics	690	0.7	4.2	729	896
Base metals	1134	3.0	3.9	1430	1728
Machinery	5216	1.6	5.4	5904	7676
Other manufacturing	232	2.7	4.0	287	350
Total manufacturing	**24889**	**1.6**	**4.1**	**28264**	**34611**

In the service sector also - as shown in Infogram 6.9 - growth is spread across most industries except for construction and public services. Construction increases very slowly between 1984 and 1992, despite high levels of activity up to the end of 1987, and this reflects low levels of investment in the latter part of the period. Strong growth is forecast for the mid 1990s as growth in the economy resumes.

In public services, where quantitative measurement of output is difficult, low growth reflects the forecast of continued restraints on government expenditure and the emphasis on improving productivity in the use of existing resources.

INFOGRAM 6.9

Real Gross Output (Services)

	1984 $m	Annual growth rates 1984-92	Annual growth rates 1992-97	1992 $m	1997 $m
Electricity, gas water	2021	2.8	4.6	2516	3150
Construction	6271	0.7	5.5	6608	8632
Trade, hotels & restaurants	12481	2.4	3.6	15030	17933
Transport	4023	3.0	4.9	5087	6471
Communications	1170	2.4	5.9	1412	1880
Financial	6029	2.2	4.2	7175	8819
Owner-occupier	1982	2.6	5.2	2432	3140
Private services	3198	2.2	4.0	3805	4633
Public services	6538	1.1	1.3	7145	7635
Total services	**43712**	**2.0**	**4.0**	**51209**	**62293**

Growth in trade, hotels and restaurants and in transport is driven mainly by domestic demand (including the trend away from home-preparation of meals, for example), but is also influenced by the strong growth in tourism. Communications is forecast to grow steadily - reflecting its competitive prices (resulting from very fast productivity improvements) and its importance as an input into almost all domestic and export activity.

6.3   Employment by Sector

The links between demand, productivity and employment in all sectors are of particular interest. Infogram 6.10 shows forecasts of employment by major sector in 1992 and 1997, compared with a base year of 1984. In this section all the employment figures represent full-time job equivalents - that is, part-time jobs are counted as equal to half a full-time position.

INFOGRAM 6.10

Employment (Major Sectoral Groupings)

	1984 (000s)	Annual growth rates 1984-92	1992-97	1992 (000s)	1997 (000s)
Primary	149	1.5	0.4	167	170
Manufacturing	302	0.5	0.9	314	329
Services	842	1.4	2.1	944	1046
Total	**1293**	**1.2**	**1.6**	**1425**	**1545**

Although the primary sector has the highest growth rate in the 1984-92 period, the service sectors are the major suppliers of new jobs in terms of absolute numbers. In some areas this reflects growing demand for personal services which are essentially labour intensive; in others (for example, communications and banking) it reflects an increase in sales made possible by the price reductions resulting from rapid improvements in productivity. For the earlier period it is forecast that an extra 102,000 positions will be created in service industries - around 77% of all new jobs. This is further accentuated in the latter period, when the services are forecast to provide over 85% of new positions. In 1992-97 the growth of primary sector employment has slowed markedly, with only 3000 extra jobs forecast to be created over the five years. Growth in manufacturing is slow over the whole forecast period.

These forecasts for employment in primary, manufacturing and services are broken down for individual sectors in Infograms 6.11, 6.12 and 6.13.

INFOGRAM 6.11

Employment (Primary Industries)

	1984 (000s)	Annual growth rates 1984-92	1992-97	1992 (000s)	1997 (000s)
Agriculture	127.6	1.1	0.2	139.5	140.5
Forestry	10.4	1.6	2.3	11.8	13.2
Fishing	5.4	3.6	3.2	7.2	8.4
Mining	5.1	6.4	-1.3	8.4	7.9
Total primary	**148.5**	**1.5**	**0.4**	**166.9**	**170.0**

The growth in agriculture primarily reflects the increase in output from labour-intensive horticulture, with much of this work being of a seasonal nature. Fishing shows a strong increase in employment, although numbers are relatively small, while mining grows rapidly until 1992. This growth reflects a forecast rapid rise in output - but with strong productivity also forecast and with growth in output tailing off in the latter period, numbers then decline marginally.

Employment (Manufacturing)

	1984 (000s)	Annual growth rates 1984-92	Annual growth rates 1992-97	1992 (000s)	1997 (000s)
Food, beverages	74.3	-0.8	-1.3	69.9	65.6
Textiles	44.0	1.2	-0.1	48.3	48.2
Wood	22.6	0.1	1.9	22.8	25.1
Paper	34.2	1.2	0.9	37.7	39.5
Chemicals	26.1	0.4	2.6	27.0	30.8
Ceramics	10.7	0.7	3.1	11.3	13.1
Base metals	9.0	1.9	0.1	10.4	10.5
Machinery	75.3	0.7	2.3	79.6	89.2
Other manufacturing	6.2	1.6	0.2	7.0	7.1
Total manufacturing	**302.4**	**0.5**	**0.9**	**314.0**	**329.1**

Slow growth in manufacturing output in the period 1984-92, combined with relatively strong productivity gains in most sectors, provides little gain in employment in manufacturing industries. The food-processing sector, in particular, is forecast to decline and shed labour (the meat-processing industry is part of this sector). In 1992-97, output of most industries shows stronger growth - but high productivity still tends to moderate growth of employment, particularly in the wood- and paper-related industries.

INFOGRAM 6.13

Employment (Services)

	1984 (000s)	Annual growth rates 1984-92	Annual growth rates 1992-97	1992 (000s)	1997 (000s)
Electricity, gas, water	15.7	2.1	0.9	18.5	19.3
Construction	87.7	-0.1	2.5	86.9	98.3
Trade & restaurants	220.9	2.5	2.7	269.8	307.8
Transport	68.2	2.0	2.5	79.8	90.2
Communications	35.0	-0.5	-2.8	33.7	29.2
Finance	99.3	1.9	2.8	115.3	132.2
Private services	65.2	2.6	4.4	80.0	99.0
Public services	250.0	0.5	0.7	260.4	270.1
Total services	**842.0**	**1.4**	**2.1**	**944.4**	**1046.1**

In general, the rise in employment follows expected increases in output from each service sector, except communications. Although output from the communications

sector is forecast to increase by 2.4% per annum in 1984-92 and 5.6% per annum in 1992-97, employment declines over the whole period. This reflects the very high labour-productivity gains expected to be made in this sector.

Growth in employment in the service sectors reflects the continuation of a trend in New Zealand - as in all maturing economies. Services provided just over 58% of all jobs in New Zealand in 1960 and are forecast to provide nearly 68% in 1997. There are some limits to the continuation of this growth. Much of the increase in personal-services employment comes from the shift of unpaid work into the paid labour market - for example, care of the sick, the elderly and children, household cleaning, and home preparation of meals. In relation to the last category, United States observers have commented that once a high proportion of breakfasts are eaten out of the home there is little scope for further growth. In Sweden the growth of personal care is slowed both by a shortage of carers and the increasing cost. These constraints would seem to be some way off in New Zealand. In the category of information services, increases in labour productivity act to slow the growth in employment - as illustrated in the communication forecasts noted above.

In the longer term, continued improvements in labour productivity would seem to lead inexorably to reductions in demand for paid labour. The crucial question is how that will be distributed - through general reductions in the working week or the length of working life, through growth in part-time work, or through unemployment.

Growth in service-sector employment is closely related to increases in female participation in paid work and increases in part-time work. The 1986 Census data shows that females represented 38% of the total working population, with 75% of their jobs provided by the service sectors (compared with 62% for males). More part-time jobs - 76% - were found in the service sectors, compared with 66% of full-time jobs. With the forecast expansion of these sectors, there is scope for considerable improvement in the prospects for women in the paid workforce.

The forecast trends in employment are also particularly important for Maori, who are heavily over-represented among the unemployed. For comparison with sectoral employment trends, the sectoral distribution of Maori employment - as recorded in the 1986 Census - is set out in Infogram 6.14.

Maori Employment by Sector
1986 Census

	Total employment	Maori employment	% of Maori employment	% of sector
Agriculture	133752	7938	7.6	5.9
Forestry	11168	3242	3.1	29.1
Fishing	5142	368	0.4	7.2
Mining	5898	854	0.8	14.5
Food, beverages	69132	11322	10.9	16.4
Textiles	42479	4442	4.3	10.5
Wood	26037	3441	3.3	13.2
Paper	33341	2735	2.6	8.2
Chemicals	25695	2181	2.1	8.5
Ceramics	10251	1137	1.1	11.1
Base metals	7296	782	0.8	10.7
Machinery	82943	6429	6.2	7.8
Other manufacturing	4634	266	0.3	5.7
Electricity, gas, water	15537	1649	1.6	10.6
Construction	98307	9722	9.4	9.9
Trade, hotels & restaurants	261668	11949	11.5	4.6
Transport	68222	6284	6.1	9.2
Communications	38694	3516	3.4	9.1
Finance	115604	2801	2.7	2.4
Government	75968	6288	6.1	8.3
Private services	244412	14669	14.1	6.0
Other	12695	1818	1.8	14.3
Total	**1388875**	103833	100.0	7.5

Source: Department of Statistics

Some of the individual sectors are worth noting. In forestry, wood and paper, where a large proportion of the labour force are Maori, the substantial recent restructuring is expected to be followed by stronger employment growth in the mid 1990s. By contrast, the large number of Maori employed in the food industries (including meat processing) face further declines in employment with little prospect for future growth unless there is a very substantial improvement in the industry's performance.

The model provides an overall forecast of relative growth rates for Maori and non-Maori employment, assuming no change in the patterns of employment and skills. This indicates that in 1984-92 total Maori and non-Maori employment increases at the same slow rate of 0.4% a year. In 1992-97, however, faster growth in those sectors which have a higher non-Maori participation rate indicates that non-Maori employment would grow at 1.7% a year and Maori employment at 1.4%. The model

results reinforce, therefore, the widely perceived need for a shift in the skills and sectoral distribution of the Maori labour force.

6.4   Productivity

The JULIANNE model's forecasts of output can be compared with the combined demand for labour and capital, to provide estimates of total factor productivity consistent with JULIANNE's overall picture of the level and patterns of economic activity. These are set out in Infogram 6.15 in a form which allows comparison with the historical performance reported on in Chapter Four. Information on the model's view of capital use by sector is available from the Planning Council.

INFOGRAM 6.15

Annual Growth in Key Indicators
% per annum

	Output O	Labour L	Capital K	Labour productivity O/L	Capital per head K/L	Total factor productivity O/L+K
1984-92						
Primary	2.9	1.5	0.7	1.4	-0.8	1.8
Manufacturing	1.6	0.5	1.6	1.1	1.1	0.6
Services	2.0	1.4	1.7	0.6	0.3	0.5
Total	2.0	1.2	1.5	0.8	0.3	0.7
1992-97						
Primary	3.1	0.4	-0.8	2.7	-1.2	3.2
Manufacturing	4.1	0.9	0.3	3.2	-0.6	3.5
Services	4.0	2.1	3.3	1.9	1.2	1.4
Total	3.9	1.6	2.2	2.3	0.6	2.0
1984-97						
Primary	3.0	1.0	0.1	2.0	-0.9	2.4
Manufacturing	2.6	0.7	1.1	1.9	0.4	1.7
Services	2.8	1.7	2.3	1.1	0.6	0.8
Total	2.7	1.4	1.8	1.3	0.4	1.1

6.5   Import Penetration

JULIANNE provides estimates of the changing mix of domestically produced and imported goods in each sector. The two sectors capturing the main import-substitution effects of the "think-big" projects - chemicals and base metals - are of particular interest.

The chemicals sector includes refined-oil products, particularly petrol. JULIANNE forecasts that in real terms imports will remain stable between 1984 and 1992, despite consumption increasing by nearly $500 million. This reflects the increase in import substitution over this period. Base metals, including both steel and aluminium, show a similar pattern - with imports providing 55% of domestic demand in 1984 and then dropping to 53% in 1992. However, while this assists New Zealand's balance of payments through the trading account, the heavy overseas debt incurred in building a number of these projects may override this benefit.

Also of interest are two industries seemingly under threat from cheap imports. In the textile sector, import penetration is forecast to <u>decline</u> marginally from 49.9% of domestic sales in 1984 to 48.3% in 1992. A similar pattern is forecast for the machinery sector, with imports representing 26.2% of sales in 1984 and dropping to 24.8% in 1992. The increase in competitiveness of locally produced goods is in part due to the forecast decline in the real exchange rate, which makes imports relatively more expensive.

6.6   Technology and Internationalisation by Sector

Forecasts both from JULIANNE and the consultations indicate a decline in the overall importance of traditional pastoral exports - the sale of meat, wool and dairy products as commodities - but the export growth industries which replace them are also based on our natural resources. The JULIANNE forecasts for 1987-92 show 92% of the extra foreign exchange earnings coming from tourism, forestry, mining, and horticulture with tourism alone providing 46% of the increase. In the latter period, 1991-97, this trend is moderated but the same sectors provide 58% of the growth in export earnings with tourism alone providing 31%.

Thus the natural resource-base remains vitally important to the economy. The rules and processes for identifying and resolving conflicts in the management of natural resources, to gain balance between sustainable use and conservation, will remain important issues. It is worth noting that two of the fastest growing industries - tourism and mining - raise potential conflicts since many of the mineral resources are located in areas of high environmental and scenic value.

The continuing reliance of the New Zealand economy on the natural resource-base contrasts with the pattern in many faster growing economies, such as Japan and Korea, which rely on technology-based industries such as micro-chip, pharmaceuticals and aerospace. This does not necessarily imply that New Zealand is becoming a low-technology economy since the competitiveness of most resource-based industries relies on access to the latest technology, such as bio-technology, and on high quality services in finance, communications and transport. It is worth noting however, that recent growth in some of New Zealand's resource-based industries has been in relatively unprocessed commodities - for example, log sales increased by 104% from 1984 to 1988 compared with a 51% increase in total forestry exports, and live sheep and cattle exports have become more significant.

This trend indicates not so much lack of access to modern technology as low total factor productivity in the processing, marketing, and transport services available to those resource-based industries. Improvement in TFP in those areas, including the better utilisation of appropriate technologies, offers the potential for better overall growth in the economy particularly in employment.

The requirement for access to the latest technology is nonetheless one of the factors contributing to the increased internationalisation of the New Zealand economy. This is particularly evident in finance, airlines, and communications, where capital intensity, high technology content, economies of scale, and the breakdown of international trading barriers point to a need for stronger international links, probably including substantial foreign ownership.

The effect of this has not been analysed in detail in the current round of forecasting, but, depending on the behaviour of foreign owners, current-account transfers could differ from our forecasts, as could the repayment of foreign debt. The sale of Air New Zealand provides a good example. If ownership was passed in total to a foreign buyer, all off-shore activities and earnings (even if bringing tourists to New Zealand) would no longer be counted in GDP, the remaining earnings would be the salaries and wages of New Zealand-based crew, and airport charges.[1]

These factors also apply to other industries such as farming, fishing, forestry, horticulture, and, more recently, overseas-property investment. Many New Zealand-owned firms based on these industries have been expanding rapidly overseas, sometimes in order to link into larger markets and distribution systems, and have now built up significant foreign assets and income streams. The assets and associated income, while of increasing importance as an element in New Zealand's national income are not accounted as part of GDP, and have therefore not been incorporated in the forecasting exercise. However, even these companies are tending to seek foreign capital as they expand, diluting the New Zealand element so that measuring the income flows becomes even more difficult.

This overall tendency towards internationalisation of the New Zealand economy makes forecasting of New Zealand economic activity a more complex exercise, and the issue will need to be examined further in the next round of forecasts. The way in which these international links are developed is clearly important for the future performance of the economy in providing growth in incomes and employment for New Zealanders.

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1. For a more detailed discussion of overseas debt see D. Webber, *Overseas Debt - An Assessment* (New Zealand Planning Council, September 1988).

PART
FOUR

FORECASTING ASSUMPTIONS

A1.1 Depreciation

The depreciation rates fed into the JULIANNE model determine the level of replacement investment needed to maintain the economy's capital stock. In the 1985 round of forecasts, industry respondents provided estimates of the rate they used to depreciate the value of the total fixed capital stock in their sector. For the purpose of the model runs reported here, we decided to use the standard PEP set of depreciation rates. These rates, along with information on capital stock and the model's forecasts of demand for additional capital, are available from the Planning Council.

A1.2 Government Consumption and Investment

Forecasting rates of change in government consumption and social investment is difficult given the current restructuring of both central and local government. The restructuring aims to increase the efficiency of this sector by splitting trading functions from core government activity (and in a number of cases eventually placing them outside the public sector), by reducing industry assistance and improving delivery systems for those services which remain as core government activities.

In the short term, part of the reduction could come from the government's pulling back on building new capital items. Slowing population growth assists in reducing demand for new capital facilities in areas such as roading and schools, while corporatisation of activities such as airports further reduces central government capital expenditure.

According to both the Department of Statistics' National Accounts and the government Budget tables, real government capital expenditure has been increasing at around 4% per annum from 1984 to 1988, with a further 4% growth forecast to March 1989. It is, however, assumed that this growth rate reduces to 1% per annum thereafter, giving a 2.3% per annum growth rate in the period 1987-92 and 1% per annum from 1992-97.

Growth in net government expenditure, excluding social-security payments and interest on public debt, also continued to increase in real terms between 1987 and 1988 with growth of 12.3%, but was expected to decline in budget terms by 5.5% to March 1989. If it is assumed that real expenditure is held constant to 1992, a growth rate of 1% per annum can be derived. This growth rate is assumed to continue through to 1997.

At the above growth rates, both capital investment and expenditure by government will fall as a proportion of GDP over the forecast period.

A1.3 Housing

The demand for housing, and investment in housing, depends to a large extent on the rate of household formation. In principle it should be possible to estimate from social trends an increase or decrease in household formation. In practice the actual rate is elusive.

At present it seems reasonable to suggest that the rate of household formation has been increasing faster than the increase in population, and that it is also outpacing recent increases in the housing stock. The increase in housing stock can be estimated by the number of building permits issued, although it is likely to be an overestimate as some permits will not be used, and there will also be some removals from the stock. Infogram A1.1 shows that, while there has been some stability in the increase in dwellings in the last five years, large fluctuations are possible.

INFOGRAM A1.1
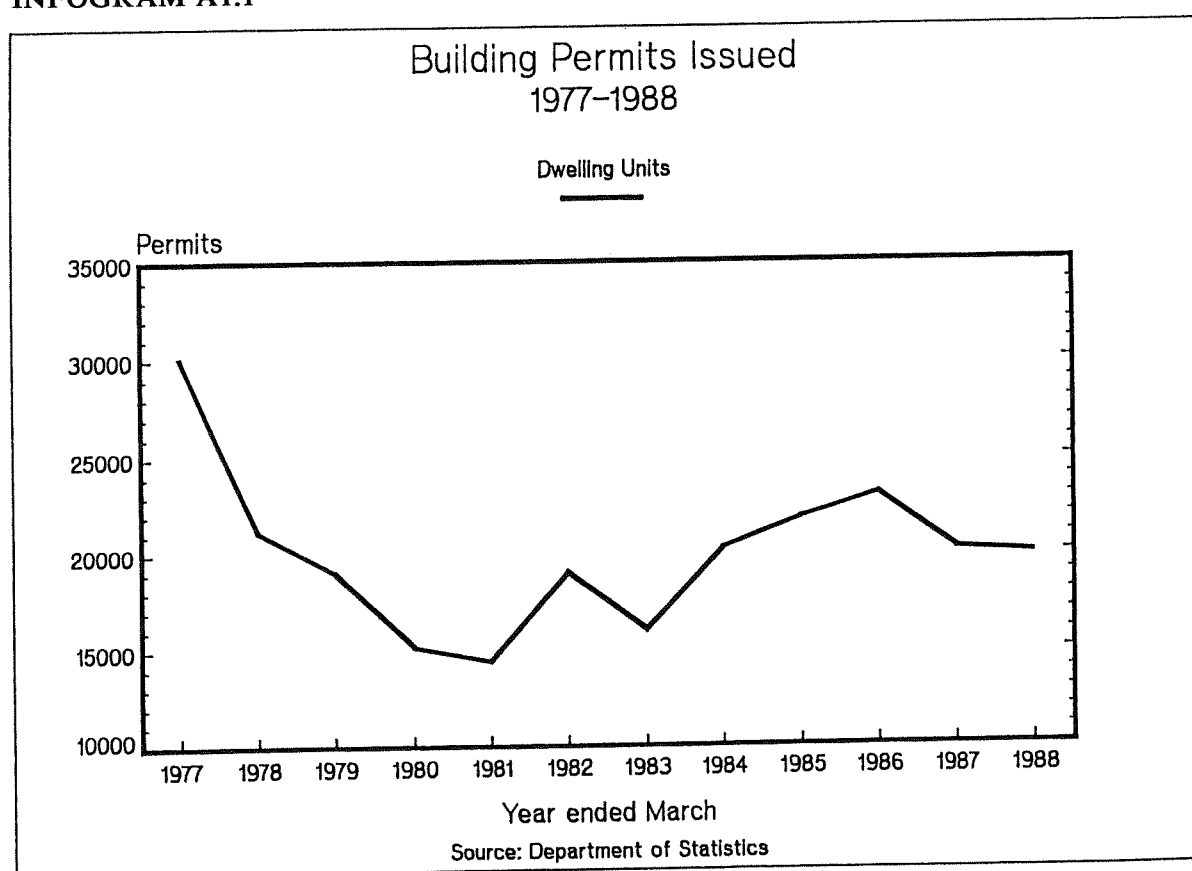
In forecasting an increase in the gross investment in the medium term, a link to population growth has been assumed. The Department of Statistics' series indicates that, in the five years 1982-87, the total population rose by an average 0.8% per annum, while additions to the housing stock (as estimated by building permits issued) rose at 1% per annum in the same period. The more rapid increase in household formation implies continuing pressure to increase the housing stock faster than population growth. The Department of Statistics' estimates of population growth, using a medium fertility and high-short-term but zero-long-term migration scenario, indicate a growth rate of 0.7% per annum from 1987-92, reducing to 0.6% per annum in 1992-97. This would suggest that a 1% per annum

88

increase in gross investment in housing stock for the whole period 1987-97 would be a reasonable estimate.

A1.4 Major Projects

In previous rounds of forecasting, considerable effort went into estimating both investment and output of major projects. In this round, all major projects have been completed and their output has become part of the normal estimates of exports. In the foreseeable future only one major project - the Maui B platform - is forecast. Current estimates indicate expenditure of $300 million (1984 prices) in 1991, a further $300 million in 1992, with a final $150 million in 1993. These are incorporated in the model runs.

APPENDIX II

THE EMPLOYMENT AND IMPORT EQUATIONS

The employment and import equations used by the SDMACRO model in the simulations reported in this volume have been arbitrarily adjusted from those reported in Haywood and Cavana (1986).

Those two equations, which were estimated econometrically, are:

$$EP= 0.522 + 0.435 \ QRP$$

and

$$MGTRP= -5.4 + 2.878 \ QRP - 0.567 \ (PMP-PDP)$$

where

EP= percentage change in numbers employed
QRP= percentage change in real GDP
MGTRP= percentage change in traditional imports of goods
PMP= percentage change in import price index
PDP= percentage change in domestic price index.

In the current exercise, we needed to make some changes to these equations in an attempt to reflect changes in the new environment. With regard to employment, we had to mirror the faster rates of change in productivity suggested in our sectoral consultations. The import equation needed to reflect changes in a protective regime. Being prospective, these changed relationships cannot be estimated econometrically and we were forced to resort to arbitrary modifications to the equations.

With respect to the employment equation, we considered a range of options and experimented with deriving new parameter values algebraically from consultation estimates on technical change. The final equation was:

$$EP= .25 + 0.4 \ QRP$$

The positive intercept in the old equation has always been hard to interpret, implying as it does that employment will increase even if GDP is static. We have arbitrarily halved it. This change could be interpreted as reflecting labour shedding. In addition, the coefficient for QRP has been lowered. The combined effect of these changes has been to increase the rate of change in output-per-person-employed by about 0.3% to 0.4% per annum above the rates generated by the old equation.

With regard to the import equation, we initially followed the approach suggested by Haywood and Cavana and adjusted the intercept in the import equation to -0.4. This had the effect of reducing the quite strong rate of import substitution implied by the original equation. In this publication we have reduced the intercept only for the first period of the simulation and have let it return to its old value from 1992, on the grounds that continuing and faster productivity increase should increase the competitiveness of local producers.

APPENDIX III

SDMACRO RESULTS

INFOGRAM A3.1

GDP, Employment and Unemployment

	BASE RUN		LOWER EXPORTS		BASE RUN	
	Real GDP $b	Change in GDP % p.a	Real GDP $b	Change in GDP % p.a	Employment '000	Rate of unemployment %
1986	36.9	3.1	36.9	3.1	1391	4.1
1987	37.7	1.2	37.7	1.2	1406	4.4
1988	38.0	0.6	38.0	0.5	1415	5.0
1989	38.2	0.6	38.1	0.5	1421	5.6
1990	38.5	1.1	38.4	0.8	1429	6.1
1991	39.1	2.1	38.9	1.8	1442	6.3
1992	40.1	2.8	39.7	2.4	1460	6.5
1993	41.3	3.2	40.7	2.8	1481	6.4
1994	42.7	3.4	41.9	3.0	1504	6.2
1995	44.2	3.5	43.2	3.1	1529	5.8
1996	45.8	3.6	44.6	3.1	1555	5.3
1997	47.4	3.6	46.0	3.0	1581	4.6

INFOGRAM A3.2

Balance of Payments Flows (as % of GDP) - Base Run

	Exports of goods and services	Imports of goods and services	Balance of goods	Balance of services	Net investment income	Current account balance
1986	30.3	32.0	0.2	-1.9	-5.1	-6.8
1987	30.6	31.3	1.0	-1.6	-5.2	-5.8
1988	31.4	30.2	2.6	-1.1	-5.3	-3.8
1989	32.4	29.2	4.2	-0.7	-5.2	-1.7
1990	33.3	28.7	5.4	-0.4	-5.0	0.1
1991	34.0	28.9	5.9	-0.2	-4.6	1.1
1992	34.3	29.0	6.0	0.0	-4.2	1.8
1993	34.4	29.0	5.8	0.3	-3.8	2.3
1994	34.4	29.0	5.4	0.5	-3.3	2.5
1995	34.2	29.2	4.7	0.6	-2.9	2.5
1996	34.1	29.5	4.0	0.7	-2.5	2.3
1997	33.9	29.8	3.3	0.9	-2.1	2.1

INFOGRAM A3.3

Overseas Debt and Exchange Rate

	Net overseas debt % GDP	Exchange rate index
1986	65.9	63.7
1987	68.1	58.7
1988	69.5	54.9
1989	69.1	52.2
1990	66.6	50.5
1991	62.2	50.5
1992	56.7	50.6
1993	50.6	50.8
1994	44.4	51.0
1995	38.4	51.2
1996	32.8	51.3
1997	27.8	51.4

Definitions

Note: 1986 values shown in this appendix are base period values as entered to the model. All subsequent figures are generated within the model. Except where noted 1986 values are mean values for the three years 1984/85, 1985/86 and 1986/87.

Real GDP: Official Gross Domestic Product estimates in constant 1982-83 prices converted to 1983-84 prices using the implicit GDP price deflator.

Employment and unemployment: Full-time equivalents, i.e. full-time plus half part-time values, are calculated for employed persons, unemployed persons and total labour-force from the March 1986 Household Labour Force Survey. (The HLFS does not cover the full span of our base period so that a three-year average cannot be calculated).

Exports and imports of goods and services: Official estimates in constant prices converted to 1983-84 prices using implicit deflators.

Net balance of payment flows: Component flows variously derived from BOP and trade data converted to 1983-84 prices.

Net overseas debt: Data from David Webber *Overseas Debt - An Assessment*, Table 1(b), NZ Planning Council, September 1988.

Exchange rate index: Reserve Bank 1979 = 100.

HIGHLIGHTS

Developments in the Macro Economy

- our macro forecasting system is designed to sketch the probable broad trend of events rather than to predict precise turning points

- real GDP is forecast to grow at an average annual rate of only 1.4% per annum in the period to 1992

- this prolonged recession reflects adjustments made necessary by high inflation, substantial overseas deficits, and high overseas debt in the base period from which our forecasts are made (the three years ended March 1987)

- with that adjustment largely completed our models suggest real GDP growth at an annual rate of 3.5% per annum from 1992-97

- the balance of payments moves from a deficit equal to 7% of GDP in 1986 to a surplus of 2% in 1992, and remains in surplus enabling repayment of overseas debt

- the ratio of net overseas debt to GDP falls from 66% in 1986 to 57% in 1992, and 28% in 1997

- the slow rate of growth in the economy enables some increase in employment but faster labour-force growth means that the unemployment rate also rises. From 1992 stronger economic growth, together with a reduction in the number of new entrants to the labour-force, leads to a falling unemployment rate

- export volumes are forecast to increase by about 3% per annum over the next decade

- the forecast improvements in the balance of payments (reflecting export growth and restrained importing) during a period of slow growth implies that per-capita consumption and investment expenditures will, taken as a whole, remain static over the period to 1992

- static total spending during a period of rapid change heightens differences between winners and losers

Sectoral Forecasts

- the most striking sectoral trend is the continued increase in the relative importance of service industries as a provider of employment. During the whole forecast period about 80% of all new jobs are expected to be in service industries

- despite this increase in the relative importance of service sectors, primary and manufacturing sectors are forecast to show gains in employment and in output

- total factor productivity is forecast to grow more rapidly than in recent

95

years, reflecting improved efficiency in the use of labour and capital

- the rate of productivity change will be fastest in the primary and manufacturing sectors but fast increases are also expected for communications, transport, and construction

- traditional meat, wool and dairy exports are forecast to decline in volume but such exports are notably sensitive to variations in the price assumptions built into our models

- non-traditional exports are forecast to show strong growth. Fishing, forestry, mining, and tourism exports are all forecast to increase in relative importance

- manufactured exports are expected to grow but to stabilise as a proportion of total exports

JEFFREY HARRIS New Zealand 1949
Homage to Van Gogh 1X
oil on panel 407 x 412
Purchased 1983. Dugald Henderson Bequest