A MACRO-ECONOMIC MODEL AND SCENARIOS TO 1995

P46 Summary
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Council

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FOREWORD

The Macro medium-term model of the New Zealand economy was originally developed within the New Zealand Planning Council by Dr. Eric Haywood, one of the authors of this planning paper. It was relocated to the Ministry of Works and Development when Dr. Haywood moved there as the Ministry's chief economist and has now returned with him to the Planning Council secretariat.

The original model (styled simply "Macro") was small and fairly uncomplicated, designed to generate coordinated forecasts some 10 - 15 years out of the main national economic aggregates - total output, employment, productivity and the current account balance. It has since been given greater sophistication with the inclusion of relative prices, additional feedback links, more complex policy reaction functions and the capacity to handle different exchange rate regimes. It has been developed by Drs Haywood and Cavana using the "system dynamic" method and this is reflected in its redesignation as "SDMACRO".

One of the model's principal applications has been to interact with and constrain Victoria University's Julianne sectoral model in the context of the Planning Council's National Sectoral Programme. This programme, whose third report will be issued shortly, models the results of an extensive series of sectoral consultations to give a possible picture of changes in the economy's physical resources over the next decade or so.

This planning paper discusses the rationale for the SDMACRO model, describes its structure and presents the results of a base run through to 1995, together with results from a number of feasible alternative scenarios.

The Planning Council is grateful to the authors and also to their employers (the Ministry of Works and Development for Dr. Haywood and the New Zealand Forest Service and latterly the New Zealand Railways Corporation for Dr. Cavana) for making their time available for this project.

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1. INTRODUCTION

This paper describes a system dynamics model (SDMACRO) of the New Zealand economy and discusses a range of feasible macro-economic scenarios generated by the model to the year 1995.[1]

The prime purpose for the development of SDMACRO was to provide a small economic model that would trace the likely *trend* movement in the key economic aggregates some 10-15 years into the future. In particular, it was to provide trend estimates of such national aggregates as population, employment, capital formation, total output, exports, imports and the current account balance. In addition, SDMACRO can be used to examine the effects of adopting different macro-economic policy objectives, particularly those relating to the balance of payments and employment. The model can also be used to examine the effects on the main macro-economic variables of changing certain key economic parameters. For example, a change from a "fixed" to a "flexible" exchange rate or a change in the exogenous parameters such as export growth rates, world prices, or the degree of import substitution assumed.

The scenario ability of the model is extremely useful to provide an indication of how sensitive economic behaviour is to key variables and assumed relationships. In all, it is believed that SDMACRO is a useful medium-term tool for economic analysis. A key aspect of any decision-making is being aware of the likely movement in those areas of importance to the particular organisation, whether it be a private firm, public corporation or the government itself. Understanding the likelihood of particular changes in the economic environment occurring is of critical importance. Failure to recognise changes and respond appropriately often means that significant resources are misallocated for considerable periods of time. It is of some importance that decision-makers respond, not only to recent economic conditions, but also to those conditions they expect will prevail in the medium-term.

Apart from the purposes outlined above, SDMACRO can also be used as a macro driver for the national sector exercise jointly undertaken by NZPC/MWD/PEP. (See Haywood and others, 1982; 1983.) As such the model needs to provide appropriate macro-economic output for use as input in the sectoral model - "Julianne" - as presently running at Victoria University.

Before discussing in detail the structure of SDMACRO it is appropriate to outline briefly what the model *cannot* be used for:

(i)   It cannot be used to provide short-term (some 12-18 months ahead) forecasts of the economy such as those provided by organisations like the RBNZ and the NZIER for example.

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(1)   A preliminary version of this paper was presented to the annual conference of the New Zealand Association of Economists, Dunedin, August 1985.

(ii) It cannot provide detailed sectoral estimates of medium-term economic activity or even detailed break-up of certain aggregate economic series such as employment for example.

(iii) Finally, it cannot be used to examine directly specific monetary or fiscal options.

The remainder of this paper is organised as follows. Section 2 discusses the structure of SDMACRO including the main econometric relationships, behavioural equations, policy response functions and identities. The assumptions underlying the Base Case of the model are presented in Section 3 together with a discussion of the output of the main macro-economic variables produced by the Base Run of the model to the year 1995. Also provided are a range of feasible alternative scenarios produced by varying key assumptions or parameter values. This section finishes with combined pessimistic and optimistic scenarios, which set realistic lower and upper bounds on GDP growth over the next 10 years. The scenarios are briefly summarised in Section 4 together with some general conclusions from the study. Appendix A contains a full computer listing of SDMACRO together with the definitions of the variables and the computer printout of the tabular and graphical output for the Base Run is displayed in Appendix B.

2.   MODEL STRUCTURE

The structure of SDMACRO follows, to a degree, that of an earlier medium-term model of the New Zealand economy (Haywood, 1980)[2]. Similarities include the emphasis on the nation's external balance as a constraint on economic growth. Causes of the balance of payments constraint are many and varied; in most instances the external balance constraint reflects problems within the internal economy. For example, declining relative productivity leading to a decrease in exports and relative increase in imports. It was also recognised that, for medium-term analysis, the degree of disaggregation that would sensibly be modelled or examined was limited. Finally, the emphasis on model construction was to capture the key economic relationships and to examine the effects of changes in these relationships rather than on a detailed econometric examination of historical behaviour and projecting this forward.

However, while certain similarities exist to the model outlined in Haywood (1980) a number of significant differences in approach, content and methodology are evident. In particular:

- the inclusion of relative prices,
- introduction of additional feedback links,
- policy reaction functions of a more complex nature,
- different exchange rate regimes, "fixed" and/or "flexible",
- the model itself is developed using the "system dynamics" method (Forrester, 1961; Coyle, 1977) with the DYNAMO package (Pugh, 1976) (also available in DYSMAP (Cavana and Coyle, 1982)).[3]

A diagram outlining the main variables and feedback linkages in the model is given in Figure 1.1. As indicated by this figure the model can be thought of as comprising four basic sectors:

1.   Output sector
2.   Demographic sector
3.   External sector
4.   Price indices

These are discussed briefly on the following page.

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(2)   For a discussion of the Haywood model see Wells, Easton and Kay, (1983); and Buckle and Pope, (1985).

(3)   For an excellent critical discussion of the system dynamics approach see Legastro and Macriariello (1980). Pioneering work in applying the system dynamics approach in New Zealand was undertaken by A.W. Smith formerly of the Ministry of Works and Development. For a discussion of the Dynamo model of the New Zealand economy as developed by Smith and others see Wells, Easton and Kay (1983).

2.1 Output Sector

This sector consists of two major indicators: Gross Domestic Product (GDP) and Gross Fixed Capital Formation. These will be discussed separately.

Figure 1.1

A Simplified Influence Diagram for SDMACRO
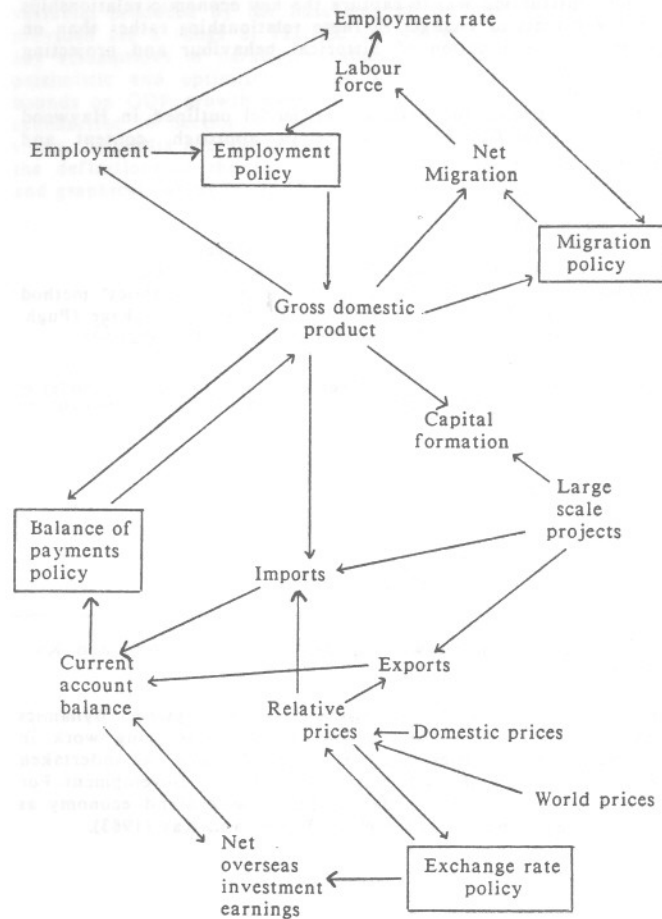
2.1.1 Gross Domestic Product

Most textbooks suggest that the purpose of macro-economic policy should be to achieve certain objectives. In particular: economic growth, full employment, price stability and external balance.

However, in practice trade-offs exist between the various objectives. For example, full employment is unlikely to be achieved without affecting the balance of payments and price stability objectives. Accordingly, depending upon the particular conditions that prevail and objective functions of the nation, different emphasis upon achieving the various objectives will exist.

At this stage SDMACRO does not directly include a price stability objective. Significant difficulties surround the formation of a price objective function as it is unclear what view policy-makers in New Zealand have regarding price stability. However, perhaps of greater importance is the very difficult task of formulating relationships that satisfactorily explain how medium-term price movements in the domestic economy occur.

In its simplest form, the model can be operated to achieve a single objective, e.g. - balance of payments or a particular employment objective. Alternatively, the two objectives, balance of payments and employment, can be combined with specific weights given to each. These two effects, which are discussed in detail below, are combined as follows in determining the growth rate of gross domestic product in the model:

$$QRP = WTBP * QRPBP + (1-WTPB) * QRPE$$

QRP	=	percentage change in real gross domestic product
WTBP	=	weight given to balance of payments effect on GDP
QRPBP	=	balance of payments effect on GDP
QRPE	=	employment policy effect on GDP

Economic growth is an 'outcome of adopting either or both of the two objectives in the model. It is assumed appropriate policies are adopted to maximise domestic growth consistent with the desired external and employment objectives. No view on what specific set of policies should be adopted to achieve this goal is given, except in one particular instance to be discussed shortly. Basically, the view adopted is that many alternative sets of policies could be implemented to achieve the same end result.

(a) Employment Policy Effect on GDP

The employment response objective function is incorporated in the model as a table function as illustrated in Figure 2.1.

Figure 2.1

Employment Objective Function

Desired employment
rate next year (%)

Actual employment rate (%)
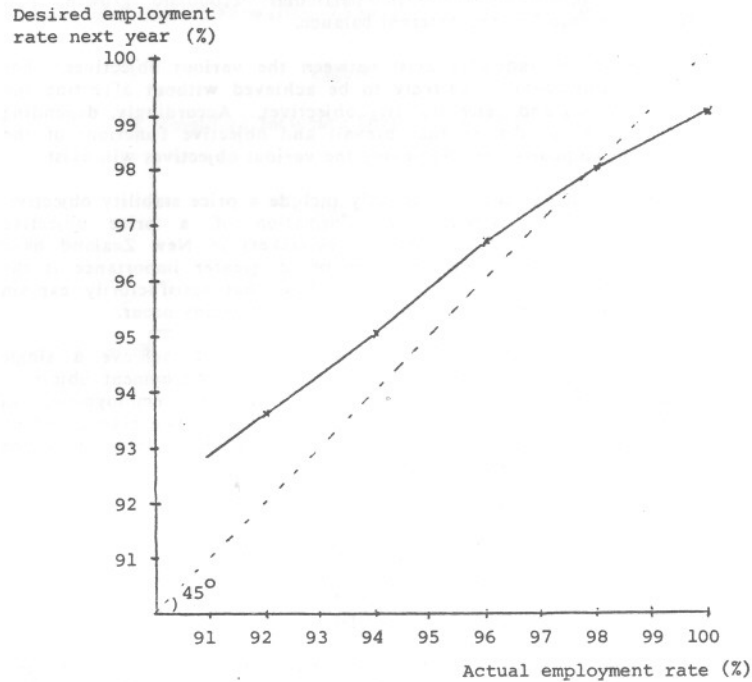
Full employment, which is assumed desirable, is specified as 2 percent unemployed (Census definition of unemployment used). Figure 2.1 specifies the *desired* employment rate in the next year given the existing employment rate. As the figure shows the desired movement towards full employment is non-linear with the greater the degree of unemployment the stronger the desired increase in the employment rate next period. The desired increase in employment which, via an employment-domestic growth equation, (i.e. reverse of the equation outlined in section 2.2.4), provides an estimate of the increase in domestic activity that would need to occur to meet the desired increase in the employment rate in the next period.

If the nation's growth rate is constrained by the available labour force (i.e. full employment has been reached) an active immigration policy is assumed to be implemented by policy makers to release this constraint on growth. For example, during the early seventies New Zealand faced severe labour shortages at which time an active immigration policy was adopted. The actual immigration policy incorporated in this model and under what conditions it applies is discussed in detail in section 2.2.3.

(b)   Balance of Payments Effect on GDP

The balance of payments desired growth response specified in the model is given in Figure 2.2.

Figure 2.2

GDP- Current Account Balance Objective Function

Desired % change
in real GDP next
period

Ratio of current
account balance to
GDP (%)
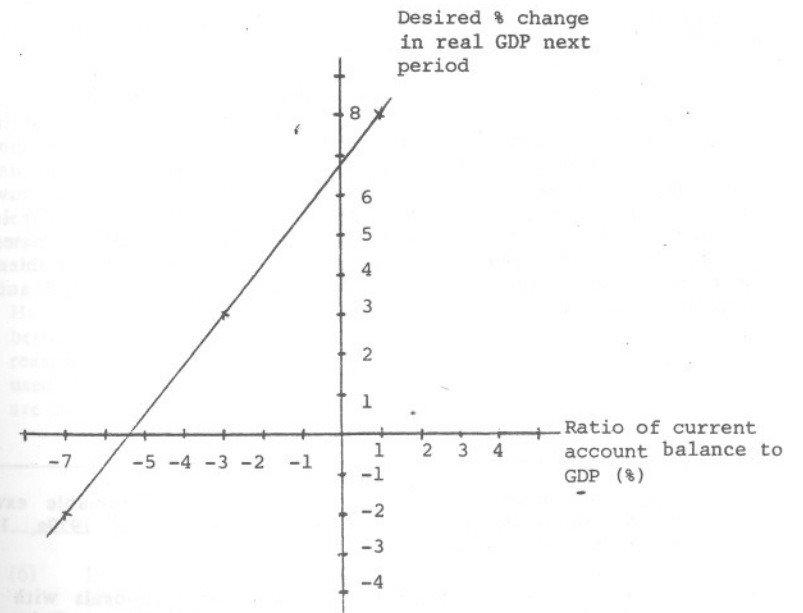
The shape of the response function was determined primarily from the results derived from a previous medium-term model (Haywood, 1980) in which the model iterated to a final growth rate, which was consistent with a sustainable current account balance/gross domestic product ratio[4]. According to the specified relationship, for example, if the current account deficit as a percentage of domestic product was -3 percent, then it is assumed that the desired rate of growth in the economy is 3 percent. Whether this growth rate is maintained or even achieved depends upon the relative weight given to the external balance objective, and secondly, to the influence of the various factors determining the current account in following periods.

That the nation's growth rate is determined primarily by the balance of payment, is accepted by many for New Zealand, see for example, Wilson (1930); Simkin (1951); Weststrate (1966); Monetary and Economic Council (1962); Anon. (1976); Morgan and Haywood (1977); Campbell and Haywood (1978); Lloyd and others (1980); Chatterjee and Michelini (1983).

For overseas studies also suggesting that it is a nation's external position that is the prime constraint on growth, see for example, Beckerman (1962); Balassa (1963); Caves (1977); Thirlwall (1979).

2.1.2 Gross Fixed Capital Formation

Capital formation in SDMACRO comprises investment associated with "traditional" economic activity, and that associated with the "large-scale projects". The former is assumed to be determined by domestic output.

As this exercise is concerned with medium-term relationships it is appropriate to filter out the short-run or business cycle influence in the data before examining the relationships between data. One method of filtering out the business cycle is to apply a moving average to the data of approximately the same period of the cycle itself, i.e. 3-5 years. However, use of moving average data in regressions leads to auto-correlation in the residuals so that ordinary least squares (O.L.S.) parameter estimates are not efficient and the standard error estimates are biased. This problem can be minimised by using the "Autoreg" procedure that exists in SAS and was adopted in this study [5].

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(4) For a discussion of what is regarded as a sustainable external deficit see: New Zealand Planning Council (1978, 1979a, 1979b) Haywood (1980); Haywood and Rose (1983).

(5) For a detailed discussion of how this procedure deals with auto-correlation in the residual series see SAS/ETS Users' Guide, SAS Institute Inc., 1980.

The econometric relationship used in the model between changes in "traditional" real gross fixed capital formation - and changes in domestic output is given below. The equation results are based upon five year moving average of annual percentage change data. [6]

$$CFTRNP = -10.428 + 4.088 \; QRP \qquad R^2 = 0.944$$
$$(10.903) \quad (14.216) \qquad 1965\text{-}80$$

CFTRNP = Percentage change in traditional real gross fixed capital formation

QRP = Percentage change in real GDP

(t) = Statistic in parenthesis

Essentially the relationship specified is an "accelerator model" of investment. Various relative price variables were investigated. However, none were found to be statistically significant. The negative coefficient for the structural component of the equation is of interest. However, what precise economic interpretation that should be ascribed to this component is uncertain. Nevertheless, the negative coefficient may be partially explained by such factors as - technical progress in the relationship between capital and output - that New Zealand's economy has reached a mature stage in its investment with most of its infrastructure already in place. Perhaps a more likely explanation is that during the late sixties and early seventies investment in many areas occurred based on an expectation of continued economic and population growth. However, this expected growth did not occur and, as a consequence, led to a significant downturn in investment during the late seventies. This pattern of investment may help to explain the magnitude of the negative structural coefficient over the years for which the equation was estimated.

Large-scale investment associated with such projects as ammonia-urea, synthetic gasoline, refinery expansion and methanol, cannot readily be explained by movements in domestic activity. Accordingly, a proportion of such investment is assumed to be "additional" to traditional investment. The actual proportion which should be assumed "additional" is open to debate.

However, based upon previous work it would seem reasonable to assume that between 40-60 percent of total investment in the large-scale projects could reasonably be regarded as "additional". An actual figure of 50 percent is used in the model. Nevertheless, it should be noted that the model results are largely insensitive to whether 40 or 60 percent is used.

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(6) It should be noted the equations listed in the model in Appendix A are expressed in decimal equivalents of the percentage form shown in the text.

Capital expenditure, net export and import savings associated with various large scale projects used in the model are given in Table 2.1. It should be noted that the data has been smoothed by applying a centred three-year moving average to the base data.

Table 2.1

Large Scale Projects: Capital Formation, Net Export Earnings, and Net Import Savings ($million, 1982-1983 prices)

Year ended March	Capital Formation	Net Export Earnings	Net Import Savings
1983	900	20	3
1984	1100	120	10
1985	1000	230	50
1986	700	300	140
1987	400	290	330
1988	100	270	490
1989	-	260	600
1990	-	260	610
1991	-	270	610
1992	-	270	610
1993	-	270	610
1994	-	270	610
1995	-	270	610

Source: Haywood and others (1983); MOWD (1984).

The investment equation, if left unconstrained, would result in unsustainable levels in the longer term if economic growth was maintained at an unusually high or low level. Consequently, upper and lower limits on the ratio of investment to domestic activity are imposed. These are currently set at 25 and 14 percent of GDP respectively in the model. Once the upper or lower limit is reached investment is assumed to grow at the same rate of increase as real activity. In practice those limits are rarely reached in the model runs.

2.2 Demographic Sector

2.2.1 Population

A nation's population is determined by births, deaths and net migration. In this version of SDMACRO the Department of Statistics population projections assuming zero migration and medium-term fertility, interpolated where necessary, are used to provide an estimate of the influence of the first two factors mentioned above. The third factor, net migration, is estimated separately in the model, see below, and added to the Department of Statistics projections to provide an estimate of total population.

2.2.2 Labour Force

Changes in the labour force are determined by two major influences; the age-sex structure of the domestic population, and net migration flows. Particularly important is the influence of the latter factor which is subject to significant variation over time.

In the model, the Department of Statistics estimated labour force numbers assuming zero migration are taken to represent the likely growth in the domestic component of the labour force. These projections incorporate "changing" age-sex specific labour force participation rates. The Department of Statistics projections assume a continuation of the 1961-81 trend in age-sex specific participation rates until 1991 after which time participation rates are assumed to remain constant.

These projections are adjusted by the labour force associated with the estimated annual net migration flow.

2.2.3 Net Migration

In the model, it is assumed that the total net migration flows are the sum of the normal net migration flows, plus the net inward migration resulting from an active immigration policy. These components are discussed briefly below.

(a) Normal Net Migration

Migration flows are very dependent upon economic conditions, both in New Zealand and overseas. In particular, the economic performance of our nearest neighbour, Australia, is of considerable importance. However, while it would be desirable to have estimates of growth of the world economies this would introduce an undue complexity into the model. As an approximation net migration was made a function of domestic activity, in particular relative changes in domestic activity. This approach, which still includes the influences of both "pull" and "push" factors in migration, avoids the almost insurmountable task of forecasting other countries' growth rates.

The results of estimating the relationship between the five yearly moving average data of net migration and the annual percentage change of real gross domestic product are given below:

$$MIGN = -18262 + 7357\ QRP \qquad R^2 = 0.77$$
$$ (5.074)\ \ (6.673) \qquad\qquad 1965\text{-}80$$

MIGN = normal net migration (persons)
QRP = percentage change in real GDP

Despite the simplicity of the above formation it is of interest to note the high degree of correlation that has existed between net migration flows and relative growth of the domestic economy over the estimation period. The equation suggests that above a growth rate of 2.5 percent the country will experience net inward migration and net outward migration if the growth rate is less than 2.5 percent.

The constant in the equation, representing a time trend, may be viewed as a proxy for an omitted variable or for variables that display a deterministic trend. It is interesting to note that this structural component in the net migration equation is estimated to be a net outflow of 18,000 persons per annum. This agrees with the fact that over the last quarter of a century New Zealand has experienced a net outflow of people at a time when real gross domestic product was rising, albeit slowly. Secondly, it accords with the condition that over the same period New Zealand's growth rate has steadily declined relative to that of our major trading partners. Labour force estimates associated with net migration forecasts are derived by using the average ratio that has existed between the two series over recent years of 72 percent.

The inclusion of the net migration equation in the model introduces an important medium for demographic-economic linkages not generally included in most models; for an exception see Monetary and Economic Council (1973).

(b)   Active Immigration Policy

The table in the model associated with the active immigration policy is illustrated in Figure 2.3.

Figure 2.3

Active Immigration Policy Response Function
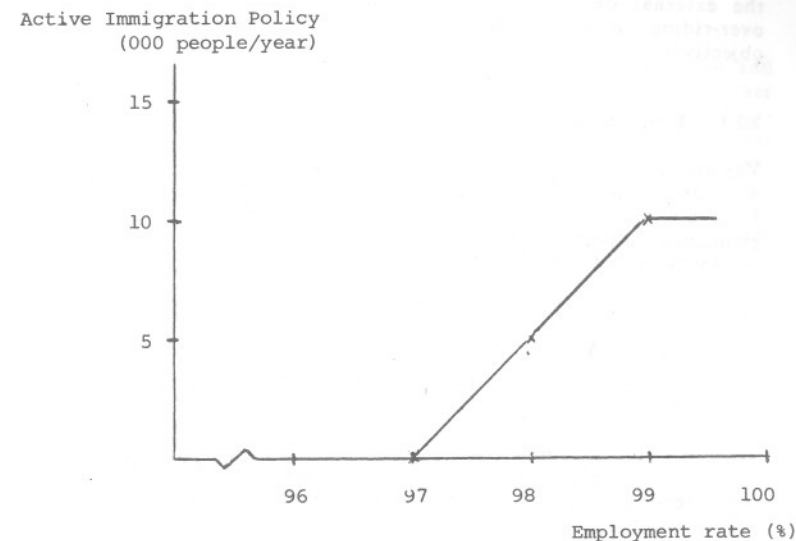
It is assumed that an active migration policy reaction will occur only if the employment rate is greater than 97 percent. In addition, it is assumed above 97 percent an increasingly active migration policy will be implemented. At an employment rate of 98 percent, for example, it is assumed that an additional net 5,000 persons are attracted to New Zealand above that associated with the normal net migration which is related to the growth in the domestic economy as discussed above. However, it is assumed that an active immigration policy will only be implemented if the balance of payments is at the same time in a satisfactory position.

A full policy response will only occur if the current account balance as a percentage of GDP is greater than -3 percent. A partial response will occur if the deficit is between -3 and -4 percent and no adjustment will occur if the external deficit is less than -4 percent. This procedure reflects the over-riding goal of maximising economic growth subject to specified objectives.

2.2.4 Employment

Variations in employment in the model are directly related to movements in domestic output. The precise relationship used is given below, resulting from applying the estimation procedure outlined earlier. Data used in the estimation was five year moving average data of annual percentage changes in employment and real gross domestic product.

$$EP = 0.522 + 0.435 \; QRP \qquad R^2 = 0.82$$
$$(3.099) \; (7.960) \qquad\qquad 1965\text{-}80$$

EP = percentage change in numbers employed
QRP = percentage change in real GDP

At a growth rate of 2.5 percent, the average of recent years, the estimated relationship suggests that numbers employed will increase by approximately 1.6 percent per annum. This implies an annual increase in output per person employed of approximately 0.9 percent.

Of interest is the positive coefficient for the intercept. This coefficient represents structural factors in the relationship between employment and output. However, a priori, it would be expected that the sign for this coefficient would be negative (i.e. representing technical progress of both labour and capital) rather than positive as given.

Other studies have found a similar positive time trend in the relationship between employment and output (Marks, 1983). The reasons for this are unclear. However, it is reasonably certain that the methods used by the Department of Statistics to estimate real gross domestic product, particularly services, may have led to an under-estimation of New Zealand's actual growth. Consequently, it may be that the trend variable in the equation represents, not economic factors, but more a systematic measurement error that exists between the two series.

2.3 External Sector

This is the most disaggregated sector of the model. It includes the export and import of goods, the export and import of services, and net overseas investment income.

2.3.1 Goods Trade

(a) Export of Goods

Three categories of export goods are assumed: traditional (meat, wool and dairy products), non-traditional (forest products, manufacturing and other primary products), and those exports associated with the "additional" large-scale projects. Growth rates in all three categories are assumed exogenous to the model. However, in the case of traditional and non-traditional exports the assumed growth rates are modified if relative price movements between domestic and export prices occur. The sensitivity of export volumes to relative price movements is largely unknown despite its probable importance. For example, a summary of past econometric studies on relative price effects on export volumes (Deane and others, 1981, pp 528-29) provides a wide variety of estimates, particularly those pertaining to specific products, of the nation's long-run price elasticity of supply of exports. Nevertheless, the author of the summary study concluded, "the long-run price elasticity of supply of total exports estimates are surprisingly close in the more recent studies, averaging out at about 0.50". However, it is also evident from the individual studies that the long-run price elasticity of supply of traditional export commodities (meat, wool and dairy products) are significantly less than that for non-traditional exports such as manufactured goods for example. Accordingly, it was decided to assume that the price elasticity for traditional exports (PESXT) is 0.3 and for non-traditional exports (PESXNT) 0.7 giving on aggregate an overall price elasticity of approximately 0.5.

The final export equations used in the model are as follows:

$$XSTRP = XGTRN + PESXT* \; (PXP\text{-}PDP)$$
$$XGNTRP = XGNTRN + PESXNT* \; (PXP\text{-}PDP)$$

XGTRP = percentage change in traditional exports real
XGTRN = exogenous "normal" growth in traditional exports real
XGNTRP = percentage change in non-traditional exports real
XGNTRN = exogenous "normal" growth in non-traditional exports real
PXP = percentage change in export price index
PDP = percentage change in domestic price index

(b) Imports of Goods

Again various categories of imports of goods are assumed. These are traditional (consumer, capital and intermediate goods imported), and those imports/import savings associated with the large-scale projects.

In the model traditional imports are made a function of real activity and relative prices. The final estimated equation, based upon averaged five year data as previously described, is given on the following page.

$$\text{MGTRP} = -5.4 + 2.878 \text{ QRP} - 0.567 \text{ (PMP-PDP)} \quad R^2 = 0.922$$
$$(3.935) \quad (6.925) \quad (3.780) \qquad 1965\text{-}80$$

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

The relative price variable displays the expected negative sign, statistically significant, and is of a magnitude close to that found in other similar studies. An examination of seventeen other studies resulted in an average long-run relative price coefficient of -0.52 (Deane and others, 1981, pp 514-15). However, the estimated long-run import-income elasticity value of 2.88 is significantly higher than the average value of 1.31 found in previous studies. The equation in this study includes, unlike previous studies, an allowance for structural factors unrelated to the influence of income. The estimated high negative coefficient for the structural component in the relationship is suggestive of an economy that has engaged in significant import substitution. Interestingly if the relationship is estimated using level data without inclusion of a time trend, as most previous studies are, then the estimated income elasticity is close to unity. However, the introduction of a time trend in the level equation increases the income elasticity to 2.7, much the same as that found in the difference equation.

It is of interest to note that the Economic Monitoring Group (1983), when discussing the import-income relationship, commented that the long-run elasticity value often estimated at close to unity is significantly less than that estimated for other developed countries and suggested such a value would appear to be on the low side. Nevertheless, taken as a whole the adopted model equation suggests, assuming no relative price influence, that if the economy grows at 3 percent per annum then real imports would increase at 3.2 percent per annum giving an overall elasticity value of 1.1.

2.3.2 Exports and Imports of Services

Exports of services are assumed to be exogenous to the model although, as with exports of goods, the assumed annual rate of increase is modified according to relative price movements. It was decided for this preliminary paper, given the deficiency of empirical studies in this area, to assume that the price elasticity for exports of services is the same as that for the average of goods exported of 0.5. Imports of services are estimated at the historical ratio of 18 percent of total goods trade.

2.3.3 Net Overseas Investment Income

This component of the balance of payments was treated as income from equity investment and the payments/receipts from loans. In addition, New Zealand borrowing overseas is treated in two broad categories of old and new borrowings.

It is assumed "direct private investment income" and "other investment income" credits move in accord with world inflation plus 3.5 percentage points. "Direct private investment income" debits, i.e. foreign investment in New Zealand, is assumed to move directly with the movement in domestic activity as represented by money GDP. "Other investment income" debits, primarily interest paid on overseas loans by New Zealanders, is broken into two categories. First, past payments are assumed to represent interest and will remain at that level adjusted for movements in the exchange rate. The interest rate on new loans required to cover the current account balance are borrowed at 3.5 percentage points above the estimated world inflation rate. If the nation experiences a current account surplus it is assumed that this will be used to reduce the nation's level of overseas indebtedness.

2.4 Price Indices

Price series used or estimated in the model are:

1.   Domestic price indices
2.   Exchange rate indices
3.   Export and Import price indices

Apart from being used to deflate money series to real or adjust real to money the appropriate price series are used to introduce relative price effects into a number of relationships in the model.

2.4.1 Domestic Price Indices

(a) Implicit gross domestic price deflator

The percentage change in this price index is assumed to comprise two elements - internally generated inflation (PIP) and imported inflation (PMP). These elements are given the following weights based upon their approximate importance in total domestic economic activity, i.e.:

$$\text{PDP} = 0.7 \text{ PIP} + 0.3 \text{ PMP}$$

The determination of the imported inflation component, PMP, is discussed in section 2.4.3. The internally generated component of the implicit gross domestic price deflator, PIP, is assumed to be exogenous, e.g. 10 percent. This approach was adopted as it was felt that on available evidence, it was impossible to provide a satisfactory model of domestic inflation.

However, it should be noted that in an early version of the model an attempt to partially endogenise the domestic price component was attempted. In that version of the model the assumed underlying domestic inflation rate was modified according to the overall demand and supply conditions. Essentially the approach adopted was that the domestic inflation rate, apart from being influenced by changes in external prices, is also modified by the degree of utilisation of the factors of domestic production, both labour and capital, and secondly by aggregate demand conditions. Both these factors it was felt could be proxied by the unemployment rate. Unfortunately, due to a time

constraint, this aspect was not incorporated in the version of model described here. However, it is hoped that this aspect will be incorporated in a future version of the model as once this is achieved a price objective function can be included in the overall model framework.

(b)   Capital expenditure price indices

Capital expenditure comprises a significant import content. Accordingly, capital expenditure price indices in the model are derived by combining the domestic and import price indices in proportions that reflect the relative weighting of domestic and import content. In the case of traditional capital expenditure approximately 45 percent is imported while for such large-scale projects as New Zealand Steel, Methanol, Synfuel plant for example, approximately 70 percent is imported. These weightings and the associated domestic content weights of 55 and 30 percent respectively are used to determine the ordinary (PCF), and large-scale project (PCFLS) capital expenditure indices.

2.4.2   Exchange Rate Indices

The model can be set to operate in either a "fixed" or "flexible" exchange rate mode. The determinants of a "flexible" exchange rate are numerous and varied. It is an over simplification to say that the exchange rate reflects the interaction of demand and supply forces in the foreign exchange market. The determinants of demand and supply forces in the foreign exchange market are numerous including - private capital flows, current account balance, differences in inflation rates, relative interest rates, performance of the economy, political stability, degree of international indebtedness, and expectations to list just a few. Nevertheless, in the longer term it would be reasonable to expect that the exchange rate would be largely determined by relative price movements. This basically was the underlying concept adopted by the Reserve Bank, between July 1979 and May 1983, when they managed the exchange rate to reflect differences between domestic and international price movements.   An interesting discussion of fixed and floating exchange rates in the New Zealand context is given in Buckle and Pope (1985); Keenan (1985); and the Economic Monitoring Group (1985). In actual fact over the last twenty years the real exchange rate, shown in Table 2.2 below, has remained remarkably stable.   This suggests that even during the so-called "fixed" exchange rate "ad hoc" adjustments to the exchange rate were occurring to largely offset differences in inflation between ourselves and our major trading partners. Such a practice reflects more a managed than fixed exchange rate regime as often assumed existed at the time.

Table 2.2

Exchange Rate: 1964-84
(Base year 1976-77 =1000)

March Years	Nominal Exchange Rate Index	Foreign Prices Index	Domestic Prices Index	Real Exchange* Rate Index
1963/64	1220	408	377	1128
1964/65	1219	422	392	1132
1965/66	1222	439	404	1124
1966/67	1227	454	416	1125
1967/68	1150	468	442	1087
1968/69	1068	488	462	1010
1969/70	1069	512	484	1009
1970/71	1067	544	522	1025
1971/72	1061	582	574	1046
1972/73	1099	616	610	1089
1973/74	1223	680	666	1198
1974/75	1200	789	745	1134
1975/76	1048	910	862	993
1976/77	1000	1000	1000	1000
1977/78	996	1208	1146	1049
1978/79	996	1168	1272	1085
1979/80	929	1308	1471	1045
1980/81	874	1455	1712	1029
1981/82	821	1581	1977	1027
1982/83	777	1677	2280	1057
1983/84	742	1757	2397	1012

* Real Exchange Rate Index = (Nominal Exchange Rate Index x Domestic Price Index)/Foreign Prices Index

Source: Anon. (1984) A Briefing on the New Zealand Economy p.62

In the model the exchange rate in its "flexible" mode adjusts according to relative differences that emerge between domestic and external prices in a manner similar in concept to the managed float as adopted by the Reserve Bank during 1979-83. As specified if world inflation, as measured by import prices measured in foreign currency, is greater (less) than domestic inflation then the nominal exchange rate will appreciate (depreciate) by the difference between the two rates.

However, as noted earlier the actual medium-term movement in the real exchange rate particularly in the case of a "true" floating exchange rate regime is determined by numerous factors not just relative inflation rates as so clearly shown recently. Accordingly, an option exists in the model which introduces a constant "under" or "over" shooting of the assumed exchange rate adjustment which causes a gradual depreciation or appreciation of the nation's real exchange rate over time.

2.4.3 Export and import price indices

The external price indices are made up of two components - firstly, movement of external prices based upon expected or forecast prices received or paid for in foreign currency. Secondly, movement of the exchange rate. If the model operates in a "fixed" exchange rate mode then the movement in the import and export price indices will be determined entirely by the forecast external price movement as given exogenously.

Alternatively, if the model is operating in its "flexible" exchange rate mode, discussed above, then the import and export price indices will be determined both by the expected movement in foreign prices and that which occurs in the exchange rate.

3. MODEL SCENARIOS

In this section results of several scenarios covering the years 1983-95 are reported. The first scenario outlines a "base case" from which other scenario runs can be easily compared. The "base case" should not be interpreted to represent the most likely to occur in reality. Rather the "base case" results should be regarded as a set of results which are reasonable for comparative purposes. Forecasting, especially medium-term economic forecasting, is a chancy business subject to a high degree of uncertainty. It is quite probable that others would regard one of the other scenario runs as more likely to occur than the "base case".

Although numerous simulation runs were conducted first, to test the robustness of the developed model structure to differing conditions, and secondly, to examine the sensitivity of a model results to assumed parameter values, only a limited number are directly reported upon in this paper. The particular runs reported represent a cross section which it is felt would interest most readers.

The full list of scenarios discussed here are:

1. Base Case
2. Reduced Import Substitution
3. Deteriorating and Improving Terms of Trade
4. Lower and Higher Export Growth
5. Depreciating and Appreciating Real Exchange Rate
6. Large Scale Projects Less/More Additional
7. Combined Pessimistic and Optimistic Future Outlooks

Before discussing in detail the results of the various simulation runs it is appropriate to remind the reader that the numerical values represent *trend* values about which significant cyclical and random movement could be expected to occur.

3.1 Base Case

3.1.1 Base Case Assumptions

Appendix A contains a full listing of the "base case" of the model as well as variable definitions. However, the main assumptions underlying the "base case" scenario are as follows:

(i)   The balance of payments and employment reaction functions are given a weighting of 70:30 respectively in the determination of the nation's growth rate.

(ii) The model operates to adjust the nominal exchange rate to preserve approximately the real exchange rate as assumed to exist in the base year. This essentially means that no real effects from relative price differences can take place.

(iii) The model commences from a base position of 31 March 1983. The base

values for that year are the average of 1981-4 actual values. This procedure being adopted to ensure that the model commences its projections from values that are close to the series medium-term trend values, at that time.

(iv)   "Traditional" and "non-traditional" exports are assumed to increase at annual real rates of 1 and 6 percent respectively. Exports of services, real, are assumed to grow at an annual compound rate of 6 percent. These rates together reflect approximately the growth in export volumes that have occurred over recent years in these categories.

(v)   Export and import prices, in foreign currency, are assumed to grow at 6 and 6.5 percent per annum respectively. These rates were based on commodity price forecasts recently released by the World Bank. These assumed price growth rates imply a gradual decline of approximately 0.5 percent per year in the nation's terms of trade.

(vi)   Domestic inflation excluding external influences is assumed to grow at a basic underlying rate of 10 percent per annum. This compares to a rate of approximately 13 percent per annum experienced by the nation over the last fifteen years. Second, and of more importance, is that such a rate would see a significant relative improvement compared to the expected inflation rate of our major trading partners compared to that which existed over recent years.

3.1.2.   Base Case Results

(a)   Real GDP and Population

A full printout of results of the "base case" using SDMACRO are given in Appendix B. Overall the nation's growth rate under this scenario (see Figure 3.1) displays a profile of increasing growth until 1988 after which the growth rate slows stabilising over the years 1990-95 at 3 percent per annum. It should be noted that the initial trend year of the simulation reflects a relatively low level of economic activity within New Zealand.

The profile of growth as shown in Figure 3.1 for the years 1983-95 results from a number of factors of which the most important are:

(i)   reduction in imports of capital goods as the large-scale projects construction phase comes to an end;

(ii)   export contribution and import substitution as these projects come on stream;

(iii)   the effect of annual increases in exports at a faster rate than the growth in imports. This is a consequence primarily of the low growth in gross domestic product resulting from an initial unsatisfactory balance of payments situation.

Figure 3.1

Base Case: Growth in Real Gross Domestic Product

Years ended March
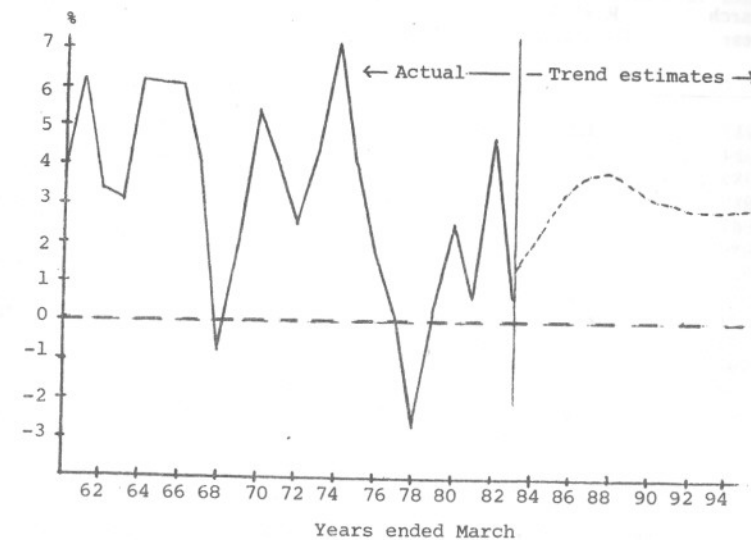
Once the effects of the large-scale projects are worked through, by 1991, the economy displays a steady state growth rate reflecting the constant growth in the exogenous inputs. Although the nation reaches full employment (i.e. an employment rate of 98 percent or more) in the last year of the simulation it is of interest to note that the nation's growth in this year can only be sustained by assuming the existence of an active immigration policy.

A more accurate indicator of a nation's well being than the growth in real gross domestic product is real growth per capita which allows for demographic changes.

Table 3.1

Base Case: Real GDP and Population

March Year	Real GDP (% change)	Population (% change)	Real GDP/capita (% change)	Real GDP per capita (1983 $)
1983	1.3	1.2	0.1	9,904
1984	2.0	0.6	1.4	10,006
1985	2.9	0.8	2.1	10,175
1986	3.5	0.9	2.5	10,405
1987	3.8	1.0	2.7	10,675
1988	3.8	1.1	2.7	10,967
1989	3.6	1.0	2.6	11,261
1990	3.2	0.9	2.3	11,541
1991	3.1	0.9	2.2	11,806
1992	2.9	0.8	2.1	12,068
1993	2.9	0.7	2.1	12,332
1994	2.9	0.8	2.1	12,599
1995	3.0	0.9	2.1	12,865

Figure 3.2

Base Case: Growth in Real Gross Domestic Product Per Capita
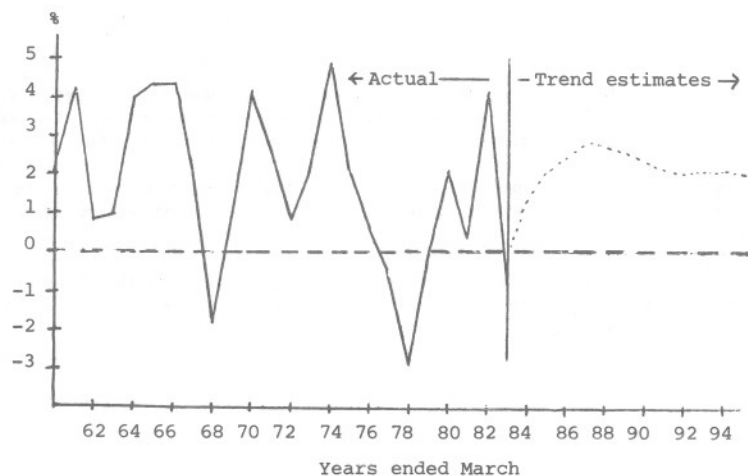
As shown in the above table growth per capita over the simulation period, 1983-95, parallels closely the growth in real gross domestic product but at a rate approximately 1 percent lower. This being the average growth in population over the period. Over the 12 years ended 1995 it is estimated real GDP/capita will increase from $9,904 to $12,865, an increase of some 29.3 percent.

(b)   Labour Force, Employment and Unemployment

As explained earlier in the paper the labour force estimates are based upon Department of Statistics projections adjusted to assume zero migration. Net migration is endogenous to the model being dependent on the growth in domestic activity. The labour force, employment and unemployment series correspond to the Census definition. That is, employment refers to numbers of persons working twenty or more hours per week, whilst numbers unemployed refer to those actively seeking employment.

In the "base case" numbers unemployed remain extremely stable for the first nine years of the simulation period. This is despite the rapid increase in domestic economic activity from 1986 onward. However, while estimated numbers unemployed remain almost unchanged as a percentage of the labour force a gradual decline is recorded; falling from 5.5 percent in 1983 to 4.5 percent in 1991. After 1991 numbers unemployed along with the unemployment rate decline rapidly. In the final year, 1995, numbers unemployed are estimated in this particular scenario to be some 30,000 while the trend unemployment rate for the year is estimated to be 1.8 percent.

Table 3.2

Base Case: Labour Force, Employment and Unemployment

Year Ended March	Labour Force assuming zero migrat. (000)	Migration effect on labour (000)	Total labour force (000)	Numbers employed (000)	Numbers seeking work (000)	Numbers seeking work % Lab.force (%)
1983	1375	0	1375	1300	75	5.5
1984	1394	-3	1391	1316	75	5.4
1985	1414	-4	1410	1337	73	5.2
1986	1438	-2	1436	1362	74	5.1
1987	1464	2	1466	1391	76	5.2
1988	1490	8	1498	1421	77	5.1
1989	1515	13	1528	1451	77	5.0
1990	1538	18	1556	1481	75	4.8
1991	1559	21	1580	1509	71	4.5
1992	1578	24	1602	1537	65	4.0
1993	1594	26	1620	1565	55	3.4
1994	1608	28	1636	1593	43	2.6
1995	1620	32	1652	1622	30	1.8

Figure 3.3

Base Case: Labour Force, Employment and Unemployment

(000 persons)
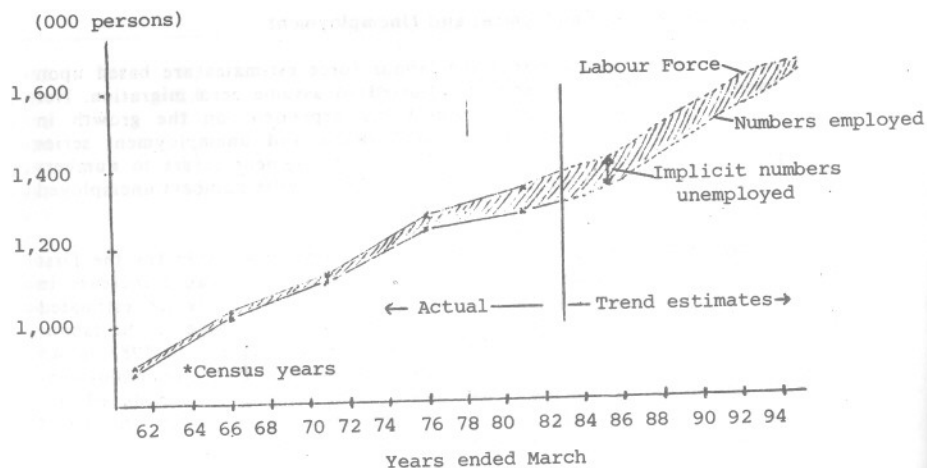
Part of the reason for the rapid improvement in the labour market towards the end of the simulation period can be traced to the assumed participation rates adopted in the Department of Statistics labour force projections which, on average, are declining at this time.

While SDMACRO includes a labour force effect, via the net migration equation, that directly relates a section of the labour force estimates to prevailing economic conditions it was thought that participation rates would also be affected by economic conditions. Two alternative hypotheses exist regarding the likely role economic conditions could have on participation rates. The first, "the discouraged worker hypothesis", suggests that when a labour market is in excess supply people will eventually become discouraged and stop looking actively for paid employment. However, according to an alternative hypothesis labour force participation will increase when the labour market is in excess supply. This, it is argued, will be due to secondary workers in a family unit seeking and obtaining work when the principal income earner becomes unemployed. Considerable time was spent examining whether, historically, the nation's participation rate has been

related to the state of the nation's economy. However, experiments using labour market data as given in a recent paper by Hicks (1985), lead the authors to the same conclusion as reached in that paper that aggregated time series of the labour market, do not support either of the above outlined hypotheses.

(c)   **Balance of Payments**

SDMACRO provides a detailed breakup of the nation's external current account. The path of the main components comprising the current account over the simulation years 1983-95 for the "base case" scenario are given in Table 3.3.

Table 3.3
Base Case: Balance of Payments, Current Account

Year Ended March	Goods			Services			Net o/seas Invest. Income	Current a/c Balance	Curr.a/c Bal./GDP ratio
	Exp.	Imp.	Bal.	Exp.	Imp.	Bal.			
	($million, current prices)								(%)
1983	7540	7400	140	1850	2689	- 839	- 991	-1690	-5.3
1984	8622	8202	420	2160	3028	- 868	-1170	-1618	-4.5
1985	9844	9120	725	2516	3414	- 898	-1345	-1518	-3.7
1986	11215	10218	997	2931	3858	- 927	-1518	-1448	-3.1
1987	12721	11540	1181	3414	4367	- 953	-1693	-1465	-2.8
1988	14431	13155	1275	3977	4965	- 989	-1878	-1591	-2.6
1989	16389	15165	1224	4632	5680	-1048	-2086	-1909	-2.7
1990	18635	17528	1108	5396	6509	-1113	-2330	-2335	-2.9
1991	21212	20116	1097	6286	7439	-1153	-2614	-2671	-2.9
1992	24147	22979	1168	7322	8483	-1161	-2930	-2923	-2.8
1993	27503	26182	1321	8529	9663	-1134	-3270	-3083	-2.6
1994	31344	29811	1533	9935	11008	-1073	-3624	-3164	-2.4
1995	35742	33974	1768	11573	12549	- 976	-3986	-3194	-2.1

The series in the above table are largely self explanatory. However, of some interest is the growth in nominal net overseas investment income which increases from $1000 million at the beginning of the simulation to $4000 million in 1995. The growth in this series, which measures primarily interest payments private and public on overseas borrowing compared to that recorded over recent years, is shown in Figure 3.4.

Figure 3.4

Base Case: Net Overseas Investment Income

$ million
current prices


```
+ 1,000

        0          ←—Actual——  -Trend estimates→

   - 1,000

   - 2,000

   - 3,000

          60  62 64 66  68 70 72  74 76 78 80  82 84 86  88 90  92 94
                              Year ended March
```
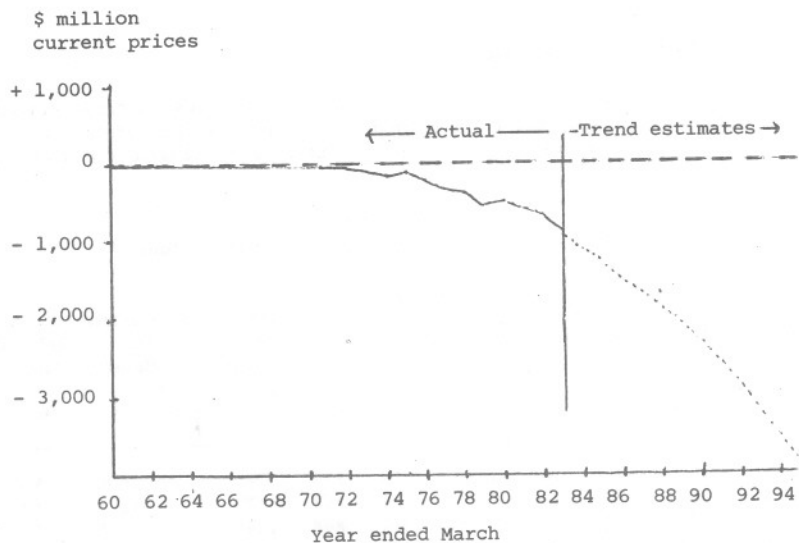
Despite the growth in this series, net overseas investment income as a percentage of nominal gross domestic product declines from 3.1 percent in 1983 to 2.6 percent in 1995. Although this series increases significantly owing mainly to the faster growth in the nation's trade balance and limited deterioration in the services balance the overall current account balance as a percentage of gross domestic product is forecast in the "base case" scenario to gradually improve over the simulation period.

3.2   Reduced Import Substitution

As noted in the introduction to this paper one purpose of the construction of the model was to allow the possibility of examining the effects of changing key model parameters.

Recent economic policy changes, particularly increased liberalisation of the external sector resulting from reduction of import controls, phase in of CER, and proposed reduced tariff and duties levels, suggest the possibility

of a gradual structural change in the nation's import to domestic activity relationship. The import of goods equation used in the base model displays a strong negative trend coefficient of -5.4 percent per annum suggesting that the nation has engaged and, will continue to engage in significant import substitution.   For this particular scenario, to examine the implications of reduced import substitution to that which is estimated to have taken place historically, the trend or structural coefficient in the equation has been reduced by 25 percent to -4.0 percent per annum. This modification reduces the future degree of import substitution that can be expected to occur and increases the overall elasticity of the equation. The modified equation suggests, assuming no relative price influence, that if the economy increases at a trend growth rate of 3 percent this will be associated with a trend increase in imports of goods of 4.6 percent giving an overall elasticity value of 1.5. This compares to an elasticity value of 1.1 in the base model associated with the same real GDP growth rate.

The effects on real GDP, unemployment rate, and net migration of reducing the degree of import substitution compared to the "base case" are shown in Figures 3.5 to 3.7. As expected, real growth over the simulation period is lower averaging 2.6 percent compared to 3.1 percent per annum in the "base case", while total net migration over the simulation period totals a mere 10,000 persons compared to 53,000 persons in the "base case". In the terminal year, 1994-95, imports of goods and services as a percentage of gross domestic product at 33 percent is significantly higher than the 31 percent ratio recorded in the "base case" despite the higher level of domestic activity associated with the latter.

These results suggest increased liberalisation of the external sector on the import side needs at the same time to be accompanied by increased growth in exports if domestic activity is not to be reduced.

Figure 3.5

% Reduced Import Substitution: Real Gross Domestic Product


```
  6              ←Actual——  -Trend estimates→
  5
  4                                               a
  3                                               b
  2
  1
  0
 -1
 -2       a="base case"
 -3       b= reduced import
              substitution
          62 64  66 68 70  72 74 76  78 80  82 84 86 88 90  92 94
                          Years ended March
```
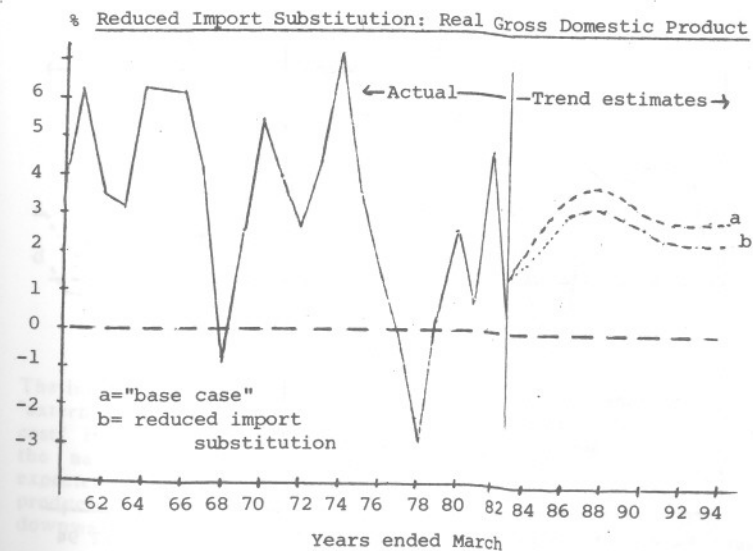
Figure 3.6

Reduced Import Substitution: Unemployment Rate

a=reduced import substitution
b="base case"

Years ended March
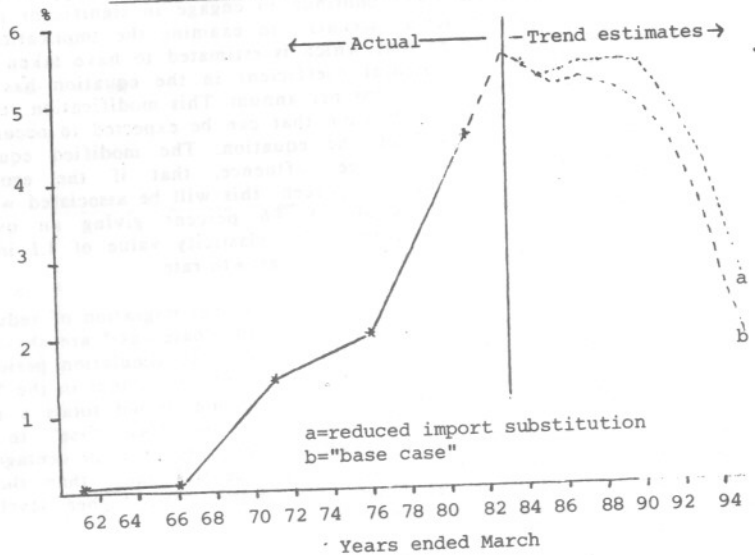
Figure 3.7

Reduced Import Substitution: Net Migration

(000 persons)

a="base case"
b=reduced import
    substitution

Years ended March
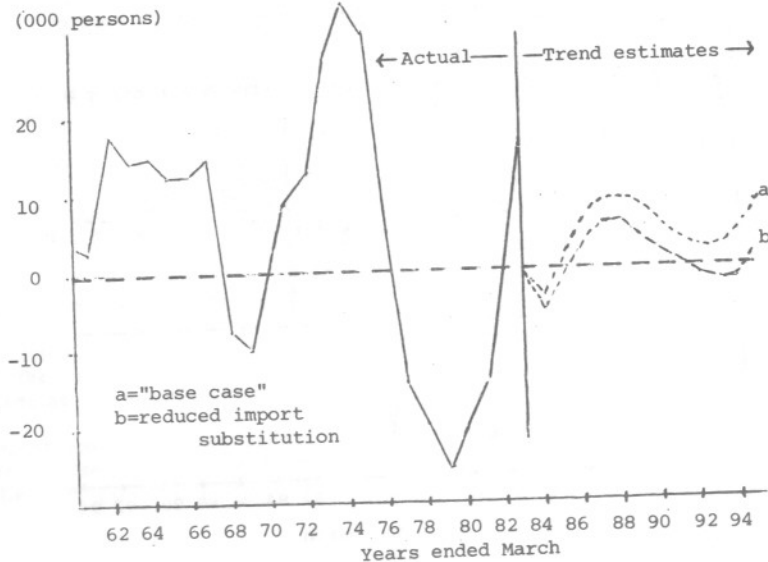
3.3 Deteriorating and Improving Terms of Trade

In the "base case" export and import prices, in foreign prices, are assumed to grow at annual rates of 6 and 6.5 percent respectively over the simulation period. Such rates suggest a decline in the nation's terms of trade of approximately 0.5 percent per annum over the projection period. However, historical experience (see figure 3.8) indicates that significant variations in the nation's terms of trade can occur for significant periods of time. In addition although the nation's terms of trade have on average in the post-war years displayed an overall decline there have been quite long periods of improving terms of trade.

Figure 3.8

Terms of Trade

Dec Qtr 1957=100

a=improving terms
    of trade
b="base case"
c=deteriorating terms of trade

Years ended March
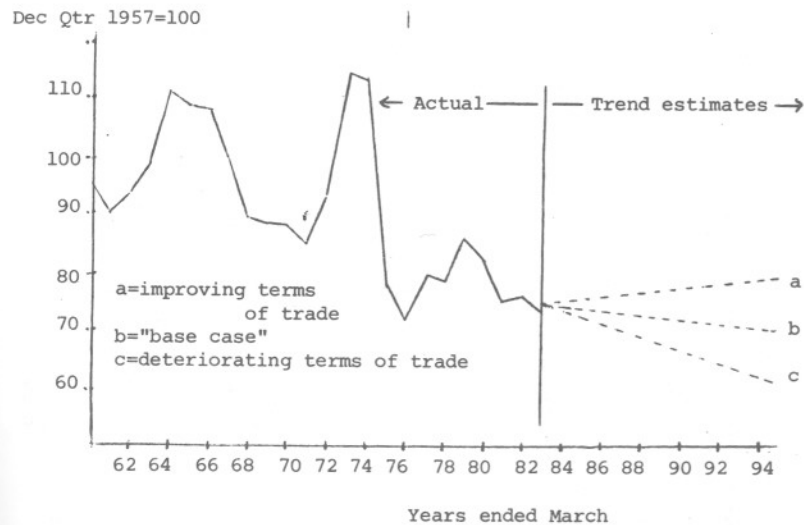
The importance of terms of trade changes on the performance of such a highly "externally dependent" economy as New Zealand is well known. In the "base case" it is assumed that our exports (particularly pastoral), compared to the nation's imports (raw materials and capital) will, because of the expected continued decline in the relative price of food and primary products compared to manufactured goods, result in a continuation of the downward trend in the nation's terms of trade. However, it could equally be

argued given rapid export diversification along with the effect of import replacement, particularly oil associated with the "think big" projects, that the nation's terms of trade, despite the current pessimistic outlook for pastoral products, may record a gradual improvement over the simulation period: 1983-95. Such an outcome could be the result of an economy undergoing significant structural change. In any case, given that it is difficult to be certain about future movements in the country's terms of trade, it was thought appropriate to present the results of two additional runs with differing terms of trade assumptions. Instead of assuming the terms of trade over the simulation period will decline by 0.5 percent per annum, alternative runs with the terms of trade declining by 1.5 percent or improving by 0.5 percent per annum were conducted. All other assumptions adopted in the "base case" scenario are unchanged.

The effects on some key macro-economic indicators, viz real gross domestic product, the unemployment rate and net migration, of assuming different terms of trade to the "base case" scenario are shown in Figures 3.9 to 3.11.

Figure 3.9

Terms of Trade Variations: Real Gross Domestic Product
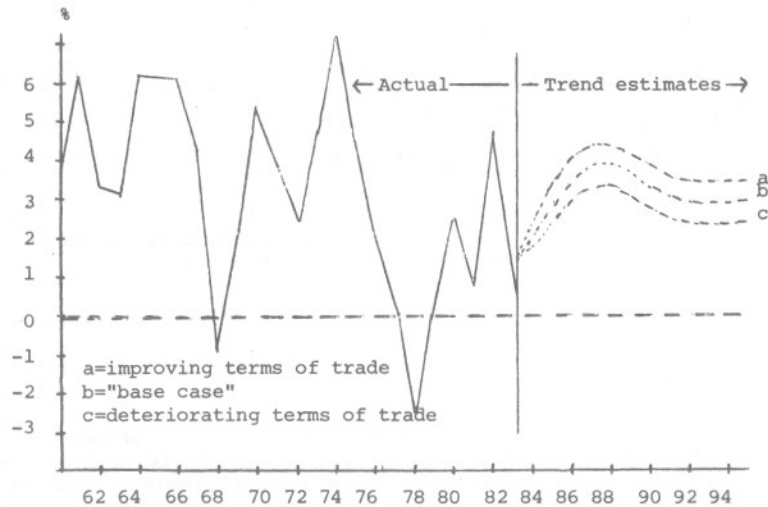
Figure 3.10

Terms of Trade Variation: Unemployment Rate
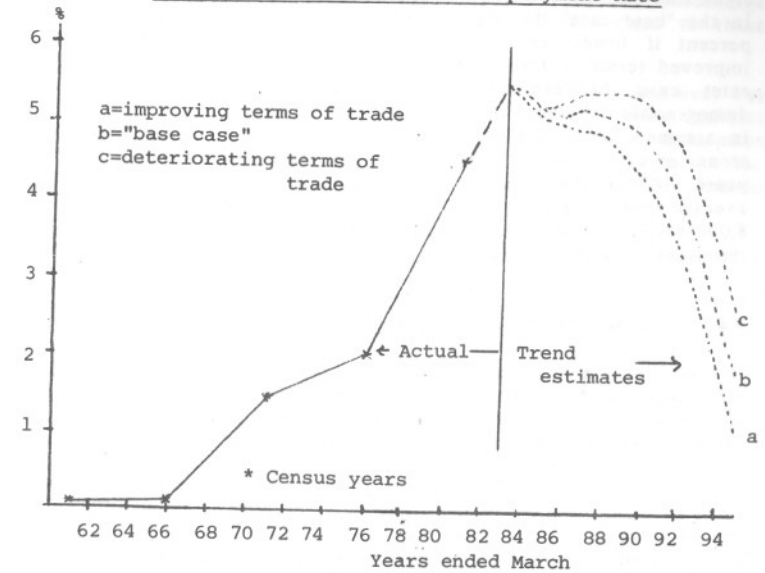
Figure 3.11

Terms of Trade Variations: Net Migration
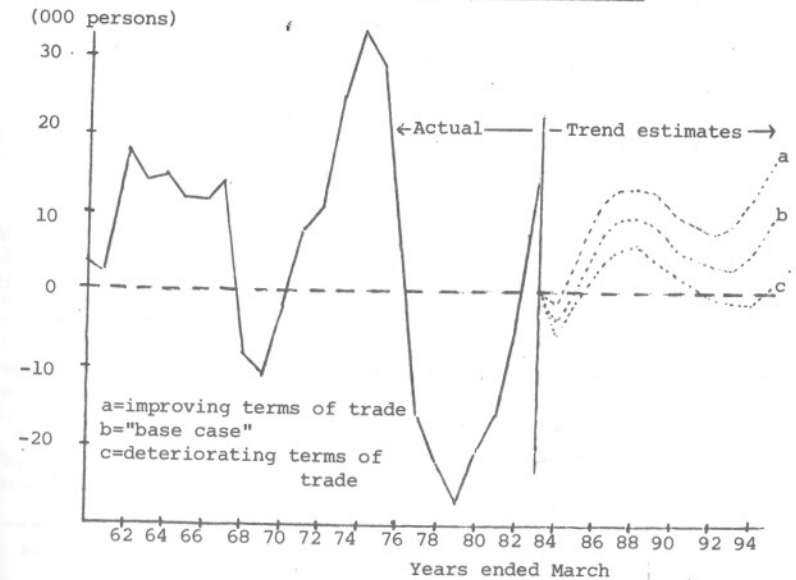
As shown in Figure 3.9 assuming different terms of trade leads to significant changes particularly in real growth over the simulation period. In the "base case" the average annual growth of 3.1 percent declines to 1.8 percent if lower terms of trade are assumed and rises to 2.6 percent if improved terms of trade are assumed. Although differences in unemployment rates exist between the three scenarios this series obscures a major demographic development that takes place; that of net migration. Differences in assumed net migration, and accordingly labour force between the three scenarios are shown in Figure 3.11. In the "base case" the nation over the years 1983-95 is estimated to gain an additional 53,000 from migration, an average annual gain of 4,400 persons. This rises to 102,000 and falls to 8,000 assuming improving or deteriorating terms of trade respectively. These represent annual net immigration gains of 8,500 and 700 respectively.

3.4   Lower and Higher Export Growth

In the "base case" exports of "traditional" goods, "non-traditional" goods and services are assumed to increase annually by 1.0, 6.0 and 6.0 respectively. These rates reflect approximately those recorded over recent years. However, significantly different rates, both higher and lower than these, have occurred historically. Accordingly it was thought appropriate to examine the model's behaviour to higher and lower export growth assumptions.

For the "high export" scenario "traditional", "non-traditional" and services are assumed to increase by 1.5, 8.0 and 8.0 percent per annum respectively over the simulation period. Alternatively, in the "low export" scenario these values are taken as 0.5, 4.0 and 4.0 percent. All other assumptions are unchanged.   The effect of assuming different export growth rates on the nation's growth is displayed in Figure 3.12.

Figure 3.12

Changing Export Growth Rates: Real Gross Domestic Product

a=higher export growth
b="base case"
c=lower export growth

Years ended March
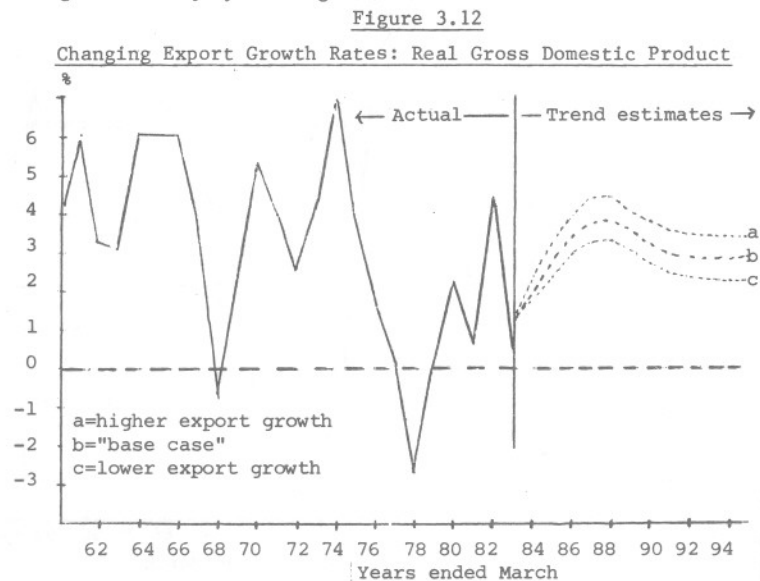
As the variation in export volumes has a similar effect on the nation's export receipts as varying the nation's terms of trade by one percentage point, it is not surprising that the results obtained are close to those discussed in the previous section.

In the case of the "high export" scenario the nation's growth rate over the simulation period averages 3.6 percent per annum and employment numbers increase by 364 thousand people or 2.1 percent per annum. The unemployment rate falls from 5.5 percent in 1983 to 1.1 in 1995. Numbers added to the population over the simulation period from migration under this scenario totals a significant 102,000 persons.

Conversely, in the "low export" scenario total net migration numbers total a mere 8,000. The nation's growth rate over the simulation averages 2.6 percent, numbers employed increase by 282 thousand while the unemployment rate declines from 5.5 percent in 1983 to 2.6 percent in 1995. Differences between the two scenarios and the "base case" can perhaps be best summarised in the terminal real gross domestic product per capita numbers. For the "high export" growth scenario this was $13,500 (1983 dollars) while in the "base case" and "low export growth" scenarios the relevant numbers are $12,900 and $12,300 respectively, compared with $9,900 for 1983.

3.5   Depreciating and Appreciating Real Exchange Rate

Since March 1985 the New Zealand economy has operated under a "free floating" exchange rate regime. This is a significant change in the nation's economic environment. As noted earlier considerable uncertainty surrounds how the country's real exchange rate will change through time in such an environment. It is quite possible, as shown in such examples as the British pound and the United States dollar recently, for a nation's currency to be in what many would regard as a medium-term disequilibrium level for quite long periods of time. In an attempt to gain some indication of the macro-economic effects of consistent "under" or "over" shooting of the exchange rate two simulations are presented: one in which the real exchange rate gradually appreciates and a second in which the exchange rate slowly depreciates.

In the first case it is assumed that the nominal exchange rate each period adjusts by 80 percent of that required to preserve the real exchange rate of the previous period. In the second case the converse situation applies, i.e. an adjustment of 120 percent occurs. Given the assumed domestic and external inflation rates of the "base case", this procedure results in the real exchange rate over the simulation period depreciating by 9.1 percent in the first case scenario and appreciating by 10.7 percent in the second. The assumed change in the real exchange rate compared to that of the "base case" and that experienced by the nation over recent years is displayed in Figure 3.13.

The impact of the gradual change in the real exchange rate on the nation's growth rate is displayed in Figure 3.14.

Figure 3.13

Real Exchange Rate

Index 1982-83=1000

← Actual — — Trend estimates →

a=appreciating exchange rate
b="base case"
c=depreciating exchange rate

Years ended March

Figure 3.14

Real Exchange Rate Variations: Real Gross Domestic Product

← Actual — — Trend estimates →

a=depreciating exchange rate
b="base case"
c=appreciating exchange rate

Years ended March
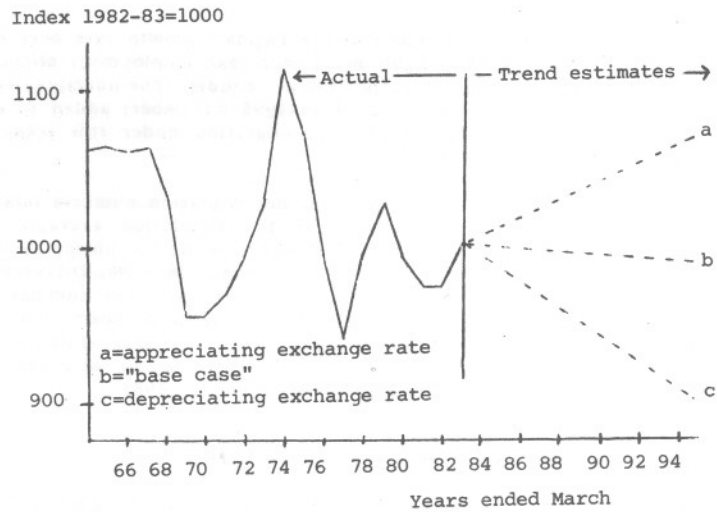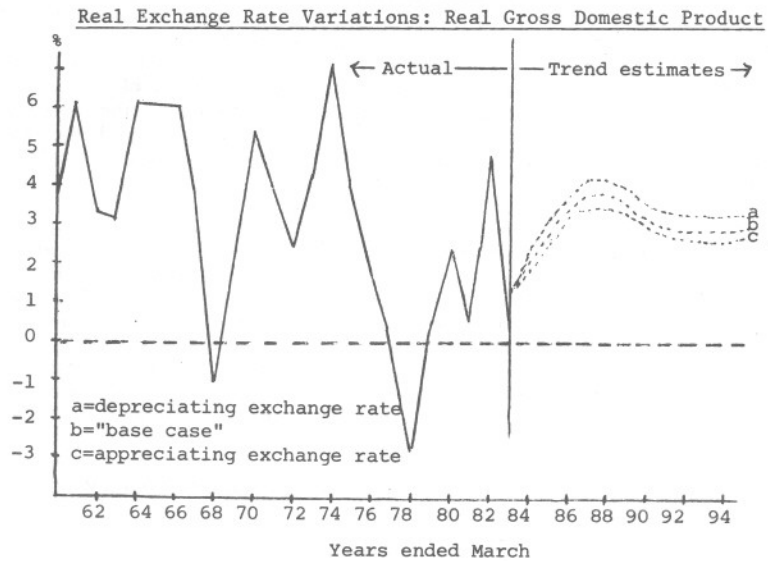
As shown in the above figure relatively minor changes in the real exchange rate appear to have a significant effect on the performance of the economy. The means by which a movement in the real exchange rate affects the domestic economy is primarily via a relative price effect in the export and import equations. This effect on the real growth of exports of goods and services is illustrated in Figure 3.15. By the terminal year 1995 exports of goods and services under the gradual revaluation scenario is some 4.0 percent less than that assumed in the "base case". While in the slow devaluation scenario exports of goods and services by 1995 is some 5.3 percent above that of the "base case".

Figure 3.15

Growth in Real Exports of Goods and Services

a=depreciating exchange rate
b="base case"
c=appreciating exchange rate

Years ended March
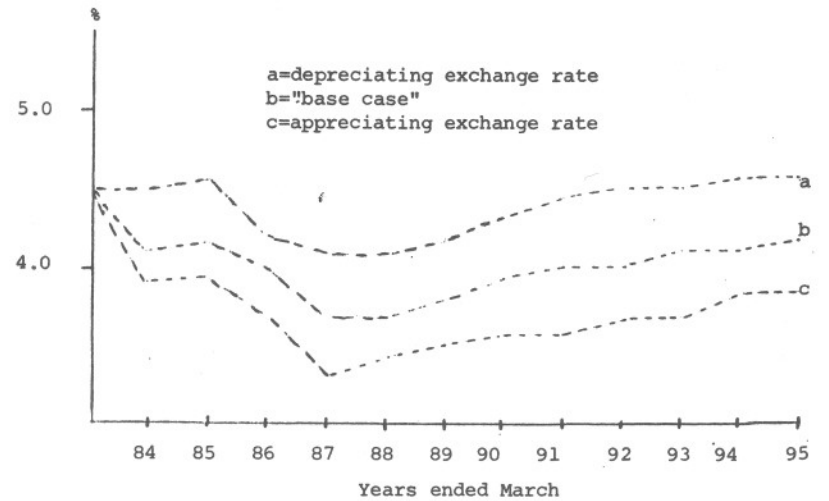
3.6 Large Scale Projects Less/More Additional

A degree of uncertainty surrounds the extent to which one should regard the costs and benefits of the various large-scale energy projects as "additional" to normal developments that could be expected to occur in the course of time. In the "base case" it is assumed that the identified projects should be regarded as 50 percent "additional". Apart from the possibility that the "think big" programme should be thought of as a normal investment and not as "additional", there is in addition the possibility that the nation has already taken the benefits of the projects early. An alternative, although not so widely expressed view is that such large-scale projects as the "syn-gas" plant and refinery expansion would not have taken place without central government involvement and should therefore be regarded as "additional" to traditional investment. To examine the implications of these two schools of thought simulations of the model were conducted assuming in one case the identified large-scale projects as normal investment and in the other as 100 percent additional to the base case. The effects on the nation's growth are shown in Figure 3.16.

Figure 3.16

Large Scale Projects: Real Gross Domestic Product
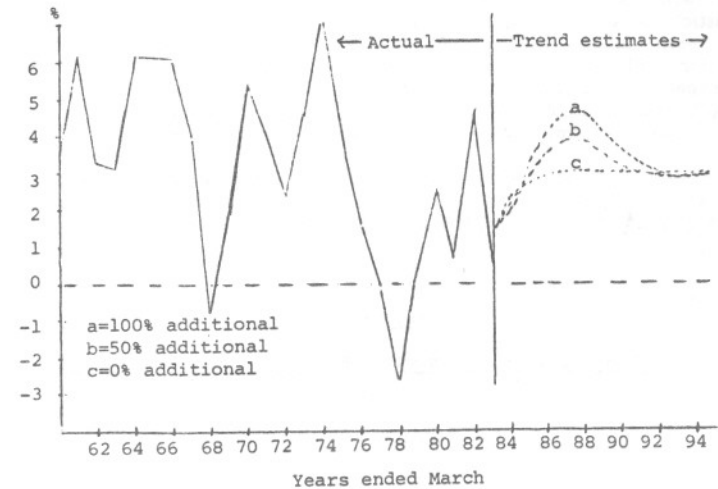
As portrayed in the above figure the profile of the nation's growth over the simulation period, 1983-95, is very dependent on whether the "think big" projects are regarded as "additional" or not, and second, if "additional" the degree of additionality. In the terminal year, 1995, real income per capita (1983 dollars) assuming 0,50 and 100 percent "additionality" is $12,600, $12,900 and $13,200 respectively, the difference between the two extreme cases being in the order of five percentage points. Although a major factor in shaping the profile of growth over the simulation period, the "major projects" and the degree to which they are regarded as "additional" are relatively unimportant compared to other factors such as the assumed growth in exports.

3.7   Combined Pessimistic and Optimistic Future Outlooks

In reality it is more probable that multiple rather than single changes to the "base case" would occur. In an attempt to examine this more probable situation a number of "optimistic" and "pessimistic" changes as outlined in the preceding scenarios have been combined. For the combined "optimistic" scenario it is assumed the nation's terms of trade will improve by 0.5% per annum (section 3.3) and secondly, the growth in exports of goods and services will be higher than the "base case" (section 3.4). For the "pessimistic" scenario option the large scale projects are assumed to have already been taken (section 3.6). In addition, it is assumed import substitution will be less than historically has been the case (section 3.2), a low export growth rate both for goods and services (section 3.4), along with declining terms of trade of approximately 1.5 percent per annum (section 3.3) are the combined elements of this particular scenario.

Model results for these scenarios compared to the "base case" are displayed in Figures 3.17 to 3.19 while Tables 3.4 and 3.5 detail the main economic and demographic projections associated with the two scenarios.

Figure 3.17

Combined Pessimistic/Optimistic: Real Gross Domestic Product
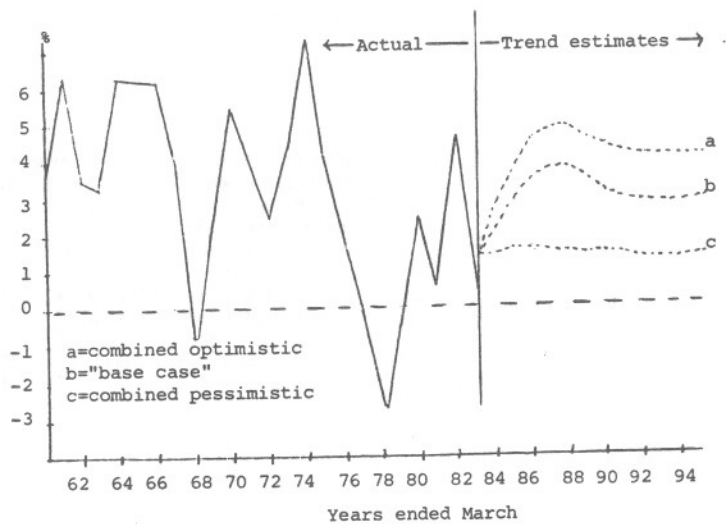
Figure 3.18

Combined Pessimistic/Optimistic: Unemployment Rate
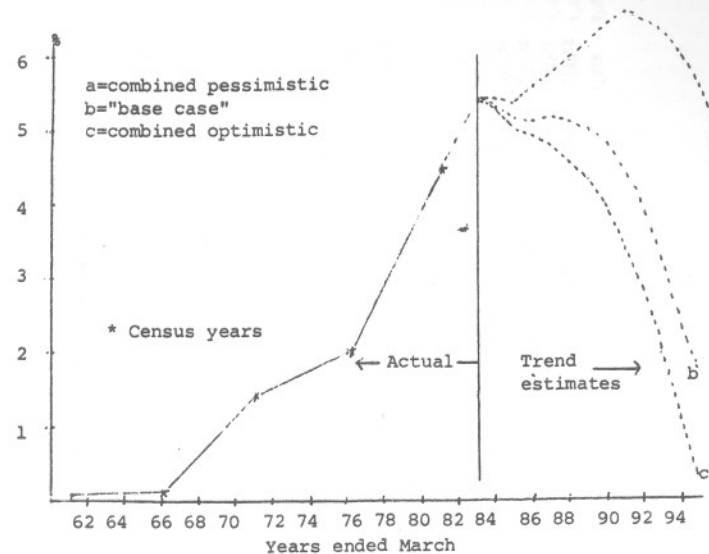
Figure 3.19

Combined Pessimistic/Optimistic: Net Migration

Table 3.4

Combined Pessimistic Scenario: Major Indicators

Year Ended March	Gross Domestic Product	Gross Fixed Capital Formation	Current Account Balance	Terms of Trade Rate	Real Exchange Rate	Population	Net Migration	Labour Force	Number Employed
	1982-83 prices ($ million)		Current prices ($ million)	1982-83 = 100		(000)			
1983	31,990	7,198	-1,698	100	100	3,230	0	1,375	1,300
1984	32,420	6,847	-1,905	99	100	3,249	-8	1,390	1,314
1985	32,874	6,529	-2,159	97	100	3,266	-8	1,405	1,329
1986	33,362	6,247	-2,469	96	100	3,283	-8	1,425	1,345
1987	33,855	5,975	-2,816	94	100	3,302	-8	1,446	1,361
1988	34,339	5,704	-3,185	93	100	3,320	-8	1,468	1,376
1989	34,809	5,432	-3,565	92	99	3,338	-8	1,488	1,392
1990	35,267	5,161	-3,950	90	99	3,354	-9	1,506	1,407
1991	35,719	5,001	-4,342	89	99	3,370	-9	1,522	1,422
1992	36,163	5,063	-4,728	88	99	3,385	-9	1,535	1,437
1993	36,603	5,124	-5,100	86	99	3,399	-9	1,545	1,452
1994	37,048	5,187	-5,466	85	99	3,413	-9	1,554	1,468
1995	37,511	5,252	-5,841	84	99	3,426	-9	1,560	1,483

Table 3.5

Combined Optimistic Scenario: Major Indicators

Year Ended March	Gross Domestic Product	Gross Fixed Capital Formation	Current Account Balance	Terms of Trade	Real Exchange Rate	Population	Net Migration	Labour Force	Number Employed
	1982-83 prices ($ million)		Current prices ($ million)	1982-83 = 100		(000)			
1983	31,990	7,198	-1,690	100	100	3,230	0	1,375	1,300
1984	32,589	7,109	-1,402	100	100	3,251	-1	1,391	1,317
1985	33,591	7,191	-1,123	101	100	3,278	7	1,413	1,342
1986	34,962	7,452	-900	101	100	3,313	14	1,443	1,373
1987	36,605	7,922	-782	102	100	3,353	17	1,477	1,408
1988	38,415	8,525	-783	102	100	3,397	18	1,514	1,445
1989	40,286	9,276	-967	103	99	3,440	16	1,549	1,483
1990	42,136	10,043	-1,228	104	99	3,480	14	1,581	1,520
1991	43,969	10,773	-1,352	104	99	3,516	13	1,611	1,557
1992	45,827	11,457	-1,341	105	99	3,556	14	1,637	1,594
1993	47,740	11,935	-1,182	105	96	3,594	17	1,662	1,631
1994	49,719	12,430	-821	106	99	3,636	21	1,688	1,668
1995	51,786	12,946	-237	106	99	3,680	22	1,713	1,707

4. CONCLUDING REMARKS

The main macro-economic variables from each of the scenarios are summarised in Table 4.1. This includes the initial values, final values and average growth rates of some of the main indicators from each of the output, demographic, price and external sectors. The important conclusions drawn from this table and from the previous section discussing the scenarios are:

(i)   New Zealand's average real growth rate is likely to average between 1.3 and 4.1 percent per annum between 1983 and 1995, with a Base Case estimate of 3 percent per annum or 2.6 percent with reduced import substitution. This compares with historical annual growth rates of 3.8 percent between 1964-73 and 1 percent between 1974-83.

(ii) The model results showed that the economy's performance is particularly sensitive to realistic changes in the export growth rates and the terms of trade. However, the experiments also indicate the importance of the real exchange rate. For example, improvements in the terms of trade, higher export growth rates or a depreciating real exchange rate will result in a better economic performance; including higher levels of employment, population and GDP per capita and a lower rate of unemployment.

(iii) The model scenarios suggest, that if the higher growth rates in the 1990's are to be sustained, then this will require a much more active immigration policy, otherwise growth will be constrained by the availability of labour.

(iv) It is estimated that the large scale projects, assuming they are 50 percent additional, will add about 0.3 percent per annum to the average GDP growth rate over the simulation run. This will result in real GDP being about 3 percent higher and about 20,000 more people being employed by 1995 than otherwise would have been the case.

Finally, we would like to repeat that SDMACRO has been developed to capture the main interactions and feedback links within the New Zealand economy, which are necessary to produce realistic medium term scenarios of the major macro-economic variables. It is intended that this model will be used and developed for further medium term policy analysis. However, this paper has presented the model and the results of a range of scenarios which, it is hoped, will be of interest to many readers.

TABLE 4.1
Summary of the Major Macro-Economic Indicators by Scenario

Scenario	Real GDP Value (1983 $000m)	Real GDP Growth rate 83-95 (%p.a)	Real GDP per capita Value (1983 $000)	Real GDP per capita Growth rate 83-95 (%p.a)	Real Investment/GDP ratio (%)	Population No (000)	Population Growth rate 83-95 (%p.a)	Total net migration over simulation (000)	Employment No (000)	Unemployment rate (%)	Real exchange rate	Terms of trade	Real exports of Goods & Services Value (1983 $000m)	Real exports Growth rate 83-95 (%p.a)	Current account balance/GDP ratio (%)
Initial Values (1983)	32.0	-	9.9	-	22.5	3230	-	0	1300	5.5	100	100	9.4	-	-5.3
Final Values (1995)															
Base Case	46.0	3.1	12.9	2.2	18.7	3579	0.86	53	1622	1.8	99	94	15.1	4.0	-2.1
Reduced import substitution	43.6	2.6	12.3	1.8	15.7	3536	0.76	10	1583	2.6	99	94	15.1	4.0	-2.9
Terms of Trade															
- decrease	43.5	2.6	12.3	1.8	15.6	3534	0.75	8	1582	2.6	99	84	14.2	3.5	-3.0
- increase	48.8	3.6	13.4	2.6	22.3	3628	0.97	102	1663	1.1	99	106	16.1	4.6	-1.2
Export growth															
- low	43.5	2.6	12.3	1.8	15.7	3534	0.75	8	1582	2.6	99	94	12.6	2.5	-3.0
- high	48.8	3.6	13.5	2.6	22.4	3629	0.98	102	1664	1.1	99	94	18.1	5.6	-1.1
Real exchange rate															
- appreciating	44.8	2.8	12.6	2.0	17.1	3557	0.81	31	1603	2.2	107	94	14.5	3.7	-2.5
- depreciating	47.6	3.4	13.2	2.4	20.7	3607	0.92	81	1646	1.4	90	94	15.9	4.5	-1.6
Large Scale Projects															
- zero additional	44.6	2.8	12.6	2.0	18.1	3553	0.80	27	1600	2.2	99	94	15.0	4.0	-2.1
- 100% additional	47.5	3.3	13.2	2.4	19.2	3606	0.92	80	1644	1.4	99	94	15.2	4.1	-2.1
Extreme Cases															
- pessimistic	37.5	1.3	10.9	0.8	14.0	3426	0.49	-100	1483	4.9	99	84	11.8	1.9	-4.7
- optimistic	51.8	4.1	14.1	3.0	25.0	3680	1.09	154	1707	0.3	99	106	19.3	6.2	-0.1

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Appendix A

COMPUTER LISTING OF THE MODEL

AND VARIABLE DEFINITIONS

```
* SDMACRO
NOTE
NOTE
NOTE                              *  SDMACRO  *
NOTE
NOTE              A MEDIUM TERM DYNAMIC MODEL OF THE NEW ZEALAND
NOTE               ECONOMY DEVELOPED BY R.Y.CAVANA & E.HAYWOOD
NOTE                             OCTOBER 1985
NOTE
NOTE
NOTE
NOTE                    **************************
NOTE                    *                        *
NOTE                    *     OUTPUT SECTOR       *
NOTE                    *                        *
NOTE                    **************************
NOTE
NOTE
NOTE
NOTE GROSS DOMESTIC PRODUCT
NOTE -----------------------
NOTE
A Q.K=QR.K*PD.K                          MONEY GDP
L QR.K=QR.J+DT*QRC.JK                    REAL GDP
N QR=31990E6
NOTE
NOTE POLICY CONTROLLING CHANGE IN REAL GDP
NOTE
R QRC.KL=QR.K*QRP.K
A QRP.K=WTBP*QRPBP.K+(1-WTBP)*QRPE.K
C WTBP=0.7
NOTE
NOTE BALANCE OF PAYMENTS POLICY EFFECT ON GDP CHANGE
NOTE
A QRPBP.K=TABXT(QRPBPT,CABQ.K,-0.07,0.01,0.04)
T QRPBPT=-0.02,0.03,0.08
A CABQ.K=CAB.K/Q.K
NOTE
NOTE EMPLOYMENT POLICY EFFECT ON GDP CHANGE
NOTE
A QRPE.K=-0.012+2.2989*EDP.K
A EDP.K=(EDF.K-E.K)/E.K
A EDF.K=LFF.K*ERD.K
A ERD.K=TABXT(ERDT,ER.K,0.92,1.0,0.02)
T ERDT=0.935,0.95,0.965,0.98,0.99
NOTE
NOTE PREVIOUS PERC. CHANGE IN REAL GDP
NOTE
L QRPJ.K=QRPJ.J+(DT/DT)*(QRP.J-QRPJ.J)
N QRPJ=0.025
NOTE
NOTE GDP INDICATORS
NOTE
A QRE.K=QR.K/E.K                      GDP PER PERSON EMPLOYED
A QRPOP.K=QR.K/POP.K                  GDP PER CAPITA
A QRPOPP.K=((1+QRP.K)/(1+POPP.K))-1 GROWTH IN GDP PER CAPITA
NOTE
```

```
NOTE GROSS FIXED CAPITAL FORMATION
NOTE --------------------------
NOTE
A CF.K=CFT.K+ICLS*CFLS.K              MONEY CAPITAL FORMATION
A CFR.K=CFTR.K+ICLS*CFLSR.K           REAL CAPITAL FORMATION
C ICLS=0.50                          ADD. IMPACT OF LARGE SCALE PROJECTS
NOTE
NOTE CAPITAL FORMATION - TRADITIONAL
NOTE
A CFT.K=CFTR.K*PCF.K
A CFTR.K=MIN(MAX(CFTRLL.K,CFTRN.K),CFTRUL.K)
A CFTRLL.K=0.14*QR.K
A CFTRUL.K=0.25*QR.K
L CFTRN.K=CFTRN.J+DT*CFTRNC.JK
N CFTRN=7198E6-ICLS*900E6
R CFTRNC.KL=CFTRN.K*CFTRNP.K
A CFTRNP.K=-0.10428+4.088*QRP.K
NOTE
NOTE CAPITAL FORMATION - LARGE SCALE PROJECTS
NOTE
A CFLS.K=CFLSR.K*PCFLS.K
A CFLSR.K=1E6*TABHL(CFLSRT,TIME.K,1983.25,1989.25,1)
T CFLSRT=900/1100/1000/700/400/100/0
NOTE
NOTE RATIO OF REAL CAP. FORM. TO REAL GDP
NOTE
A CFQR.K=CFR.K/QR.K
A CFTQR.K=CFTR.K/QR.K
NOTE
NOTE MISCELLANEOUS OUTPUT INFORMATION
NOTE ------------------------------
NOTE
NOTE CHANGE IN STOCKS
NOTE
A STC.K=STCQ*Q.K
C STCQ=0.05
NOTE
NOTE FINAL CONSUMPTION EXPENDITURE
NOTE
A CONS.K=Q.K-(CF.K+STC.K+XGS.K-MGS.K)
NOTE
NOTE RATIO OF NATIONAL AGG. TO GDP
NOTE
A CONSQ.K=CONS.K/Q.K
A CFQ.K=CF.K/Q.K
A XGSQ.K=XGS.K/Q.K
A MGSQ.K=MGS.K/Q.K
NOTE
NOTE
NOTE
NOTE               ****************************
NOTE               *                          *
NOTE               *    DEMOGRAPHIC SECTOR    *
NOTE               *                          *
NOTE               ****************************
NOTE
NOTE
NOTE
NOTE
```

```
NOTE EMPLOYMENT
NOTE ----------
NOTE
L E.K=E.J+DT*EC.JK                   NO. EMPLOYED
N E=1300E3
R EC.KL=E.K*EP.K
A EP.K=0.00522+0.435*QRP.K
A ER.K=E.K/LF.K                      EMPLOYMENT RATE
NOTE
NOTE UNEMPLOYMENT
NOTE
A UE.K=LF.K-E.K                      NO. UNEMPLOYED
A UER.K=1-ER.K                       UNEMPLOYMENT RATE
NOTE
NOTE LABOUR FORCE
NOTE ------------
NOTE
A LF.K=LFN.K+LFM.K
NOTE
NOTE NORMAL LABOUR FORCE WITH ZERO NET MIGRATION
NOTE
A LFN.K=TABXT(LFNT,TIME.K,1983.25,1995.25,1)*1E3
T LFNT=1375/1394/1414/1438/1464/1490/1515/1538/1559/
X 1578/1594/1608/1620
NOTE
NOTE LABOUR FORCE ASSOC. WITH NET MIGRATION
NOTE
A LFM.K=LFMP*MIGT.K
C LFMP=0.6
NOTE
NOTE LABOUR FORCE FORECASTS
NOTE
A LFF.K=LFNF.K+LFM.K
A LFNF.K=TABXT(LFNT,TIME.K+1,1983.25,1995.25,1)*1E3
NOTE
NOTE MIGRATION
NOTE ---------
NOTE
L MIGT.K=MIGT.J+DT*MIG.JK            TOTAL NET MIGRATION
N MIGT=0
R MIG.KL=MIGN.K+MIGPO.K              ANNUAL NET MIGRATION
NOTE
NOTE NORMAL NET MIGRATION
NOTE
A MIGN.K=-18262+735684*QRPJ.K
NOTE
NOTE ACTIVE IMMIGRATION POLICY
NOTE
A MIGPO.K=MIGPOE.K*TABIIL(MIGPOM,CABQ.K,-0.04,-0.03,0.01)
T MIGPOM=0,1
A MIGPOE.K=TABIIL(MIGPOT,ER.K,0.97,0.99,0.01)*1E3
T MIGPOT=0,5,10
NOTE
NOTE POPULATION
NOTE ----------
NOTE
A POP.K=POPN.K+MIGT.K
NOTE
```

```
NOTE POPULATION WITH ZERO NET MIGRATION
NOTE
A POPN.K=TABXT(POPNT,TIME.K,1983.25,1995.25,1)*1E3
T POPNT=3230/3255/3280/3305/3331/3357/3383/3408/3433/
X 3457/3480/3503/3526
NOTE
NOTE GROWTH IN POPULATION
NOTE
A POPP.K=((POP.K-POPJ.K)/POPJ.K)*(1/DT)
L POPJ.K=POPJ.J+(DT/DT)*(POP.J-POPJ.J)
N POPJ=3220E3
NOTE
NOTE
NOTE                    ***********************
NOTE                    *                     *
NOTE                    *   EXTERNAL SECTOR   *
NOTE                    *                     *
NOTE                    ***********************
NOTE
NOTE
NOTE EXTERNAL BALANCES
NOTE
A CAB.K=BGT.K+BIT.K                CURRENT ACCOUNT BALANCE
A BIT.K=BOS.K+NOII.K               BALANCE ON INVISIBLES TRANSACTIONS
NOTE
NOTE    GOODS TRADE
NOTE    ===========
NOTE
NOTE BALANCE ON GOODS TRADE
NOTE
A BGT.K=XG.K-MG.K
NOTE
NOTE EXPORTS OF GOODS
NOTE ----------------
NOTE
A XG.K=XGT.K+XGNT.K+ICLS*XGLS.K
A XGR.K=XGTR.K+XGNTR.K+ICLS*XGLSR.K
NOTE
NOTE GOODS EXPORTS - TRADITIONAL
NOTE
A XGT.K=XGTR.K*PX.K
L XGTR.K=XGTR.J+DT*XGTRC.JK
N XGTR=4180E6
R XGTRC.KL=XGTR.K*XGTRP.K
A XGTRP.K=XGTRN+PESXT*(PXP.K-PDP.K)
C XGTRN=0.01
C PESXT=0.3
NOTE
NOTE GOODS EXPORTS - NON TRADITIONAL
NOTE
A XGNT.K=XGNTR.K*PX.K
L XGNTR.K=XGNTR.J+DT*XGNTRC.JK
N XGNTR=3350E6
R XGNTRC.KL=XGNTR.K*XGNTRP.K
A XGNTRP.K=XGNTRN+PESXNT*(PXP.K-PDP.K)
C XGNTRN=0.06
C PESXNT=0.7
```

```
NOTE
NOTE GOODS EXPORTS - LARGE SCALE PROJECTS
NOTE
A XGLS.K=XGLSR.K*PX.K
A XGLSR.K=1E6*TABHL(XGLSRT,TIME.K,1983.25,1991.25,1)
T XGLSRT=20/120/230/300/290/270/260/260/270
NOTE
NOTE GROWTH IN REAL EXPORTS OF GOODS
NOTE
A XGRP.K=((XGR.K-XGRJ.K)/XGRJ.K)*(1/DT)
L XGRJ.K=XGRJ.J+(DT/DT)*(XGR.J-XGRJ.J)
N XGRJ=7460E6
NOTE
NOTE IMPORTS OF GOODS
NOTE ----------------
NOTE
A MG.K=MGT.K+ICLS*(MKLS.K-MSVLS.K)
A MGR.K=MGTR.K+ICLS*(MKLSR.K-MSVLSR.K)
NOTE
NOTE IMPORTS - TRADITIONAL GOODS
NOTE
A MGT.K=MGTR.K*PM.K
L MGTR.K=MGTR.J+DT*MGTRC.JK
N MGTR=7400E6-ICLS*MCCFLS*900E6
R MGTRC.KL=MGTR.K*MGTRP.K
A MGTRP.K=-0.054+2.878*QRP.K-0.567*(PMP.K-PDP.K)
NOTE
NOTE IMPORTS - CAPITAL FOR LARGE SCALE PROJECTS
NOTE
A MKLS.K=MKLSR.K*PM.K
A MKLSR.K=CFLSR.K*MCCFLS
NOTE
NOTE GOODS IMPORT SAVINGS - LARGE SCALE PROJECTS
NOTE
A MSVLS.K=MSVLSR.K*PM.K
A MSVLSR.K=1E6*TABHL(MSVLST,TIME.K,1983.25,1991.25,1)
T MSVLST=0/10/50/140/330/490/600/610/610
NOTE
NOTE GROWTH IN REAL IMPORTS OF GOODS
NOTE
A MGRP.K=((MGR.K-MGRJ.K)/MGRJ.K)*(1/DT)
L MGRJ.K=MGRJ.J+(DT/DT)*(MGR.J-MGRJ.J)
N MGRJ=7320E6
NOTE
NOTE    SERVICES TRADE
NOTE    ==============
NOTE
NOTE BALANCE ON SERVICES TRADE
NOTE
A BOS.K=XS.K-MS.K
NOTE
NOTE EXPORT OF SERVICES
NOTE
A XS.K=XSR.K*PX.K
L XSR.K=XSR.J+DT*XSRC.JK
N XSR=1850E6
R XSRC.KL=XSR.K*XSRP.K
A XSRP.K=XSRN+PESXS*(PXP.K-PDP.K)
```

```
C XSRN=0.06
C PESXS=0.5
NOTE
NOTE IMPORTS OF SERVICES
NOTE
A MS.K=(XG.K+MG.K)*MSPTT
C MSPTT=0.18
NOTE
NOTE MISCELLANEOUS TRADE INFORMATION
NOTE --------------------------------
NOTE
NOTE REAL EXPORTS OF GOODS & SERVICES
NOTE
A XGSR.K=XGR.K+XSR.K
NOTE
NOTE GROWTH IN REAL EXPORTS OF GOODS & SERVICES
NOTE
A XGSRP.K=((XGSR.K-XGSRJ.K)/XGSRJ.K)*(1/DT)
L XGSRJ.K=XGSRJ.J+(DT/DT)*(XGSR.J-XGSRJ.J)
N XGSRJ=9200E6
NOTE
NOTE EXPORTS OF GOODS & SERVICES
NOTE
A XGS.K=XG.K+XS.K
NOTE
NOTE IMPORTS OF GOODS & SERVICES
NOTE
A MGS.K=MG.K+MS.K
NOTE
NOTE      NET OVERSEAS INVESTMENT INCOME
NOTE      ==============================
NOTE
A NOII.K=NOIE.K+NOIL.K
NOTE
NOTE NET OVERSEAS INCOME FROM EQUITY
NOTE -------------------------------
NOTE
A NOIE.K=OCE.K-ODE.K
NOTE
NOTE OVERSEAS CREDITS FROM EQUITY
NOTE
A OCE.K=OCEF.K/EXR.K
L OCEF.K=OCEF.J+DT*OCEFC.JK
N OCEF=140E6
R OCEFC.KL=OCEF.K*OPR
N OPR=PWMP+ORR
C ORR=0.035
NOTE
NOTE OVERSEAS DEBITS FROM EQUITY
NOTE
A ODE.K=0.013*Q.K
NOTE
NOTE NET OVERSEAS INCOME FROM LOANS
NOTE ------------------------------
NOTE
A NOIL.K=OCL.K-ODL.K
NOTE
NOTE OVERSEAS CREDITS FROM LOANS
```

```
NOTE
A OCL.K=OCLF.K/EXR.K
L OCLF.K=OCLF.J+DT*OCLFC.JK
N OCLF=175E6
R OCLFC.KL=OCLF.K*OIR
N OIR=PWMP+ORR
NOTE
NOTE OVERSEAS DEBITS FROM LOANS
NOTE
A ODL.K=ODLO.K+ODLN.K
NOTE
NOTE OVERSEAS DEBITS FROM OLD LOANS
NOTE
A ODLO.K=890E6/EXR.K
NOTE
NOTE OVERSEAS DEBITS FROM NEW LOANS
NOTE
A ODLN.K=NOLF.K*OIR/EXR.K
L NOLF.K=NOLF.J+DT*(NOLCAB.JK*EXR.J)
N NOLF=0
R NOLCAB.KL=-(CAB.K-NOIE.K)
NOTE
NOTE
NOTE                            ***********************
NOTE                            *                     *
NOTE                            *   PRICE INDICES     *
NOTE                            *                     *
NOTE                            ***********************
NOTE
NOTE
NOTE
NOTE EXCHANGE RATE INDICES
NOTE ---------------------
NOTE
NOTE EXCHANGE RATE INDEX
NOTE
L EXR.K=EXR.J+DT*EXRC.JK
N EXR=1.0
R EXRC.KL=EXR.K*EXRP.K
A EXRP.K=WXR*(PWMP-PDPJ.K)
C WXR=1.0
NOTE
NOTE REAL EXCHANGE RATE INDEX
NOTE
A EXRR.K=(EXR.K*PD.K)/PWM.K
NOTE
NOTE EXPORT & IMPORT PRICE INDICES
NOTE -----------------------------
NOTE
NOTE EXPORT PRICE INDEX
NOTE
A PX.K=PWX.K/EXR.K
L PWX.K=PWX.J+DT*PWXC.JK
N PWX=1.0
R PWXC.KL=PWX.K*PWXP
C PWXP=0.06
A PXP.K=(((1+PWXP*DT)/(1+EXRP.K*DT))-1)/DT
```

```
L  PXCH.K=PXCH.J+DT*(PXP.J*PXCH.J)           CHECK ON PX
N  PXCH=PWX
NOTE
NOTE IMPORT PRICE INDEX
NOTE
A  PM.K=PWM.K/EXR.K
L  PWM.K=PWM.J+DT*PWMC.JK
N  PWM=1.0
R  PWMC.KL=PWM.K*PWMP
C  PWMP=0.065
A  PMP.K=(((1+PWMP*DT)/(1+EXRP.K*DT))-1)/DT
L  PMCH.K=PMCH.J+DT*(PMP.J*PMCH.J)           CHECK ON PM
N  PMCH=PWM
NOTE
NOTE TERMS OF TRADE
NOTE
A  TOT.K=PX.K/PM.K
NOTE
NOTE DOMESTIC PRICE INDICES
NOTE ---------------------
NOTE
NOTE DOMESTIC PRICE INDEX
NOTE
L  PD.K=PD.J+DT*PDC.JK
N  PD=1.0
R  PDC.KL=PD.K*PDP.K
A  PDP.K=0.7*PIP+0.3*PMP.K
C  PIP=0.10
L  PDPJ.K=PDPJ.J+(DT/DT)*(PDP.J-PDPJ.J)
N  PDPJ=0.105
NOTE
NOTE CAPITAL FORMATION PRICE INDICES
NOTE
A  PCF.K=MCCFT*PM.K+(1-MCCFT)*PD.K           TRADITIONAL
C  MCCFT=0.45
A  PCFLS.K=MCCFLS*PM.K+(1-MCCFLS)*PD.K       LARGE SCALE PROJECTS
C  MCCFLS=0.70
NOTE
NOTE
NOTE
NOTE      *************************************************
NOTE      *                                               *
NOTE      *                                               *
NOTE      *     CONTROL STATEMENTS & OUTPUT REQUEST       *
NOTE      *                                               *
NOTE      *************************************************
NOTE
NOTE
NOTE
NOTE
NOTE
C  DT=0.25
N  TIME=1983.25
C  LENGTH=1995.75
C  PLTPER=0.25
C  PRTPER=1
NOTE
NOTE
NOTE
PRINT 1)Q,QR,QRC,QRE,QRPOP,(0,5)QRP,QRPBP,QRPE,QRPJ,QRPOPP,POPP,CABQ
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PRINT 2)E,UE,EDF,EC,(0,5)EP,EDP,ERD,ER,UER
PRINT 3)LF,LFF,LFNF,LFN,LFM,POP,POPN,MIGT,(3,3)MIG,MIGN,MIGPO,MIGPOE
PRINT 4)CF,CFR,CFLS,CFLSR,CFT,CFTR,CFTRN,CFTRLL,CFTRUL,CFTRNC,
X (0,5)CFQR,CFTQR,CFTRNP
PRINT 5)XG,XGR,XGRP(0,5),XGLS,XGLSR,XGT,XGTR,XGTRP(0,5),
X XGTRC,XGNT,XGNTR,XGNTRP(0,5),XGNTRC,XGSR,XGSRP(0,5)
PRINT 6)MG,MGR,MGRP(0,5),MGT,MGTR,MGTRC,MGTRP(0,5),MKLS,MKLSR,
X MSVLS,MSVLSR
PRINT 7)XS,XSR,XSRC,XSRP,MS,BOS,NOII,BIT,BGT,CAB
PRINT 8)OCE,OCEF,OCEFC,ODE,NOIE,NOIL,OCL,OCLF,OCLFC,ODL,ODLO,ODLN,
X NOLF,NOLCAB
PRINT 9)EXR,EXRR,TOT,PX,PWX,PWXC,PM,PWM,PWMC,PD,PDC,PXCH,PMCH,PCF,PCFLS
PRINT 10)(0,5)EXRP,PWMP,PDPJ,PDP,PIP,PMP,PXP
PRINT 11)(9,2)CONS,STC,CF,XGS,MGS,Q,*,*,*,*,(0,3)CONSQ,STCQ,CFQ,XGSQ,
X MGSQ
NOTE
NOTE
NOTE
PLOT QRP=Q,QRPOPP=A,POPP=P(-0.01,0.05)
PLOT UER=U(0,0.10)/MIGN=N,MIGPO=O(-10E3,30E3)
PLOT TOT=T(0.7,1.1)/EXR=E,EXRR=R(0,2)
PLOT CAB=C,BGT=G,BOS=S,NOII=I(-6E9,6E9)/CABQ=R(-0.07,0.01)
NOTE
NOTE
NOTE
NOTE
NOTE
NOTE
NOTE
NOTE        ***************************
NOTE        *                         *
NOTE        *                         *
NOTE        *   VARIABLE DEFINITIONS  *
NOTE        *                         *
NOTE        ***************************
NOTE
NOTE
NOTE
NOTE
NOTE
NOTE    ABBREVIATIONS IN DIMENSIONS
NOTE    -------------- -- ----------
NOTE
NOTE    $       = CURRENT N.Z. DOLLAR
NOTE    1983$   = CONSTANT 1983 N.Z. DOLLAR
NOTE    F       = UNIT OF FOREIGN CURRENCY
NOTE    YR      = YEAR
NOTE    1       = DIMENSIONLESS
NOTE
NOTE
NOTE    NAME      DEFINITION
NOTE    ----      ----------                            DIMENSION
NOTE                                                    ---------
NOTE    BGT     = BALANCE ON GOODS TRADE                ($/YR)
NOTE    BIT     = BALANCE ON INVISIBLES TRANSACTIONS    ($/YR)
NOTE    BOS     = BALANCE ON SERVICES TRADE             ($/YR)
NOTE    CAB     = CURRENT ACCOUNT BALANCE               ($/YR)
NOTE    CABQ    = RATIO OF CURRENT ACC.BAL. TO GDP(Q)   (1)
NOTE    CF      = GROSS FIXED CAPITAL FORMATION         ($/YR)
NOTE    CFLS    = CAP. FORMATION - LARGE SCALE PROJECTS ($/YR)
NOTE    CFLSR   = REAL CAP. FORM. - LARGE SCALE PROJECTS (1983$/YR)
NOTE    CFLSRT  = TABLE VALUES FOR CFLSR                (1983$/YR)
NOTE    CFQ     = RATIO OF CAP.FORM. TO MONEY GDP       (1)
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NOTE    CFQR    = RATIO OF REAL CAP.FORM. TO REAL GDP        (1)
NOTE    CFR     = REAL GROSS FIXED CAPITAL FORMATION         (1983$/YR)
NOTE    CFT     = CAPITAL FORMATION - TRADITIONAL            ($/YR)
NOTE    CFTQR   = RATIO - REAL TRAD.CAP.FORM.TO REAL GDP     (1)
NOTE    CFTR    = REAL CAP. FORM. - TRADITIONAL              (1983$/YR)
NOTE    CFTRLL  = LOWER LIMIT FOR CFTR                       (1983$/YR)
NOTE    CFTRN   = NORMAL VALUE FOR CFTR                      (1983$/YR)
NOTE    CFTRNC  = ANNUAL CHANGE IN CFTRN                     (1983$/YR/YR)
NOTE    CFTRNP  = PERCENTAGE CHANGE IN CFTRN                 (1/YR)
NOTE    CFTRUL  = UPPER LIMIT FOR CFTR                       (1983$/YR)
NOTE    CONS    = FINAL CONSUMPTION EXPENDITURE              ($/YR)
NOTE    CONSQ   = RATIO OF CONS.EXP. TO MONEY GDP            (1)
NOTE    DT      = SOLUTION INTERVAL                          (YR)
NOTE    E       = TOTAL NUMBERS EMPLOYED                     (PERSON)
NOTE    EC      = ANNUAL CHANGE IN NUMBERS EMPLOYED          (PERSON/YR)
NOTE    EDF     = DESIRED FUTURE NO. EMPLOYED (NEXT YR)      (PERSON)
NOTE    EDP     = DESIRED PERC. CHANGE IN NO. EMPLOYED       (1/YR)
NOTE    EP      = PERCENTAGE CHANGE IN NO. EMPLOYED          (1/YR)
NOTE    ER      = EMPLOYMENT RATE                            (1)
NOTE    ERD     = DESIRED EMPLOYMENT RATE                    (1)
NOTE    ERDT    = TABLE FOR ERD                              (1)
NOTE    EXR     = NOMINAL EXCHANGE RATE INDEX                (F/$)
NOTE    EXRC    = ANNUAL CHANGE IN EXCHANGE RATE INDEX       (F/$/YR)
NOTE    EXRP    = PERC. CHANGE IN EXCHANGE RATE              (1/YR)
NOTE    EXRR    = REAL EXCHANGE RATE INDEX                   (1983F/1983$)
NOTE    ICLS    = ADD.IMPACT CO-EF.OF LARGE SCALE PROJ.      (1)
NOTE    LENGTH  = END OF SIMULATION RUN                      (YR)
NOTE    LF      = LABOUR FORCE                               (PERSON)
NOTE    LFF     = LABOUR FORCE FORECAST                      (PERSON)
NOTE    LFM     = TOT.CHANGE IN LF ASSOC.WITH NET MIGR.      (PERSON)
NOTE    LFMP    = PERC.PERSONS MIGRATING IN LABOUR FORCE     (1)
NOTE    LFN     = NORMAL LABOUR FORCE WITH ZERO NET MIG.     (PERSON)
NOTE    LFNF    = FORECAST OF LFN                            (PERSON)
NOTE    LFNT    = TABLE VALUES FOR LFN                       (PERSON)
NOTE    MCCFLS  = IMPORT CONTENT OF LARGE SCALE PROJECTS     (1)
NOTE    MCCFT   = IMPORT CONTENT FOR TRAD.CAP.FORM.          (1)
NOTE    MG      = IMPORTS OF GOODS                           ($/YR)
NOTE    MGR     = REAL IMPORTS OF GOODS                      (1983$/YR)
NOTE    MGRJ    = PREVIOUS VALUE OF MGR                      (1983$/YR)
NOTE    MGRP    = PERCENTAGE CHANGE IN MGR                   (1/YR)
NOTE    MGS     = IMPORTS OF GOODS & SERVICES                ($/YR)
NOTE    MGSQ    = RATIO OF IMPORTS OF G.&S. TO GDP           (1)
NOTE    MGT     = TRADITIONAL IMPORTS OF GOODS               ($/YR)
NOTE    MGTR    = REAL TRAD. IMPORTS OF GOODS                (1983$/YR)
NOTE    MGTRC   = ANNUAL CHANGE IN MGTR                      (1983$/YR)
NOTE    MGTRP   = PERCENTAGE CHANGE IN MGTR                  (1/YR)
NOTE    MIG     = ANNUAL NET MIGRATION                       (PERSON/YR)
NOTE    MIGN    = NORMAL ANNUAL NET MIGRATION                (PERSON/YR)
NOTE    MIGPO   = ACTIVE IMMIGRATION POLICY                  (PERSON/YR)
NOTE    MIGPOE  = IMMIG.POL.RELATED TO EMPLOYMENT RATE       (PERSON/YR)
NOTE    MIGPOM  = MULTIPLIER FOR CABQ IN MIGPO               (1)
NOTE    MIGPOT  = TABLE FOR MIGPO                            (PERSON/YR)
NOTE    MIGT    = TOTAL NET MIGRATION                        (PERSON)
NOTE    MKLS    = IMP. CAP. GOODS-LARGE SCALE PROJECTS       ($/YR)
NOTE    MKLSR   = REAL IMP. CAP. GOODS-LARGE SCALE PROJ.     (1983$/YR)
NOTE    MS      = IMPORTS OF SERVICES                        ($/YR)
NOTE    MSPTT   = MS AS A PROP. OF TOTAL GOODS TRADE         (1)
NOTE    MSVLS   = IMPORT SAVINGS - LARGE SCALE PROJECTS      ($/YR)
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NOTE    MSVLSR  = REAL IMP.SAV. - LARGE SCALE PROJECTS       (1983$/YR)
NOTE    MSVLST  = TABLE VALUES FOR MSVLSR                    (1983$/YR)
NOTE    NOIE    = NET OVERSEAS INCOME FROM EQUITY            ($/YR)
NOTE    NOII    = NET OVERSEAS INVESTMENT INCOME             ($/YR)
NOTE    NOIL    = NET OVERSEAS INCOME FROM LOANS             ($/YR)
NOTE    NOLCAB  = NEW O/SEAS LOANS TO FUND CUR.ACC.BAL.      ($/YR)
NOTE    NOLF    = NEW O/SEAS LOANS - FOREIGN CURRENCY        (F/YR)
NOTE    OCE     = OVERSEAS CREDITS FROM EQUITY               ($/YR)
NOTE    OCEF    = O/SEAS CREDITS FROM EQUITY-FGN CURR.       (F/YR)
NOTE    OCEFC   = ANNUAL CHANGE IN OCEF                      (F/YR/YR)
NOTE    OCL     = OVERSEAS CREDITS FROM LOANS                ($/YR)
NOTE    OCLF    = O/SEAS CREDITS FROM LOANS-FGN CURR.        (F/YR)
NOTE    OCLFC   = ANNUAL CHANGE IN OCLF                      (F/YR/YR)
NOTE    ODE     = OVERSEAS DEBITS FROM EQUITY                ($/YR)
NOTE    ODL     = OVERSEAS DEBITS FROM LOANS                 ($/YR)
NOTE    ODLN    = OVERSEAS DEBITS FROM NEW LOANS             ($/YR)
NOTE    ODLO    = OVERSEAS DEBITS FROM OLD LOANS             ($/YR)
NOTE    OIR     = OVERSEAS INTEREST RATE                     (1/YR)
NOTE    OPR     = OVERSEAS PROFIT RATE                       (1/YR)
NOTE    ORR     = OVERSEAS REAL RATE OF RETURN               (1/YR)
NOTE    PCF     = CAPITAL FORMATION PRICE INDEX              ($/1983$)
NOTE    PCFLS   = LARGE SCALE CAP.FORM. PRICE INDEX          ($/1983$)
NOTE    PD      = DOMESTIC PRICE INDEX                       ($/1983$)
NOTE    PDC     = ANNUAL CHANGE IN PD                        ($/1983$/YR)
NOTE    PDP     = PERC.CHANGE IN PD                          (1/YR)
NOTE    PDPJ    = PREVIOUS VALUE OF PDP                      (1/YR)
NOTE    PESXNT  = PRICE ELAST.SUPPLY FOR NON-TRAD.EXP.       (1)
NOTE    PESXS   = PRICE ELAST.SUPPLY FOR EXP.OF SERVICES     (1)
NOTE    PESXT   = PRICE ELAST.SUPPLY FOR TRAD.EXPORTS        (1)
NOTE    PIP     = N.Z.INTERNALLY GEN. PERC. CH.IN PD         (1/YR)
NOTE    PLTPER  = PLOTTING INTERVAL                          (YR)
NOTE    PM      = IMPORT PRICE INDEX                         ($/1983$)
NOTE    PMCH    = CHECK ON PM                                ($/1983$)
NOTE    PMP     = PERC.CHANGE IN PM                          (1/YR)
NOTE    POP     = TOTAL POPULATION                           (PERSON)
NOTE    POPJ    = PREVIOUS VALUE OF POP                      (PERSON)
NOTE    POPN    = POPULATION WITH ZERO NET MIGRATION         (PERSON)
NOTE    POPNT   = TABLE FOR POPN                             (PERSON)
NOTE    POPP    = PERCENTAGE CHANGE IN POPULATION            (1/YR)
NOTE    PRTPER  = PRINTING INTERVAL                          (YR)
NOTE    PWM     = WORLD IMPORT PRICE INDEX                   (F/1983F)
NOTE    PWMC    = CHANGE IN WORLD IMPORT PRICE INDEX         (F/1983F/YR)
NOTE    PWMP    = PERC.CHANGE IN WORLD IMPORT PRICES         (1/YR)
NOTE    PWX     = WORLD EXPORT PRICE INDEX                   (F/1983F)
NOTE    PWXC    = CHANGE IN WORLD EXPORT PRICE INDEX         (F/1983F/YR)
NOTE    PWXP    = PERC.CHANGE IN WORLD EXPORT PRICES         (1/YR)
NOTE    PX      = EXPORT PRICE INDEX                         ($/1983$)
NOTE    PXCH    = CHECK ON PX                                ($/1983$)
NOTE    PXP     = PERC.CHANGE IN PX                          (1/YR)
NOTE    Q       = GROSS DOMESTIC PRODUCT                     ($/YR)
NOTE    QR      = REAL GROSS DOMESTIC PRODUCT                (1983$/YR)
NOTE    QRC     = ANNUAL CHANGE IN QR                        (1983$/YR/YR)
NOTE    QRE     = OUTPUT PER PERSON EMPLOYED                 (1983$/YR/PERSON)
NOTE    QRP     = PERCENTAGE CHANGE IN QR                    (1/YR)
NOTE    QRPBP   = BAL. OF PAYMENTS POLICY EFFECT ON QRP      (1/YR)
NOTE    QRPBPT  = TABLE VALUES FOR QRPBP                     (1/YR)
NOTE    QRPE    = EMPLOYMENT POLICY EFFECT ON QRP            (1/YR)
NOTE    QRPJ    = PREVIOUS VALUE OF QRP                      (1/YR)
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NOTE    QRPOP  = REAL GDP PER CAPITA                      (1983$/YR/PERSON)
NOTE    QRPOPP = PERC. CHANGE IN REAL GDP PER CAPITA      (1/YR)
NOTE    STC    = CHANGE IN STOCKS                         ($/YR)
NOTE    SICQ   = RATIO OF CH.IN STOCKS TO GDP             (1)
NOTE    TIME   = SIMULATED TIME                           (YR)
NOTE    TOT    = TERMS OF TRADE                           (1)
NOTE    UE     = TOTAL NUMBER UNEMPLOYED                  (PERSON)
NOTE    UER    = UNEMPLOYMENT RATE                        (1)
NOTE    WTBP   = WEIGHT OF BAL.OF PAY. EFF. ON QRP        (1)
NOTE    WXR    = WEIGHT FOR FIXED/FLEXIBLE EXCH.RATE      (1)
NOTE    XG     = EXPORTS OF GOODS                         ($/YR)
NOTE    XGLS   = EXPORT GOODS FROM LARGE SCALE PROJECTS   ($/YR)
NOTE    XGLSR  = REAL EXP.GOODS FROM LARGE SCALE PROJ.    (1983$/YR)
NOTE    XGLSRT = TABLE VALUES FOR XGLSR                   (1983$/YR)
NOTE    XGNT   = EXPORT OF GOODS - NON TRADITIONAL        ($/YR)
NOTE    XGNTR  = REAL EXPORT OF GOODS - NON TRADITIONAL   (1983$/YR)
NOTE    XGNTRC = ANNUAL CHANGE IN XGNTR                   (1983$/YR/YR)
NOTE    XGNTRN = NORMAL VALUE FOR XGNTRP                  (1/YR)
NOTE    XGNTRP = PERCENTAGE CHANGE IN XGNTR               (1/YR)
NOTE    XGR    = REAL EXPORTS OF GOODS                    (1983$/YR)
NOTE    XGRJ   = PREVIOUS VALUE OF XGR                    (1983$/YR)
NOTE    XGRP   = PERCENTAGE CHANGE IN XGR                 (1/YR)
NOTE    XGS    = EXPORT OF GOODS & SERVICES               ($/YR)
NOTE    XGSQ   = RATIO OF EXPORTS OF G.&S. TO GDP         (1)
NOTE    XGSR   = REAL EXPORTS OF GOODS & SERVICES         (1983$/YR)
NOTE    XGSRJ  = PREVIOUS VALUE OF XGSR                   (1983$/YR)
NOTE    XGSRP  = PERCENTAGE CHANGE IN XGSR                (1/YR)
NOTE    XGT    = EXPORT OF GOODS - TRADITIONAL            ($/YR)
NOTE    XGTR   = REAL EXPORT OF GOODS - TRADITIONAL       (1983$/YR)
NOTE    XGTRC  = ANNUAL CHANGE IN XGTR                    (1983$/YR/YR)
NOTE    XGTRN  = NORMAL VALUE FOR XGTRP                   (1/YR)
NOTE    XGTRP  = PERCENTAGE CHANGE IN XGTR                (1/YR)
NOTE    XS     = EXPORTS OF SERVICES                      ($/YR)
NOTE    XSR    = REAL EXPORTS OF SERVICES                 (1983$/YR)
NOTE    XSRC   = ANNUAL CHANGE IN XSR                     (1983$/YR/YR)
NOTE    XSRN   = NORMAL VALUE FOR XSRP                    (1/YR)
NOTE    XSRP   = PERCENTAGE CHANGE IN XSR                 (1/YR)
NOTE
NOTE
NOTE
RUN BASE RUN
```

Appendix B

SIMULATED TABULAR AND GRAPHICAL OUTPUT

FOR THE BASE CASE

TIME	Q	E	LF	CF	XG	MG	XS	OCE	EXR	EXRP	CONS
	QR	UE	LFF	CFR	XGR	MGR	XSR	OCEF	EXRR	PWMP	STC
	QRC	EDF	LFNF	CFLS	XGRP	MGRP	XSRC	OCEFC	TOT	PDPJ	CF
	QRE	EC	LFN	CFLSR	XGLS	MGT	XSRP	ODE	PX	PDP	XGS
	QRPOP	EP	LFM	CFT	XGLSR	MGTR	MS	NOIE	PWX	PIP	MGS
	QRP	EDP	POP	CFTR	XGT	MGTRC	BOS	NOIL	PWXC	PMP	Q
	QRPBP	ERD	POPN	CFTRN	XGTR	MGTRP	NOII	OCL	PM	PXP	
	QRPE	ER	MIGT	CFTRLL	XGTRP	MKLS	BIT	OCLF	PWM		
	QRPJ	UER	MIG	CFTRUL	XGTRC	MKLSR	BGT	OCLFC	PWMC		
	QRPOPP		MIGN	CFTRNC	XGNT	MSVLS	CAB	ODL	PD		
	POPP		MIGPO	CFQR	XGNTR	MSVLSR		ODLO	PDC		CONSQ
	CABQ		MIGPOE	CFTQR	XGNTRP			ODLN	PXCH		STCQ
				CFTRNP	XGNTRC			NOLF	PMCH		CFQ
					XGSR			NOLCAB	PCF		XGSQ
					XGSRP				PCFLS		MGSQ
E+00	E+09	E+03	E+03	E+09	E+09	E+09	E+09	E+06	E+00	E+00	E+09
	E+09	E+03	E+03	E+06	E+09	E+09	E+06	E+06	E+00	E+00	E+09
	E+06	E+03	E+03	E+06	E+00	E+09	E+00	E+06	E+00	E+00	E+09
	E+03	E+03	E+03	E+06	E+06	E+09	E-03	E+06	E+00	E+00	E+09
	E+03	E+00	E+03	E+09	E+06	E+09	E+09	E+06	E+00	E+00	E+09
	E+00	E+00	E+03	E+06	E+09	E+06	E+06	E+06	E+00	E+00	E+09
	E+00	E+00	E+03	E+06	E+06	E+00	E+06	E+06	E+00	E+00	
	E+00	E+00	E+03	E+06	E+06	E+06	E+06	E+06	E+00		
	E+00	E+00	E+03	E+09	E+06	E+06	E+06	E+06	E+00		
	E+00		E+03	E+06	E+09	E+06	E+06	E+06	E+00		
	E+00		E+03	E+00	E+06	E+06		E+06	E+00		E+00
	E+00		E+03	E+00	E+00			E+06	E+00		E+00
				E+00	E+06			E+09	E+00		E+00
					E+09			E+06	E+00		E+00
					E+00				E+00		E+00
1983.3	31.99	1300.0	1375.0	7.198	7.540	7.400	1.850	140.00	1.0000	-.04000	23.89
	31.990	75.000	1394.0	7198.0	7.540	150.00	850.0	140.00	1.0000	.06500	1.60
	426.7	1330.0	1394.0	900.0	.04289	.04371	110.25	14.000	1.0000	.10500	7.20
	24.608	14.329	1375.0	900.0	20.00	7.085	59.594	415.9	1.0000	.10182	9.39
	9.904	.01102	.000	6.748	20.00	7.085	2.689	-275.9	1.0000	.10000	10.09
	.01334	.02308	3230.0	6748.0	4.180	-127.62	-839.2	-715.0	.06000	.10606	31.99
	.00146	.95409	3230.0	6748.0	4180.0	-.01801	-990.9	175.00	1.0000	.10101	
	.04106	.94545	.000	4478.6	.00976	630.00	-1830.1	175.00	1.0000		
	.02500	.05455	.130	7.997	40.783	630.00	140.0	17.500	.06500		
	.00091		.130	-335.70	3.350	.0	-1690.1	890.0	1.0000		
	.01242		.000	.22501	3350.0	.00		890.0	.10182		.747
	-.05283		.000	.21094	.05943			.0	1.0000		.050
				-.04975	199.10			.000	1.0000		.225
					9.390			1414.2	1.0000		.294
					.08261				1.0000		.315

Notes: i)   All variable definitions are provided in Appendix A

ii)   The value for each variable in the table is obtained by multiplying the decimal exponent, E, at the head of each column by the value at each point in time.

For example, the annual value for Q at 1983.3 (March 1983) is
$31.99 \cdot E{+}09 = 31.99 \cdot 10^9 = 31.99$ billion

```
1984.3   35.93   1316.2  1390.9   7.797      8.622    8.202    2.160   160.39   .9635    -.03543   26.78
         32.519  74.798  1410.9   7050.9     7.827    7.409    1960.7  154.53   .9980    .06500    1.80
         663.1   1347.0  1414.0   1217.0     .03700   .00910   113.60  15.453   .9951    .10043    7.80
         24.707  18.546  1394.0   1100.0     132.19   7.781    57.940  467.0    1.1016   .10040    10.78
         10.006  .01409  -3.051   7.189      120.00   7.029    3.028   -306.6   1.0614   .10000    11.23

         .02039  .02343  3249.9   6500.9     4.647    29.29    -868.4  -862.9   .06368   .10132    35.93
         .01119  .95467  3255.0   6500.9     4218.2   .00417   -1169.6 200.49   1.1070   .09628
         .04186  .94623  -5.085   4552.6     .00876   852.42   -2038.0 193.17   1.0666
         .01907  .05377  -4.232   8.130      36.968   770.00   419.6   19.317   .06933
         .01425          -4.232   -135.96    3.909    11.1     -1618.4 1063.4   1.1048

         .00605          .000     .21683     3548.3   10.00            923.7    .11091             .745
         -.04505         .000     .19991     .05712                    139.7    1.1016             .050
                                  -.02091    202.67                    1.346    1.1070             .217
                                             9.787                     1311.7   1.1058             .300
                                             .04119                             1.1064             .313
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
1985.3   40.62   1336.8  1409.6   8.498      9.844    9.120    2.516   183.45   .9298    -.03538   30.27
         33.301  72.856  1433.6   6956.7     8.126    7.454    2076.7  170.58   .9971    .06500    2.03
         951.1   1370.9  1438.0   1222.4     .03771   .01462   120.29  17.058   .9902    .10038    8.50
         24.911  23.586  1414.0   1000.0     278.65   8.722    57.923  528.1    1.2115   .10038    12.36
         10.175  .01764  -4.354   7.887      230.00   7.129    3.414   -344.7   1.1265   .10000    12.53

         .02856  .02552  3272.7   6456.7     5.155    197.41   -897.5  -1000.2  .06759   .10128    40.62
         .02080  .95624  3280.0   6456.7     4255.3   .02769   -1344.8 229.31   1.2235   .09623
         .04667  .94832  -7.257   4662.1     .00875   856.45   -2242.3 213.22   1.1376
         .02696  .05168  1.571    8.325      37.251   700.00   724.6   21.322   .07395
         .02069          1.571    80.57      4.550    61.2     -1517.7 1229.5   1.2199

         .00771          .000     .20890     3755.3   50.00            957.2    .12246             .745
         -.03736         .000     .19389     .05709                    272.3    1.2115             .050
                                  .01248     214.40                    2.532    1.2235             .209
                                             10.202                    1173.0   1.2215             .304
                                             .04181                             1.2224             .309
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
1986.3   46.27   1362.0  1435.7   9.386      11.215   10.218   2.931   209.82   .8973    -.03538   34.50
         34.349  73.679  1461.7   6955.6     8.417    7.557    2199.7  188.28   .9962    .06500    2.31
         1186.6  1398.1  1464.0   945.5      .03551   .02047   127.41  18.828   .9853    .10038    9.39
         25.219  27.577  1438.0   700.0      399.71   9.981    57.923  601.5    1.3324   .10038    14.15
         10.405  .02025  -2.291   8.914      300.00   7.382    3.858   -391.7   1.1956   .10000    14.08

         .03455  .02651  3301.2   6605.6     5.719    331.54   -927.1  -1126.1  .07174   .10128    46.27
         .02837  .95651  3305.0   6605.6     4292.7   .04491   -1517.8 262.28   1.3522   .09623
         .04895  .94868  -3.818   4808.9     .00875   662.58   -2444.9 235.36   1.2134
         .03339  .05132  6.306    8.587      37.578   490.00   996.6   23.536   .07887
         .02511          6.306    244.02     5.295    189.3    -1448.4 1388.4   1.3471

         .00920          .000     .20250     3974.4   140.00           991.8    .13522             .746
         -.03130         .000     .19231     .05709                    396.6    1.3324             .050
                                  .03694     226.91                    3.559    1.3522             .203
                                             10.617                    1056.7   1.3494             .306
                                             .04013                             1.3507             .304
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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1987.3   52.95   1390.6  1466.2   10.567     12.721   11.540   3.414   239.98   .8660    -.03538   39.51
         35.596  75.585  1492.2   7088.7     8.682    7.722    2329.9  207.83   .9953    .06500    2.65
         1335.2  1427.0  1490.0   596.9      .03130   .02564   134.95  20.783   .9805    .10038    10.57
         25.598  29.949  1464.0   400.0      424.94   11.577   57.923  688.3    1.4653   .10038    16.14
         10.675  .02154  2.173    10.268     290.00   7.747    4.367   -448.3   1.2690   .10000    15.91

         .03751  .02620  3334.6   6888.7     6.345    414.06   -953.0  -1244.4  .07614   .10128    52.95
         .03292  .95634  3331.0   6888.8     4330.4   .05345   -1692.8 299.98   1.4944   .09623
         .04823  .94845  3.621    4983.5     .00875   418.44   -2645.8 259.79   1.2942
         .03696  .05155  8.932    8.899      37.908   280.00   1181.0  25.979   .08412
         .02688          8.932    337.97     6.163    493.2    -1464.8 1544.4   1.4875

         .01036          .000     .19914     4206.2   330.00           1027.7   .14932             .746
         -.02767         .000     .19352     .05709                    516.7    1.4653             .050
                                  .04906     240.14                    4.475    1.4944             .200
                                             11.011                    1016.5   1.4906             .305
                                             .03690                             1.4923             .300
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
1988.3   60.71   1420.9  1497.8   12.004     14.431   13.155   3.977   274.48   .8358    -.03538   45.38
         36.959  76.845  1522.8   7290.0     8.955    7.965    2467.8  229.41   .9945    .06500    3.04
         1404.8  1456.6  1515.0   164.9      .03137   .03242   142.94  22.941   .9757    .10038    12.00
         26.011  30.912  1490.0   100.0      435.10   13.502   57.923  789.2    1.6115   .10038    18.41
         10.967  .02175  7.771    11.921     270.00   8.175    4.965   -514.7   1.3468   .10000    18.12

         .03801  .02508  3370.0   7240.0     7.040    448.71   -988.7  -1363.1  .08081   .10128    60.71
         .03474  .95652  3357.0   7240.0     4368.4   .05489   -1877.8 343.10   1.6516   .09623
         .04565  .94869  12.951   5174.3     .00875   115.61   -2866.5 286.76   1.3804
         .03795  .05131  9.654    9.240      38.241   70.00    1275.3  28.676   .08973
         .02714          9.654    370.02     7.174    809.3    -1591.2 1706.2   1.6425

         .01059          .000     .19724     4451.5   490.00           1064.9   .16488             .748
         -.02621         .000     .19589     .05709                    641.3    1.6114             .050
                                  .05111     254.15                    5.360    1.6516             .198
                                             11.423                    1076.5   1.6466             .303
                                             .03707                             1.6489             .299
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
1989.3   69.55   1451.4  1528.3   13.798     16.389   15.165   4.632   313.94   .8066    -.03538   52.09
         38.346  76.901  1551.3   7585.9     9.248    8.308    2613.9  253.22   .9936    .06500    3.48
         1365.1  1485.0  1538.0   .0         .03256   .04004   151.40  25.322   .9709    .10038    13.80
         26.419  30.053  1515.0   .0         460.78   15.713   57.923  904.1    1.7722   .10038    21.02
         11.261  .02071  13.349   13.798     260.00   8.608    5.680   -590.2   1.4295   .10000    20.85

         .03560  .02315  3405.2   7585.9     7.810    412.73   -1047.5 -1495.3  .08577   .10128    69.55
         .03319  .95726  3383.0   7585.9     4406.7   .04795   -2085.5 392.42   1.8254   .09623
         .04122  .94968  22.249   5368.4     .00875   .00      -3132.9 316.53   1.4723
         .03607  .05032  8.278    9.586      38.577   .00      1224.1  31.653   .09570
         .02513          8.278    312.91     8.349    1095.2   -1908.9 1887.7   1.8137

         .01021          .000     .19783     4711.1   600.00           1103.4   .18206             .749
         -.02745         .000     .19783     .05709                    784.3    1.8254             .050
                                  .04125     268.97                    6.326    1.8254             .198
                                             11.862                    1318.7   1.8189             .302
                                             .03812                             1.8219             .300
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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1990.3   79.46  1480.9  1555.8   15.793      18.635   17.528    5.396  359.07   .7784     -.03538   59.70
         39.675 74.981  1576.8  7860.1        9.561    8.688   2768.6  279.51   .9927      .06500    3.97
         1286.2 1512.0  1559.0      .0        .03369   .04137  160.37   27.951  .9661      .10038   15.79
         26.792 28.612  1538.0      .0       506.75   18.143   57.923 1033.0   1.9490      .10038   24.03
         11.541 .01932  17.841   15.793      260.00    8.993    6.509 -673.9   1.5172      .10000   24.04

         .03242  .02100 3437.7  7860.1         8.664  348.85  -1113.3 -1656.0  .09103      .10128   79.46
         .03076  .95885 3408.0  7860.1        4445.4  .03879  -2329.9  448.83 2.0174       .09623
         .03628  .95181 29.735  5554.5         .00875    .00  -3443.1  349.38 1.5704
         .03302  .04819  6.029   9.919        38.915    .00   1107.8   34.938  .10208
         .02300          6.029 221.98          9.718 1230.6  -2335.4 2104.8   2.0027

         .00920          .000  .19811         4985.9  610.00           1143.3   .20104              .751
        -.02939          .000  .19811          .05709                   961.5  1.9490               .050
                               .02824         284.66                    7.485  2.0174               .199
                                              12.330                   1661.5  2.0093               .302
                               .03911                                         2.0130               .303

1991.3   90.55  1509.9  1580.1   17.889      21.212   20.116    6.286  410.68   .7513     -.03538   68.19
         40.946 70.899  1599.1  8059.6        9.896    9.022   2932.5  308.52   .9919      .06500    4.53
         1256.2 1537.3  1578.0      .0        .03477   .03588  169.86   30.852  .9614      .10038   17.89
         27.131 28.019  1559.0      .0       578.74   20.796   57.923 1177.2   2.1435      .10038   27.50
         11.806 .01857  21.082   17.889      270.00    9.327    7.439 -766.5   1.6103      .10000   27.55

         .03068  .01861 3468.1  8059.6         9.612  315.14  -1153.3 -1847.5  .09662      .10128   90.55
         .03063  .96135 3433.0  8059.6        4484.5  .03379  -2614.0  513.35 2.2296       .09623
         .03079  .95513 35.137  5732.5         .00875    .00  -3767.3  385.65 1.6750
         .03099  .04487  4.540  10.237        39.257    .00   1096.6   38.565  .10887
         .02187          4.540 170.35         11.311 1360.1  -2670.7 2360.9   2.2114

         .00862          .000  .19683         5276.7  610.00           1184.7   .22199              .753
        -.02949          .000  .19683          .05709                  1176.2  2.1434               .050
                               .02114         301.26                    8.836  2.2296               .198
                                              12.829                   1904.2  2.2196               .304
                               .04004                                         2.2241               .304

1992.3  103.03  1537.0  1601.6   20.136      24.147   22.979    7.322  469.71   .7250     -.03538   77.74
         42.193 64.551  1617.6  8212.2       10.243    9.326   3106.1  340.55   .9910      .06500    5.15
         1240.4 1560.6  1594.0      .0        .03484   .03173  179.91   34.055  .9567      .10038   20.14
         27.451 27.679  1578.0      .0       636.48   23.731   57.923 1339.4   2.3573      .10038   31.47
         12.068 .01801  23.567   20.136      270.00    9.631    8.483 -869.7   1.7091      .10000   31.46

         .02940  .01533 3496.3  8212.2        10.664  289.89  -1160.7 -2060.5  .10255      .10128  103.03
         .03203  .96477 3457.0  8212.2        4523.8  .03010  -2930.2  587.14 2.4641       .09623
         .02325  .95970 39.278  5907.0         .00875    .00  -4090.9  425.69 1.7865
         .02961  .04030  3.524  10.548        39.602    .00   1167.6   42.569  .11613
         .02128          3.524 130.57         13.164 1503.1  -2923.3 2647.6   2.4419

         .00795          .000  .19463         5584.5  610.00           1227.5   .24513              .755
        -.02837          .000  .19463          .05709                  1420.1  2.3572               .050
                               .01590         318.83                   10.296  2.4641               .195
                                              13.349                   2053.6  2.4519               .305
                               .04019                                         2.4575               .305
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1993.3  117.13  1564.8  1619.6   22.584      27.503   26.182    8.529  537.23   .6997     -.03538   88.51
         43.440 54.801  1633.6  8337.9       10.609    9.614   3289.9  375.91   .9901      .06500    5.86
         1262.9 1583.9  1608.0      .0        .03543   .03019  190.56   37.591  .9520      .10038   22.58
         27.761 27.957  1594.0      .0       699.97   27.013   57.923 1522.7   2.5925      .10038   36.03
         12.332 .01787  25.570   22.584      270.00    9.919    9.663 -985.5   1.8140      .10000   35.85

         .02907  .01225 3522.6  8337.9        11.831  289.26  -1134.2 -2284.3  .10884      .10128  117.13
         .03460  .96962 3480.0  8337.9        4563.6  .02916  -3269.8  671.54 2.7233       .09623
         .01617  .96616 42.616  6081.6         .00875    .00  -4404.0  469.88 1.9055
         .02911  .03384  3.150  10.860        39.950    .00   1321.1   46.988  .12386
         .02146          3.150 121.46         15.322 1661.2  -3082.9 2955.8   2.6964

         .00745          .000  .19194         5910.2  610.00           1272.0   .27068              .756
        -.02632          .000  .19194          .05709                  1683.8  2.5924               .050
                               .01457         337.43                   11.782  2.7233               .193
                                              13.899                   2097.4  2.7085               .308
                               .04073                                         2.7153               .306

1994.3  133.14  1592.9  1635.6   25.306      31.344   29.811    9.935  614.46   .6753     -.03538  100.71
         44.714 42.718  1647.6  8457.9       10.994    9.905   3484.7  414.93   .9893      .06500    6.66
         1297.0 1607.1  1620.0      .0        .03600   .02978  201.84   41.493  .9473      .10038   25.31
         28.071 28.414  1608.0      .0       769.80   30.729   57.923 1730.8   2.8511      .10038   41.28
         12.599 .01784  27.586   25.306      270.00   10.210   11.008 -1116.3  1.9253      .10000   40.82

         .02901  .00892 3549.0  8457.9        13.126  295.83  -1072.7 -2508.0  .11552      .10128  133.14
         .03779  .97541 3503.0  8457.9        4603.6  .02898  -3624.3  768.07 3.0098       .09623
         .00850  .97388 45.977  6260.0         .00875    .00  -4697.0  518.66 2.0324
         .02898  .02612  4.996  11.179        40.300    .00   1533.1   51.866  .13211
         .02121          3.055 120.96         17.833 1836.0  -3163.9 3276.1   2.9775

         .00764          1.941 .18915         6254.9  610.00           1318.0   .29889              .756
        -.02376          1.941 .18915          .05709                  1958.1  2.8510               .050
                               .01430         357.11                   13.223  3.0097               .190
                                              14.478                   2047.6  2.9920               .310
                               .04126                                         3.0001               .307

1995.3  151.37  1621.7  1651.6   28.394      35.742   33.974   11.573  702.79   .6517     -.03538  114.62
         46.040 29.896  1663.6  8590.9       11.399   10.213   3690.9  458.00   .9884      .06500    7.57
         1359.3 1631.9  1632.0      .0        .03658   .03176  213.79   45.800  .9426      .10038   28.39
         28.390 29.294  1620.0      .0       846.60   34.988   57.923 1967.8   3.1356      .10038   47.31
         12.865 .01806  31.594   28.394      270.00   10.518   12.549 -1265.0  2.0434      .10000   46.52

         .02953  .00629 3578.7  8590.8        14.562  320.47   -975.6 -2721.2  .12261      .10128  151.37
         .04112  .98095 3526.0  8590.8        4644.1  .03047  -3986.2  878.48 3.3264       .09623
         .00246  .98190 52.656  6445.6         .00875    .00  -4961.8  572.50 2.1678
         .02965  .01810  9.503  11.510        40.654    .00   1767.7   57.250  .14091
         .02055          3.553 141.06         20.757 2029.1  -3194.1 3599.6   3.2878

         .00879          5.949 .18659         6619.7  610.00           1365.7   .33004              .757
        -.02110          5.949 .18659          .05709                  2234.0  3.1354               .050
                               .01642         377.94                   14.559  3.3263               .188
                                              15.090                   1929.1  3.3052               .313
                               .04178                                         3.3148               .307
```

QRP=Q,QRPOPP=A,POPP=P

```
       -10.A (-1%)              5.A  (0.5%)           20.A  (2%)              35.A  (3.5%)        (5%) 50.A QAP
  1983. . . . . . . . . . . . A . . . . . . . A . . P-Q . . . . . . . . . . . . . . . . . . . . . . . . . AP
       .                          P     A       A       Q   Q
       .                         .P          A     A     Q     Q
       .                         P  P           A    A    .Q
       .                        P P              A   A        Q    Q
       .                       P  P               .A   A         Q    Q
  1986. . . . . . . . . . . . P . . . . . . . . . . A A . . . . . . . Q . .Q . . . . . . . . . . . . . . .
       .                       P                   A A             Q   Q.Q
       .                        P                  A A            Q  Q
       .                        P                 A  A          Q.QQQ
       .                        P                 A A          QQQQ          Real GDP (%change)
  1988. . . . . . . . . . . . . P . . . . . . . . .A . . . . . . . . Q . . . . . . . . . . . . . . . . . .
       .                        P                A A             Q
       .                       P                 A             Q.Q
       .                      P                 A  A          Q  Q
       .                     P                 A A           Q  Q
       .                    P            Real GDP per capita Q  Q
  1991. . . . . . . . . . P . . . . . . A A (1% . . . . . . Q Q . . . . . . . . . . . . . . . . . . . . .
       .                 P         Population (% change)    Q
       .                P  P                A A           Q Q
       .                P P                 A A          Q Q
       .                P                   A A          Q Q
  1993. . . . . . . . . P . . . . . . . . . A A . . . . Q Q . . . . . . . . . . . . . . . . . . . . . . .
       .                P                   A A         Q Q Q
       .                P                   A A        Q Q Q
       .                 P                  A A       Q Q Q Q
       .                  P                 A A         Q Q Q
       .                   A                A          Q Q Q Q
  1996. . . . . . . . . . . P . . . . . . . A . . . . . Q . . . . . . . . . . . . . . . . . . . . . . . .
```

UER=U,MIGN=N,MIGPO=O

```
           .0              .025                .05               .075              .1 U
       -10.T (T = thousand) .0          10.T            20.T            30.T NO
  1983. . . . . . . . . . . . . . N . . . . . . . . . . . . . . U . . . . . . . . . . . NO
       . N                   O                            U
       .       N        N    O                            U
       .           N  N      O                           U U
       .                 N    O                          U
       .            N         O O                       U                          . NO
       .                   N    O                       U U
  1986. . . . . . . . . . . . O . . . N . . . . . . . . U . . . . . . . . . . . . . . .
       .                     O      N      N            U U      Unemployment rate
       .        Normal net migration  N     N          U U
       .                     O         N      N         U U
       .                     O          N      N        N .U
  1988. . . . . . . . . . . O . . . . . . N . . . . . N-U-U . . . . . . . . . . . . . .
       .                    O            Active immigration policy N .U U
       .                    O                 N    N     N .U U
       .                    O                   N   N     U
       .                    O                     N   N   U
  1991. . . . . . . . . . . O . . . . . . . . . . . N . . U . . . . . . . . . . . . . .
       .                    O                     N      U
       .                    O                    N      U
       .                    O                   N     U
       .                    O               N      U
  1993. . . . . . . . . O . . . . . . . . N-NU . . . . . . . . . . . . . . . . . . . . .
       .                O          U       N    U
       .                .U   O   N N      O                                     . UO
       .              U  U.   O  O N N   O
       .          U U         O  ON  N  O
  1996. . . . . . . U . . . . . . U . . . N . . . O . . . . . . . . . . . . . . . . . .
```

TOT=T,EXR=E,EXRR=R

```
          .7              .8              .9              1.             1.1 T
          .0              .5              1.             1.5             2. ER
1983.                                      E                 T               ER
                                           E                 T               ER
                                           ER                T.T
                                           ER                T.T.
                                           E  R              T.T
                                           E  R              T T
                                           E  R              T T
1986.                                      E  R              T T
                                           E  R              T T
                                           E   R             T T
                                           E   R             T T
                                           E   R             T T
                    Nominal exchange rate  E   R  Real       T T   Terms of Trade
                                           E   R  exchange   T T
                                           E   R  rate       T T
1988.                                      E   R            T T
                                           E   R            T T
                                           E   R            T T
                                           E   R            T T
                                           E   R            T T
                                           E   R           T T
                                           E   R           T T
1991.                                      E   R           T T
                                           E   R           T T
                                           E   R           T T
                                           E   R          T T
                                           E   R          T T
                                           E   R          T T
1993.                                      E  R           T T
                                           E  R          R.  T
                                           E  R          R.  T
                                           E E R         R.  T
                                           E E R         R.  T T
                                           .EE R         R.  T
                                           E  R          R.  T
1996.                                      E             R   T
```

CAB=C,BGT=G,BOS=S,NOII=I,CABQ=R

```
       -6000.M  (M=million)  -3000.M            0.         3000.M         6000.M CGSI
       -70.A   (-7%)         -50.A (-5%)     -30.A (-3%)  -10.A (-1%)    (1%) 10.A R
1983.                            C    IS         G                                R
                    R            C    I S        .G
                      R     R    C    I S         G
                         R  R    C    I S          G
                            R    CC   I S           G                         .  CR
                                 C  I  S            G                         .  IR
                                 C   SR            G                          .  CI
1986.                            C   S  R         -G                          .  CI
                                 CC   S   R        G                          .  CI
                                 IC   S    R       G                          .  CI
                                 IC   S    R       G
                                 IC   S     R      G
                                 I C  S      R     GG
                                 I C  S      R     G G
1988.                            I  C S       R   -G                          .  CI
                                 I  C  S       R   G                          .  CI
                                 I C   S       R   G
                                 IC    S       R   G
                           Balance on services    Ratio of current account   .  CI
                                 I C   S        R  G    balance to GDP        .  CI
                                  IC   S        R  G         Balance on       .  CI
                                  C    S        R  G         goods trade      .  CI
1991.                             C    S        R  G                          .  CI
                                  CI   C        R  G
                                  CI   C        R  G                          .  CI
                              Net  CI  C        R  G                          .  CI
                              overseas CI C     R  G                          .  CI
                              investment CC     R  G
                              income   CC   S   R  G
1993.                            IC   C.    S    R  G
                                  IC  C.    S    R  G
                                   IC C.    S     R G
                                    I C.    S     R G
                             Current Account balance S   R G
                                    I  C.   S      R  G
1996.                               IC      S        R G
```