Financial Deregulation & Disinflation in a Small, Open Economy: The New Zealand Experience

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with Stan Vandersyp.

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by

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EXECUTIVE SUMMARY

This monograph explores some of the implications of the key elements of the early policy moves of the 1984 Labour Government.

Part I outlines the advantages that can be gained through freeing financial markets from constraints. It points out that the end-result of loosening up the capital account depends on whether resultant capital inflows are used for consumption or investment.

The contribution to monetary control of a floating exchange rate in a deregulated financial environment is controversial. Critics of the float focus on international competitiveness. This ignores other issues: the extent to which a floating exchange rate can aid a disinflationary process and the evolution of structural change, which requires relative price changes. Liberalisation of the capital account may also play an important role since freeing up of capital flows should considerably aid the financing of structural change.

After considering the difficulties and alternative methodologies of empirical testing, empirical analysis of the effects of financial deregulation through the use of vector autoregressive (VAR) modeling is undertaken.

Part II explores the implications of the post-float movements in the NZ Dollar. This cannot be looked at in isolation from the opportunities for growth in financial services. The structural effects of a "booming sector" is considered and measures derived to evaluate the potential effects of monetary contraction.

The main concern is how the nominal exchange rate affects profitability. This depends upon, inter alia, the relative importance of exports and direct imports in the industry revenue and cost structure as well as their sources and destinations.

Competitiveness measures appear to suggest that the nominal exchange rate has been the major determining factor in relative competitiveness. However, contrary to some generalisations, the results suggest that exchange rate movements have benefited some manufacturing industries' profitability over the last three years.

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PREFACE

This monograph incorporates the results of two research projects undertaken over the period 1986 to 1988, funded by the Reserve Bank of New Zealand. The projects were dissimilar in their focus. The first examines the macroeconomic issues associated with financial deregulation. The second explores in some detail the impact of the post-float changes in the value of the New Zealand Dollar on the broadly defined manufacturing sectors. Nonetheless, the contrast in approach is itself interesting and for that reason both projects are presented in a single publication.

In doing this, the original reports, which are available as working papers from the NZIER, have been pared back significantly. Nevertheless, both remain distinct in this monograph. Part One deals with the macroeconomic implications of financial deregulation. This was written by Nicola Hunn, Dr David Mayes and C J (Stan) Vandersyp and completed in mid-1987. Special mention is due to Phil Briggs and Neil Williams, who undertook the empirical work. Part Two examines the sectoral impact of disinflation. This research was undertaken by Neil Williams and completed early in 1988. Bob Buckle, in his supervisory capacity, provided many useful comments in the course of this work, while thanks are also due to Dirk Catsberg (Department of Trade and Industry), Karen Renouf (Department of Statistics) and Professor Brian Philpott for help in gathering the data used.

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Finally, the NZIER would like to record its appreciation of the Reserve Bank of New Zealand's support, which has enabled us to undertake both the original research and this publication. The usual disclaimers apply.

CHAPTER 1

INTRODUCTION

1.1 Preamble

Since 1984 a wide-ranging process of economic liberalisation has been undertaken in New Zealand[1]. At the same time, a macroeconomic programme of disinflation has been under way. The removal of controls on capital flows in the foreign exchange market in December 1984 and the subsequent floating of the exchange rate in March 1985 were an integral part of this programme.

For the most part, the liberalisation experiment has involved more reliance on market mechanisms and less on government regulation in the process of resource allocation. Reform of the foreign exchange market was intended to contribute to these objectives in three ways: first, by creating a more competitive market, lowering transaction costs for the domestic corporate sector and encouraging a wider range of information and hedging services; second, by complementing the extensive financial market reforms with a greater interaction between the foreign exchange market, the broader domestic financial market and foreign asset markets; and, third, by facilitating the move to a floating exchange rate.

The contribution to monetary control of a floating exchange rate in a deregulated financial environment is by no means an uncontroversial issue, critics of the float have been concerned primarily with the effects on the international competitiveness of the tradeable goods sector. The major concern has been whether, during a process of economic liberalisation and monetary disinflation, the nominal exchange rate will generate "appropriate" relative price signals to domestic producers. Much of the criticism has been provoked by the behaviour of the exchange rate since the float. However, it can find support from the emerging literature on the optimal sequencing of market reform and the past experience of overseas countries that have combined an economic liberalisation programme with monetary disinflation.

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1. See Bollard and Buckle (1988) and Harper (1986) for details.

New Zealand has experienced such a policy mix since 1984. Both the monetary disinflation and liberalisation policies have the potential to influence the nominal exchange rate in such a way that producers of tradeable goods may be relatively disadvantaged.

The literature on optimal sequencing of market reform makes it clear that the treatment of the foreign exchange market, during a process of economic liberalisation, can be crucial to the success of that whole process. The inference drawn in several studies, particularly those based on the experience of the Southern Cone countries of South America, is that for a successful transition from a repressed to a liberalised economy, the order in which trade, fiscal, monetary and foreign exchange measures are taken can turn out to be critical.

There are no definitive theoretical results which can provide firm conclusions about the optimal scope and sequence of reform. A convergence of informed opinion has nevertheless emerged that there are useful rules to follow. One aspect of this consensus is summarised by Mathieson (1986):

> "Scope and sequencing of financial reforms must be closely linked to other trade and fiscal changes .... trade reforms - including removal of import quotas and lowering protective import tariffs - should come early in the overall reform process. The liberalisation of the financial system should also be introduced early, but gradually ..... international capital controls, it is agreed, should be relaxed only at the final stage of the reform process".

The rationale for retaining capital controls until the end of the reform process is the fact that, especially in countries that have undertaken to combine stabilisation and financial liberalisation, capital flows have been a major source of difficulties for the reform process. The combination of stabilisation and financial liberalisation has increased the perceived yields on domestic real and financial assets. The result is an inflow of capital which, with flexible exchange rates, tends to lead to an appreciation of the nominal and real exchange rates. To the extent that this is incompatible with improvement in the external balance of an economy there may be destabilisation of the adjustment process.

These inferences ignore, however, a number of other issues. First, the extent to which a floating exchange rate can aid a disinflationary process relying on monetary policy. In this respect, the lessons from the OECD experience of the late 1970s and early 1980s become relevant. Generally such a policy mix has been successful in achieving inflation and, ultimately, growth objectives, although there remains the issue of unemployment. More importantly, and less often addressed, is the evolution of structural change - measured by both the fall and rise of various activities and improving productivity - which requires relative changes in price levels - including the exchange rate - to enforce and cement into place.

In this respect it is not entirely clear that an appreciating real exchange rate has only adverse effects for all sectors of the economy. This issue was explored by Pope (1981) in respect of Australia. In essence, much depends upon the extent to which sectors are "open" to the rest of the world in respect of imports as well as exports. This issue can be widened, for a small, open economy such as New Zealand, to consideration of the cost of investment goods. These costs fall under this scenario, enhancing the ability of the domestic economy to implement capital-based productivity improvements and to adjust the pattern of economic activity.

Liberalisation of the capital account may also play an important part in this alternative to the optimal sequencing arguments. In particular, freeing up of both internal and external capital flows should considerably aid structural change, especially when key activities, as in New Zealand, have a long history of overseas ownership. Perhaps more important is the issue of whether capital controls can be effective in any case. The lessons from the South American countries, with their problems of capital flight, are instructive. Even under the relative economic and political stability of New Zealand there was doubt that capital controls - such as they were - achieved the objectives desired.

Objectives of the Research:

This monograph presents the results of two projects that were designed to explore some of the issues related to the debate outlined above. The first was an assessment of the macroeconomic impact of financial deregulation in New Zealand and the second an evaluation

of the sectoral implications of changes in the nominal exchange rate since 1984.

Part I: deals with the macroeconomic effects of financial deregulation and empirically tests for structural change resulting from the legislative changes. It first discusses the forms which financial regulation normally takes in a repressed economy, the reasons for it and the problems of disentangling the effect of financial deregulation from the impact of other liberalisation policies. It then details the role of the financial sector in the macroeconomy and the economic consequences of that regulation. This highlights the advantages that can be gained through freeing financial markets from earlier constraints. It leads into a discussion of the immediate effects of removing the controls for areas such as credit and investment, the longer-term consequences of freeing the capital account and the relationship between financial deregulation, capital flows, interest rates and the exchange rate, particularly at a time of disinflation. Some broad conclusions are drawn about the effects of loosening up the current account and parallels with overseas experience. It points out that the end-result is likely to depend on whether the capital inflows are used for consumption or productive investment. A discussion of the New Zealand experience since deregulation in 1984 follows.

After considering the difficulties and alternative methodologies of empirical testing, the discussion is completed with an empirical analysis of the effects of financial deregulation on the macroeconomy through the use of vector autoregressive (VAR) modelling.

Part II: explores the implications for New Zealand producers of the movement in the value of the NZ Dollar since the exchange rate was floated. The floating exchange rate cannot be looked at in isolation from the disinflationary environment, however, or from the fact that the combination of deregulation of the foreign exchange market, removal of interest rate controls and various other regulations created opportunities for growth in the financial services sector. The methodology used by Corden and Neary (1982) to analyse the structural effects of a "booming sector" is considered for its relevance to the New Zealand experience. Recent contributions by Corden in which a standard two-sector tradeable/non-tradeable

model is applied to evaluate the implications of a monetary contraction for prices and output in each sector are turned to. This allows identification of the potential effects of monetary contraction, particularly on the exchange rate, and consideration of the sectoral implications of wider market liberalisation, particularly when this liberalisation results in biased sectoral growth.

Using the Corden approach the main concern is how the nominal exchange rate affects profitability in different manufacturing industries. This depends upon, inter alia, the relative importance of exports and direct imports in the industry revenue and cost structure as well as the source and destination of direct imports and of exports. This is because of the divergent behaviour of the New Zealand dollar cross rates. Contrary to some recent popular generalisations, the results suggest that exchange rate movements have benefited some manufacturing industries' profitability over the last three years. They also point to import-competing industries having fared better than exporting industries.

Attention then focuses on the relationship between the real exchange rate, non-exchange rate costs and relative profitability between individual tradeable industries and the non-tradeable sector. The way in which the nominal exchange rate affects profitability in different manufacturing industries and measures of internal and external competitiveness and the impact of non-exchange rate costs are also examined. Competitiveness measures are derived for the different manufacturing production groups in the New Zealand economy. The results appear to suggest that changes in the nominal exchange rate have been the major determining factor in the relative competitiveness of manufacturing.

1.2 Deregulation and Change: Analytical Problems

Before analysing the impact of financial deregulation and disinflation at the macroeconomic or sectoral level, it is useful to understand the background to the changes in financial regulation - why the regulations were first implemented; the interaction between the financial sector and the macroeconomy and the consequent factors of economic influence; the macroeconomic pressures that existed from the outset; the empirical techniques and problems involved with their implementation in analysing economic change;

and, finally, the conflict of interest that exists between varied policy options, reflecting expectations and uncertainties and the roles of influence in the macroeconomy.

1.2.1 Motives and Effects

Two main motives existed for implementing the initial financial regulations: the first was to try to protect the economy from progressive collapse of the financial system through the imprudent behaviour or bad luck of the managers of a few financial institutions. The second was to achieve macroeconomic objectives, particularly with regard to the rate of inflation. This second motive encompassed what is usually known as monetary policy. A collapse of the financial system would have a massively depressing effect on the real economy while, whatever particular view is held of the economy's behaviour, it is generally accepted that unfettered monetary growth would be highly inflationary. Many other motives for regulation have been cited and a succinct summary was given in the March 1987 Reserve Bank Bulletin (RBNZ (1987), pp 10-11).

As the understanding of the operation of financial markets of both the regulatory authorities and those running financial intermediaries has improved, it has become accepted that levels of prudential control in the past may have been greater than were necessary to avoid system failure. This was particularly true where users had confidence in the system and there was little realistic chance of serious failure. Indeed, regulations enforcing segmentation of the market may make the system more fragile as they restrict the ability of financial institutions to spread risk. To achieve suitably less regulated but effective prudential control, it is necessary, on the one hand, to have responsible managers of financial institutions and, on the other, to have adequate means of monitoring and intervening by central banks to ensure that potential difficulties can be spotted and early corrective action taken.

The second motive for regulation, namely, to provide a control mechanism for the economy as a whole, has been the more important for New Zealand[2] and has come in for the most criticism. There is

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2. Indeed, the Reserve Bank Act did not allow for prudential supervision.

considerable dispute over the way in which financial regulation affects the real growth of the economy and further dispute over the ways in which regulation influences the rate of general price inflation. Nevertheless, it has become widely accepted that controls the world over have tended to be excessive: not merely ineffective in many instances, but actually counter-productive. Thus excessive regulation inhibits the efficiency of the market, restricting access of borrowers to funds and reducing the rates of return that can be earned by depositors. Both of these in turn lead to a holding back of the real growth and development of the economy.

In the case of New Zealand, criticism has been levelled at the system in place before 1984 on both counts. As a result, major changes have taken place since 1984 through a process which is still not yet complete, but which has already taken New Zealand from having one of the most regulated financial markets in the OECD to arguably the freest of all.

Harper (1986) (pp40-43) lists the changes which took place between July 1984 and July 1987. This period of change is described in some detail in Keenan and Mayes (1987). However, to understand the impact of deregulation one must also be aware of the nature of the pre-existing regulations.

(i) **direct controls on activities of financial intermediaries:**

Prior to mid-1984, there were controls on both the quantity of lending and the price - interest rates - which could be charged. Financial institutions were also subject to controls on their reserve asset ratios. See Harper (1986) and RBNZ (1986), p90, for the dates and details.

(ii) **regulatory barriers to entry to the industry:**

The members of each of the following five groups of banks were accredited with carefully delineated statutory functions: trading banks; private savings banks; trustee savings banks; Post Office Savings Bank; Reserve Bank. Any new bank could only be incorporated by Act of Parliament.

Restrictions were placed on other activities and financial institutions. Until August 1983 only the four trading banks could deal in foreign exchange. Foreign ownership of financial institutions was limited to 70%.

In July 1986 a provision was introduced allowing, *inter alia*, the Reserve Bank to register new banks. The resulting legislation - the Reserve Bank Amendment Act (1986) - came into force on 1 April 1987.

(iii) **segmentation of the market:**

As mentioned above, the various categories of banks and other financial institutions, such as building societies, life assurance companies and stockbrokers, had clearly defined functions, which had only limited overlap. Companies had to remain in their particular area of operation, although the trading banks did set up finance companies. Further legislative changes have since blurred the distinctions.

1.2.2 The Interaction of Financial Deregulation and Other Factors

In addition to awareness of past regulatory structures, the analysis of the impact of liberalisation requires that the effects be disentangled from other factors concurrently influencing the economy. Table 1.1 lists these different factors which need to be considered when examining the period of financial deregulation.

Deregulation in the rest of the economic system would also be expected to result in changes in its responses. The important feature is that the timing and nature of these changes affects the timing and nature of the response to financial deregulation. Say, for example, that exchange controls are lifted. Foreigners' willingness to hold New Zealand assets will also change. Since expected rates of return are likely to rise as a result of financial deregulation, let us assume that additional funds are attracted. If there are still restrictions on ownership of New Zealand enterprises or land, this will affect both the quantity and nature of the inflow and its impact on economic behaviour.

Table 1.1 : FACTORS TO BE DISENTANGLED

1. 'Exogenous' influences on the system such as:
   - (i) foreign demand;
   - (ii) commodity prices - including oil;
   - (iii) changes in competitors' supply conditions - good harvests etc;
   - (iv) foreign financial influences - interest rates, money supplies, government deficits, aid provisions, etc.

2. Internal policy 'innovations' outside the financial sector:
   - (i) budgetary stance;
   - (ii) tax regime changes, including removal of subsidies;
   - (iii) trade barriers.

3. Regulatory changes in other domestic markets:
   - (i) changes in competitive conditions (Commerce Act, etc.);
   - (ii) formation of state-owned enterprises.

4. Changes in monetary and fiscal stance.

5. Changes in monetary and fiscal control methods, such as:
   - (i) control of narrow money;
   - (ii) full funding of the deficit.

6. Changes in 'prudential' regulations in the financial sector including removal of:
   - (i) barriers to entry for new institutions, or of existing institutions into different financial sectors;
   - (ii) reserve ratio requirements;
   - (iii) direct controls - e.g. lending limits or priorities.

It is only at this point that we can hope to start disentangling the effects of the various direct changes in variables affecting the financial market labelled 4, 5 and 6 in Table 1.1. Even so this is clearly a difficult task.

1.2.3 Short-Run Adjustments in Assets and Liabilities

For any given set of constraints on the monetary aggregates, the changes in wealth holding as a result of deregulation will reflect the pattern of demand for assets and liabilities, the constraints previously imposed and those which operate in the future, both within the financial markets and outside them. Thus, for example, in the regulated system there were limits not just on lending, but on the proportion of the value of the house on which funds would be lent and on the terms of the loan. With a deregulated system, therefore, households may prefer both to hold a larger proportion of their assets in the form of housing and to increase their borrowing on the strength of that asset. However, because housebuilding takes a relatively long time - finding the site, purchase, arranging a building permit, construction and sale - it is not possible to realise people's hopes initially. The net result will tend to be pressure on house prices and movement into other assets in the short run. The terms of loans may also be bid up to satisfy demand. Only over a longer period can there be a full supply response in the housing market itself.

Similar problems occur with adjustments in industrial enterprise. It takes a relatively long time to set up a new factory and manufacturing process. Hence, if foreign firms perceive more opportunities for direct investment in New Zealand, or New Zealand firms themselves see the opportunity for increased returns from investment, they are forced into portfolio investment or acquisition in order to get a stake in the short run. However, in order to earn that increased rate of return, they must be able to utilise resources more efficiently than the existing management. Otherwise much of the possible gain would tend to be already incorporated in the price of equity.

Both these examples suggest that there will be short-run pressures on wealth holding which will only unwind as other markets also adjust.

1.2.4 Macroeconomic Pressures at the Outset

The problem of initial and transitional effects is complicated by the fact that the economy was starting from a position of difficulty. The financial control system was ineffective and dramatic changes were

required, first of all in exchange rates but more importantly in the problems of debt and deficit finance. We thus observe not just a period of financial deregulation, but a combination of disinflation and deregulation. This makes the disentangling of the effects of financial deregulation more difficult.

For example, it is to be expected that as the system is deregulated previous demand for funds which was frustrated by the regulations will be met on commercial terms. This would tend to be at higher interest rates, not just because more lending requires higher rates to be offered to depositors to attract more funds in the first place, but because in general under the regulated system the better risks will have been met first. The higher risk projects would tend only to be met at the margin because with controlled rates there would be no particular commercial gain from taking on the higher risk.

Thus we would observe a rise in real interest rates following deregulation. However, a disinflationary policy works through a similar mechanism. By tightening the fiscal stance, fully funding the deficit and keeping the supply of narrow money to a constant level, both real and nominal interest rates will also be driven up. There is a tightening in the monetary stance from two points of view, first by a reduction in nominal terms of the injection into the system by the public sector, and second because price inflation lowers the real value of the nominal levels.

Given that transaction requirements are affected by the nominal price level, irrelevant of real balances, the raising of the price level by around 7 per cent with the introduction of GST will have further added to the monetary pressures.

We have then both the forces of deregulation and of disinflation raising interest rates. It is only when the disinflationary forces change independently of the deregulatory ones that we can disentangle the two effects clearly. But since we expect that deregulation may very well alter responses of lenders, borrowers and intermediaries to given financial pressures, it is not possible merely to measure what responses to disinflationary policies have been in the past, and assume that similar results will have occurred since 1984.

This problem is exacerbated because the disinflationary policy itself is intended to be innovatory, achieving the counter-cyclical responses expected in the past and aiming towards maintaining a constant level of financial injection into the system. Expectations of the relative availability of funds and pricing behaviour would therefore change. So too would reactions in the financial sector. If we could be reasonably sure of the structure and parameters underlying the economic behaviour being observed, then it would be a relatively simple matter to separate out the various effects and to draw conclusions concerning the impact of the particular exogenous shocks in question. In practice, such econometric models are difficult to apply under any but the most stable of conditions applying over a period of time. In a trivial respect this is just an example of the Lucas critique in operation - traditional econometrics cannot capture the effect of policies designed to change the operations of the system.

1.3 Empirical Testing: A Macro Perspective

The main hypothesis of Part One of this study is that financial deregulation allows the economy to function more efficiently, with the consequence being that higher economic growth is to be expected (in addition to any welfare gains). However, in the periods during and following deregulation, such effects may be difficult to discern as a result of transitory adjustments to deregulation or through distortions arising from deregulation in markets other than the finance market. The problem is then, what is the appropriate methodology for analysis? The various options are discussed in the following sub-sections as a prelude to the analysis undertaken in Chapter 4.

1.3.1 Statistical Indicators

The key indicators used are the development of the money supply, interest rate behaviour, ratios of assets and liabilities to GDP, domestic portfolio changes, overseas debt and inflation and growth patterns. From such *prima facie* evidence it is possible to draw inferences about the impact of financial deregulation on the macroeconomy, or, at the very least, some conclusions about the efficiency of the financial system relative to the general level of economic activity.

This approach is somewhat unsatisfactory in that it does not draw out the mechanism by which change occurs nor will it indicate possible future developments in the economy as a result of deregulation, except to the extent that they imply a certain theoretical behaviour is being followed.

This analysis could be taken one step further, by taking as a "model" the corresponding behaviour in other economies that have undergone a broadly similar pattern of deregulation and comparing, at various identifiable stages, the pattern of development in the indicators being used. From such comparisons inferences could be drawn concerning the future path of development in the economy relative to what is known to have transpired in the other economies being used for the comparison.

Data for such an approach is readily available overseas as a consequence of the intensive studies undertaken of the liberalisation process in the Southern Cone countries of South America and elsewhere. However, for such an approach to show acceptable results, the differences between the countries being compared must not be too great. In reality, this is unlikely to be the case. Differences will arise from such fundamental aspects as institutional structure and historically developed modes of behaviour. Other differences will arise from the comparative degree of regulation in place when the liberalisation process begins and from the speed and extent of the liberalisation process itself. Finally, the difficulties arising from deregulation, and indeed its ultimate success or failure, may depend upon factors external to the economy, such as unfavourable shocks or strong growth in export markets.

Australia, like New Zealand, has embarked on a process of financial liberalisation. However, while Australia began the process several years earlier than New Zealand, the latter has moved more quickly and further. Thus, despite the later start, New Zealand now has a financial system less restrained than that of its trans-Tasman neighbour. Furthermore, the philosophy of liberalisation has been more stringently applied to macroeconomic policy formation and to markets other than the financial sector. The latter alone would be sufficient to weaken comparisons of the relative impact of financial deregulation on the two economies.

Finally, other marked differences arise from developments in external conditions. Thus Australia, Japan, New Zealand and the United States began financial deregulation when world trading conditions were relatively buoyant, especially for manufactures trade, but more recently for agricultural commodities, and, so far, have been free of major shocks. By contrast, the experience in the Southern Cone and the United Kingdom coincided with the oil shocks of the 1970s and early 1980s. For the former this shock was sufficient to seal the end of deregulation, while for the United Kingdom it gave mixed effects - easing pressures on the balance of payments and the government's fiscal position, but nonetheless putting upward pressure on the exchange rate.

1.3.2 Econometric Methods

A more traditional empirical approach is to use structural models of economic behaviour. This approach requires the development of a theoretical framework of the economy under study. Such a model can be verified by applying statistical analysis, which also provides the means for forecasting or testing the effects of changes in exogenous variables once a satisfactory specification has been established. Rather than analysis of comparative statistics between countries (although differences in the structure of models of different countries can be illuminating), this approach emphasises the time profile of change. This is a crucial matter in its own right as the argument about sequencing makes clear.

Whilst this approach is more rigorous in concept than that suggested in the previous section, it is beset by a number of difficulties. The most obvious is that an empirically estimated structural model represents a best formulation of past modes of behaviour over the period for which data exists. Acceptance of forecasts from such a model, or testing for possible future economic reactions to changes in circumstance, requires that the institutional structure and forms of economic behaviour essentially remain unchanged from the period for which the model was validated.

However, the reason for liberalisation is in fact to alter the underlying institutional structures and modes of behaviour so as to achieve certain desired outcomes. This, by definition, invalidates the use of a pre-existing structural model.

Thus models constructed under behavioural assumptions based on the paradigm of Keynesian macroeconomic theory (as happened in many cases for twenty or thirty years from the early 1950s) have come under increasing criticism and this has led to new directions in research[3]. One area of research, for example, follows the neoclassical rational expectations approach associated with Thomas Sargent and Robert Lucas. Another approach has worked from the Keynesian framework, concentrating on the apparent weaknesses in the original interpretation of the theory. This has lead to greater concentration on price inflexibility and the dynamics of adjustment (see Cuddington *et al*, 1984). Whilst these developments are of considerable interest, they do little to address the empirical problems facing this study.

The issues raised briefly above have been previously addressed in New Zealand by Wells and Evans (1982). In addressing these difficulties - with particular emphasis on the issue of the Lucas Critique and the issue of exogeneity - Wells and Evans turn to an alternative method of analysing economic behaviour, namely the use of vector autoregressive (VAR) models.

This technique is applied in Chapter 4. A VAR model reflects the way in which agents react without imposing any particular structure on their behaviour. This overcomes, in one sense, the econometric problem although it does create new problems of interpretation.

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3. Often improvements in model specification and estimation are enabled, if not necessarily generated, by advances in computing technology and in mathematics. In this context, the development recently of so-called 'catastrophe' theory holds interesting, though as yet speculative, possibilities for economic analysis.

PART ONE: MACROECONOMIC EFFECTS OF FINANCIAL DEREGULATION

CHAPTER 2

THE FINANCIAL SYSTEM AND THE MACROECONOMY

This chapter examines some microeconomic aspects of saving and investment behaviour, the role of the financial system and the ways through which deregulation may impact on the real economy. This discussion is not intended as a rigorous microeconomic analysis. Rather, it highlights the basic functions of the financial sector and places them in a macroeconomic perspective. This is an introduction to later chapters which more specifically trace the effects on the macroeconomy of the reforms described by Harper (1986).

2.1 The Role of the Financial System

An economy can be divided into five sectors for the purposes of this analysis:

- Personal sector (households);
- Industrial and commercial sector (firms);
- Public sector (central and local government, and public corporations);
- Financial sector (banks and other financial institutions);
- Overseas sector.

Each of these sectors provides goods and services, which it exchanges with other sectors in return for other goods and services or, more usually, for a medium of exchange (money).

The provision of such a payments mechanism is the most basic function of any financial system. The responsibility for this function lies at the centre of the monetary system - the note-issuing authority and the Central Bank - and is therefore the direct concern of only

one part of the financial system. The broader objective of the financial system is to provide channels through which funds can flow from surplus economic agents to deficit agents within the economy. For such flows to be optimal, the funds need to move to where they will generate the highest rate of (private or social) return.

The sectors above form a closed system. If one sector wishes to purchase more output than its current income can maintain (that is, if it wishes to move into deficit), then there must be another sector willing to move into an equal surplus. This wish to incur a deficit will also occur if a sector wants to purchase liquid assets, because, for example, it anticipates a shortage of funds in the future and wishes to purchase assets now in order to be able to sell them when the funds are actually required.

There are three ways in which a sector can run a deficit:

(a) running down existing cash balances;
(b) selling assets acquired earlier;
(c) creating liabilities against itself which a surplus sector is prepared to buy.

Selling assets includes converting other liquid financial assets to pay cash, realising securities, and convincing debtors to 'pay up' (RBNZ, 1986).

In the same way, there are several reasons why a sector could wish to run a surplus. These include planning for future spending on expensive items which cannot currently be paid for, or during a period when income is expected to be reduced, such as retirement. A current surplus can also act as a precaution against a need for unexpected future spending or lack of income as would occur with unemployment. The methods by which the sector can do this mirror those used by a deficit sector - purchasing and accumulating financial assets from deficit sectors, including buying back its own assets (paying off past debts).

The sale of existing assets or the production of new assets by the deficit sector will affect the financial markets where such assets are traded, particularly the prices of such assets, as will the counterpart actions by sectors which wish to run a surplus. If sectoral tendencies

towards surplus or deficit reflect sectoral preferences as opposed to budgeting errors, then inadequate links between the sectors may prevent the achievement of sector objectives. For example, the personal sector may limit its savings, or simply hoard money balances, because of inadequate or unsatisfactory outlets for such funds (Carter and Partington, 1984).

There are therefore at least two possible functions for the financial sector:

(a) to provide for efficient transmission of funds between sectors, and

(b) to produce the appropriate signals which will allow potential transactors to make correct decisions about present or future borrowing or lending.

The existence of financial intermediation can thus be said to mobilise saving and encourage investment by providing a mechanism by which funds can be transferred from surplus to deficit agents, and therefore allowing borrowers and lenders to move beyond their budget constraints. The microeconomic mechanism by which this occurs is described in detail in Bain (1981).

The signal which the system provides, and on which economic agents rely, is the rate of interest. A surplus unit willing to consume less now in order to consume more in the future is expressing an implicit rate of time preference. The yield received on the financial assets purchased must be at least equal to that rate in order to induce saving. Similarly, a deficit unit will be willing to pay a yield up to the rate of return expected from the proposed investment, in order to obtain the required funds. The system will move funds from surplus to deficit units until these rates are equal. Raising the rate of return will simultaneously induce more surplus units to forgo consumption now in favour of future consumption and reduce a number of projects which it is profitable to undertake, thus raising the supply and lowering the demand for funds. When the rates are equal, the flows of saving and borrowing will also be equal. At this rate, if individual borrowers are charged for specific costs and risks, funds are priced according to their opportunity cost. If firms fund all projects able to earn at least enough to meet the financing costs, then efficiency in the supply of funds will feed through into the efficient allocation of investment.

This approach is deliberately simplified, in effect describing just one asset and hence only one interest rate, but is readily extendable to the complexities of the actual market in New Zealand. It has also been argued that social returns may diverge from private returns and that efficient allocation of resources should reflect the former (Bain, 1981). This is not addressed in this report.

Bain also argues that competition between financial institutions for deposits involves a substantial marketing effort. This raises savers' perceptions of future needs and results in a higher level of saving at each interest rate. This, it is argued, offsets any negative impact on saving from consumer access to credit as a result of the introduction of intermediation. In addition the aggregation of savings which allows the financing of large-scale investments could be expected to raise the investment schedule at each rate of interest, as more projects will become profitable when they are able to take advantage of economies of scale.

Finally, the average quality of investment rises when financial markets are introduced. Producers with the opportunity to earn a rate of return higher than the market rate of interest are encouraged to invest more, whereas those with lower-yielding projects invest less. In the absence of financial intermediation, investors are constrained by their own implied rate of return, the transaction cost of finding savers or their ability to generate internal funds to finance their investments. Thus, higher risk, entrepreneurial type investments which can provide substantially higher yields are foregone due to lack of funds, and the economy as a whole realises a lower rate of return on its assets than is necessary. Thus the financial system transfers funds from surplus sectors to deficit sectors within the economy, and in so doing raises the level of saving and investment and ensures an efficient allocation of funds.

In the current analysis we are not discussing the move from no financial sector to a fully fledged one, but from a restricted system to a much more deregulated one. In part the consequences are the same, but the position is complicated because regulation itself may have distorted the system, making it harder for some groups to run surpluses or deficits but easier for others.

We now turn to a brief examination of how the financial intermediaries perform these tasks, and how the institutions themselves benefit from the provision of these services, as this will clarify the effects of deregulation and innovation discussed later.

2.2 Financial Intermediaries

The cost of performing transactions is a central element in the theory of financial intermediation. Some authors (e.g. Benston and Smith, 1976) have claimed that these costs alone are the rationale for the existence of financial institutions. This is true for a payments intermediary, whose advantage lies in an ability to economise on cash balances by consolidating the holdings of many individuals, and thus minimising the fixed cost of making transactions. It has, however, been shown that the existence of transaction costs alone is not sufficient to explain the existence of other types of intermediary. An assumption of perfect certainty vitiates the case for intermediation even if significant transaction costs are assumed to exit. (A full discussion is given by Chant (1987)).

Thus, financial intermediaries alleviate market imperfections caused by economies of scale in transaction markets and in information gathering and portfolio management. There are also considerable economies of scope to be realised in the joint provision of services because of the public good characteristics of a variety of inputs: "Information and know-how, in particular, represent critical common inputs into the provision of a variety of financial services". Harper (1986) discusses the economies of scope in detail monograph.

All other roles performed by intermediaries involve to some degree the management of risk. One of these, the provision of insurance services, is based on individual willingness to accept a lower mean expected income in order to avoid the potential large costs of "natural hazard" (Goodhart, 1975). However, the archetypal financial intermediary actually produces financial assets. In particular, it issues liabilities of a kind attractive to lenders, at relatively low yields, and invests a proportion of the funds thus obtained in higher-yielding assets of a kind borrowers prefer to issue.

As described above, there are several reasons why sectors, and agents within sectors, may decide to run a surplus or deficit. Because of this, there is a wide variety of financial instruments, distinguished by risk, liquidity, and real value certainty (i.e. the susceptibility to loss of value during a period of inflation). The risk of loss or default is one of the major reasons (risk-averse) lenders prefer to avoid direct financing. The liquidity of an asset reflects both its maturity and its marketability. Real-value certainty depends on the yield offered on the asset and the expected rate of inflation.

Surplus and deficit agents will have differing preferences for trade-offs between risk and return. For example, a firm may run a deficit in order to undertake investment. The bulk of physical investment is durable, with returns generated over a lengthy time period. The firm will therefore prefer longer-term liabilities.

It would be possible for a market mechanism to match the needs of surplus and deficit units by varying the rate of return of assets of different maturities. However, the financial intermediary, rather than merely realising economies of scale (and scope) by performing a brokerage role, creates assets more closely matching those desired by each agent. Risk-averse lenders therefore can obtain a more liquid asset than they could under direct financing. Long-term borrowers, in turn, can issue longer-term instruments at lower cost than if they were dealing with more risk-averse lenders.

Financial firms therefore perform a role of transformation of risk and maturity, and are able to do this largely because of the scale of their operations. They are generally sufficiently large that they can rely on a fairly stable deposit base, or at least can estimate the probability of changes in their own liability position. This allows them to issue liabilities which are more liquid than their assets. They also maintain cash reserve holdings, and a "second echelon" of highly liquid short-dated assets, to counter the uncertainty of withdrawals. The existence of organised markets where institutions can bid for large deposits if necessary is also a factor which reduces the need to maintain large reserves to remain solvent.

Regulation can introduce various gaps into the system, preventing the existence of some assets, denying some agents access to funds and distorting relative prices so that real rates of return are not made

equal. This may affect the rate of investment both in aggregate and for individual sectors, thereby in turn affecting economic growth. Liabilities offered by borrowers have different degrees of risk exposure. *Default* (or financial) risk is borne by debt instruments such as loans, and the rate of interest on these includes a charge for risk of loss. Most *business* risk, on the other hand, is concentrated on a firm's equity, as the returns on these liabilities depend on the future value of assets and income. Financial institutions average and transform risk by taking the residual risk of loss on their own equity capital, and by diversifying their portfolios over a range of assets of varying risk and return (thus lowering the variation of the expected outcome). The presence of transaction costs - search, assessment of likely return (i.e. information), problems of monitoring and enforcement - means individual savers are unlikely to be able to achieve a similar spread in their portfolio, or to adjust their portfolio as rapidly in light of changing conditions. Individuals basically exchange the risk of losing all their investment for a near certainty of losing a small fraction, and that loss is usually covered by the rate of interest charged (Carter and Partington, 1984).

2.3 Interest Rates

The structure of interest rates in reality is, of course, much more complex than described earlier when we focused on the rate of time preference. The process of intermediation itself introduces a wedge between the rate of return on capital earned at the margin by firms and the rate of deposit interest earned at the margin by holders of financial assets. This is because the functions of the intermediary are not costless. Costs include the inducements necessary to persuade the lender to transfer funds to the intermediary and the costs of servicing the portfolio of assets (offset to some extent by any economies of scale or scope which may be realised), as well as a 'normal' expected profit. To be efficient, the price of financial services should equal their marginal cost. If the financial intermediary is "...selling services at a higher price than their marginal cost, or offering financial inducements to depositors which after due allowance for risk factors are lower than the rate of real capital, it will be enjoying a super-normal profit margin on its operations" (Goodhart, 1975). Restrictions and barriers to entry of various kinds may prevent new entrants from competing away any monopoly profits. This would result in a higher rate of interest than

otherwise. In New Zealand before July 1984, there were not only barriers to entry but the market was segmented. This provided many opportunities for deviation from a fully efficient system.

Another factor affecting the interest rate structure arises from the joint provision of financial services. Frequently a financial intermediary's inducements to hold the liabilities consist both of interest payments and other services. These ancillary attractions can include geographic convenience, advisory services, safekeeping of funds, and so on. Financial firms often do not charge separately for these services but instead offer a lower rate of interest to the depositor. To the extent that the implicit interest payment (in the form of services) is not used fully by depositors, they are not receiving the full return of their deposits, whereas other depositors who make extensive use of the ancillary services will not be charged the full marginal cost. This could result in depositors being induced to make more use of the (expensive) services and to hold fewer balances than would be the case if the resources were being used efficiently. Implicit interest payments have also been used extensively to circumvent interest rate regulations.

The premia on risk and liquidity which are included in market interest rates also reflect implicit yields. Cash balances offer a zero yield, but are held because they generate an implicit rate of return in terms of use as a means of payment and certainty. Demand deposits, an asset produced by banks, are widely used as money (an asset produced by the Central Bank). For this reason they can offer a lower yield than that offered on assets of a similar liquidity. Government debt is perceived as risk-free, and thus offers a lower yield than that of a private sector debt instrument without a government guarantee, e.g. a long-term debenture.

The rates charged for liabilities of different terms reflect liquidity premia and expected future rates of interest. At any point in time, a saver would expect to get the same return on a long-term investment as on a series of short-term ones. Thus, for example, if short-term rates are expected to fall in the future, the average short-term rate during the period of a long-term loan will be less than the current short-term rate, and this difference may more than offset the liquidity premium effect, resulting in a 'negative yield curve'.

So far the discussion has been in terms of real interest rates. The final influence on market rates is expected inflation, which links real and nominal rates. If different participants in the market have different expectations of the future course of inflation, they will perceive different real rates in each market rate of interest. this will in turn lead to different resource decisions.

2.4 An Overview

The actual structure of the financial system is also naturally more complex than implied in earlier discussion. A variety of institutions exist, offering a range of assets and services. To a large degree the segmentation of these institutions has been due to regulation, and the process of deregulation will lead to a much simpler structure as firms exploit economies of scope and are released from constraints on competition (Harper, 1986).

However, there are limits to this process of reintermediation and diversification of functions. Different kinds of intermediation require specialised forms of information or skills. The provision of insurance services requires specialised actuarial assistance and other skills which are not naturally available to a bank in the course of its usual business. Thus a bank which chooses to diversify into the insurance business may have to set up a specialised subsidiary. There are few economies of scope to be realised in this situation. "The economies still to be obtained, e.g. a more centralised control of the asset portfolio, could be rather sparse, and there could be disadvantages as the growing range of business covered either attenuated the specialised information of top management on each aspect of that business, or else led to an unwieldy expansion of the management structure..." (Goodhart, 1975).

Thus the financial system consists of an array of institutions and assets. However, as a result of deregulation, many distinctions will disappear. In this macroeconomic analysis we shall be focusing on the effects on the financial system *as a whole*. Thus, for example, changing market shares (reintermediation) will be of interest only if the movement of funds back into the banking sector can be shown to lead to a lower rate of interest *in general*, or changes the term structure of interest rates, or leads to growth in credit at a *faster* rate than would have occurred in the regulated system.

We therefore concentrate on the effects of deregulation on the economy. However, sectoral reallocation of assets and liabilities may in itself result in changes in prices, investment and growth. This may have macroeconomic consequences worthy of note.

2.5 Deregulation and Monetary Control

A difficulty with analysing the impact of deregulation in New Zealand is not just that financial deregulation and disinflationary pressures have occurred simultaneously, but that the economic control requirements and the prudential deregulation requirements actually conflict to some extent. Subsequent to deregulation both real and nominal demand for money appear to vary, particularly for the wider aggregates. It is likely therefore that deregulation is the cause. The major effect appears to be that the velocity of circulation for broader aggregates slows and hence the aggregates rise in size relative to nominal measures of income and GDP. However, at the same time - because the authorities are trying to control price inflation by bringing down the rate of monetary growth - it appears that monetary control methods are failing.

Since asset prices reflect expectations of the future and of the success of government policy, control operations depend in large measure on the ability to maintain confidence and credibility. In some cases, such as Argentina, credibility was lost because of the inability to control the fiscal deficit (McKinnon). In others, such as the United Kingdom, despite the progressive collapse of various explicit targets for the money supply[1], overall confidence was maintained both because of strong budgetary control and because of relative success in the control of narrow money (M1). As a result, the exchange rate, after allowing for the effect of changes in the price of oil, has remained at a high level. This contributed to the continued control of inflation, which remained below five percent for over five years, switching the UK from having one of the highest rates of inflation among OECD countries to being below average.

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1. Sterling M3 as a target was finally abandoned in the version of the Medium Term Financial Strategy set out in the 1987 Budget.

2.5.1 Risk, Volatility and Uncertainty

We can observe changes in behaviour as a result of financial deregulation through changes in the composition of portfolios of assets and liabilities, both within and between sectors. Furthermore, we can observe differences in the relationship between the stock of assets and the flow of incomes. Third, as constraints are removed, relative prices will change as the relative demands for the assets are revealed. The supply of assets in the various categories will respond to these demands at varying rates, with financial assets generally being able to adjust in quantities much more rapidly than physical or technical assets.

However, changes in size and composition are not the only components of change in behaviour due to deregulation. Rules introduced a measure of certainty: indeed, they were designed to do so, protecting the returns to particular groups either in relative terms or over time. Without the rules, steps have to be taken to allow for more risk and uncertainty. This can take many forms, such as the development of new 'products', such as futures or options, to try to guard against some of the risk over time. It may also be reflected in the sheer number of transactions as wealth holders adjust their portfolios much more frequently to guard against volatility and large swings in relative prices. This is likely to increase the cost of asset holding.

Thus, on the one side, it is the increased flexibility of the market which allows asset holders to move more quickly to their desired positions, reduces transaction costs through the pressures of competition and improves the efficiency of the economy through the greater effectiveness of the process of financial intermediation. On the other, however, there are increased costs from the higher risk and volatility, which result both in more transactions and a higher cost on many of those transactions.

2.6 Routes of Influence

Routes of transmission from the deregulated financial market to the ultimate macroeconomic objectives are subject to some debate. The main argument advanced on the real side is that regulation inhibits the undertaking of projects at the upper end of the spectrum of risk

and returns. Hence, assuming that the market can judge the risk appropriately and change the appropriate rates of interest, the average rate of real return should increase, thus resulting in faster growth of the economy and the encouragement of more innovative behaviour.

As has been said earlier, it is very difficult to observe this behaviour in New Zealand because the transition is overlaid by the need to correct the overall imbalance in the economy caused by high and repeated government deficits. This appears to have had such a marked effect on overall growth that the direct benefits of deregulation are difficult to detect.

Although the process of deregulation that has been in progress since July 1984 is of unprecedented speed and extent, it is not a new process. Changes in regulations have taken place before and in some senses, more importantly, the financial system has evolved to try to get round some of the previous rules by creating new financial instruments. Any such innovation alters the way the system operates (see, for example, Hester, 1981). The nature of previous changes gives an indication of the directions in which the system might wish to evolve as regulations are removed. There are thus pointers from both past and overseas behaviour.

The major channels of macroeconomic influence are through:

(i) interest rates;
(ii) the exchange rate and overseas transactions;
(iii) access to credit;
(iv) expectations;
(v) increased efficiency;
(vi) reactions to risk and uncertainty;
(vii) changes in the structures of demand for money and other assets.

(i) Interest rates

Interest rates feature strongly in investment and consumption according to evidence in New Zealand and overseas. The cost and terms of credit have a clear impact on consumers' expenditure on durable goods. However, the clearest example relates to mortgage

finance. Mortgage payments represent a large portion of many households' outgoings. People tend to take on as large a commitment as they think they can afford and as the lenders permit. If interest rates rise, then the only consequence for those trying to buy near the limits of the offers of credit is a fall in the size of the principal advanced. For existing borrowers, if deferral is not possible, the pressure will fall largely on consumption. Thus consumers' expenditure will be affected adversely and house price inflation will be reduced. Ironically, since it is consumers' expenditure on housing which features in the consumer price index, the rise in mortgage interest rates will actually lead to more inflation in the short run on that measure. There is thus a nominal as well as a real interest rate effect.

Effects on investment have been debated more widely. While it is generally thought that rises in real interest rates have a downward effect on investment, empirical evidence is more mixed. Nominal rates also have an impact quite simply through their effect on the cash flow of companies seeking to service their debt.

Interest rates also have an impact through real balances. When nominal interest rates rise, the value of many financial assets, bonds in particular, will fall as the market seeks to maintain real rates of return. Under these circumstances wealth holders observe that the real value of their financial holdings has fallen and hence may wish to augment or restructure their portfolios. In so far as this leads to a rise in saving and a fall in consumption, this may reinforce the direct interest rate effects. Under these circumstances a rise in interest rates would be clearly deflationary. If, however, the rise in rates is the result of an increased drive for credit in order to finance consumption or investment, then the picture is rather different. While the higher rates will choke off rises in demand eventually, they will not, of course, reduce it; rather they reflect its existence.

(ii) Exchange rates and overseas transactions

When the exchange rate is flexible and capital flows are not controlled, perhaps the most important influence on interest rates occurs outside the domestic economy. In these circumstances if New Zealand interest rates rise, then New Zealand's relative attractiveness as a destination for investment increases.

This provides several routes for effects on the macroeconomy. The first of these is through the effect on relative prices. As the exchange rate rises, goods priced in overseas currencies will tend to become cheaper in New Zealand and goods produced in New Zealand will tend to become more expensive in foreign country prices. Consequently, imports will tend to increase and advantages will accrue to companies importing components, as their costs will fall. Through this route there will be clear downward pressure on the price level.

However, both the rise in imports and any fall in exports squeeze domestic output, hence leading to a fall in GDP and employment. This is then an adverse effect of deregulation. However, it is an empirical matter whether the payoff from increased investment and consumption offsets the exchange rate pressure for lower output. Some indeed are of the opinion that greater pressure actually increases productivity and reduces unit costs.

(iii) Access to credit

Where access to credit has been hindered in the past, it is expected that there will be a surge in credit growth, particularly for consumer credit. Past frustrations are released and in the short run credit will rise rather higher than in the long run, as there is a once-and-for-all bringing forward of purchases. The effects on the economy will first of all depend upon whether this increased demand is met primarily from domestic production or from imports. In the former case there will be a knock-on effect onto domestic output, employment and spending and so on through the multiplier process. If, on the other hand, much of the increase is met by imports, there will be only a negligible further effect. The trade balance will be worsened and the exchange rate may fall, resulting in inflation but also helping to increase competitiveness and subsequent growth of output.

(iv) Expectations

While disinflationary policy may operate directly on expectations, it is not so clear that financial deregulation will have the same effect, except in so far as there is less worry about being able to obtain the finance necessary to change. Output expectations may be raised

because of the expected increase in economic efficiency. Interest rate expectations may also rise. A contribution to price expectations by deregulation seems less likely. This would tend to follow from the restriction of the government deficit and the money supply, i.e. from disinflationary policy.

(v) **Increased efficiency**

It is to be expected that the financial sector itself will increase its efficiency markedly as a result of deregulation. This has been subject to explicit study by Harper (1986), for example. However, the availability of more appropriate instruments and greater competition may mean that borrowers and lenders can also operate more efficiently - not having to structure proposals in a distorted manner in order to be able to qualify for a loan in a restricted favoured category, for example.

(vi) **Reactions to risk and uncertainty**

Deregulation may open up more opportunities for a more efficient structure and hence faster growth of enterprises and smaller rises in costs, but it may also increase the cost of transactions. Where prices are likely to fluctuate widely, a requirement arises to cover against the resulting risk, whether it is by forward cover or options on exchange rates or commodities. This not only creates a cost on each occasion, but, as transactions become easier through computers, may increase the number of transactions as well. Insofar as these changes do take place, they are inflationary on the one hand, as costs are increased, and deflationary on the other, as bigger margins and larger balances are necessary as a precaution.

(vii) **Changes in the structure of the demand for financial assets**

Money demand functions have come under considerable scrutiny recently as the central tenet of monetary control has been that to have a predictable impact on inflation requires a predictable relationship between nominal incomes and the demand for money. If real incomes have a large exogenous element to them, then from these two it is possible to work out the implications for inflation. It is fairly clear that in the face of deregulation there will be shifts in the structure of the demand for money. The particular shift is for a

fall in elasticity, so that the relationship is weakened. Furthermore, as we have noted, the velocity of circulation is likely to fall for all but the narrowest of aggregates, leading to an expansion in the various monetary aggregates. As such, this particular change is unlikely to have much macroeconomic effect except insofar as it leads policymakers to incorrect decisions over the monetary stance, or indeed leads to instability by undermining the credibility of monetary policy altogether. Harsher monetary moves may become necessary to achieve given macroeconomic outcomes.

The macroeconomic effects of other changes, such as those in portfolio balances, are much more difficult to pin down. The surge in stock market prices is unlikely to have much impact except insofar as it aids investment or encourages takeover activity, which leads to more efficient use of resources, for example.

Finally, in looking at channels of influence onto the macroeconomy, it is necessary to examine the feedback on to other policies and questions as to whether the push for deregulation in other sectors is encouraged or slowed and whether fiscal policy is different as a result.

CHAPTER 3

THE DISTORTING EFFECTS OF A REPRESSED ECONOMY

The previous chapter discussed the role of the financial sector in the macroeconomy and examined the microeconomic foundations which enable the financial system to perform that role.

Frequently, however, the financial sector is subject to controls and regulations which distort the workings of the system. As was pointed out in Chapter 1, these controls are to prevent bank failure and the loss of savers' funds, leading to a loss of confidence in the system, which would have the effect of halting the flow of savings to deficit units in the productive sector. This would eventually lead to stagnation and unemployment. The other motive is to use controls as an economic policy mechanism.

In this chapter we examine the distortions caused by the most common controls and their resulting effects on the rest of the economy. The ideas developed in this chapter are then used to explore what happens when a small, open economy moves from a regulated state to a deregulated state and the interaction between financial deregulation, trade liberalisation and disinflation.

3.1 The Repressed Economy Syndrome

According to the conventional wisdom up until the early 1970s, the relationship between interest rates and investment was unambiguous: lower real interest rates would, ceteris paribus, promote investment spending and hence growth. In 1973, however, this view was challenged in the case of a "repressed economy" by both McKinnon and Shaw. Their seminal works formed the basis for a wave of financial deregulation in developing countries.

Financial repression occurs when direct controls are placed on the financial system. This leads to inefficiencies and distorts financial flows. In most cases, controls on the financial sector are accompanied by severe protectionist measures, including tariffs, quantitative

controls and restrictions on purchases of foreign currency.

> "The name of the policy game in repressed economies is interventionism. Because monetary variables are out of hand, there seems to be a need for price control in detail. Because the exchange rate is overvalued, complex tariff schedules, import licenses and differentiated export bonuses are put into force. Because savings are scarce, credit is rationed loan by loan. An economy that immobilizes critical relative prices must fall back on the contrivances of interventionism to clear markets. A burden is put on the civil service that it cannot carry, and the costs in both inefficiency and corruption are high. It is a principal purpose of liberalisation to substitute markets for bureaus." (Shaw, 1973)

The most common forms of regulation have been:

(i) Nominal Interest Rate Ceilings:

These result in lenders being discouraged from accumulating assets through the controlled intermediaries. This can often cause speculation on land and buildings (see RBNZ, 1986).

There is also pressure on demand for loans at the low real interest rate. This leads to credit rationing (Goodhart, 1975). Riskier, high-return projects are then discriminated against. It can also lead to Central Bank directives as to which sectors receive priority funding (see Molho 1986, Santomero and Siegel 1986, Goodhart 1975, RBNZ, 1986 and 1987).

(ii) Reserve Ratio Requirements:

These force the intermediaries to hold a certain level of reserves of cash, government and local authority stock, and/or investments in targetted sectors of the economy. This forces the banks to adjust their portfolios in order to avoid the penalties associated with infringement (RBNZ 1986). This places upward pressure on lending rates in both the 'captive' institutions and other lending markets.

3.2 The Distortionary Impacts on Investment and Working Capital

The overall effect of direct controls on the financial system is the shortage of credit relative to notional demand so investment is inefficient and insufficient. The imposition of these restrictions also sparks responses by the financial sector.

In Shaw's Debt-Intermediation view of repressed economies, low interest rates depress private savings. Liberalisation would lead to increased deposit accumulation. This would expand the lending potential of financial intermediaries and hence stimulate investment.

McKinnon focussed on an alternative approach. This was based on the complementarity between savings and capital. Savings are accumulated first in the form of deposits and later in the form of physical capital. This is because, in repressed capital markets where individuals are constrained to borrow less than they wish to, there is an increased reliance on self-financing.

Combining these two approaches produces an interesting outcome as set out in a three-period model by Molho (1986). A rise in the deposit rate will discourage capital formation in the shortrun if loans finance a relatively large increase in current consumption or fail to increase in line with deposits. This could happen if, for example, financial institutions use the funds to acquire assets other than loans, such as foreign assets or government stock. The possibility that the expansion of the operations of financial intermediaries may be associated with a decrease in investment spending in the short run has been extensively discussed by Tobin and Brainard (1963) and, more recently, by van Wijnbergen (1983).

However, if the 'conduit' role of deposits (emphasised by McKinnon) outweighs the substitute asset roles in the longer run, a rise in the deposit rate will encourage capital formation. Instantaneous portfolio shifts into deposits may have an immediate negative effect on investment, whereas the increase in the rate of accumulation of internal funds will only gradually result in increased investment.

The latter response may be extremely sluggish in the presence of uncertainty about inflation. The risk associated with accumulating savings in deposit form may be seen as outweighing any shortrun interest rate advantage. A policy of high interest rates will have its

full impact only after enough time has elapsed to eliminate any problems of credibility. The longer the public's experience with negative real rates and inflationary uncertainty, the longer the lag.

Credit shortages and rationing not only distort investment expenditure decisions, but will also affect the supply of working capital to the business sector.

Working capital is another link between credit and the real economy. Production planning, employment plans and inventory holdings depend on the availability and/or cost of working capital. Working capital determines, within limits set by other economic parameters, the volume of production possible. Even where current production is financed through accumulation of past profits, expansion may depend at least in part on credit availability and costs. Increased production volumes require additional liquidity as the penalty for illiquidity can be severe (Keller, 1980).

Constraints on working capital limit production. This situation is exacerbated by the need to reduce the cost of carrying inventories. Lower inventory levels will then limit the ability to produce and supply final goods smoothly, further affecting profitability and output.

Therefore the imposition of direct controls on the financial system causes many distortions. Inefficient investment and shortage of credit are the two main ones, however.

The extent to which these effects can be avoided by some rearrangement of business practices by the intermediary or evaded by a transfer of business through other financial channels is unknown, but there is a great incentive for institutions to try to evade these restrictions. When faced with restrictions on the rates they could offer for deposits, the clearing banks in the United Kingdom set up subsidiaries which could bid in the open market for large funds. In the United States banks bid for funds through the Eurodollar market and through holding companies in the commercial paper market (Goodhart, 1975).

"The net resulting effect on expenditure decisions, e.g. investment and saving, is thus incalculable.... Certainly the economic effect of, say, ceilings on bank lending cannot be observed by monitoring the subsequent movements in bank lending because the relationships between, say, bank advances and company or personal expenditures will have been so distorted by the control itself that the constrained variations in bank advances will tell the enquirer virtually nothing about the net economic impact of the measure." (Goodhart, 1975)

3.3 Financial Deepening

The result of liberalisation on the financial sector is called financial deepening. Deposit rate deregulation has two effects: the deposit rate rises, which increases the demand for deposits and reduces the demand for currency, and the responsiveness of the deposit rate to changes in the general market rate of interest increases. Both of these effects work in the same direction: they lower the interest sensitivity of real money demand.

If the previous interest ceilings were binding, the first effect of liberalisation is a significant rise in nominal interest rates as deposit rates move to reflect more accurately the opportunities that exist for substitution of investment for current consumption, and consumers' rates of time preference. The higher general level of interest rates and the opportunity to hold diversified portfolios will encourage savings. The rise in nominal interest rates will raise real interest rates. This effect will be increased if inflation expectations are dampened by government control over the rate of expansion of nominal cash balances. There will then be a shift from physical to financial assets as stocks of physical assets used as inflation hedges are run down. This effect also implies that the income elasticity of money demand will move in the opposite direction from the interest elasticity.

Deposits will be held as interest-bearing liquid assets, rather than simply to facilitate transactions. Thus, even though the interest elasticity of money demand is reduced under deregulation, the reduction in the income elasticity of money demand may be sufficient to outweigh it. The effect of deposit rate deregulation on the elasticities of a range of monetary aggregates is examined in detail in Santomero and Siegel (1986).

Despite the rise in interest rates, there will be an expansion in real bank lending. This is partly induced by the increased supply of funds, and partly because, in the absence of controls, returns can be adjusted to reflect risk. Wojnilower (1980) identifies a further possible process in which high interest rates can stimulate lending: if nominal rates are regarded as 'high', they foretell recession and lower future interest rates. The supply of credit enlarges as lenders become more aggressive. Meanwhile credit demand will be strong as some previously repressed sectors expand. For those sectors which are not repressed, the fall-off in cash receipts is not immediately offset by expenditure cuts. These sectors also become larger and need to borrow more.

Increased competition between financial institutions will cut profit margins and improve efficiency, so that lending rates should not rise by as much as the increase in deposit rates. In addition, the increased supply of loanable funds will lead to a rapid rise in intermediation, despite the higher rate of interest. There may be a transitory increase in savings, a temporary acceleration in the demand for wealth, perhaps to restore inventories. This would be a once-and-for-all adjustment of wealth portfolios to desired levels and have no lasting effect on capital intensity (Shaw, 1973).

However there are permanent effects. Changes in the relative prices of factor inputs including capital and labour may give rise to new investment opportunities. Bank credit flows more freely, even at higher rates of interest. Raising real rates of return on financial assets and reducing the variance of those rates of return extends savers' horizons over both space and time. Wealth portfolios at each level of income are too small when savers can diversify more efficiently in an integrated capital market and when they can anticipate the flow of returns to wealth with greater precision for relatively long periods. Savers will also lower their rates of time discount.

Reducing the spread in interest rates has the immediate effect of increasing demand for real stocks of money and near-money. Whatever the effect on desired savings, and on the steady-state rate of saving, the effect on demand for real money and relatively close substitutes in the short run is substantial. McKinnon suggested that monetary authorities should meet the increased demand by supplying

incremental amounts of nominal money. This would yield an immediate bonus flow of savings to borrowers in the intermediation process. If this does not happen, the discontinuity of real stocks of financial assets demanded could be deflationary. "Financial deepening that lifts the growth paths of accumulation may involve some stormy experiences for monetary, fiscal and international economic policy." (McKinnon, 1973).

3.4 Effects on the Real Economy

The effects of liberalisation which have been identified so far are:

(i) an immediate sharp increase in interest rates, and
(ii) increased availability of funds, leading to
(iii) increased intermediation.

How do these changes affect the real economy?

One possible influence is the switch from physical to financial assets as the real return on the latter increases. The increase in the real return on money depends both on the rise in nominal rates and the fall in inflationary expectations. Real money balances should rise as inflationary expectations fall. Agents will reduce their demand for commodities in order to acquire cash balances when deposit rates are increased. Thus there will be a deflationary effect on aggregate demand even as the real size of the banking system increases. Real credit can then be increased rather than contract and the squeeze on working capital (and contraction in real output) commonly associated with deflation can be avoided. In Korea in 1965, the relaxation of financial constraints on aggregate supply were apparently enough to overcome any dampening influence on output from reduced aggregate demand (McKinnon, 1973).

However, if the banking system is not capable of directing this new lending into high productivity investments, then considerable social loss will occur in both the short and long run. Moreover, the immediate 'financial' costs of deflation will be greater if banks do not have high return loans available to offset the contraction in inventory investment (inflation hedges) as real money balances become more attractive.

High interest rates have more effects than just causing switching between different stores of wealth. A sharp rise in interest rates is equivalent to a supply shock for firms. The cost of financial capital rises and this eventually affects prices. Working capital is a function of the funds required to finance labour and physical inputs, and of the interest rate. If for some reason the demand for funds increases or the supply is rationed and interest rates rise sharply, there will be a cost-push effect on firms. A higher cost of borrowing shifts aggregate supply upwards (Foxley, 1983).

In economies with developed, homogenous capital markets, these changes are not large. However if the market is segmented, the cost effect may be extremely significant. Initially there is segmentation between the official regulated market and the higher cost, free market. Both of these are domestic markets. When interest rates are deregulated, the official and private domestic capital markets become one. The interest rate is determined by supply and demand - at a rate much higher than the old official rate. The result is a cost-push. At the same time, external borrowing becomes more effective. Where there are exchange control regulations setting the maximum amount of external borrowing, the external financial market now becomes a rationed, cheap credit market for those firms which have access to it. A second kind of market segmentation is established. This effect is reinforced during periods of deflationary stabilisation policies.

Large firms are able to develop an access to foreign borrowing rapidly. This is a significant advantage in a segmented market. Thus liquidity tends to concentrate in larger firms. It is easy for them to buy 'undervalued' assets of smaller firms that are in trouble because of low sales and increased borrowing at the very high interest rates prevailing in the domestic credit market. For example, in Chile, this was a very powerful mechanism for concentrating assets in a few large conglomerates (Foxley, 1983).

The higher cost of credit also forces firms to reduce stocks - typically by reducing production. This is the idea of working capital discussed by Keller (1980), whereby the availability and cost of funds affects production even though finance may not be a direct input into the production function. Therefore not only do prices rise due to cost-push pressures, but output falls. The result is stagflation.

This effect will be temporary, and very temporary if external capital flows are deregulated simultaneously. However, inflationary expectations perform an important amplifying role vis-a-vis any changes in critical indicators such as the exchange rate, wages and interest rates.

The prevalence of high real interest rates also has major effects on asset redistribution. Resources will not flow into new real investment unless rates of return are available similar to those to be gained in the financial markets. This can only occur if the price of productive assets comes down far enough to compensate.

The negative influences of high real interest rates on investment are counteracting the positive effects of credit availability. Initially supply bottlenecks associated with the shortage of working capital will be eased and production will expand. In the longer term, investment with higher than average productivity would increase as entrepreneurs embark upon profitable ventures because of their access to finance. Thus aggregate output will rise in both the short and longer term.

However, the relationship between increased intermediation and capital formation is not as straightforward as it appears. For example, in Brazil and Mexico in the early 1970s, the rapid growth in output and financial intermediation was associated with a concentration of income among the highest income groups and of greater emphasis on income favouring profits, rents and executive salaries than the general wage bill. The rapid growth in financial intermediation was not necessarily associated with increased investment finance because short term financial liabilities expanded disproportionately. These were also concentrated in the higher income groups. Absolute and relative increases in the real incomes of wealthier households were associated with demand shifts favouring credit purchases of consumer durables, such that the accumulation of financial assets of net savers was matched by the increased financial liabilities of net borrowers. This suggests that the association between fuller financial intermediation and growth in the investment share of output is ambiguous. It also implies "that the fiscal and distributive corollaries of financial policy must be examined before the ultimate effect of financial intermediation on growth can be deduced." (Reynolds, 1976).

In fact none of the effects discussed above are unambiguous or certain. For example, in Chile, the liberalisation of the financial sector and the existence of positive real interest rates for the first time in years did not lead to an increase in domestic savings. "Domestic savings not only did not increase but stood at one of the lowest levels in history. Gross domestic investment was remarkably low during the period, and public sector investment fell to one of its lowest levels." (Edwards, 1985). It has been suggested that the low level of savings was due to the behaviour of asset prices. These increased dramatically (as shown by the stock index). To the extent that savings depend on the difference between actual and desired wealth, the increase in asset prices and consequently of perceived wealth could well explain the poor savings effort.

A significant increase in the demand for credit was experienced in these countries, triggered by the increase in perceived wealth and permanent income. This higher credit demand was directed toward both investment projects and increased consumption. The increased demand induced by the supply of funds may have been responsible for the sharp rise in asset prices.

A similar boom was experienced in Britain in 1971. Reintermediation began almost immediately, with lending to those sectors most affected by controls, notably individuals, rising strongly. There was a rapid acceleration in house prices. Nor was this loan demand noticeably responsive to higher interest rates (Goodhart, 1975).

3.5 Institutional Distortions and Imperfect Information

Some characteristics of a repressed economy can occur in the absence of direct controls. Institutional factors may cause credit rationing even in the absence of direct controls. In the housing market, building societies are relatively slow to change their mortgage rates. If market interest rates rise, the flow of deposits to these societies falls and mortgages are then rationed at the lower society rate. "Such rationing has had a marked effect on the housing market, stronger than the effect of changing mortgage rates" (Goodhart, 1985).

Another argument is raised by Cho (1986). Cho claims there are two constraints in credit markets: institutional regulations, such as

interest rate ceilings, and endogenous constraints due to imperfect information. The latter arise because of the cost of distinguishing between the risk characteristics of different customers, especially new customers. Several studies have shown there is credit rationing in competitive credit markets. Lending does not necessarily increase as a function of the interest rate charged. For example, it may be more profitable for the lender to ration credit at a lower rate, rather than to increase the interest rate in response to excess demand for loans; or borrowers may be excluded from the market due to imperfect information even though the expected return on their proposed investment is higher than that of established borrowers who receive credit.

In a repressed economy, banks concentrate loans on a small number of firms that have established relations. There are however likely to be very productive firms about whom the bank knows nothing. Cho shows that when imperfect information prevails, banks avoid financing new, productive groups who may be perceived to be risky, even if the banks are risk neutral and free from interest rate ceilings. Thus a free interest rate regime is not sufficient for full allocative efficiency of capital. The dynamic effect of this on growth is even worse, since it makes adjustment of the industrial structure difficult if comparative advantage shifts to a new industry.

Cho suggests that in the presence of asymmetric information, debt finance is subject to problems of adverse selection and moral hazard, whereas equity finance is not. The expected return to an equity investor is the same as the expected return on the project itself. Thus equity capital can finance those risky, productive borrowers for whom the problem of asymmetric information is acute. This suggests the need for fostering equity markets as a part of a comprehensive liberalisation strategy.

For the remainder of this chapter we shall assume that a well-functioning equity market does exist. However, the fact remains that deregulation, while necessary, is not always sufficient for well functioning financial markets if there is also imperfect information.

3.6 IS-LM Analysis

To try and draw together the effects of deregulation within a unified framework, it is useful to look at them in the context of an IS-LM model.

This analysis does have significant limitations. The most serious of these is that these curves of output and money supply show equilibrium positions. The LM curve in particular shows combinations of interest rates and national income at which a given money supply is demanded and hence equilibrium reached. Yet deregulation changes money demand, the money supply, interest rates and income simultaneously. An LM curve cannot possibly show the dynamic effects of these changes.

However, it may be possible to reach some idea of the final result by considering the effects of deregulation as a sequence of events and examining each in turn. Looking first at the possible effects of deregulation on the LM curve:

(1) As physical assets are transformed into financial assets and shift into now higher-yielding financial instruments which form part of the conventional money supply, reintermediation will increase money demand;

(2) Transaction balances are expected to fall and the interest elasticity of the supply of deposits will increase as yields become positive in real terms;

(3) The interest sensitivity of money demand is likely to decrease in the longer term. As financial instruments become more related to market rates of interest, the differential between them remains unchanged even though the market rate may change. Thus there is no incentive to adjust between instruments when the returns all move in line with the general level of interest rates (Akhtar, 1983). This is by no means a unanimous view. Santomero and Siegel (1986), for example, feel that the income elasticity effect will outweigh the other effects," ... so that the LM curve ... becomes flatter under deregulation rather than steeper as is usually depicted."

(4) The income elasticity of demand is, however, also likely to fall as

deposits will be held as interest-bearing liquid assets, rather than simply to facilitate transactions (Santomero and Siegel, 1986). This effect works to offset the change in interest elasticity.

The overall effect of these influences is likely to be a steepening of the LM curve. However, in the transition period, money demand and supply are likely to be highly unstable. It is not possible to assess *ex ante* how the schedule will behave. Work by Judd and Scadding (1982) concludes that deregulation is likely to significantly reduce the interest elasticities of M1 and M2.

Next we turn to the IS curve. This schedule shows the combinations of interest rates and national income at which intended saving and investment levels are in equilibrium. The net effect of financial liberalisation is to increase the interest sensitivity of most components of aggregate expenditures over time (i.e. flatten the IS curve) for the following reasons:

(1) Under the system of non-price credit rationing, the flow of credit to some sectors is prevented, while others are sheltered from various interest rate or price changes. Under a liberalised regime, interest rate changes will affect most economic agents directly. Thus the average interest elasticity of demand components should rise.

(2) The removal of interest rate ceilings will lead to a higher average level of interest rates. Interest costs will therefore form a larger proportion of total expenditure and changes in the rate of interest will have a greater impact on agents' budgets and expenditure.

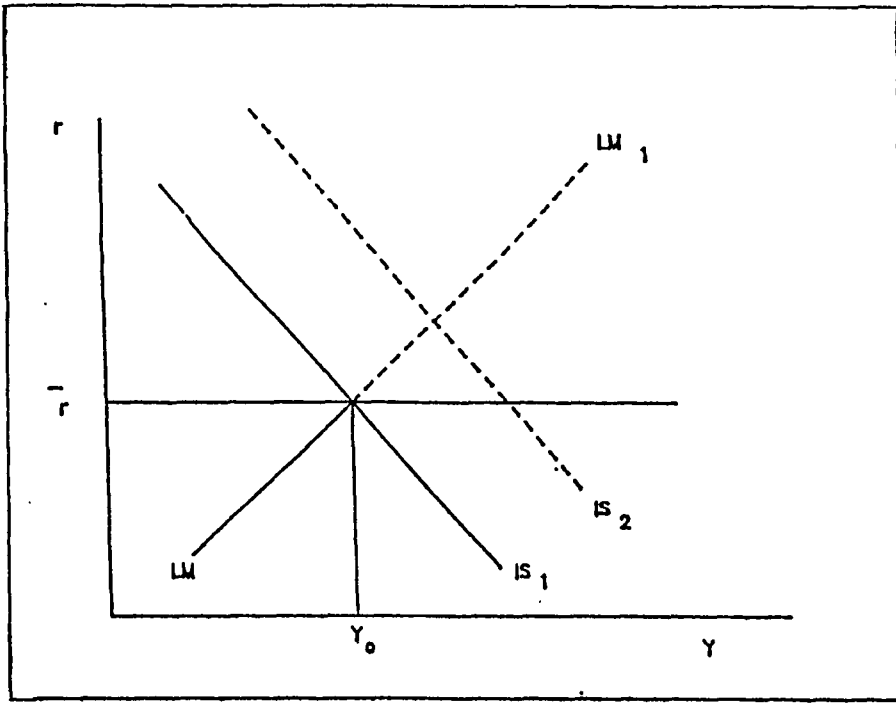
(3) Rigidities in other markets could increase market sensitivity. Borrowers are likely to be more sensitive to changes in interest rates if prices in their product markets, or income levels, move more slowly.

The change in the interest sensitivity of aggregate expenditure will occur slowly, as agents adjust only slowly to the new environment. In the transition period, there could well be a period of deflation. It is likely that there will be unpredictable shifts in the schedule as investment expenditures also tend to be very sensitive to changes in producer confidence and certainty.

The sequencing of these effects is uncertain. However, it is likely that the LM schedule will move more rapidly than the IS curve as the money market tends to react faster than the goods market. This is due in part to purely physical factors, such as production and investment lead times, and long-term contracts, although in the short run some reaction can be manifested via inventory changes.

Before deregulation, the IS-LM model could be represented as shown in Figure 3.1.

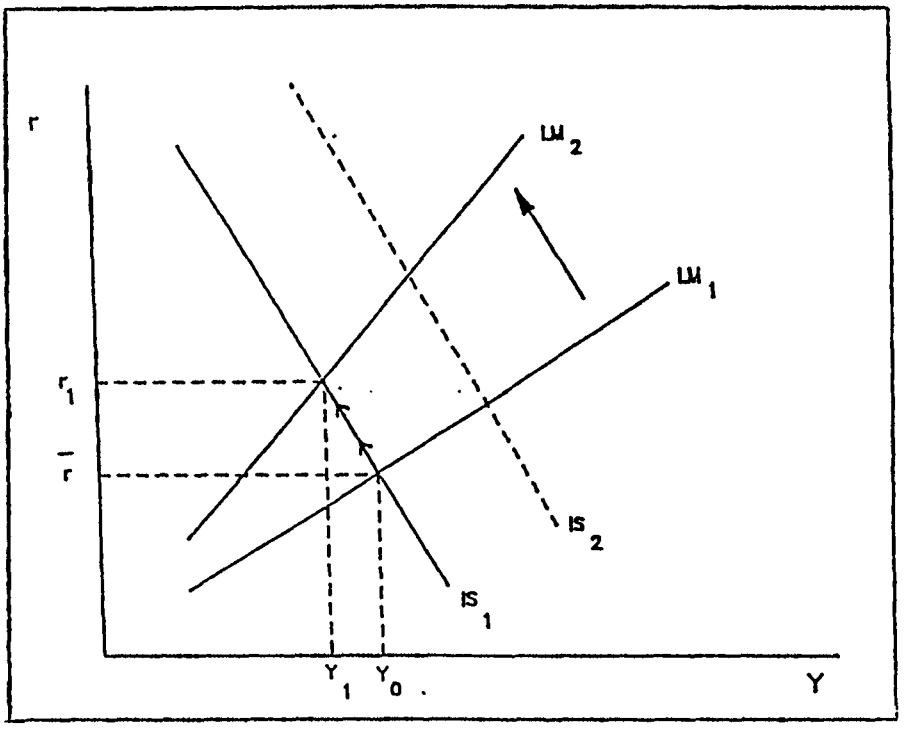
FIGURE 3.1: THE IS-LM MODEL BEFORE DEREGULATION



For a fixed money supply, the LM curve must end at the level of the interest rate ceiling F. If income rises above Yo, the demand for real money balances rises, but it is unable to increase to clear the market. Thus the IS curve is constrained. Aggregate expenditure is less at each level of interest than it would otherwise be, owing to the constraint on the level of saving caused by the interest rate control.

The immediate effect of lifting the ceiling on interest rates, therefore, would be a steepening of the LM curve, as shown in Figure 3.2. As the IS curve is fixed in the short term, this has a deflationary effect, with real incomes falling.

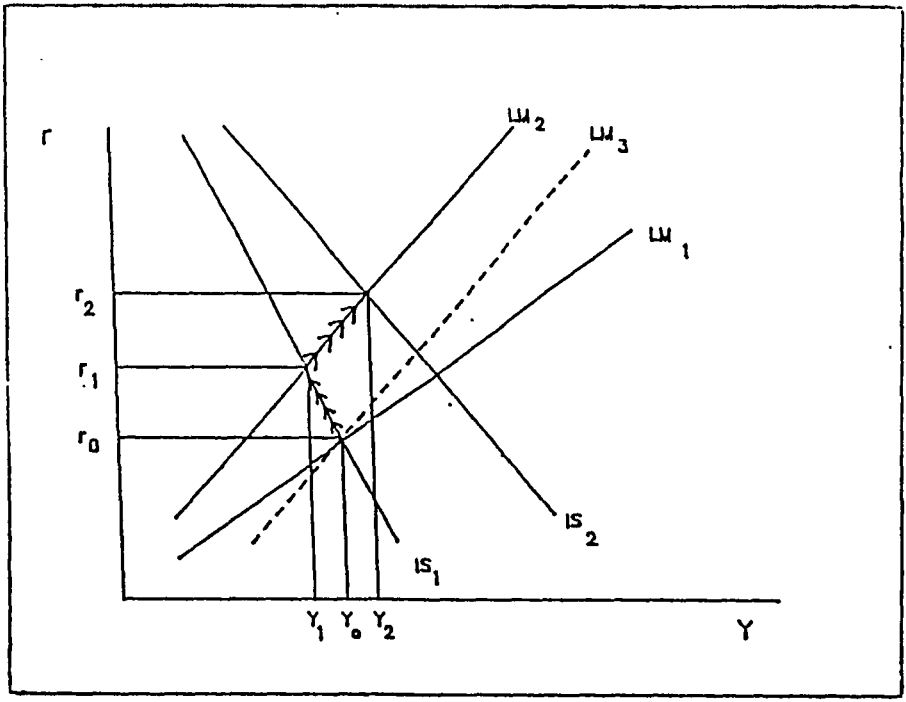
FIGURE 3.2: THE SHORT-RUN IMPACT OF DEREGULATION



In the longer term, however, the IS schedule moves to the position it would have held without the interest rate constraint, IS_2, but becomes flatter as the interest sensitivity of expenditure increases, as illustrated in Figure 3.3.

The outcome may therefore be a period of deflation, followed by expansion even as interest rates continue to rise. The final equilibrium shown here is a higher national income and higher level of interest rates.

FIGURE 3.3: THE LONG-RUN IMPACT OF DEREGULATION



Allowing the money supply to expand during the initial phase of this sequence would help lower interest rates (say LM_3) and might reduce the deflationary effects of deregulation. However, given the rapid expansion of money demand, expanding the money supply could result in a rapid increase in inflation as the physical market can respond only slowly.

The sequence shown here is one possible outcome, but it is by no means the only one. Experiences of deregulation have shown that both IS and LM schedules move erratically during the transition period. Much of this is due to uncertainty on the part of the market. There is likely to be a lag, for instance, in the formation of some investment plans until it is clear that the regulations will not be reimposed: "The striking feature of periods with binding financial controls ... is increased uncertainty and the interplay of expectations about regulatory avoidance and regulatory response." (Poole, 1986).

This uncertainty is likely to persist for some time, leading to erratic movements in the components mentioned above.

All this suggests that economic activity may turn out to be more responsive to monetary policy and less responsive to fiscal policy during the transition from a regulated to a liberalised economy.

3.7 Liberalisation of Foreign Exchange

Both the exchange rate regime and the extent of direct controls on international capital flows have important consequences for the outcome of financial liberalisation.

The study of the effects of financial deregulation in this chapter so far were based on two key assumptions:

(1) the exchange rate is fixed, and

(2) there are exchange controls in place.

Thus, for example, the movement in interest rates does not cause an inflow of capital from abroad.

It is necessary, however, to examine the consequences of freeing up the capital account of the balance of payments and the effect of the flexibility of the exchange rate on this process in order to be able to review the interaction of this form of liberalisation with the behaviour already described as a result of other financial deregulation.

3.7.1 The Nature of Controls on the Capital Account

Controls on the capital account of the balance of payments are widespread. Most developed countries have had exchange controls at some time. Controls on capital movements are usually imposed as an adjunct to trade restrictions, in an effort to improve the balance of payments, usually in the face of an adverse external shock such as a deterioration in the terms of trade. However, they have been much less widely discussed and analysed than current account controls. For example "... the General Agreement on Tariffs and Trade has no parallel as far as capital transactions are concerned other than fairly

vague political commitments to capital market liberalisation." (Beenstock, 1980). However, capital controls play an important role in the international transmission mechanism and are particularly critical in the context of financial sector deregulation.

The controls usually apply to outward capital movements. In other words, generally only one side of the capital account is restricted, although this is not always the case. Controls assist the government in pursuing policies aimed at insulating the economy from adverse external economic events. For example, in the case of a deterioration in the terms of trade, a government can undertake expansionary financial policies to offset the resulting foreign exchange losses through the current account. The presence of exchange controls means that the additional injection boosts domestic expenditure, rather than leading to a large outflow of funds through the capital account.

3.7.2 Distortions Stemming from Controls

Controls on capital outflows also provide support for an overvalued exchange rate. Without exchange control, the expectation of a devaluation would lead to a large outflow and heighten pressure for a devaluation.

However the imposition of these controls leads to distortions in the allocation of resources. Maintaining domestic expenditure above national income, as in the face of a fall in the terms of trade, involves ongoing current account deficits. Often subsequent policy is directed at the current account deficit rather than the base cause, i.e. the government's fiscal policy (RBNZ, 1986). Export incentives and other measures are introduced to increase the profitability of traded goods. However the expansionary stance of policy and consequent high level of aggregate demand mean the prices of non-tradeables are able to rise in line with the prices of traded goods, thus eliminating any incentive to undertake the structural adjustment necessary to correct the deficit.

Another effect of excess domestic demand is that *ex ante* investment exceeds planned savings. The government finances the difference. As an expansionary policy is being pursued, the funds are borrowed from overseas. To the extent that interest rates overseas are above

domestic rates, adjusted for exchange rate risk, at least some of the private expenditure will be on investment that is expected to yield a lower return than the cost of the overseas borrowing. This is thought to have happened to some extent in New Zealand: "... the Government's macroeconomic policy ... reduced New Zealand's medium-term national income by facilitating investment projects in New Zealand with lower returns than the cost of the official overseas borrowing effectively used to finance them." (RBNZ, 1986).

In fact, controls are often imposed when foreign rates of return exceed those available domestically. Thus they are frequently an adjunct to policies of financial repression. For example, interest rate ceilings which lower domestic interest rates below those available overseas would generate an outflow of capital in the absence of controls, worsening the balance of payments.

Under a fixed exchange rate, such an outflow would lead to a rapid depletion of reserves. It would tend to place upward pressure on interest rates and intensify the effect of the controls and the capital outflow. With a floating regime, a capital outflow would cause the exchange rate to depreciate. This generates a rise in inflation and again places upward pressure on interest rates, stimulating further outflows.

When outflows are controlled, domestic investors are unable to take advantage of higher yielding investments overseas. Retaining funds by means of controls thereby reduces the rate of return on those funds. This may lead to a lower rate of economic growth (depending on the degree of repatriation of interest and profits from overseas investments that would occur in the absence of capital controls) (EMG 1985). EMG further note that the very presence of controls on outflows is an incentive to avoid repatriation of funds wherever possible.

As well as limiting investment to the sum of domestic saving and official borrowing, exchange controls restrict domestic savings opportunities. By enabling domestic interest rates to be maintained below market rates, residents are discouraged from saving, as discussed in the previous chapter.

3.7.3 Removing the Controls

Opening the capital account exposes the domestic financial sector to a much wider market. The resulting capital flows will depend on the relationship between domestic and foreign interest rates and on expected exchange rate movements.

There has been some debate about the influence of interest rate differentials on capital flows. On the one hand, a relative rise in the domestic interest rate will attract foreign capital inflows and lead to upward pressures on the domestic currency. On the other hand, it has been argued that a relative rise in interest rates signifies a rise in the inflation rate differential and hence generates expectations of a devaluation and consequently outflows of capital.

Chiang (1984) has examined this problem and postulates a model which explains both sorts of behaviour. The difference depends on the specification of the opportunity cost of money - that is, whether it is related to short-term or long-term interest rate differentials, or expected inflation. This in turn is taken to depend on the structure of the economy.

Such a model implies that it is possible for interest rate movements to have different effects in different countries. It also suggests that the behaviour of owners of capital in response to interest rate changes may itself change over time. For example, as inflation expectations alter, the perceived opportunity cost of money may switch from an interest-rate differential to expected inflation.

For the purposes of examining deregulation, the assumption made in this paper is that a level of domestic interest rates relatively higher than prevailing foreign interest rates (adjusted for exchange rate risk) will lead to an inflow of foreign capital.

Freeing up capital flows when the financial sector is still repressed, with interest rates fixed at artificially low levels, will lead to large capital outflows. These will lead to the problems described earlier, placing upward pressure on interest rates and stimulating further capital outflows.

For this reason, many authors have suggested that the capital account should be liberalised only after the deregulation of the domestic financial sector. As discussed in the previous chapter, deregulation of the financial sector usually raises interest rates substantially (Edwards, 1984). As Edwards notes, most of the literature on domestic financial market liberalisation refers to "raising" interest rates, rather than "freeing" them. Edwards also states "... it is generally accepted that in an inflationary environment the domestic financial market should only be liberalised after the fiscal deficit has been controlled."

Liberalisation of the capital account in the case of a deregulated financial sector will therefore lead to a large inflow of foreign capital. Under a flexible exchange rate, such inflows lead to an appreciation of the nominal (and real) exchange rate. If the exchange rate is fixed, the process takes longer. Capital inflows lead to an expansion of the money supply, causing a higher rate of inflation. Eventually the authorities are forced to revalue the currency in order to curb these inflationary pressures.

Not only does opening the capital account lead to a real appreciation, but owing to the speed with which the financial sector reacts, the real appreciation will be quite abrupt. To some extent the pressure on the exchange rate will be temporary. When the exchange controls are first lifted, both domestic and foreign investors will restructure their portfolio. Domestic agents will increase their holdings of foreign assets and liabilities and vice versa. However, to the extent that the capital flows are sustainable, the appreciation may be a move towards a new long-run equilibrium.

3.7.4 Short-Run Overshooting of the Level of Capital Inflows

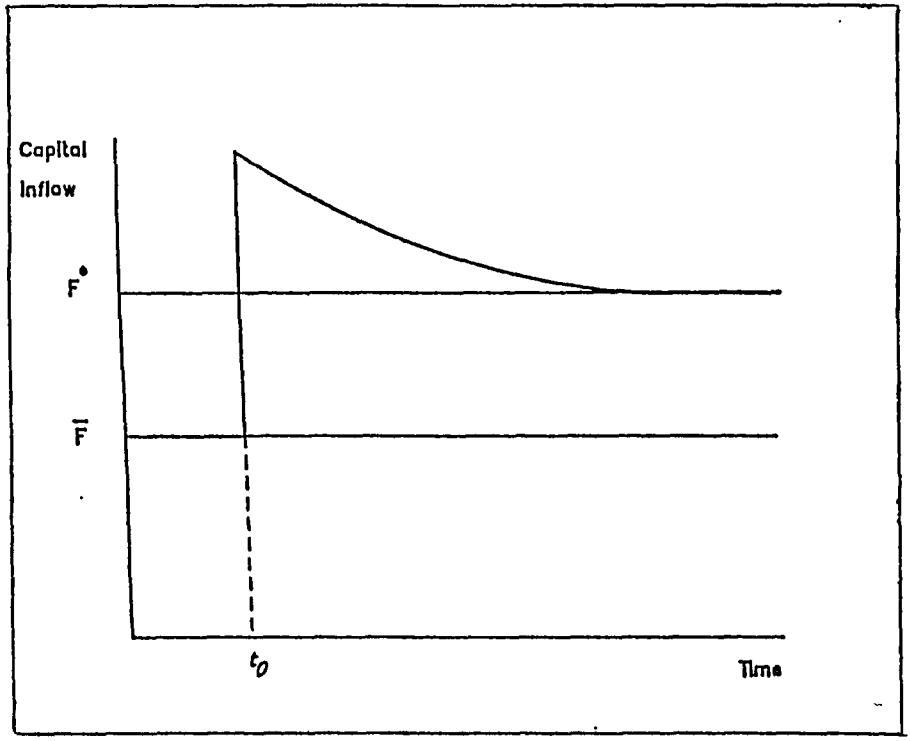
A simple model can be constructed to show how opening the capital account can result in short-run overshooting of the level of capital inflows (Edwards, 1984). Assume capital inflows, K, respond to the level of desired or sustainable foreign debt D^* such that:

$$F = \min [P(D^*-D(t-1)), F^*]$$

where F* is the maximum (net) capital inflow permitted in each period, D(t-1) is the actual stock of foreign debt outstanding in the previous period, and P is a partial adjustment coefficient.

D*, the level of sustainable or desired foreign debt, depends *inter alia* on the level of the world interest rate, real income, real wealth and the perceived return on domestic investments. The model is based on the assumption that there is a long-run equilibrium level of foreign debt to GDP, as advanced by Harberger (1982). If GDP grows at the annual rate g, and the real interest rate on foreign debt is r, then net annual capital inflows will grow at a rate (g - r), in the absence of constraints.

FIGURE 3.4: CAPITAL FLOW BEHAVIOUR



Clearly, if $F^* < P(D^*-D(t-1))$, the gap between the actual and desired level of foreign debt will increase over time. When restrictions on foreign debt are lifted, therefore, capital inflows will

jump immediately to a fraction P of the *accumulated* difference. As the gap is slowly closed, capital inflows will gradually reduce until they reach a new equilibrium level. The behaviour of capital flows over time will therefore follow the pattern shown in Figure 3.4.

This tendency to overshoot will be enhanced if, in addition, D^* itself rises significantly as the perceived profitability of domestic investments increases (as proposed by McKinnon, for example; see discussion earlier in this chapter.)

The sudden increase in capital inflows will produce a large current account deficit, as expenditure exceeds income. However, as a portion of these flows will be spent on non-tradeable goods, absorption of the inflows requires an increase in the relative price of these goods and therefore a real appreciation of the currency. If the nominal exchange rate is fixed, the adjustment will occur through the nominal price of non-tradeables and through real wages. This short-term increase in the relative price of non-tradeables generates an expansion of the non-tradeable goods sector and a contraction of the importables and exportables sectors. For example, after the capital account in Chile was opened in 1979/80, a significant part of the massive capital inflow which ensued was used to finance the expansion of the construction sector.

As the gap between actual and desired debt begins to close and the level of capital inflow declines, the relative price of non-tradeables will tend towards its new long run equilibrium. Again, under a fixed nominal exchange rate, the adjustment must be through a decline in the relative price of non-tradeables and real wages. If, however, the nominal price of non-tradeables is not flexible for some reason, this relative price decline will not occur. Using Chile once more as an example, real wages were virtually inflexible as a result of an indexation mechanism introduced in 1979. As a result, the necessary change in relative prices could not take place, and the adjustment occurred instead through quantities, with a reduction in production and employment.

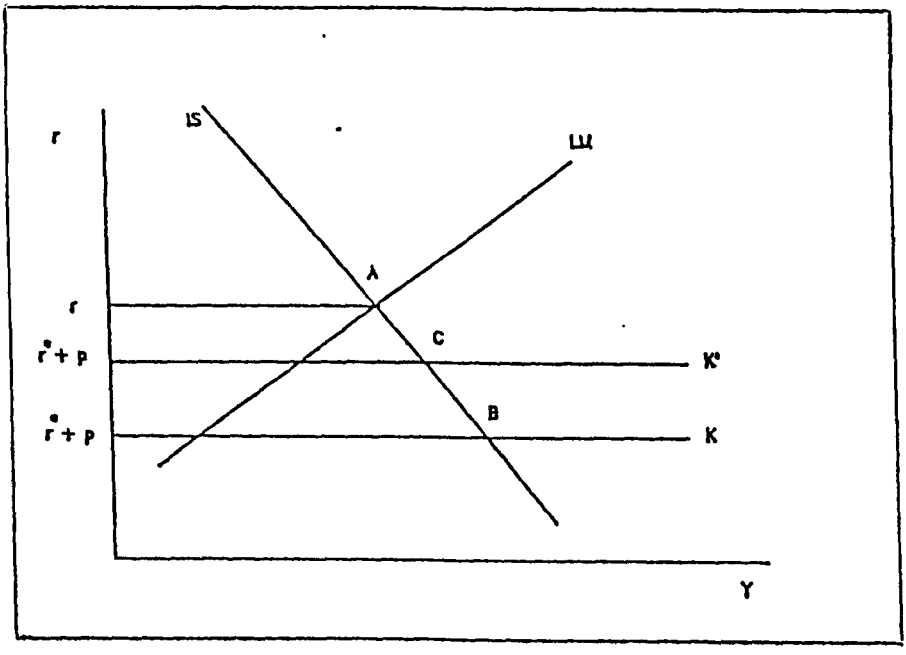
The surge in capital inflows under a floating exchange rate will generate an appreciation of the currency. The impact of this depends on the relative strength of two effects. First, the appreciation will squeeze those sectors exposed to foreign competition (both exports

and import-substitutes). On the other hand, import costs will fall and this could lessen domestic inflation and result in some competitive gains. As the capital inflows lessen, the exchange rate will depreciate, and both of these effects will be reversed. If importers regard the appreciation as temporary and do not pass on the lower prices, the squeeze on the export sector will be intensified. However, demand for imports will also be lessened.

3.7.5 Longer Term Consequences of Liberalisation

A more analytical framework is desirable to examine the longer-term consequences of liberalising the capital account. One possibility is to use the IS-LM model, an approach adopted by Khan and Zahler (1983, 1985). In their model, capital flows consist of an autonomous component and a component determined by the difference between domestic and foreign interest rates, adjusted for expected exchange rate changes and a country risk premium.

FIGURE 3.5 : SHORT-RUN RESPONSE TO CAPITAL ACCOUNT LIBERALISATION



To allow for an upward sloping supply curve of foreign credits, the risk premium is made a function of the ratio of external debt to income. Thus, as this ratio increases, the risk premium rises and net capital inflows to the country are reduced, even though domestic and foreign interest rates, and the expected exchange rate, remain unchanged.

It is assumed that initially there is no foreign debt (an assumption which does not change any basic results). With a constant risk premium and foreign interest rate, the (small) country faces an infinitely elastic supply of foreign capital that, when monetised, will make the effective LM curve horizontal. The short-term response to opening up is therefore to shift LM to KK (see Figure 3.1). At B, expenditure exceeds income. The current account therefore goes into deficit. This is an effect also of the increase in relative price of non-tradeables that results from the excess supply of money created by the inflow of capital.

Assuming a fixed exchange rate the effect on international reserves depends on the size of the current account deficit relative to the capital inflows.

In the absence of net investment (by assumption), output remains constant; therefore the rising foreign debt leads to an increase in the risk premium. (In the diagram, KK moves to K'K'.) At the point C, the difference between income and expenditure is less. This lowers the current account deficit. The interest differential is also less. This reduces the inflow of capital and so slows the rate of increase in foreign debt. This process continues until the economy has returned to equilibrium at the original levels of income and domestic interest rates. However, at the new equilibrium, the stock of foreign debt is larger and the risk premium higher, and the level of real expenditure on goods and non-financial services lower, compared to the initial position.

The main results of this model are:

(1) Domestic interest rates initially fall, then rise back to their initial levels;

(2) The current account deficit is financed by an increase in foreign debt rather than by a fall in international reserves; and

(3) During the transition period, real expenditures on goods and non-financial services increase, but are later reduced in the final equilibrium due to the servicing requirements of the (now larger) stock of foreign debt.

This analysis omits all consideration of possible outflows of capital. The implicit assumption is that domestic interest rates exceed those overseas, that the lifting of controls results in an increase in borrowing from overseas as domestic residents reduce their borrowing costs, and in an increase in foreign direct investment to take advantage of the higher returns. This effect is usually a result of the lifting of interest controls rather than exchange controls as inward flows by non-residents are not usually strictly controlled.)

To some extent, however, the lifting of controls will result in an outflow, despite an interest rate differential, as investors restructure their portfolios. To the extent that domestic holdings of foreign bonds and other assets increase, the balance of payments worsens, contracting the money supply and pushing up interest rates. This triggers deflation via domestic demand through real balance and interest rate effects. The rise in interest rates will tend to generate a capital inflow, offsetting the initial outflow. Domestic deflation will also improve the balance on current account. These factors therefore offset the impact of the capital inflows postulated by Khan and Zahler.

An alternative approach used by Edwards (1984) and based on an extension of the Ricardo-Viner model examines more closely resource movements during the process of liberalisation. A three sector economy is examined. The sectors are import substitutes, exports, and non-tradeables. Capital is sector-specific in the short run, while labour is assumed to be perfectly mobile.

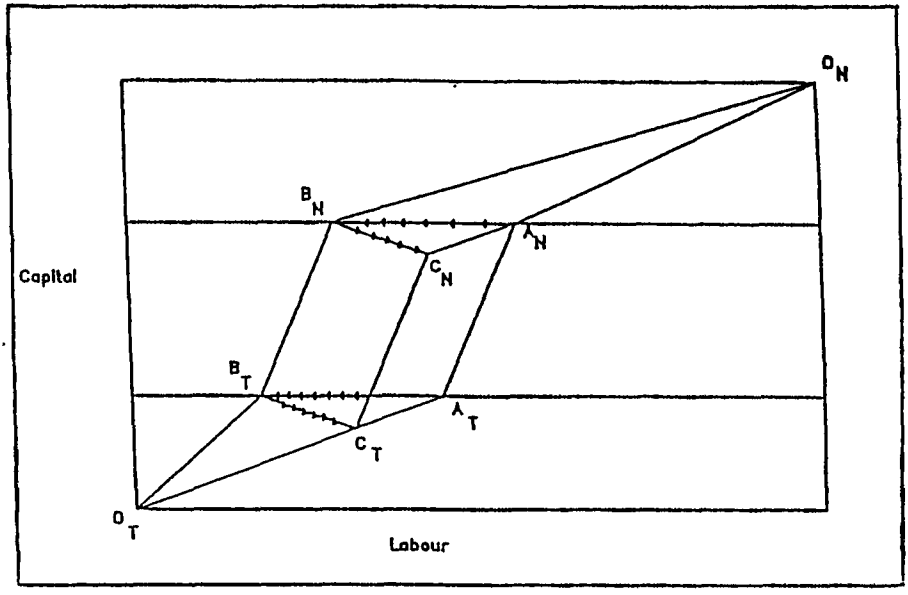
Opening up the capital account results in an inflow of capital. To the extent that some of the borrowed funds are used to finance consumption of non-tradeables, production of these goods will increase. The increase in demand means the relative price of

non-tradeables rises, i.e. there is a real appreciation. The increased production of these goods is achieved by increasing the use of labour in that sector, as capital is fixed and immobile in the short-run. The return to capital in the non-tradeables sector increases, while that in the tradeables sector declines.

In the long run, relative prices are assumed to be completely determined by world prices, technology and tariffs. Therefore opening the capital account will have no long-term effect on relative prices of goods or factors of production. Eventually capital will move into the non-tradeables sector, so that equilibrium is re-established at the original capital-labour ratios. However the final production of non-tradeables will be higher, and that of tradeables lower than before liberalisation.

The model so far has not considered overshooting of capital inflows. If the short-run inflows exceed the long-term levels, then the result differs. Under this scenario, production of non-tradeables will fall during the transition from short to long-run equilibrium. The transition from short to long-run equilibrium can be shown in a Melvin-Edgeworth-Bowley diagram:

FIGURE 3.6 : TRANSITION FROM SHORT TO LONG RUN



N refers to non-tradeables; the path A_N to B_N shows the higher labour/capital ratio due to fixed capital and higher output in the short run; B_N to C_N shows the shift back to the original labour/capital ratio, with the injection of more capital in the longer term.

3.7.6 Overall Effect of Capital Account Liberalisation

The discussion so far leads to some broad conclusions about the effects of opening up the capital account.

First, the immediate result of lifting controls will be large net capital inflows. These are partly a move by domestic borrowers to obtain cheaper finance offshore, and partly a result of portfolio adjustments.

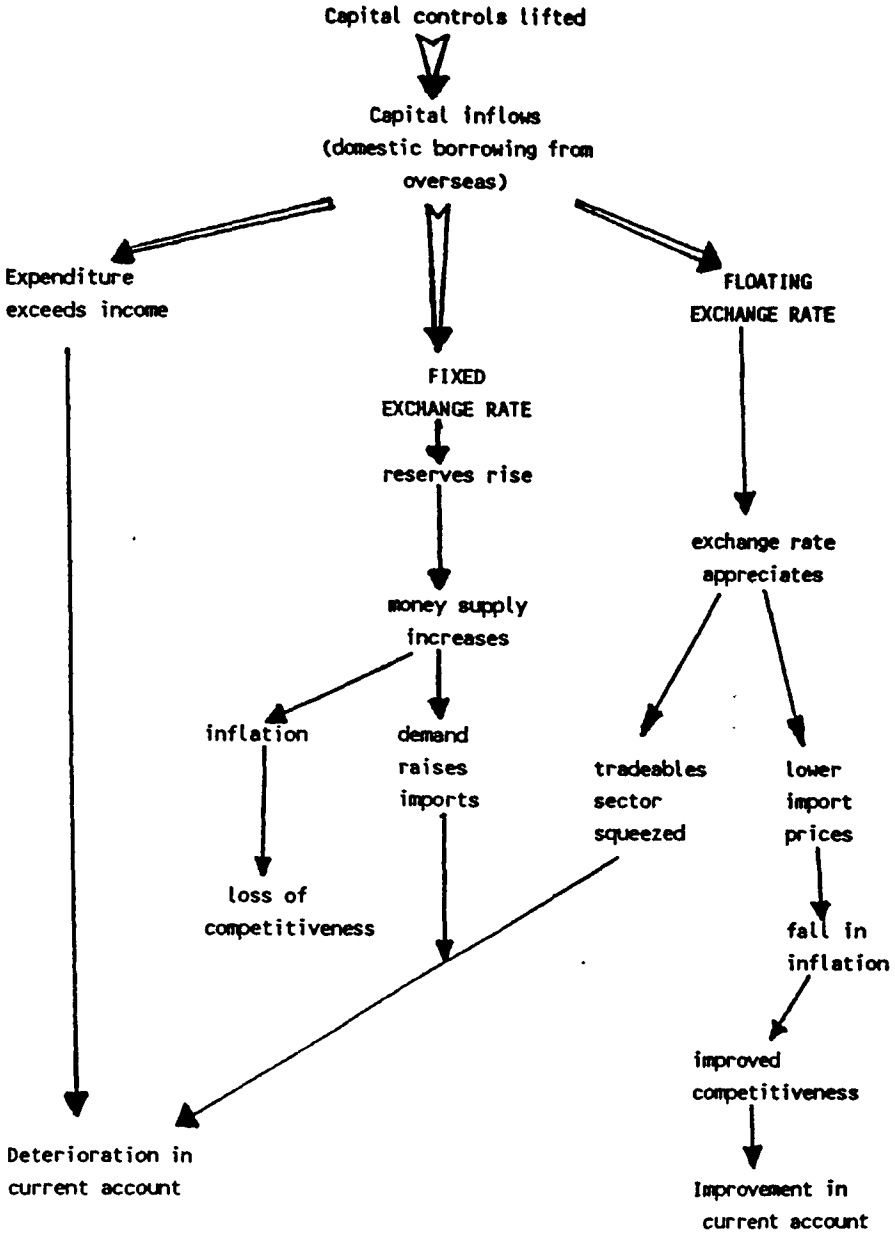
These inflows will place upward pressure on the currency. A floating rate will appreciate. Under a fixed rate, the inflows will cause the price of non-tradeables to rise. They will also increase the money supply, placing downward pressure on interest rates. The subsequent increase in demand will raise imports, leading to a deterioration in the current account.

The appreciation of the floating rate will squeeze the export and import-competing sectors, and will lower the price of imports. To the extent that these price falls are passed on, inflation will drop, thus offsetting some of the loss in competitiveness. However the increase in demand for imports as a result of lower prices will further worsen the current account.

The deterioration in the current account places downward pressure on the exchange rate. As the level of overseas debt reaches its desired level, and domestic interest rates fall to world levels, the capital inflows slacken off, also placing downward pressure on the exchange rate.

The final position therefore depends ultimately on what the borrowed funds are used for. If the entire amount of offshore borrowing is used to finance current consumption, as was assumed in both models, the final position is one of a greater level of overseas debt and lower real expenditure.

FIGURE 3.7: STYLISED SEQUENCE OF EVENTS FOLLOWING LIBERALISATION OF THE CAPITAL ACCOUNT



If however the borrowing was used for productive investment, the final result will be an increase in growth, which can be used to repay the added debt.

3.7.7 Interaction with Other Factors

A major problem in a theoretical analysis such as this is assessing the different speeds of response of different markets. Finance and foreign exchange markets tend to react quickly to change, whereas goods markets tend to respond more slowly.

For example, a decrease in competitiveness of exports due to an exchange rate appreciation will not automatically lead to a reduction in output. If the appreciation is seen as temporary, exporters will try to maintain their presence in their overseas markets, albeit at a reduced profit, as the cost of re-entry may be great.

Similarly, the increased demand for non-tradeables may result purely in a price increase and production increases within existing capacity constraints, rather than increased investment.

Another problem arises with the investment that is undertaken with the foreign borrowing. To the extent that the short-term appreciated value of the exchange rate is interpreted as a permanent change in relative profitability between tradeables and non-tradeables, investment will be misplaced. Once capital inflows fall off and the exchange rate readjusts, the investments may not generate a return sufficient to service the debt which financed them.

The difference between short-term and long-term signals has also been advanced as a rationale for liberalising the trade account before the capital account of the balance of payments. Because of the different speeds of adjustment, signals which exactly offset each other in the long-term can be misinterpreted in the short run, leading resources to switch between sectors, a move which is later reversed. This movement of resources is costly and inefficient (Edwards, 1984).

How then does moving to a floating exchange rate and to a freer capital account affect the process of financial liberalisation?

We stated earlier that financial deregulation leads to higher levels of saving and investment, at high interest rates. Raising interest rates will attract foreign capital, while lifting exchange controls will encourage domestic borrowers to seek funds from overseas, as costs will be relatively cheaper. The result will therefore be large net capital inflows, and an appreciation of the exchange rate, as already described.

Capital inflows, *ceteris paribus*, should result in a drop of domestic interest rates to equal those obtainable overseas (with a risk premium). To the extent that domestic investment is funded using cheaper offshore loans, there is a deterioration in the current account. This should result in a depreciation of the exchange rate, enhancing the effect of the fall in interest rates.

We noted in Chapter 1, however, that the move to financial deregulation is not normally undertaken in 'equilibrium' conditions. In most cases countries also wish to apply a disinflationary policy as well. Such a policy in itself normally leads to higher interest rates which will attract an even greater inflow of funds, thus exaggerating the rise in foreign debt and the appreciation of the exchange rate in the short-run.

Asset prices now incorporate expectations of future changes in rates of return. Therefore, a government which embarks on a credible policy of disinflation, through a proposed programme of reduction in fiscal deficits and control of monetary growth, will obtain an even greater inflow of funds and exchange rate appreciation than would be expected from current 'real' interest rates. This is because investors will be taking into account the much lower expected rates of price inflation in the more distant future. These pressures thus emphasise the initial movements away from equilibrium and make the adjustment of the real economy to an improved competitive structure more difficult by lowering international competitiveness.

Thus the floating of the exchange rate and the removal of capital controls greatly assists the deflationary process by lowering import prices. This process is accentuated when there is simultaneous trade liberalisation with falls in tariffs and the removal of licensing and quota systems. On the other hand, the adjustment of the real economy is made more painful, with a harsher environment for

exports and import-substitutes, and an encouragement of imports. This impacts on domestic production, i.e. it widens the gap between expenditure and consumption and tends to result in a larger proportion of the capital inflow going to finance consumption rather than the investment which is necessary to change the structure and provide the basis for the faster growth which is an expected outcome of financial deregulation.

There is thus a delicate balance to be achieved. A quick and effective disinflationary process may shorten the initial phase of capital inflow, the burden of overseas debt will not increase as much, the initial recession in the real economy may be shallower and competitiveness will improve through the new low inflation levels. As a result the path to faster growth - which lies in substitution for imports at home and exports abroad by those industries which really do have a competitive advantage in the absence of distortions in the liberalised economy will be more rapid.

However, if the disinflationary process is prolonged, the debt burden can become overwhelming and the recession unacceptable. This was the eventual experience in the South American countries and the process of deregulation and financial liberalisation was halted and reversed. In the UK, although the recession was deep and the recovery slow, the exchange rate fell in both nominal and real terms. Also, there was no problem of rising foreign debt. Indeed, worries were expressed about the size of the capital outflow. The UK, with the asset of North Sea oil, faced very different foreign exchange problems from those experienced in the South American countries.

CHAPTER 4

THE NEW ZEALAND EXPERIENCE

4.1 Review of Developments

The current period of deregulation follows an earlier attempt begun in 1975 but abandoned in 1980 (see Nicholl 1980). This was followed shortly afterwards by the imposition of controls that, in many respects, were more restrictive than those previously in place.

As the current process of financial deregulation had only been in progress for three years in New Zealand at the time of writing the picture of its effects is partial. The pattern of deregulation set out in Chapter 1 began rapidly with the removal of interest rate controls and lending controls. It was followed within six months by an easing of foreign exchange restrictions. Within the year, ratio restrictions were abolished and the dollar was floated. Liberalisation of the stock exchange occurred towards the end of the second year and, during the third, conditions were established for the entry of further banks and eight were approved by the end of the year.

However, financial deregulation has to be seen in the context of other policy moves, particularly the 20% devaluation of the dollar at the beginning of the period, the pursuit of a disinflationary policy, the moves towards trade liberalisation with reductions in tariffs, removal of subsidies and an easing of the licensing system. There has also been a move to introduce commercial practice into the operation of state enterprises.

The path of annual fiscal deficits and that proposed for 1988 after asset sales is shown in Figure 4.1, as is the path of price inflation. This inflation path reflects a resurgence after the lifting of the wage freeze towards the end of 1984 and a second surge following the introduction of GST[2] in October 1986. The consequent path of the real economy is shown in Figure 4.2. An initial period of rapid

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2. GST, the Goods and Services Tax, is a consumption tax levied at the rate of 10% on all goods and services in New Zealand.

FIGURE 4.1a: FISCAL MEASURES
(As a percentage of GDP)

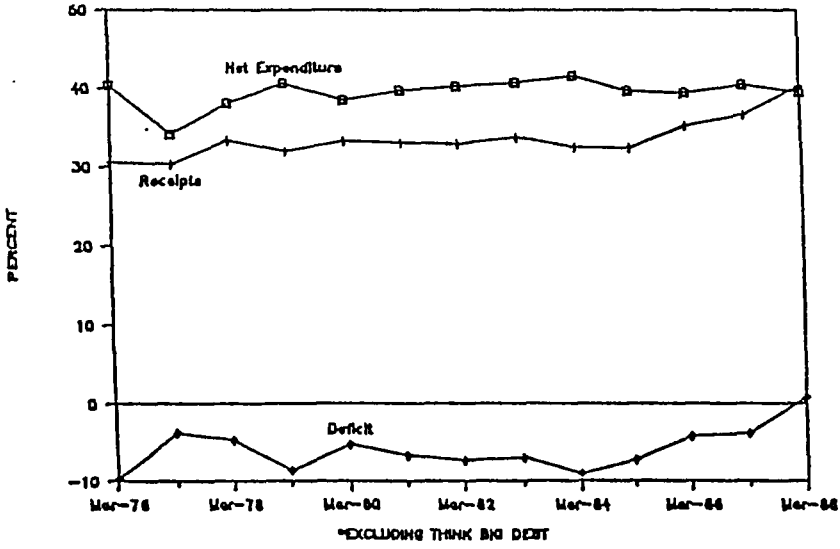
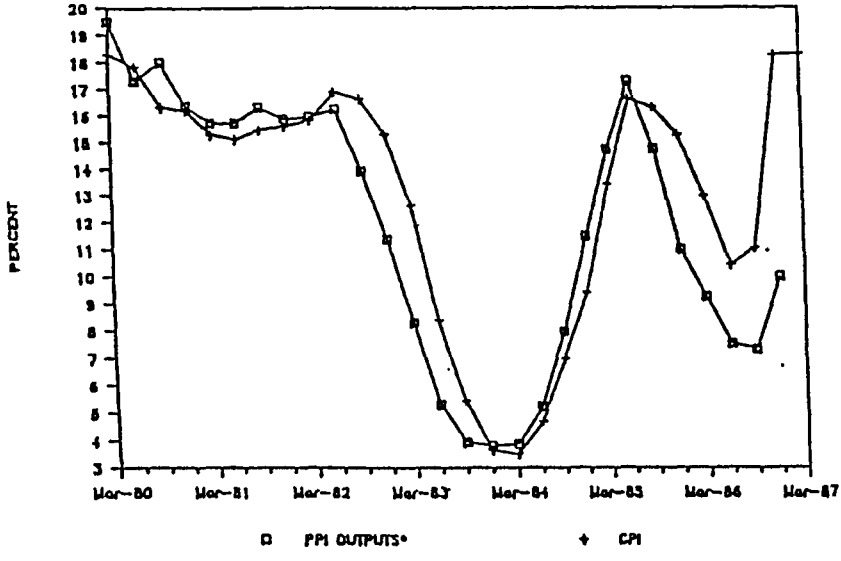


FIGURE 4.1b: INFLATION



*NOTE THAT DEC QTR 1986 INCLUDES THE IMPACT OF GST ON THE CPI, AND ON SOME PRODUCTION GROUPS IN THE PPI (EG INSURANCE & FINANCING, OWNER-OCCUPIED RENTALS)

growth was followed by a recession. Over this same period there was a major fall in oil prices. This had a substantial impact on the balance of payments, as did the start-up of the Motonui synthetic (methanol-based) petrol plant. This cut the need to import petrol by a third. All this serves to confuse the picture.

However, the behaviour of financial aggregates was as might be expected. There was a substantial surge in growth despite the rise in real interest rates. No doubt part of this surge represented re-intermediation of funds squeezed outside the system (see RBNZ, 1987). At the time of writing the initial surge appeared to be coming to an end. This could imply a settling down to new levels, although disinflationary pressures were still high.

With respect to savings and investment the picture looked rather different. The first notable feature is that real consumption ran ahead of real disposable income. While real disposable income peaked at the beginning of 1985 and fell by nearly 7% after that, real consumption only faltered and then increased by a further 2%. Thus despite the steep rise in real and nominal interest rates, consumers were prepared not only not to save but to borrow to finance extra expenditure. To some extent this reflected a release of frustration as consumer credit was previously heavily restricted.

Turning to the balance of other sectors, the size of the public sector's, albeit reducing, deficits, forced the private sector to borrow overseas to finance its expenditure. Even if the government does not finance its deficit abroad directly, this merely means that, for a given level of domestic savings, the private sector has to borrow overseas instead. The rate of increase of overseas debt was rapid (see Table 4.1). It remained to be seen at the time of writing whether this inflow would continue since initial portfolio adjustment had probably been largely completed. In addition, the re-financing of the "Think Big" major capital investment projects has been completed and the government's need to borrow reduced.

There were, therefore, real responses to the disinflationary pressures and financial deregulation, but the process was far from complete. Goods and labour markets proved slow to adjust although export receipts held up well and import demand was held down, not just in the energy sector but also in capital goods imports, once the "Think

Big" projects were completed. While any positive real growth effects have yet to come, this may reflect the dominance of the disinflationary policy. There are signs that increased competition had reduced stockbrokers' margins (Miller, *et al*, 1987), but while financial transactions had increased rapidly, it was not yet clear if overall costs had been reduced. An appropriate sample survey of firms and financial institutions would be the quickest way of testing whether this was the case.

FIGURE 4.2: ECONOMIC INDICATORS

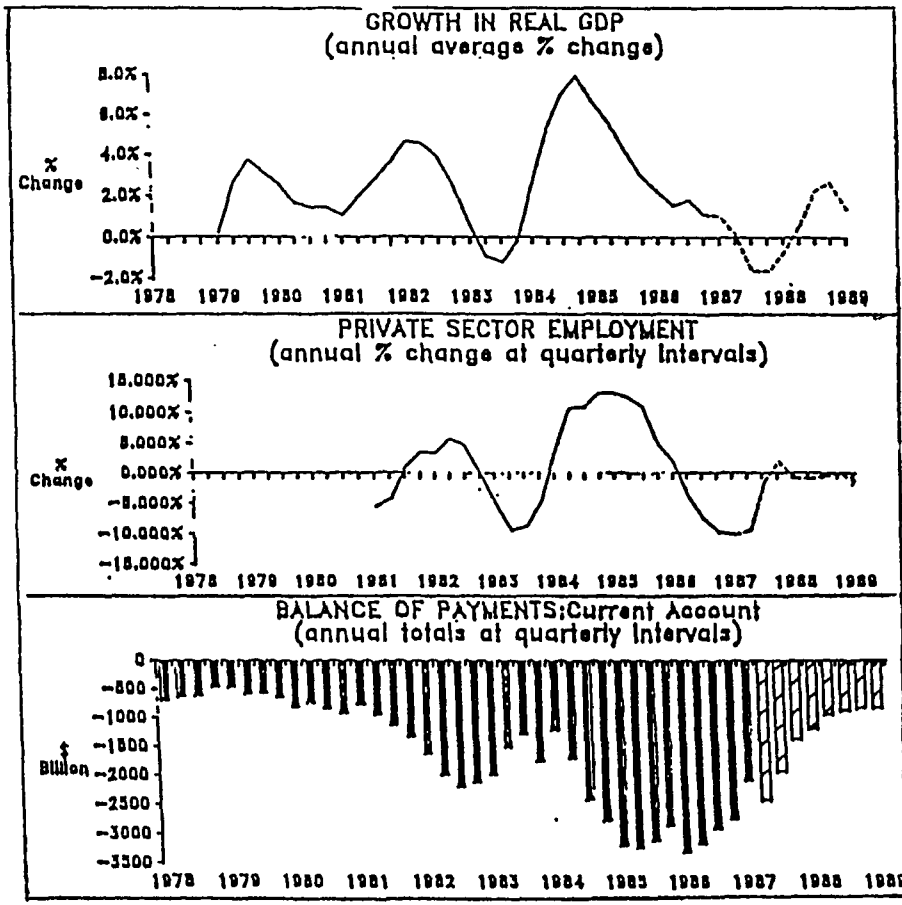


TABLE 4.1: *NEW ZEALAND OVERSEAS DEBT
($ billion)

At March 31:	Private	Official Govt[1]	Other Central Govt[2]	Total
1983	3.1	9.2	2.5	14.7
1984	3.9	9.3	3.1	16.4
1985	5.4	13.9	5.2	24.6
1986	5.2	15.6	5.6	26.4
1987	7.0	21.8	6.9	35.8

Source: Department of Statistics

(1) Railways Corporation loans are included under Other Central Government

(2) Other Central Government Sector includes organisations/corporations substantially owned and/or controlled by the government.

4.2 Econometric Estimation of Effects

As observed in Chapter 1, it is very difficult to provide a satisfactory empirical estimate of the effects of financial deregulation. It requires modelling not just the pre-existing set of behaviour but the new long-run state and the transition process as well. This section therefore opts to examine how far behaviour has changed from its pre-existing path by using the NZ Institute of Economic Research VAR model of the New Zealand economy.

The likely impact of deregulation was assessed by estimating the model up to the pre-liberalisation period and then running the model over the remaining (deregulatory) period. This enables a comparison of what might have occurred with the continuation of traditional financial sector policies with actual outcomes under financial and other market deregulation. These runs used actual export and import prices over the period tested. This assumes that domestic policy changes and associated responses did not alter the prices domestic traders faced internationally and mutes the response through the exchange rate.

The exercise obviously has to be treated with caution as:

(i) the VAR projections assume fixed relationships between the variables;

(ii) The VAR projections implicitly assume a continuing influence of the same type of government policy which shaped the relationships between variables quantified by the model, as they do for all established institutional reactions;

(iii) VAR forecasts may deteriorate rapidly as the forecast horizon is extended;

(iv) some potentially important deregulatory variables may not be captured by the model e.g. liberalisation of import controls, SMPs, tariffs; and

(v) the VAR tends to ignore longer term cyclical factors.

Non Structural Economic Analysis

The development of VAR models dates back to the early 1980s, to the work of Sims (1980, 1982), which reflected the long-standing criticisms concerning identification problems in multi-equation structural models (when common explanatory variables appear in more than one equation of a system). As Wells and Evans (1982) show, the logic of this problem can be taken one step further, by examining the effect of imposing rational expectations in a structural model. This incorporates the Lucas critique into the underlying theoretical construct, with the consequence that, as economic behaviour adjusts to changes in policy, the previously specified equation concerning that behaviour is invalidated. Wells and Evans treated this problem as one of whether particular variables could be specified as exogenous. Their work concentrated initially on the use of VAR models for testing such propositions.

The work with VAR models is essentially an attempt to analyse the behaviour of the economy statistically, without imposing *a priori* constraints in the form of a specified equation based on preconceptions of the underlying behaviour.

From the point of view of the empirical testing of the effects of deregulation the use of VAR models is thus attractive. It abstracts from the difficulties of imposing upon the econometric analysis any rigid form of behaviour - which we have argued above is essentially unknowable and most likely untestable, particularly in periods of extreme structural change. Rather, they rest on statistical measures

of the evolution of economic behaviour and do not require knowledge of the structure toward which the economy is moving.

The empirical analysis carried out in this chapter for New Zealand uses the Institute's VAR forecasting model. Essentially the approach is to use the VAR model to assess the extent to which the macroeconomy had moved from its original structure over the first two and a half years of liberalisation. The difference between the path that the model projected for the economy and that actually taken, as shown by historical statistics, may then provide some clues as to the impact of liberalisation.

This approach has its own dangers. First, as noted above it can only be used for a restricted time horizon. Second, it tells very little about the underlying structure of the economy. Finally, in examining the difference between actual variable values and the model-generated values, there cannot be complete certainty that the residual values can be attributed to the effects of liberalisation. Certainly, in New Zealand's case there are no grounds for attribution to financial deregulation alone, since other policy changes - such as lowered import protection, freeing up of other markets, anti-inflation policies - will have also contributed to changes in the values of the variables contained in the model.

Work in New Zealand on VAR modelling techniques was pioneered by Graeme Wells and Lewis Evans of the Victoria University of Wellington (see Wells and Evans, 1982). The development of the NZ Institute of Economic Research VAR model was based on this work, being related to the model (WE) described in Wells and Evans (1983).

For the purposes of this study, further experiments were carried out, introducing an interest rate variable for private sector new mortgages. This variable was included in the original Wells and Evans (1982) model, but was excluded from the NZIER model because of poor in-sample forecasting results. However, in the context of an investigation of financial liberalisation, it was thought desirable to widen the range of variables correspondingly. The results with respect to interest rates must, however, be interpreted with care, although inclusion of mortgage interest rates does not appear to have had a marked effect on the performance of the other variables.

While the main use of the WE model was to examine the impact of import and export price changes on the New Zealand economy, the NZIER model was developed for forecasting purposes. The selection of variables was thus varied to reflect practical data and forecast requirements. The number of variables was reduced to nine, with quarterly data being used. (Briggs, 1986, contains a full description of the model.) The variables used are:

(i) Real GDP;
(ii) Consumer price index;
(iii) Employment (number of full-time private sector employees);
(iv) Capacity utilisation (median utilisation derived from the Institute's Quarterly Survey of Business Opinion (Bowie and Easton, 1987));
(v) money supply (M1);
(vi) private sector average weekly earnings;
(vii) exchange rate (trade-weighted index);
(viii) import price index;
(ix) export price index.

The variables enter the model in the form of first-differences of their logarithms. In addition, the data is actual rather than seasonally adjusted, with dummy variables used in each equation to cope with seasonality. The three period lag structure of the WE model was retained. The model was estimated from data beginning in the December quarter 1961.

A block structure similar to that of the WE model was retained. Three variables were identified as being independent of the others. Thus import and export prices were found to be exogenous to all the other variables, while the exchange rate was found to be exogenous to domestic variables, but not to external prices. Predicted values of these variables are consequently generated as a separate and prior block. Export and import prices are expressed as a function of their own lagged values and that of export and import prices. The remaining variable values are generated after these three equations have been run, being expressed as functions of the lagged value of all nine variables.

A number of alternative scenarios were examined.

TYPE 1 MODELS

Estimation up to the end of the Wage-Price Freeze 1984(2) and Projections to 1986(3).

In the first run, the model was estimated up to 84(2) and projected from 84(3) on the basis of the estimated structure. A major problem was the different exchange rate profiles since the projections did not include the depreciation of 84(3) and therefore were much higher than actual exchange rate levels. This appears to lower the overall CPI profile to less than actual, although projected wages tracked the actual outcome reasonably closely, albeit at a slightly higher level.

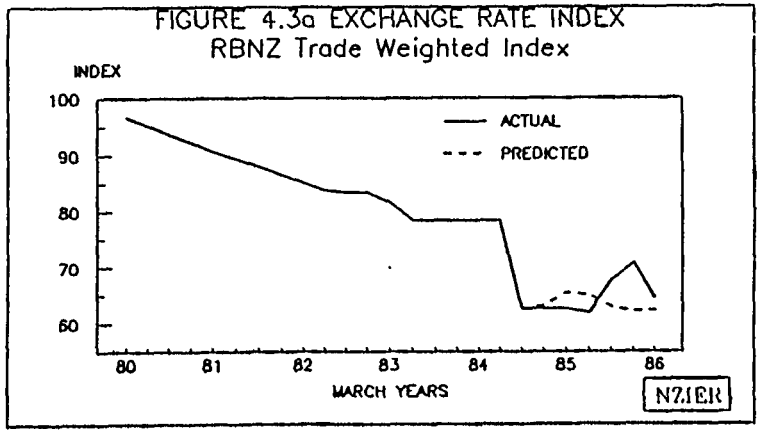
Real GDP was projected to lower levels than actually occurred. This seems consistent with the higher exchange rate profile possibly reducing export competitiveness, given export and import prices, with the lower real import prices not compensating for the higher exchange rate. This suggests the existence of an inflation-output trade-off, although in this case it is likely that the trade-off has come about as a result of a devaluation-induced relative price advantage to the tradeable goods sector. Therefore there is an element of expenditure switching, as opposed to a domestically sourced fiscal or monetary stimulus of the type normally considered in the Phillips Curve literature.

Despite the projections of a lower level of GDP, higher real exchange rate and higher real wages, the projected full-time private sector employment track followed the actual outcome closely. Other aspects of the run included a lower level of M1 than actually occurred, despite the greater control of the money supply afforded to authorities under a floating exchange rate. Possibly the lower M1 growth reflects slower GDP growth. CUBO, the NZIER's capacity utilisation variable, was projected to reach very high levels - levels which are viewed as extremely unlikely. The interest rate variable performed poorly, as expected given the regulations imposed on this variable and its lack of apparent relationship with the other data.

It was hypothesised that the differences in the actual and projected levels of the exchange rate might have produced significant

differences in the real variables. In an attempt to isolate this exchange rate influence we allowed for the devaluation in 1984(3) and projected the exchange rate from 1984(4). This resulted in the projected exchange rate tracking the actual rate quite closely, thus removing the potentially misleading impact of the divergent values in the previous forecast. Since the devaluation as such was not part of financial deregulation, it was thought acceptable to extend the start of the process to just beyond this event for the purposes of analysis.

The results were somewhat surprising. Projected real GDP was slightly lower than in the earlier exercise. Despite an increase in relative prices in the traded goods sector, which implied an improvement in exporters' competitiveness, there was no improvement in real GDP and the projection is even further below actual values under deregulation. Consistent with the output forecast was a lower level of full-time private sector employment, although this is despite the lower real wages profile that the model projected. The lower exchange rate raised the domestic price profile to a level only slightly below that actually prevailing, but it lowered the wage profile bringing it very close to actual levels. This implies that the real wage, defined in terms of consumer prices, was lower than previously forecast. These results are shown in Figures 4.3a-h.



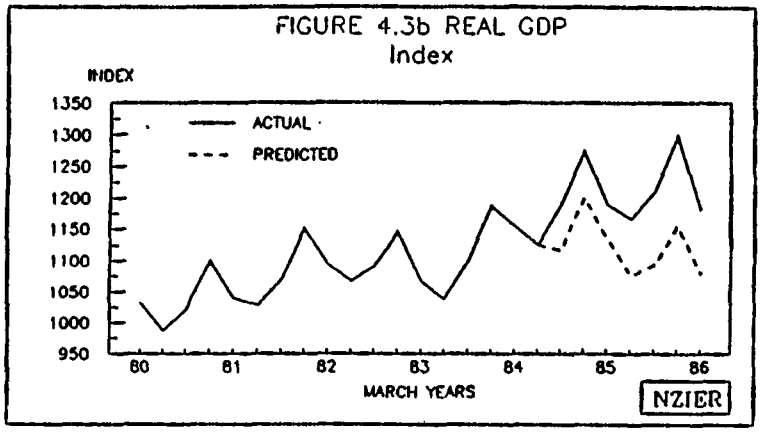


FIGURE 4.3b REAL GDP
Index
INDEX
1350
1300
1250
1200
1150
1100
1050
1000
950
ACTUAL
PREDICTED
80
81
82
83
84
85
86
MARCH YEARS
NZIER

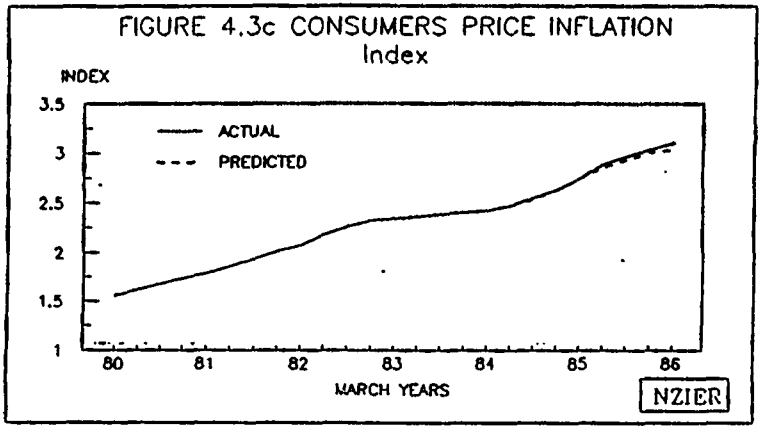


FIGURE 4.3c CONSUMERS PRICE INFLATION
Index
INDEX
3.5
3
2.5
2
1.5
1
ACTUAL
PREDICTED
80
81
82
83
84
85
86
MARCH YEARS
NZIER

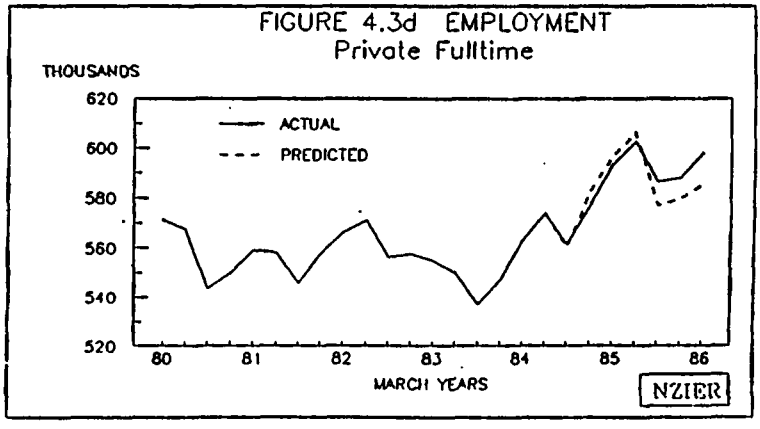


FIGURE 4.3d EMPLOYMENT
Private Fulltime
THOUSANDS
620
600
580
560
540
520
ACTUAL
PREDICTED
80
81
82
83
84
85
86
MARCH YEARS
NZIER

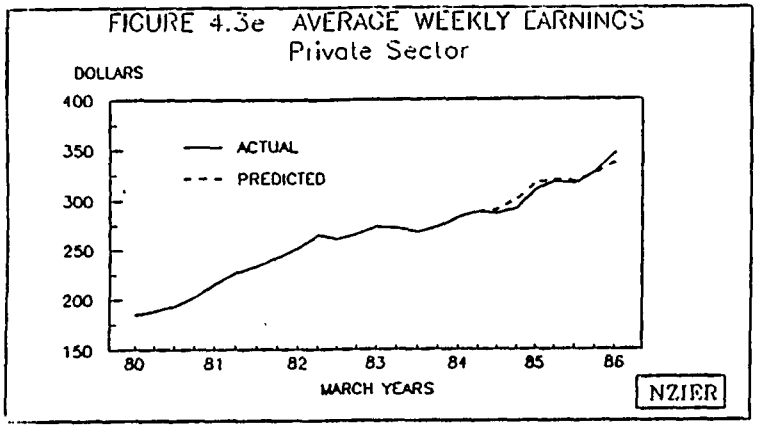


FIGURE 4.3e AVERAGE WEEKLY EARNINGS
Private Sector
DOLLARS
400
350
300
250
200
150
ACTUAL
PREDICTED
80
81
82
83
84
85
86
MARCH YEARS
NZIER

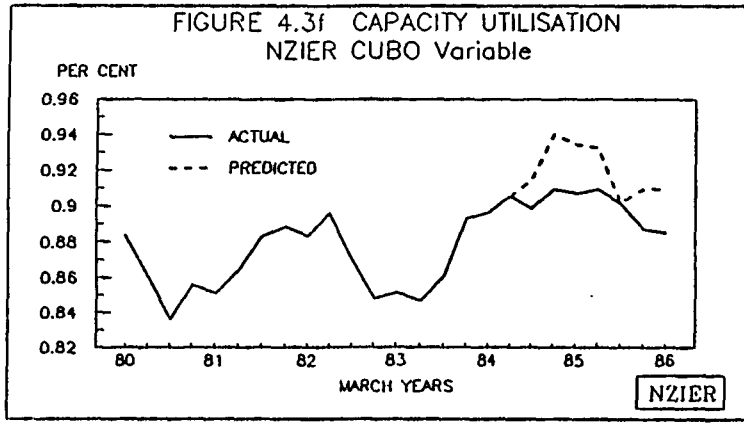


FIGURE 4.3f CAPACITY UTILISATION
NZIER CUBO Variable
PER CENT
0.96
0.94
0.92
0.9
0.88
0.86
0.84
0.82
ACTUAL
PREDICTED
80
81
82
83
84
85
86
MARCH YEARS
NZIER

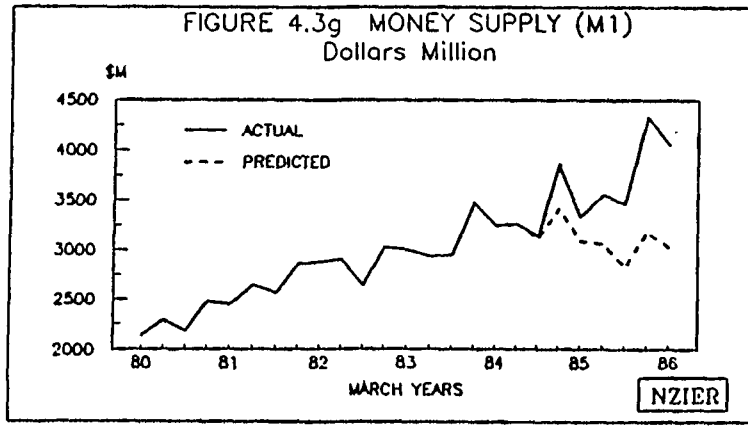
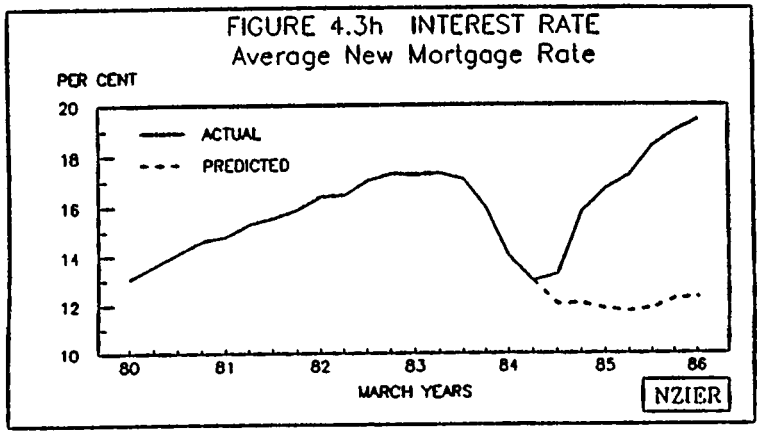


FIGURE 4.3g MONEY SUPPLY (M1)
Dollars Million
$M
4500
4000
3500
3000
2500
2000
ACTUAL
PREDICTED
80
81
82
83
84
85
86
MARCH YEARS
NZIER



In this alternative projection the inflation-output trade-off that was evident in the first run has disappeared. Now the projected and actual price profiles are roughly the same, but output is still lower than actual. This rough comparison suggests that a higher level of real GDP and private sector employment has been achieved for a given level of price increase. Furthermore, the increases in output and employment have been attained with levels of nominal and real interest rates which, in an historical context, are high.

TYPE 2 MODELS

Estimation up to the start of the Wage-Price Freeze and Projections up to 1986(4).

There were some misgivings that the inclusion of the wage and price freeze period in the estimation sample might be detrimental to the quality of the model runs, particularly in its role as predictor of the outcome of variables under previous interventionist policies. This is because the freeze distorted the relationship between variables as measured by official statistics. Estimation over the freeze period is unlikely to be constructive for the model as it provides little useful information on behavioural relationships, and it would confuse more general responses with the restricted behaviour under the freeze by combining them in a single set of data.

There were two alternatives, either to capture the freeze period by dummy variables with appropriate allowance for lagged effects into and out of the freeze period, or to estimate up to the start of the freeze period and project over the freeze period and up until the end of 1986. The advantage of this approach is that it avoids the distortionary effect of the freeze. A disadvantage is that it is a further abstraction from reality, in that it projects the post-freeze period on the basis that the freeze did not occur. Thus, when comparing the actual performance of the economy in the two and a half years of deregulation, it is also necessary to take into account the impact of the freeze period on the economy beyond mid-1984. This run therefore provides extreme hypotheses. The first option assumes that the freeze had no impact on behaviour or the starting points of the prediction. The second assumes that, whatever impact it did have, would not be carried over into post-freeze behaviour, i.e. immediately following the freeze, indicators of behaviour returned to where they would have been had the freeze not been imposed.[3]. The second of these options was chosen, as imposing dummy variables essentially removes the values of the variables in the freeze period from consideration, but with considerable complication of the estimation process.

Once again in this case export and import prices were assumed 'given' and the private sector mortgage interest rate was included in the model. Interpretation of the results must be tempered by the divergence in actual and predicted exchange rate levels. Over the three quarters of 1986 included in the predictions the trade-weighted index averaged approximately 64, whereas the predicted level over the same period was 75; over the entire post-freeze period the exchange rate prediction is approximately 15 per cent higher than that which actually prevailed. On the other hand, this could be taken to imply that the 20% devaluation was 15% greater than was necessary on the basis of previous behaviour. On the other hand it could call the model run results into question.
Not surprisingly the real GDP result from the run was significantly lower than the actual series. An interesting pattern emerged, however. Over the earlier part of the freeze period the predictions

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3. This is in contrast to Type I models, which incorporated 'freeze-behaviour' fully into the model. Reality probably lies somewhere between the two.

were above actual levels, suggesting the freeze had a contractionary effect on real output. From late in 1983 and particularly in 1984 this pattern is reversed and actual levels exceed predicted levels at a slightly increasing rate until the end of our forecasting period, 1983(3) (see Figures 4.4a-h).

Consumer prices are fixed on an apparently lower profile than they would have been in the absence of the freeze. According to the model, once the freeze was lifted, prices increased at approximately the same rate as they might have been expected to if the freeze had not been established. The wage rate profile which has emerged from the post-freeze era has been less stable than the pre-freeze profile since 1980. It is difficult to rationalise this change in terms of economic liberalisation, as wage setting is a heavily institutionalised process and reforms to the labour market have not been as forthcoming as those in other areas of the economy.

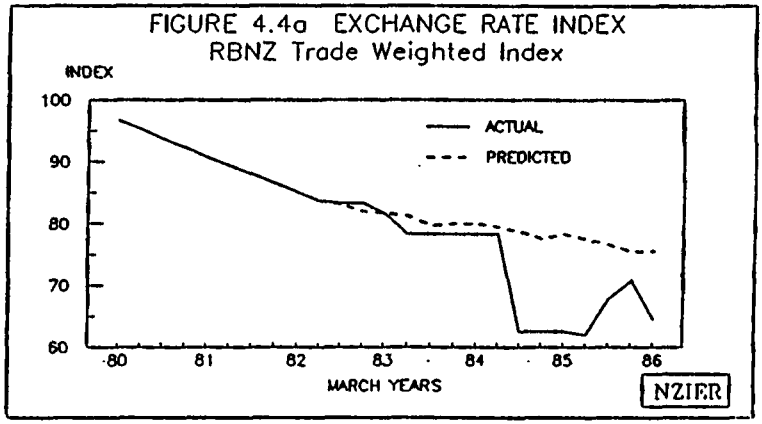


FIGURE 4.4a EXCHANGE RATE INDEX
RBNZ Trade Weighted Index

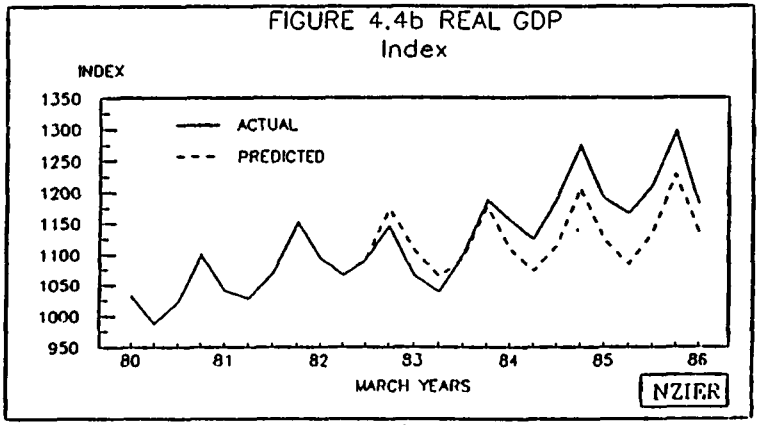


FIGURE 4.4b REAL GDP
Index

FIGURE 4.4c CONSUMERS PRICE INFLATION
Index

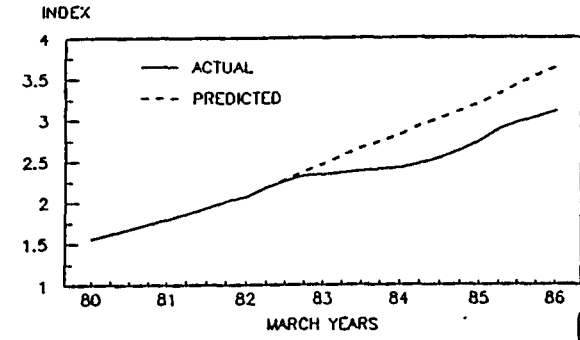


FIGURE 4.4d EMPLOYMENT
Numbers; Private Fulltime

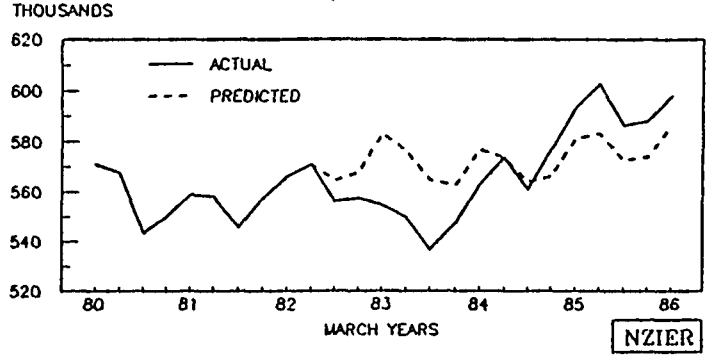


FIGURE 4.4e AVERAGE WEEKLY EARNINGS
Private Sector

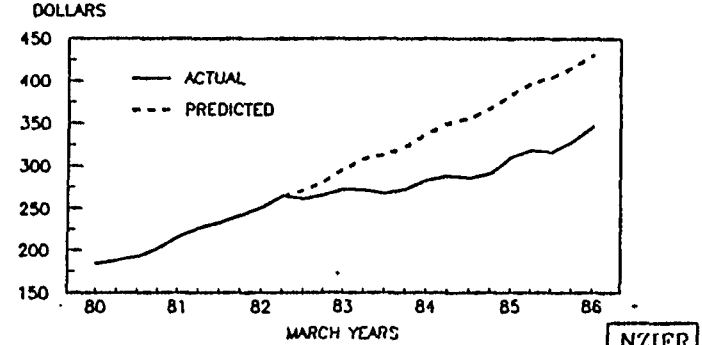


FIGURE 4.4f CAPACITY UTILISATION
NZIER CUBO Variable

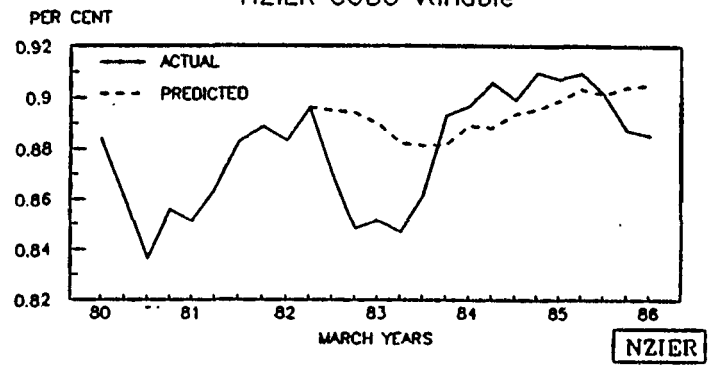


FIGURE 4.4g MONEY SUPPLY (M1)
Dollars Million

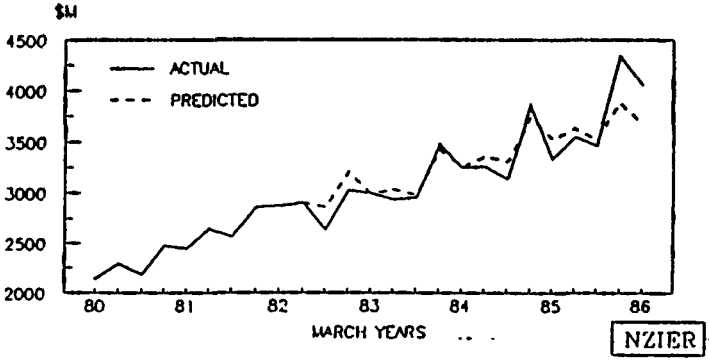
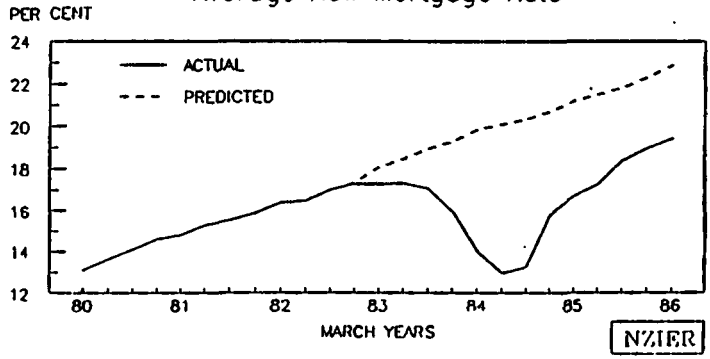


FIGURE 4.4h INTEREST RATE
Average New Mortgage Rate



The projected profile of private sector full-time employment is similar in some respects to that of real GDP. With the introduction of the freeze actual employment fell significantly below the projected level. By the end of the freeze (from 1983(3) to 1984(3)) actual employment levels were approximately the same as predicted levels. The advent of deregulation was associated with rapid employment growth, with approximately 10,000 more people actually employed on average over the 1985 and early 1986 period than was predicted. The employment levels observed since the freeze and over deregulation have been far more variable than the model projected, culminating in a drop of actual employment approximately 8,000 less than the model run produced in 1986(3).

Of the remaining variables, the CUBO profile was lower than in the previous runs and more closely reflected the GDP and employment profiles. That is, the prediction was higher than actual until the latter part of the freeze. Then, for much of the remaining time, actuals exceeded run levels, although from 1985(4) until 1986(3), this was again reversed with predictions exceeding actuals. The prediction of M1 was qualitatively the same as in previous runs. M1 growth was projected to be lower than that which prevailed over the last four quarters of the period. As suggested earlier this may be caused by a lower demand for money operating through lower GDP. Interest rate forecasts were completely different from those of the previous exercises. The actual interest rate had been increasing steadily since 1980 up until the freeze period. The predictions showed this upward path continuing and although actual interest rates increased rapidly from 1984(3), the model run produced 23.5% whereas the actual rate was 18.9%. This difference between the two rates was even more marked in 1984 and 1985.

4.3 Summary

The major difficulty in assessing the macroeconomic effects of financial sector deregulation with a statistical macroeconomic model is that deregulation accompanied the transition from an economy heavily controlled by the wage and price freeze. An associated transitional development was the exchange rate devaluation that occurred before the dollar was floated.

Significant changes in the real economy would be anticipated, at least as measured by the official statistics, as a response to the lifting of controls and the return to relative orthodoxy in economic policy setting. It is therefore difficult to distinguish the effects of transition from the freeze from the effects of deregulation. Nevertheless, some interesting observations from the model runs can be summarised here.

The deregulation period was associated with a higher level of output and, initially at least, employment. The transition from a heavily controlled period to a relatively deregulated one manifested itself in the higher variability of the actual levels of GDP and employment compared with those produced by the model under continuing previous economic policies. This is not a surprising result, but it should be kept in mind that, as long as the model's parameters are stable, the VAR projections may be expected to be relatively damped as opposed to explosive. Therefore, over the length of the run horizons, relatively smoothed series will tend to be produced.

Although actual GDP growth was consistently greater than projected, the results suggested that gains in employment would be relatively short-lived and that actual employment might now be below levels that would prevail under unchanged policy. This implies significant labour productivity gains over the deregulation period and is evidence of "rationalisation" of labour. An important caveat in the interpretation of this result is the cyclical nature of the economy and the effect this has on labour demand and, hence, productivity. The upward part of the cycle is generally associated with rising labour productivity and then, possibly, by increasing employment, which will eventually manifest itself in the downward phase of the cycle, as falling productivity. Falling employment, slightly lagging the cycle, is then experienced. To some extent the results reported in this paper are consistent with this type of cycle although the pattern for GDP is not as well defined as it is for labour. Thus the labour "rationalisation" might be the 'de-hoarding' generally associated with this phase of the cycle. Two important points arise about the cycle. First, the freeze may have disrupted the historical cyclical pattern in New Zealand's macroeconomic aggregates, thus producing the major part of the difference between actual and projected levels. Second, and more likely, is that the freeze followed by deregulation produced

a cycle of much greater amplitude than otherwise would have been the case. This raises the question of whether the evidence from the VAR model runs represents a 'one-off' gain under deregulation and a continuation of the traditional rate of growth or whether the higher level and growth rate of GDP will be sustained, possibly along a more volatile path.

Another interesting aspect of the model is the apparent lack of a long-run inflation-output trade-off. Any short-run trade-off appears small. This property of the model was revealed by inspecting the effect of different price profiles on the projected levels of GDP and employment. Allowing for devaluation and a higher price profile in the second experimental run showed that although a higher level of GDP was produced after four quarters, the longer-run result was for the non-devaluation, lower price profile to yield a slightly higher level of GDP. In the first type of experiment we imposed the same price profile on the model with the result that the forecast level of GDP was lower than actual. In the second type the model has a lower wage-price profile overall but the projected rate of change of prices was similar to that which actually prevailed. Once again the level of GDP actually attained exceeded that projected.

An additional characteristic of the model is also revealed. The devaluation and associated increase in export competitiveness, which brought about the domestic price increase, had no effect on output in the model. Possibly this reflects past policies, which tended to lack the discipline to impose a relative price change on the economy. The advantages of the devaluation might be swamped in domestic inflation as the necessary expenditure-reducing policies were not forthcoming. That is, the real exchange differences between the two scenarios might not be that significant.

Nevertheless, a tentative interpretation of these results is that the expansion in output has been achieved by a shift in, as opposed to a movement along, any short-run Phillips curve. This suggests the possibility that the economy's aggregate supply curve has shifted outwards. This cannot be attributed purely to financial deregulation, even though the changes are of the expected signs, as this analysis ignores all the other important changes which affected the economy over the period. Nevertheless the results are consistent with those expected and therefore cannot be taken as a rejection of the results.

PART TWO: SOME SECTORAL ASPECTS OF DISINFLATION

CHAPTER 5

DISINFLATION AND THE BOOMING SECTOR

5.1 Introduction

The first part of this monograph reviewed the impact on a previously repressed economy of financial deregulation, including the freeing up of interest rates, lifting of other controls on banking, removal of controls on the capital account and floating of the exchange rate. It took into account that the process took place in a disinflationary environment. Our concern was essentially with the macroeconomic effects of these changes.

In an open economy, particularly a small one, with floating exchange rates, the nominal exchange rate has a crucial role in triggering price and quantity adjustments in response to a monetary contraction. In the post-float period, the New Zealand dollar generally traded above its pre-float level. Not surprisingly, therefore, these exchange rate developments prompted exporters to urge the government to intervene in order to restore their perceived loss of competitiveness in foreign markets.

We were therefore interested in considering how relative price changes induced by a change in the nominal exchange rate in fact affect resource allocation and the structure of the economy. For this purpose we draw on the work of Corden (1981). An important and controversial aspect of this analysis is whether relative price changes induced by a monetary contraction can have 'permanent' real effects.

There is a body of theoretical literature which suggests that a monetary disinflation programme will have significant real effects. The relative price change comes about through a nominal exchange rate appreciation which, because of price and wage rigidity, results in a disequilibrium real exchange rate (defined here as the ratio of non-tradeable to tradeable prices) and hence causes structural

change. In other words, exchange rates can under- or over-shoot their equilibrium levels. The alternative point of view is that prices and wages are flexible, that agents have full information and consequently, the monetary contraction can have no permanent structural impact. The economy has a natural rate of output from which it can diverge only temporarily.

This part proceeds as follows. First we examine a monetary contraction within the traditional 'single-good' model of Mundell-Fleming and contrast it with the results of another 'single-good' model, the monetary approach to the balance of payments. Second, the Corden approach is considered. This extends the traditional approaches above as it is a two sector model and features a tradeable and non-tradeable sector. This sectoral distinction is potentially quite important. We also consider possible longer term implications of a monetary contraction. We then examine the consequences of a booming sector for sectoral output and the real exchange rate. Finally we draw some preliminary conclusions from the literature.

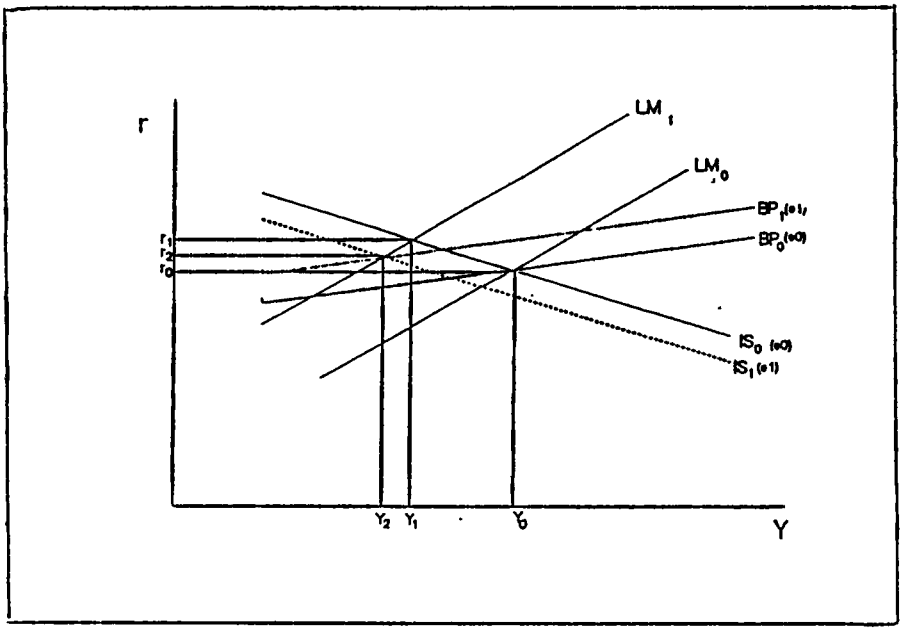
5.2 Monetary Contraction in a Single-Good Model

The traditional starting point for analysing the impact of a monetary contraction is the Mundell-Fleming 'single-good' model. This model is developed within a Hicksian IS-LM framework and one of its most important features is the potential for the existence of equilibrium at a level of output consistent with less than full employment of factors. The model assumes a single good which is tradeable on world markets. Domestic prices and wages are fixed and in the case of floating exchange rates the money stock is assumed exogenous and totally controllable by the monetary authorities. With a fixed exchange rate, the money stock becomes an endogenous variable.

In the Mundell-Fleming model outlined below, a monetary contraction leads to a fall in output. This occurs because the monetary contraction requires a rise in the domestic interest rate to adjust money demand to the lower money supply. Interest-sensitive spending will fall and in turn output fall. These changes have consequences for the balance of payments and the exchange rate. If incomes fall, imports are assumed to fall and, for a given level of

exports, the balance of payments is in surplus. An exchange rate appreciation restores balance of payments equilibrium by reducing the net export balance to a level consistent with net international capital flows. Thus in the Mundell-Fleming model a monetary contraction influences spending through the interest rate. This in turn has consequences for the balance of payments and, in particular, the exchange rate. Figure 5.1 depicts the standard open economy IS-LM-BP diagram. This is used to expand upon the adjustment mechanism outlined above.

FIGURE 5.1: A MUNDELL-FLEMING ANALYSIS OF MONETARY CONTRACTION



In this model, the IS curve shows combinations of output (y) and interest rates (r) at which there is goods market equilibrium. The LM and BP curves show those combinations of y and r for which there is money market and balance of payments equilibrium. The BP curve is drawn under the assumption of fixed overseas prices, income, and interest rates. An upward sloping BP curve suggests that for a given exchange rate, e, and domestic prices, P, the domestic interest rate, r, can permanently deviate from the world rate. With perfect capital mobility, the BP schedule is usually drawn as a horizontal line

reflecting the fact that arbitrage in the foreign exchange market will ensure that world and domestic interest rates will always be equal. This ignores the possibility of a risk premium (although this can easily be incorporated). As domestic output increases, imports increase and the current account deteriorates. A higher net capital inflow is required for balance of payments equilibrium. Even in the absence of controls or regulations on foreign capital flows, perceptions of increased risk in investing in the country might arise as the volume of borrowing increases and as the overseas indebtedness increases. It is on this basis that the BP curve is drawn. Its upward slope suggests domestic interest rates must increase in order to attract larger net capital flows.

The IS and LM curves are drawn on the basis of a fixed domestic average price level, P, but changes in the exchange rate, e, can alter relative prices between the economy and the rest of the world. An exchange rate depreciation, for example, stimulates domestic aggregate demand by increasing demand for exports and reducing the demand for imports. This is represented by a shift of the IS curve to the right. Changes in e are represented by shifts in the BP curve. A depreciation shifts the BP curve to the right as, for a given level of output, exports increase and imports decrease. A lower net capital inflow is required so the interest rate required for equilibrium at the given level of output is lower.

The channels through which a monetary contraction operate with less than full employment are now analysed in Figure 5.1. Assume equilibrium in all three markets at r_0 and y_0. A monetary contraction is represented by a shift in the LM curve to LM_1 from LM_0. Money demand is equilibrated with the reduced supply through a higher domestic interest rate. Through its contractionary influence on investment spending the interest rate rise contributes to a fall in income from y_0 to y_1. There is now a balance of payments surplus at (r_1, y_1) as net capital inflows increase and imports fall. With a flexible exchange rate, and given domestic prices, the nominal (and real) exchange rate appreciates from e_0 to e_1.

In this model the monetary contraction reduces spending through interest rate and/or exchange rate channels. Under an appreciating exchange rate, adjustment takes place through changing relative prices. The appreciation raises the domestic price level in terms of

the world price level and helps to reduce the BOP surplus. To represent this the BP curve is shifted to the left from BP_0 to BP_1. Similarly aggregate demand is reduced as a result of the appreciation i.e. the IS curve shifts to the left from IS_0 to IS_1. The net effect of these shifts is a reduction in the nominal interest rate from r_1 to r_2 and a further fall in output from y_1 to y_2.

If the BP curve is assumed perfectly horizontal, there is no interest rate increase. Adjustment to the monetary contraction results in a leftward shift of the IS curve reflecting an exchange rate appreciation. All adjustment to the contraction takes place through the exchange rate. By contrast in the case depicted in Figure 5.1 some of the adjustment is likely to be borne by investment-sensitive spending as the interest rate increases above world levels.

Thus, in the IS-LM-BP model, with floating exchange rates, capital mobility, fixed prices and less than full employment, a monetary contraction reduces demand and output through two mechanisms. Equilibrium of money demand with the reduced money supply is achieved through higher interest rates. This then reduces real income through a multiplier effect on investment. The reduced demand and higher interest rate result in a BOP surplus which is reduced through an exchange rate appreciation. The appreciation lessens the trade balance (shifts the IS schedule to the left) and also tends to lower the interest rate back to world levels. Given the monetary contraction, an appreciation is necessary to restore equilibrium in the model. Adjustment with a flexible exchange rate involves changing relative prices. The higher exchange rate reduces the price of foreign goods (in terms of domestic prices which are fixed). This reduces the net trade balance and requires a higher net capital inflow.

An alternative view of the adjustment mechanism in an open economy is provided by the monetary approach to the balance of payments[1]. The essential difference between the monetary approach and the Mundell-Fleming analysis is the emphasis of the former on the portfolio adjustment undertaken by domestic agents in order to maintain real cash balances.

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1. For a review of the monetary approach see, for example, Johnson (1972).

Under the monetary approach to the balance of payments, adjustment to money supply changes is analysed within a full employment, market clearing model. Domestic prices are assumed fixed relative to world prices in the medium term and perfect capital mobility is assumed. The monetary approach focuses on domestic portfolio disequilibrium as the source of BOP disequilibrium. If domestic absorption is greater than domestic output, a BOP disequilibrium results as foreign liabilities are incurred.

If there is a monetary contraction, the initial effect is portfolio disequilibrium. To restore cash balances firms and households reduce spending on the range of both physical goods and financial assets including foreign goods and assets. This tends to raise economy wide interest rates and will also reduce real output and the domestic price level. Higher interest rates attract foreign capital and the exchange rate appreciates. Domestic participants try to maintain money balances (in the face of a contractionary monetary stance) by attracting overseas capital through the sale of financial (and real) assets which will be taken up by foreign agents.

The decline in income reduces the demand for real money balances and helps achieve equilibrium with the real money supply. The reduction in the price level resulting from the appreciation in the exchange rate also helps to maintain the real value of the money supply and thus maintain monetary equilibrium. Under this approach the deviation of domestic from world interest rates will not persist in the medium term. Portfolio balance is eventually restored at which time the economy will return to its 'natural' rate of output.

Both models identify an appreciation of the nominal exchange rate as a consequence of a monetary contraction. As different industries and sectors in the open economy might be affected by exchange rate changes in different ways, it would be useful to consider the sectoral implications of a monetary contraction. Unfortunately neither model is particularly helpful in assessing the potential sectoral effects of a monetary contraction as each model consisted of a single good which was assumed to be tradeable on international markets. In this respect Corden's (1981) analysis is an extension, focusing on the sectoral implications of a monetary contraction. For this purpose Corden makes the familiar distinction between the tradeable and non-tradeable sectors of the economy.

5.3 Corden's Two-Sector Model

The distinction between the tradeable and non-tradeable sectors is based upon the degree to which prices and profitability are affected by changes in the nominal exchange rate. The tradeable sector is assumed to be directly affected whereas the non-tradeable sector is assumed to be only indirectly affected by exchange rate changes. In practice this distinction is somewhat difficult to make and necessarily arbitrary to some extent. Furthermore the tradeables : non-tradeables distinction requires the additional assumption that the terms of trade are fixed. This allows the two goods in the tradeables sector, exportables and importables, to be combined as a single good.

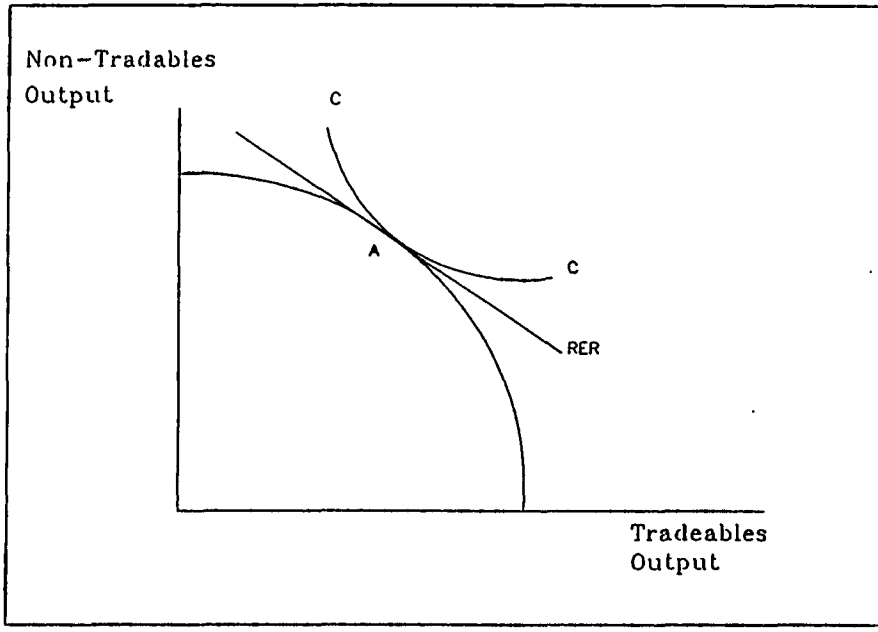
Corden develops the framework so that supply and demand conditions in each sector can be analysed independently. This requires, among other things, that capital be sector-specific. The supply curves are assumed fixed and the nominal wage is held constant. Similarly the demand curve for one type of good is independent of equilibrium output of, and demand for, the other type of goods. This depends upon the invariance of expenditure to price changes, so the price elasticity of demand for each of the two goods is assumed to be unity. For example, if the price of tradeables falls due to an exchange rate appreciation, there will be an increase in the quantity of tradeables demanded and a consequent substitution effect away from non-tradeables. The real income effect of the relative price change will maintain total expenditure on non-tradeables. In this particular model, perfect mobility of international capital is assumed.

These assumptions allow us to represent the real sectors of the model using a production possibility frontier as in Figure 5.2 or, in price and quantity space for each sector, as in Figures 5.3 and 5.4 for the non-tradeable and tradeable sectors.

In Figure 5.2 the relative price vector, RER, is the ratio of non-tradeables prices to tradeables prices. RER is the real exchange rate and it is the relevant price ratio for resource allocation in the open economy. Its equilibrium position, A, depends upon both supply and demand factors, that is, the relative slope of the frontier and the community indifference curve, depicted as cc. At point A there is a full employment equilibrium. Equilibrium positions

consistent with full employment are represented by points on the frontier. If a market clearing, full employment model is assumed, changes in the real exchange rate induce movements around the frontier. In contrast, situations of less than full employment are represented by positions inside the frontier.

FIGURE 5.2: THE PRODUCTION POSSIBILITY FRONTIER



The sectoral analysis of monetary contraction is somewhat easier with the apparatus of Figures 5.3 and 5.4, however, than with the production possibility frontier. Equilibrium is initially at prices P_0^{NT} and P_0^{T} which, given the initial demand and supply curves, corresponds to real output of Q_0^{NT} and Q_0^{T}. The initial positions of the demand curves depend upon:

> (i) for non-tradeables, the level of the money supply and its velocity of circulation as well as the interest rate. Assume the initial split between tradeable and non-tradeable is given.

(ii) for tradeable goods, demand (domestic and external) is a function of domestic aggregate demand as well as overseas prices and incomes which are assumed given and fixed. The nominal exchange rate is assumed to be freely determined in the foreign exchange market.

The supply curves are drawn for given sectoral capital stocks and nominal wage rates. Assume that there is a once and for all monetary contraction which leaves a lower money stock. This will result in a leftward shift of the two demand curves. For the moment, assume the two shifts are of the same magnitude. Consider the possible channels of influence of a monetary contraction on aggregate demand. First, the contraction is likely to raise the interest rate initially. This will reduce investment expenditures although the strength and timing of this effect is not altogether certain. For example, there could well be some change in velocity in the opposite direction to the monetary change. This helps to maintain nominal aggregate expenditure. The greater the change in the interest rate, the greater the expected response of velocity. Other interest rate effects might include a negative effect on consumer durables expenditure and a general decline in consumer spending if savings increase in response to higher interest rates. Second, the exchange rate is likely to appreciate. If there is zero capital mobility and if wage costs are unchanged, then initially demand falls from A to B for non-tradeables and G to H for tradeables at initial prices. At initial prices P_0^{NT} and P_0^{T}, output remains at A and G for non-tradeable and tradeable goods, respectively. So there is excess supply.

With no capital inflows, for balance of payments equilibrium to be maintained, the exchange rate must appreciate, lowering the price of tradeables from P_0^{T} to P_1^{T}. For the non-tradeable sector the initial excess of supply of goods, AB, will cause a fall in the price of non-tradeable goods to P_1^{NT} with a resultant increase in demand from B to C and a fall in supply, at the initial wage, from A to C.

The new equilibrium positions at C and I for the non-tradeable and tradeable sectors represent positions with a higher real wage than the original position and a consequent lower level of output and employment.

If there is capital mobility the movement to the new equilibrium is likely to be faster. As pointed out in Chapter 3, increased interest rates, or even the expectation of increased interest rates, are likely to induce a capital inflow. This will tend to cause the exchange rate to appreciate and limit the rate of increase in the interest rate. Capital mobility is more efficient for disinflation than the case of zero mobility. As the interest rate does not increase by so much, if at all, capital mobility dampens the increase in velocity encountered in the earlier case. Thus aggregate expenditure might fall by a greater amount for any given monetary contraction. Moreover, expenditure reduction might be more effective under an exchange rate appreciation than one which relies on a high interest rate. This arises if the elasticity of investment and other spending with respect to interest rates is low in the short-term. On the other hand, an exchange rate appreciation might reduce the price of tradeables directly, though the strength of this effect will depend, among other things, on the degree of substitutability between domestically produced and foreign goods. Theory does not provide conclusive answers to these questions. They are empirical issues which cannot be easily resolved.

In conclusion, then, which sector is likely to suffer the greater output loss? Corden considers the conditions under which the effect on prices, output and profits would be the same for both the tradeable and non-tradeable sectors. This would be the case if:

(i) there were perfect price flexibility in non-tradeable goods so that output and prices fell to C in Figure 5.3;

(ii) there were no capital inflow and tradeables equilibrium was at I in Figure 5.4;

(iii) the two supply elasticities were identical, and;

(iv) the proportional declines in expenditure on non-tradeables and tradeables were equal.

FIGURE 5.3: NON-TRADEABLE OUTPUT

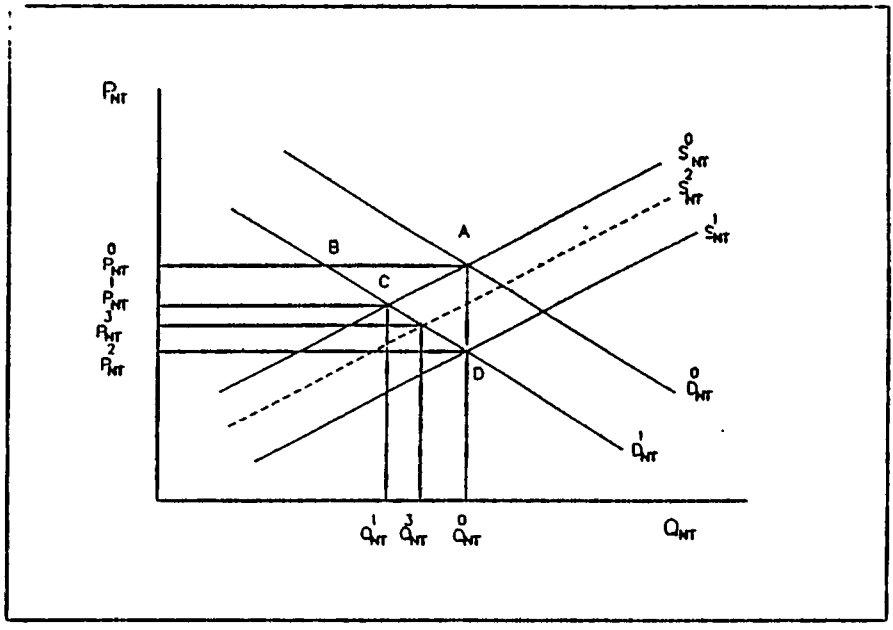
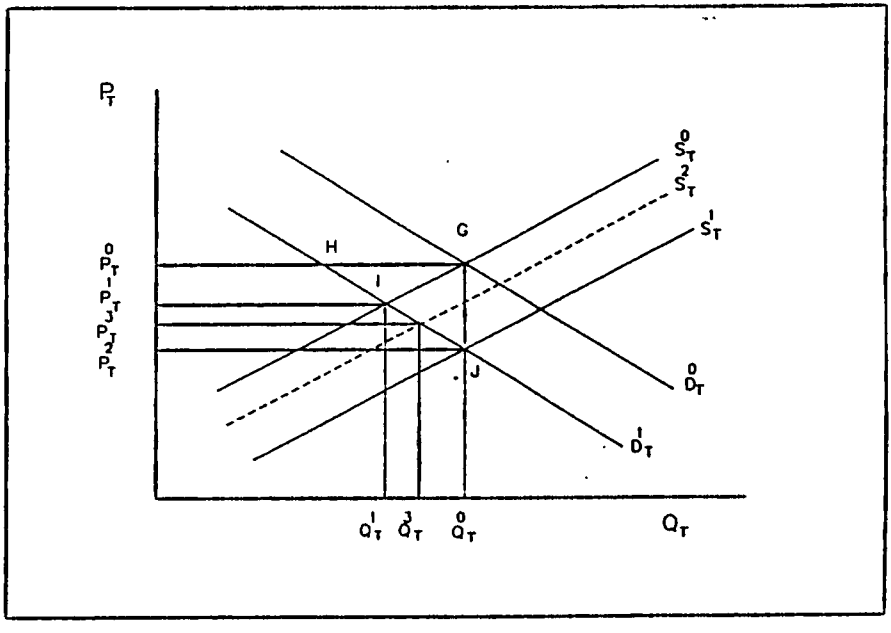


FIGURE 5.4: TRADEABLE OUTPUT



Looking at each of these in turn, there seems little evidence first on the matter of relative price rigidity with which to make an informed judgement. Secondly, a capital inflow causes an exchange rate appreciation which places an extra burden on the tradeables sector. A nominal exchange rate appreciation with domestic price and wage rigidity will probably reduce tradeables profits. Third, as with price rigidity, we have no evidence on the issue of relative supply elasticity. The supply side effects of an exchange rate appreciation are a neglected aspect of Corden's analysis. However, if the two sectors of the economy rely to a significant extent on direct imports for raw materials, an exchange rate appreciation will tend to shift the supply curve to the right, as in S_2^{NT} and S_2^{T} in Figures 5.3 and 5.4 and output to Q^3_{NT} and Q^3_{NT}. If the tradeables sector is relatively more dependent on imported intermediate goods than is the non-tradeables sector, the shift in the supply curve will be greater and the output loss smaller in tradeables than it would otherwise be.

Finally, there is some presumption that demand will be more heavily reduced on tradeables than non-tradeables because of the loss of competitiveness caused by exchange rate appreciation. Corden raises the possibility that investment spending is relatively insensitive to interest rates in the short-term. When combined with the direct or indirect supply side effects of exchange rate appreciation, this might see the non-tradeable sector able to keep its output and profit losses relatively minor, at least in the short-run. Again, this is an empirical issue. The sectoral effect of the interest-inelasticity of investment obviously depends upon which sector provides the larger volume of capital goods.

Corden concludes that (at least in the case of Britain):

> "...because of the rapid effects of incipient capital flows on the exchange rate and the slower response of expenditure to interest rate and income changes, it is reasonable to expect the squeeze on tradeables to be greater than on non-tradeables as was evident in Britain in 1980".

5.4 Long Term Implications of Disinflation

(a) Exchange rate overshooting

A principal concern of the monetary contraction has been the possibility of exchange rate overshooting[2] - the phenomenon whereby the exchange rate departs from its "long-run equilibrium" value. This usually arises where there is a "shock" or policy change which requires some new equilibrium rate (for example, a new equilibrium based on expected purchasing power parity). This was also briefly referred to in Part I of this monograph.

Corden has described this process in some detail (p. 30). Given the announcement of a monetary contraction, assume the equilibrium exchange rate is anticipated to be higher. In order to maintain interest parity, the spot rate will also need to rise by the same amount. This occurs before spending has reduced and thus before interest rates have changed. The spot appreciation will, to some extent, reduce the domestic price level and moderate the extent of the interest rate increase when the monetary contraction occurs. Output losses also moderate the interest rate increase.

But when the interest rate increase occurs, along with the deflationary effect of the monetary contraction on prices, interest parity requires the spot exchange rate to depreciate and so presumably it has exceeded the equilibrium rate. A falling price level due to the contraction is associated with a falling exchange rate although the equilibrium exchange rate is expected to be higher. This analysis suggests that the initial exchange rate appreciation will have to "overshoot" its "equilibrium" value in order for interest parity conditions to prevail subsequent to the monetary contraction. Overshooting is seen to be largely a result of the different speeds of adjustment to, in this case, a change in the real money stock on the part of the foreign exchange market, as oppposed to the product and labour markets. The exchange rate adjusts in anticipation of the monetary contraction whereas the price, wage and activity levels in the product and labour markets adjust with some lag.

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2. This concept was originally developed by Dornbusch (1976).

The implication is that there is a strong likelihood of exchange rate overshooting accompanying a disinflationary monetary policy which may place an extra burden on the tradeables sector. The deviation and the strength of the overshooting are likely to depend upon the nature of the monetary programme as well as the degree of flexibility in labour and product markets. Again an empirical issue. A monetary disinflation policy carries with it some risk of undesired structural change to the tradeables sector if the exchange rate maintains a disequilibrium value for some length of time.

(b) **Longer term real effects**

The new classical macroeconomics which embraces rational expectations as well as the "structural neutrality" or "classical invariance" hypothesis suggests an instantaneous adjustment of both sectors of the economy to their original "natural rates" of output Q_{NT}^{o} and Q_{T}^{o} at lower price levels, P_2^{NT} and P_2^{T} (in Figures 5.3 and 5.4). This position requires perfect wage and price flexibility so that no relative prices and real variables change during disinflation. It also requires the informational assumptions implicit in perfect competition models. The new classical hypothesis denies the existence of structural effects resulting from sluggish wage and price adjustment. It precludes the possibility of effective demand failure which could result, for example, from the effect of exchange rate overshooting on tradeables demand or higher nominal interest rates on investment activity in either sector of the economy.

There is, however, considerable debate (see Buiter and Miller 1980, Minford 1981) over the longer run effects of a monetary disinflation policy on the real exchange rate. Some suggest that exchange rate overshooting is a transitory phenomenon and that when inflation and interest rates ease, the exchange rate - which is predominantly determined by capital movements - will fall back to restore original levels of competitiveness. The alternative theory hinted at by Minford (1981) is that it is the competitive structure of the economy after disinflation that will determine the real exchange rate. That is, relative prices of tradeables and non-tradeables will reflect the opportunity costs in terms of resources used and services obtained from the two sectors. Thus there is not necessarily any presumption that the real exchange rate should return to its pre-disinflation levels if it is merely adjusting to a changing economic structure.

Empirical evidence on this matter is, not surprisingly, difficult to interpret. In a review of the pattern of real exchange rates worldwide over a period when a number of countries practised monetary disinflation policies, Atkinson and Chouraqi (1986) suggested that real exchange rate effects are not neutral with respect to resource allocation[3]. There is some theoretical justification for this view. For example, Baldwin and Krugman (1986) have formally developed a partial equilibrium model of hysteresis effects which might arise from large swings in the nominal and real exchange rate. Hysteresis effects refer to undesirable permanent changes in the economy structure. These effects can arise in a number of ways. In the Baldwin and Krugman model, an exchange rate shock which persists for some period of time might induce entry and exit of firms in a particular market. In the context of disinflation and a sustained high real exchange rate this might manifest itself by the exit of domestic firms from their overseas markets and the entry of overseas firms into domestic markets. If there are significant sunk costs associated with entry into a market, it might be uneconomic for firms to regain export or domestic market share even if the real exchange rate subsequently declined and competitiveness returns. The costs of restoring capital and labour stocks to a competitive condition after temporary redundancy would be one example of the type of sunk costs Baldwin and Krugman refer to. Furthermore, if a monetary contraction temporarily raises real interest rates above their equilibrium level, this might be detrimental to investment and to the longer run quality of the capital stock.

5.5 Deregulation and the Booming Sector

In conjunction with New Zealand's monetary disinflation policy there has been a programme of microeconomic liberalisation. The programme has included the removal of some specific industry assistance and protection. However, as discussed in Part I of this monograph, some of the most sweeping reforms have been in the financial sector, where deregulation of the foreign exchange market, and removal of interest rate controls and other regulations created opportunities for growth in the financial services sector.

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3. Page 17. Note that their definition of the real exchange rate is the nominal exchange rate adjusted for relative GDP deflators. This definitional difference does not affect the relevance of the argument.

These microeconomic policies may therefore have induced changes in the structure of the economy in terms of the relative demand and supply of non-tradeables and tradeables. Hence we might expect the equilibrium price vector for the economy to also change. If this is so, there is the likelihood that a change in the nominal exchange rate, along with other domestic price variables, will be required as the real exchange rate adjusts to restore equilibrium between the tradeable and non-tradeable sectors of the economy.

Here it seems appropriate to turn to the methodology used by Corden and Neary (1982), among others, to analyse the structural effects of a "booming sector". The booming sector has usually been resource-based - minerals in Australia, natural gas in the Netherlands or oil in the United Kingdom - and generally the traditional manufacturing sector has been disadvantaged. We use a similar technique here to study the sectoral effects of a booming non-tradeable sector (of which we define the financial services sector as part).

Deregulation has been wide-ranging and has affected the various production sectors in complex ways, as discussed in part I. This discussion aims to highlight the point that real structural changes have implications for equilibrium prices. If this is the case there are also implications for the real exchange rate and, if monetary factors are introduced, nominal exchange rates.

A central feature of the Corden-Neary model is the distinction between the resource and spending effects of the boom. The booming sector raises the marginal product of factors employed there, raising the demand for factors and causing factors to be reallocated towards the booming sector. This is the resource effect. The spending effect arises from the increased real income of the expanding sector which raises economy-wide aggregate demand and, in this instance, will raise demand for output from the tradeable sector. Thus the spending effect will depreciate the real exchange rate by raising the price of tradeables.

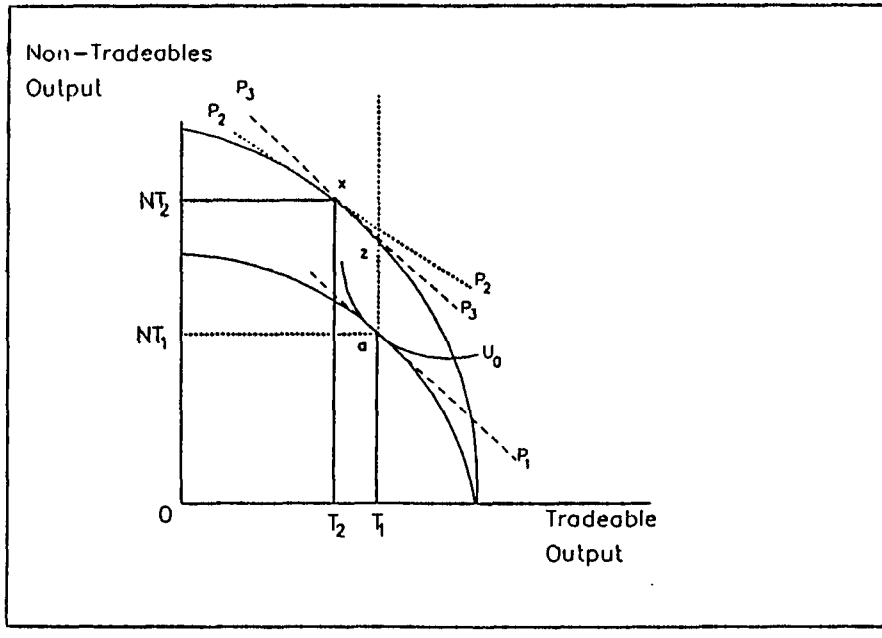
Figure 5.5 shows these effects with a traditional two sector production possibility frontier (PPF) diagram. Assuming full employment of resources, the economy is initially at T_1 of tradeables and NT_1 of non-tradeables which reflects the point of tangency

between the real exchange rate - the ratio of the price of non-tradeables to tradeables - represented by line P_1 and the community indifference curve, U_0.

The liberalisation of the non-tradeable sector is represented here as a technological change and is showing the shift of the production possibility frontier outwards along the NT axis. Holding the real exchange rate constant (i.e. $P_1 = P_2$) sees a move to (NT_2, T_2). This reflects an increase in labour demand (the variable factor) proportional to the extent of technological progress. At the given real exchange rate the economy-wide wage goes up and labour shifts from the tradeable to the non-tradeable sector. This is the resource movement and gives rise to a fall in tradeables output (de-industrialisation) as represented by the fall from T_1 to T_2. Any spending or real income effect is removed by holding the income elasticity of demand for tradeables at zero. In this case, the demand for tradeables on the expanded PPF will be at point Z, thus leading to an excess demand for tradeables at the real exchange rate P_2. In order to eliminate the excess demand there must be a fall in the real exchange rate, that is, the line representing the relative prices must steepen to some degree, for example to P_3, moving consumption and production closer to, but not reaching, Z (as we are abstracting from the spending effect). Now tradeable output has fallen from T_1 to somewhere between T_1 and T_2, but there has been a relative price change in favour of tradeables due to the lower output of tradeables with demand constant at its original level. The effect of the resource movement is a fall in the output of tradeables and a depreciation of the real exchange rate, as shown by P_3 relative to P_2.

To analyse the spending effect of the boom, assume that the expanding non-tradeable sector displaces no labour in the tradeable sector and therefore the new position after liberalisation is now directly above point a at point z. The real exchange rate is shown by the initial price vector P_2. As long as tradeable goods are normal goods, demand for tradeables will have increased with the rise in real income. So at the initial real exchange rate, P_3, there is an excess demand for tradeables and so a depreciation must occur to achieve equilibrium between production and demand. In this case, the output of tradeables will increase from the starting position T_1 to somewhere to the right of T_1 on Figure 5.5. The real exchange rate must depreciate as in the resource effect.

FIGURE 5.5: THE EFFECTS OF THE BOOMING SECTOR ON SECTORAL OUTPUT AND RELATIVE PRICES



At this stage we have identified a number of effects on resource allocation and the real exchange rate. First, as outlined in section 5.3, the disinflation effect tends to raise the real exchange rate through an appreciating nominal exchange rate and the short run, full employment effect of this would be an allocation of resources to the non-tradeable sector and a consequent fall in tradeable output. Second, the deregulation and subsequent expansion of the non-tradeable sector has two effects. The resource allocation effect of the expanding sector unambiguously reduces output of tradeables and raises output of non-tradeables, but unambiguously depreciates the real exchange rate. The spending effect of the boom unambiguously raises demand for, and output of, tradeable goods and results in a further depreciation. Overall, the "liberalisation" effect has an ambiguous effect on the output of tradeables and an unambiguous depreciating effect on the real exchange rate.

Accordingly, if the price of tradeables is determined on international markets and (assuming fixed prices overseas) a real exchange rate

change is required to preserve equilibrium after the boom, then relative price adjustment will be via non-tradeable prices or nominal exchange rate changes. In order to maintain balance between the demand and supply of tradeables, the presumption is that any change in the price of tradeables arising from the spending and resource effects must come from an exchange rate depreciation.

5.6 Effects of a Booming Sector on Factor Incomes

In the Corden and Neary model each sector has a specific factor (say, capital) and they share a mobile factor (say, labour). Thus the nominal wage is set in the labour market by the intersection of the labour supply curves and the aggregate labour demand curve which is the sum of the two sectors' individual labour demand schedules. These schedules in turn reflect an assumed declining marginal product of labour.

The resource effect will tend to raise wage rates across the economy as the labour demand schedule for non-tradeables, and the economy as a whole, shifts out. Labour's marginal product has increased in the booming non-tradeable sector. Demand for labour in the tradeable sector falls as a result of the nominal wage increase, given nominal prices in the two sectors, as well as relative prices.

The spending effect raises the demand for tradeables and lowers it for non-tradeables. Thus the real wage will fall in tradeables and rise in non-tradeables. Overall, the effect on the real wage is ambiguous. The stronger the spending effect and the greater the share of tradeables in wage-earners' income, the more likely it is that the real wage will fall.

Relative returns to the specific factor are interpreted as the relative profitability of the two sectors. The resource effect unambiguously lowers profitability in the tradeable sector because of reduced output and a higher real wage although the effect of the latter on profits is not clear if the higher nominal wage reflects the higher marginal value of the product of labour due to reduced output and labour usage. Profitability will increase in the booming sector because of the increased output. The key point now arises. If the spending effect arising from the increased incomes is strong enough, much of the gains accruing to the booming sector might be redistributed to

the tradeable sector via the spending effect. It has been established that the spending effect will bring about a real depreciation of the exchange rate, i.e. an increase in the price of tradeables relative to non-tradeables and an expansion in demand for tradeables. Extending Corden and Neary's work, given perfect substitutability between domestic and foreign tradeables and assuming fixed world prices, then the real depreciation will come about through a nominal exchange rate depreciation and/or a fall in the price of non-tradeables. Nevertheless, the spending effect will raise profitability (the return to the specific sector) in the tradeable sector vis-a-vis the non-tradeable sector.

Although output and employment in the tradeables sector might fall, the relative price change might be of sufficient magnitude to outweigh the negative quantity effects of the resource movement.

Similarly, the extent to which the tradeables sector contracts, if at all, under a booming non-tradeables sector is largely an empirical question. The relative effects depend upon the strength of the resource effect versus the spending effect. In turn, this depends upon the strength of the inter-relationships between the various industries and sectors of the economy - for example, on the dependence of the non-tradeable sector on the tradeable sector for production inputs. Although on the face of it the evidence suggests a contraction in tradeables output, it is the strength of the relative price change in the opposite direction which will determine relative profitability between the two sectors. This in turn raises the question of how the real exchange rate adjustment takes place. The extent to which the nominal exchange rate provides the necessary real exchange rate adjustment will depend upon both tradeable and non-tradeable price flexibility.

Furthermore, the literature reviewed assumed full employment of factors. If this is not so, there is the possibility that the resource effect can take place without severely impinging on tradeables output, particularly if resources lack mobility between sectors. Moreover, if there is considerable excess capacity initially this might tend to moderate the extent of price and wage adjustments and allow more quantity adjustments.

5.7 Conclusion

The two models of disinflation reviewed here provided some related insights into the potential relative price and real effects of a monetary contraction.

In the fixed price, single good (sector) Mundell-Fleming model a monetary contraction causes a decline in real output. The Corden two-sector model, on the other hand, assumes full employment. Real effects in this model are represented by movements around the production possibility frontier and changes in the equilibrium production of non-tradeables and tradeables. Corden's assessment was that a monetary contraction would most likely result in a substitution of non-tradeable output for tradeable output.

Both models identified an important role for the nominal exchange rate in the disinflation process. An exchange rate appreciation in the Mundell-Fleming model was necessary to restore equilibrium in the balance of payments subsequent to the monetary contraction. Given fixed domestic prices the exchange rate appreciation implies a fall in price competitiveness for domestic producers of the single tradeable good. In the two sector Corden model the nominal exchange rate effects a relative price change between non-tradeable goods and tradeable goods. Corden's focus is upon the implications of the nominal exchange rate change for the real exchange rate and for the sectoral composition of a given level of output. We interpret the real exchange rate as a measure of internal competitiveness. As in the Mundell-Fleming analysis, Corden's model suggests that disinflation will yield a real exchange rate appreciation with a consequent fall in the competitiveness of the tradeable sector vis-a-vis the non-tradeable sector.

The booming sector literature emphasised the notion of an equilibrium real exchange rate. Ultra-biased growth, emanating from New Zealand's liberalisation of the financial services sector, might require changes in the real exchange rate to maintain equilibrium in the production of non-tradeables and tradeables. This in turn might have implications for the nominal exchange rate as well as domestic prices. If we accept the booming sector thesis, this complicates interpretation of movements in the real exchange rate in New Zealand since 1984.

The next two Chapters of this monograph provide a detailed empirical investigation of real and nominal exchange rate changes in New Zealand, particularly movements in these variables since 1984. First we attempt to measure the real exchange rate in New Zealand, initially on a heavily aggregated level and then on a disaggregated basis for each tradeable industry. We extend the concept of a real exchange rate to include costs and profitability. In Chapter Seven we attempt to measure the effect of nominal exchange rate changes on manufacturing industry profitability. Different measures of external competitiveness are also estimated and discussed.

CHAPTER 6

INTERNAL COMPETITIVENESS

6.1 Introduction

The previous section identified the nominal exchange rate as an important intermediate variable through which monetary policy can influence domestic output. In a typical Mundell-Fleming single-good model, if prices and costs are sticky, changes in the nominal exchange rate will affect the ability of domestic producers to compete with foreign producers. In a multi-good model, such as Corden's tradeables/non-tradeables model, the consequences of nominal exchange rate changes are more complex. In these circumstances there can be changes in external competitiveness, with consequent implications for aggregate demand and output, and changes in the relative profitability of domestic tradeable and non-tradeable production, with consequences for resource allocation.

In a multi-good model it is therefore important to distinguish between external and internal competitiveness. We generalise Dwyer's (1987) definition of external competitiveness to mean:

> "the ability of the traded goods sector to offer goods at final prices less than those of its foreign competitors".

In models that distinguish between tradeable and non-tradeable goods internal competitiveness has been defined by Dwyer as:

> "the ability of a domestic production sector, whether tradeable or non-tradeable, to attract resources from other sectors".

Our objective in the remainder of this section is to identify these measures of competitiveness for different production sectors of the New Zealand economy and to evaluate how recent movements in nominal exchange rates have contributed to changes in competitiveness.

This chapter concentrates exclusively on the measurements of internal competitiveness. The next considers measures of external competitiveness and attempts to determine the contribution of nominal exchange rate changes to both internal and external competitiveness in the manufacturing sector.

6.2 Internal Competitiveness Measurement

The ratio of non-tradeable to tradeable output prices (the real exchange rate) used in Corden's and Corden and Neary's analyses of monetary contraction and structural change is akin to Dwyer's concept of internal competitiveness. For given factor prices, a change in the real exchange rate will change the relative ability of sectors to compete for factors of production. Implicit in the models analysed later is the assumption that output prices respond to excess demand and accordingly an increase in the real exchange rate will, for given factor prices, increase the profitability of the non-tradeables sector.

Our main interest here is to observe the movements in the output prices of tradeables and non-tradeables and hence internal competitiveness. This requires a classification of production groups into tradeable and non-tradeable groups.

6.3 Measurement of the Real Exchange Rate

The real exchange rate (RER) will be measured as the ratio of producer output prices in the non-tradeables and tradeables sectors. Measurement of the RER involves the following steps:

(i) Classification of the various industries according to whether they are deemed tradeable or non-tradeable;

(ii) Weighting of the various industry sectors. This will be done on the basis of the contribution of each sector or industry to total GDP, and;

(iii) The application of the weights to the appropriate industrial producer output price series to form the RER index.

The major methodological issue concerns the categorisation of the 25 industry groups in the SNA into the two broad sectors. This is where the problem of aggregation arises. Goldstein, Khan and Officer (1980) proposed using the relative sizes of the ratios of imports to domestic sales and exports to domestic sales for each industry as the major criteria for classification. High ratios suggest the industry is a tradeable activity. In their study of ten countries tradeables generally included agriculture and related activities, mining and quarrying, and manufacturing.

These ratios are reproduced in Table 6.1 for New Zealand from the Input-Output tables. A few classification problems arise. For example, forestry and logging have low export/sales and import/sales ratios because the majority of the output is used for further processing by domestic manufacturers. Nevertheless profitability in this industry will be strongly influenced by the effect of exchange rates on export prices in the "downstream" industries.

Table 6.1 suggests that both the Distribution and Transport industries might also be included in the tradeable sector as each had relatively high export/sales ratios, of 11 percent and 27 percent respectively, in 1983-84. Once again this is not an ideal classification and is due to aggregation problems. In the case of the Distribution industry, the high export content is due to the inclusion of the activities of marketing authorities, stock and station agents and general importers/exporters. The majority of the output of the sector is domestically orientated and is of a services nature that is probably not directly subject to external competition.

Transport includes air and sea passenger and freight movements which are classified as export activities. As these are most likely to be subject to external competition and exchange rate developments, it is probably appropriate that this sector be classified as a tradeable. This too represents a major aggregation problem. The majority of the industry's output relates to domestic travel and freight which, for the most part, have no direct competition from overseas and are therefore more correctly classified as non-tradeable. In summary, we follow the suggested classification of Goldstein *et al*, but we also include the Distribution and Transport industries as tradeable.

TABLE 6.1: EXPORT AND IMPORT RATIOS OF PRODUCTION GROUPS, 1983-84

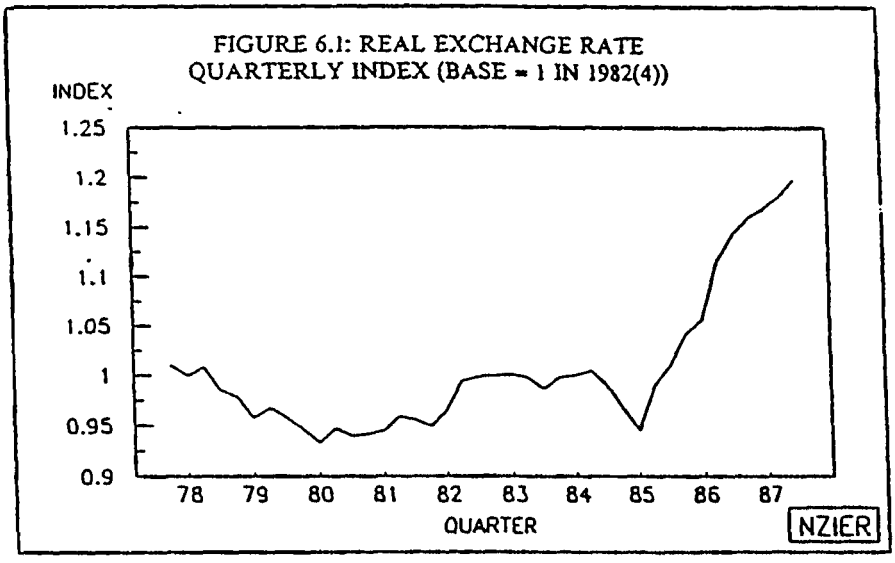
Production Group	Ratio of Exports to Output	Ratio of Direct Imports to Output
Agriculture	.15	.06
Fishing and Hunting	.42	0
Forestry and Logging	.05	0
Mining and Quarrying	.04	.06
Food and Beverages	.52	.05
Textiles	.36	.13
Wood Products	.13	.05
Paper	.22	.10
Chemicals	.08	.41
Non-metallic Minerals	.07	.05
Basic Metals	.41	.43
Fabricated Metals	.09	.22
Other Manufacturing	.21	.03
Transport, Storage	.27	.11
Distribution	.11	.05
Utilities	0	0
Construction	0	.08
Communication	.05	.02
Finance	.03	.03
Personal Services	.01	.14
Private, Non-profit Services	.01	.02
Domestic Services	0	0
Owner Occupied Homes	0	.05
Central Government	0	.06
Local Government	.01	.04

Source: Provisional Inter-Industry Study, 1983-84 : Dept of Statistics (1987).

Figure 6.1 plots the real exchange rate (RER). This is defined as:

$$RER_t = \frac{\sum_{i=1}^{n} P_{NTti}}{\sum_{j=1}^{m} P_{Ttj}} \qquad (6.1)$$

Where P_{NTti} is the value of the producer price index of output for non-tradeable industry i in quarter t and P_{Ttj} is the value of the producer price index of output for tradeable industry j in quarter t. There are n non-tradeable and m tradeable industries.



Figures 6.2 through 6.16 in Appendix 1 plot the disaggregated real exchange rates (6.2) for each of the tradeable industry groups.

$$RER_{jt} = \frac{\sum_{i}^{n} P_{NTti}}{P_{Ttj}} \qquad (6.2)$$

We are mainly interested in the behaviour of the RER indices since early 1985, when the exchange rate was floated. Figure 6.1 indicates the RER appreciated considerably after March 1985. The value of the RER in 1987(3) compared with 1985(1) was some 28 percent higher and it was about 20 percent higher than its value immediately prior to the 1984 devaluation. Figures 6.2 through 6.16 (appendix 1) show where this tendency for non-tradeables prices to appreciate much faster than the individual industry prices occurred, and shows there were some exceptions.

In the primary sector there was considerable variation in RERs. Agriculture and mining and quarrying experienced a considerable appreciation. Mining and quarrying had the highest value of the RER index in the tradeable sector. On the other hand, the falling indices for fishing and forestry indicate a relative price advantage for these industries vis-a-vis the non-tradeable sector. Variability in the manufacturing sector RERs is less marked than in the primary sector, with all manufacturing industries experiencing an appreciation in their individual RERs. This implies falling relative output prices relative to non-tradeable prices. Chemicals, basic metals and, to a lesser extent, food, beverages and tobacco all had significant RER appreciation relative to other manufacturing industries. The remaining manufacturing sectors all experienced an RER appreciation of some magnitude (in historic context at least) and of a similar amount. Fabricated metals had the smallest appreciation (hence the least unfavourable relative price change). Of the remaining tradeable sectors, Distribution and Transport also experienced RER appreciation, though the latter's appreciation was somewhat higher than that of Distribution. Both indices are comparable to those of Manufacturing.

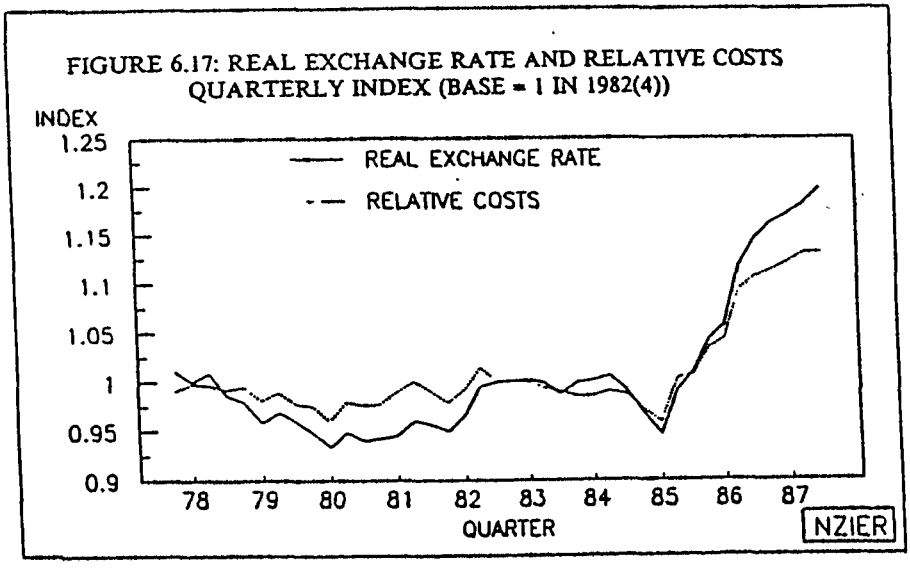
In the previous section we anticipated these results. If factor prices are held constant, these indicators imply a resource allocation in favour of the non-tradeable sector. We are now interested in the extent to which this has influenced resource allocation. Before looking at sectoral and industrial output it might be worthwhile to look at relative costs across the tradeables and non-tradeables sectors. If changes in costs are not constant across sectors and industries, this might affect our interpretation of the estimated real exchange rates.

6.3.1 Relative Costs and Profitability

In this section the sectoral behaviour of costs is considered. Industry and sector costs are measured here by the Producer Price Index Inputs series. These are direct non-labour costs and could be broadly described as the cost of intermediate goods. It is intended to construct an index of the ratio of non-tradeable costs to tradeable costs for the aggregate sectors. This time an appreciation of the index has the opposite implication for resource allocation as to the RER of Figure 6.1. Given constant output prices, an increase in the relative cost index implies that non-tradeables costs are rising faster

than tradeables, implying a favourable relative profitability movement for the latter.

Figure 6.17 plots the ratio of non-tradeables PPI inputs costs to tradeables PPI inputs costs, as well as the RER from Figure 6.1. This indicates that the increasing RER has been associated with a rapid increase in relative costs in the same direction. That is, non-tradeable costs have risen much faster than tradeables. This trend was particularly evident over 1985, but since 1986 the rate of increase of relative prices has exceeded that of relative costs, implying a relative profit (or more correctly, value added) advantage to the non-tradeables sector. This is evident in Figure 6.18 (appendix 1). This plots indices of profitability in the non-tradeables and tradeables sector. The profitability index is defined as the ratio of output prices to input costs. Figure 6.18 shows that the tradeables sector maintained its profit margin after 1984 whereas the non-tradeables sector, after experiencing a decline in margins over 1984, achieved a rapid gain in margins from 1985(2) to 1987(3). So although tradeables have maintained margins, they have suffered a decline relative to the non-tradeable sector.



This analysis of relative profitability has identified the importance of relative cost movements as well as relative prices. Figure 6.1, the RER, suggested a relative price movement in favour of non-tradeables of around 20 percent (1987[3] compared with base period 1982[4]), but once relative costs were taken into account the profitability advantage was in the vicinity of 6 percent.

This profitability ratio is also estimated for each of the tradeables industries and compared with that of the non-tradeable sector calculated above. Figures 6.19 to 6.33 (appendix 1) show the relative profitability ratios. The graphs indicate that most of the tradeables industries were able to maintain their margins, but only two, fishing and hunting and forestry and logging, significantly exceeded that of non-tradeables.

Mining and quarrying as well as transport suffered heavy declines in profit margins. They also, had particularly high RERs. Overall, although only three manufacturing industries profitability margins fell after the 1982(4) base period, the profitability comparison suggests that manufacturing's internal competitiveness fell. If the three industries' which experienced declining absolute profitability are excluded, the fall in manufacturing's internal competitiveness was probably only marginal. It would appear that much of the apparent fall in internal competitiveness of the tradeables sector, as measured by profit margins, can be attributed to the substantial falls in mining and transport. Moreover for the latter much of the fall occurred over 1984 and 1985. These profitability ratios represent the unit profitability of production. In the next section we examine the observed changes in real output (value added) across the two major sectors of the economy and also within a broad breakdown of industries within tradeables.

6.4 Sectoral Output and Value Added

Figure 6.34 (appendix 1) plots annual average percentage changes in tradeable and non-tradeable real value added (output). Both sectors experienced strong growth from early- to mid-1983 until mid-1985. From then until mid-1987, non-tradeable output continued to grow at over 4 percent per annum while tradeable output fell to around only 1 to 2 percent per annum for six quarters. This output pattern broadly corresponds with the divergence in profitability ratios of the

tradeable and non-tradeable sectors in Figure 6.18[4].

Figures 6.35 through to 6.38 (Appendix 1) plot real value added for each of the tradeable industries (on a broad industry base) versus the non-tradeable sector. These figures show real value added for

(i) agriculture;

(ii) fishing, hunting, forestry, mining;

(iii) manufacturing; and

(iv) trade, restaurants and hotels (distribution).

Manufacturing and, in particular, distribution were quite weak over the post-1984 period. At the commencement of the upturn in the business cycle manufacturing output grew to some extent but weakened towards the end of 1985. The primary sector activities appear to have fared somewhat better in terms of real output although they are difficult to measure accurately. For example, increased exploration activity in the second series had a negative effect on measured value added. Agricultural value added is also difficult to measure and Figure 6.37 (Appendix 1) must be interpreted carefully. In the face of declining unit profitability agricultural producers attempt to maintain real incomes by increasing supply and simultaneously reducing the use of intermediate inputs. The effect of this in the national accounts is to increase value added quite significantly. Thus even at this relatively heavily aggregated level of measurement, output effects were quite diverse and caution is needed in the interpretation of these movements, particularly with reference to the observed RER and profitability indices.

6.5 Assessment

Estimated measures of internal competitiveness which might be relevant for internal resource allocation were discussed earlier. Particular attention was focused on the tradeable and non-tradeable

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4. Care must be taken in identifying specific quarters because the use of annual average changes in Figure 6.18 (Appendix 1) obscures quarterly turning points.

distinction. The real exchange rate was shown to have appreciated significantly after 1984. When individual tradeable industries were considered, most had experienced a rising real exchange rate, but there was considerable industry variation around this secular trend. Relative sector and industry direct non-labour costs exhibited a similar trend with non-tradeable costs growing faster than tradeables. The price and cost series were combined to form a unit profitability series which showed an advantage to non-tradeables, though the advantage was considerably smaller than that indicated by the real exchange rate alone. Once again, there was considerable variation in the unit profitability index across the tradeable industries. Sectoral value added growth since 1984 was broadly in sympathy with the observed price and profitability trends, i.e. the output of non-tradeables grew at a much faster rate than tradeables after mid-1985.

Corden suggested monetary disinflation would be most likely to raise the real exchange rate, the major reason for this being the response of the nominal exchange rate to capital inflows. Corden suggested that real output was likely to fall in both sectors, but the presumption was that tradeable output would fall more. This uneven sectoral response reflected the likelihood that domestic spending and investment were relatively insensitive to interest rate and money supply changes at least in the short run. On the other hand, tradeable prices and output were likely to be quickly affected by the exchange rate appreciation. The New Zealand experience appears, on the face of it, consistent with Corden's predictions. The major difficulty in assessing the strength of the disinflation effect is identifying the effect of the liberalisation programme on the real exchange rate and sectoral output.

Corden and Neary identified two potentially important effects of a booming sector on the RER and output. First the resource movement would attract factors of production into the booming sector (in New Zealand's case, the non-tradeables sector which benefits from liberalised financial services). This would raise output in non-tradeables and lower output in tradeables. The real exchange rate would fall. The spending effect arising from increased real income in the booming non-tradeable sector would raise demand for the (non-booming) tradeables sector output and further lower the real exchange rate.

Our results suggest that the RER effects of the resource and spending movements have not been significant. The booming sector effects on the RER may be dominated by the disinflation effects noted above. There could be a number of reasons for this.

The Corden-Neary analysis is conducted within a full employment model but the economy may be less than fully employed. When liberalisation occurs there may be sufficient resources available for both sectors to expand. This being the case, the output of both sectors might expand towards the production possibility frontier but, say, with non-tradeables growing faster. If the income elasticity of demand for non-tradeables is greater than that of tradeables, then a real appreciation might occur[5]. So in this case, less than full employment results in only a weak resource effect. This would also occur if labour and capital were immobile or only weakly mobile across sectors. As tradeable output has also increased (as the resource effect is not limiting in this case), it is the strength of the relative demand effects (as before) which determines the RER. Tradeable output in this case is able to expand to meet at least some, if not all, of the extra demand due to the spending effect, so the strength and direction of the RER influence is not necessarily clear. If this description of the booming sector is more realistic than the predictions of full employment theory, then the monetary disinflation effect on the RER might have been the major influence in the post-float period.

Nevertheless, our review of the data suggested that relative unit profitability measures had appreciated somewhat less than the RER. This was because of considerable divergence in relative cost movements across sectors. In particular non-tradeables' costs had increased faster than tradeables' costs. This difference between profitability and RER could be due to the spending and/or resource effects. For example, as the non-tradeable sector increases its demand for goods from the tradeables sector, the latter is faced with rising cost curves and it raises its prices to the non-tradeables sector. The appreciation of the RER may reflect mark-up pricing on rising

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5. This would depend upon whether demand in the non-tradeables sector was increasing faster than output in that sector. In turn, demand depends upon the income effects of the increased output and the relative propensities to spend on non-tradeables and tradeables.

costs. Thus the RER does not necessarily adequately capture resource movement implications as factor costs are not held constant in the economy. The resource requirements of the expanding non-tradeables sector have raised costs. Similarly, spending effects arising from the expanding non-tradeables sector might have helped the tradeables sector maintain profit margins to a greater extent than might otherwise have been possible. This is an empirical issue but does not lend itself easily to formal testing.

Some empirical tests were undertaken to try and determine first, whether this type of spending effect might exist and, second, which industries within the tradeable sector might benefit most from the spending effect. The hypothesis tested is that the output growth of different industries exhibits varying sensitivities over the business cycle. Some industries will be particularly sensitive to the cycle (and experience strong output growth over an upswing) while others will not. The underlying hypothesis in this case is that those (tradeable) industries which are most sensitive to the domestic cycle are most likely to benefit from the non-tradeable boom in terms of derived demand and profitability. Our purpose here is to try and identify the strength of the relationship between individual industries and the general business cycle. A full explanation of the theory, empirical technique and results are detailed in Appendix Two.

The empirical estimation using OLS in two different forms, log level and logged first differences was implemented in order to gauge how robust the results are to the functional form[6].

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6. A number of problems exist with this type of econometric analysis. Some of these problems include
   (i) the co-determination of the regressor and regressands theoretically necessitates use of an estimation technique other than OLS;
   (ii) intra-sectoral and intra-industry changes are obscured by the degree of aggregation of the data;
   (iii) the tests for structural change are confined to the arbitrarily selected 1984(4) - 1986(4) period and ignore the possibility of structural change during other periods;
   (iv) there is no theory as to the direction of, or reasons for, causality across the different sectors. This is a purely statistical exercise;
   (v) the regressions ignore lagged responses between sectors;
   (vi) All data are deflated so price effects are ignored.

The empirical estimation discussed in Appendix One was undertaken

(i) for each of the nine SNA production groups for which data are gathered quarterly,

(ii) for each of the nine manufacturing industries for which data are published quarterly in the Quarterly Survey of Manufacturing. For each of the above sets of industries the equations that were estimated in logarithmic first differences were tested for structural change over the period of policy reform - deemed to be from 1984(4) to the end of the sample period 1986(4).

The explanatory variable used in each case was GDP rather than, say, specific sectors. For example, there was some attraction in regressing manufacturing on non-tradeable output as this would appear to confront our hypotheses more specifically. It was decided to use GDP, because the non-tradeable versus tradeable sector is essentially an arbitrary division. Every industry group has elements of both non-tradeable and tradeable activities. Therefore, if, for example, a tradeable industry group was regressed on our definition of non-tradeable output, it would exclude the potentially important effect of non-tradeable activities in other industries falling under the heading of tradeables. Moreover, there may only be an indirect spending effect from non-tradeable activities to tradeable industries. So the spending effect on a tradeable industry might be via another tradeable activity. Use of GDP recognises these possibilities. We also attempted to recognise that industries have leading and lagging relationships with each other. Correlations between the cyclical (de-trended) output of each of the sectors leading and lagging each other, as well as leading and lagging cyclical GDP, were calculated in an attempt to capture these effects.

The results of the econometric study are set out in detail in Appendix Two and are briefly summarised below.

There is evidence of significant inter-sectoral spending effects in the economy. The direction of the spending effect appears to be predominantly from non-tradeable to tradeable activities. The impact is greater on some sectors and industries than others. We found that construction (a non-tradeable activity) and manufacturing were most

sensitive to cyclical conditions, with betas significantly greater than one. Distribution and services had unitary betas. The remaining five production groups appeared to have only minimal sensitivity to economy-wide cyclical conditions. In general, it appears that the manufacturing sector is more likely to benefit from any spending effect than other tradeables.

Within the manufacturing sector, the various industries are affected differently. Industries with very low sensitivity to domestic conditions are primary food processing, paper and printing, textiles and basic metals. The first three are relatively export oriented and a priori it is difficult to establish a strong case as to why they would tend to change significantly over the domestic business cycle. The investment-related industries, fabricated metals and non-metallic minerals, are the most sensitive to domestic cyclical conditions. They also have relatively low exports as a proportion of their total output. Chemicals (a very low export ratio), other food processing (high export ratio) and wood products have betas close to one. A broad conclusion therefore is that the sectors most likely to benefit from any type of spending effect are those with a high proportion of domestically oriented sales.

There is some evidence that spending effects between sectors are likely to be distributed over time. In particular this is most evident between services output and its lagged effect on manufacturing output. This is not necessarily significant, however.

Finally, we were interested in the extent, if any, to which the change in policy regime induced structural change in the type of relationships we had identified. The test for structural change hypothesised a shift from 1984(4) onwards. At the broad production group level there was little evidence of structural change in the sectoral inter-relationships. When the tests were applied to disaggregated manufacturing data, paper and printing, non-metallic minerals and primary food processing suggested structural change. For primary food the results suggested the output response had increased over the recent cycle. This is consistent with our knowledge of recent behaviour in the agricultural sector. With the exception of the food processing sectors, the results suggested the responses of all the manufacturing industries to changes in GDP had become smaller. This has a number of possible interpretations. The

non-tradeable sector may be using more imported intermediate and final goods or have reduced its dependence on manufactured goods. Possibly, the manufacturing sector was unable to meet the requirements of the rest of the economy in the recent growth period. This could also partly explain the cost pressures on the non-tradeable sector of the economy.

6.6 Conclusions

Two measures of internal competitiveness were estimated. The first, the real exchange rate, is the ratio of output prices between the non-tradeable and tradeable sectors. Our results suggest that the real exchange rate has appreciated considerably in favour of non-tradeables. The second measure, relative unit profitability, has varied considerably less between sectors than the real exchange rate, but the differential in favour of non-tradeables still appears significant.

Theory, and some informal evidence, suggested at least two factors have operated on internal competitiveness. First, disinflation has raised the real exchange rate. Second, the booming non-tradeable sector is suspected of having operated in the opposite direction to equalise relative profitability. The exact nature of this effect is unclear, though.

In the next Chapter we attempt to identify the contribution of changes in the nominal exchange rate to the changes in internal competitiveness. We will also consider the related concept of the external competitiveness of tradeables. External competitiveness is concerned with the ability of domestic producers to compete with international producers of tradeable goods - whether exportables or importables. Changes in external competitiveness do not necessarily have implications for domestic resource allocation. This ultimately depends upon internal competitiveness. We will also attempt to identify the contribution of the nominal exchange rate to changes in external competitiveness.

CHAPTER 7
THE EXCHANGE RATE AND COMPETITIVENESS

7.1 Introduction

In the previous Chapter we presented alternative measures of domestic competitiveness, with particular emphasis on the distinction between the tradeables and non-tradeables sector. There were three major findings. First, relative domestic competitiveness, as measured by the real exchange rate, had moved in favour of non-tradeables. Second, it appeared that when relative cost differences were taken into account, the profitability advantage to non-tradeables was somewhat less than that implied by the real exchange rate measure. Third, both the real exchange rate and profitability measures, when calculated for each tradeable industry, suggested a wide diversity of changes in internal competitiveness across tradeable industries.

In this chapter we are interested in the role of the nominal exchange rate in affecting various measures of competitiveness. As the earlier theoretical discussion on the impact of monetary policy (or structural changes arising from, say, a booming sector) noted, changes in competitiveness will be associated with changes in nominal exchange rates (for the floating exchange rate case). Indeed the nominal exchange rate (at least until domestic costs change) is what alters relative prices and internal (as well as external) competitiveness.

The point can be illustrated by reference to the profit statement

$$\pi = P - C \qquad (7.1)$$

where π is the unit profitability
P is output prices
C is unit costs.

Now for the tradeable goods sector the ex-post profit statement is

$$\pi_T = ex_T \; PX_T^W - C_T \qquad (7.2)$$

and the non-tradeable sector's profit statement is

$$\pi_{NT} = P_{NT} - C_{NT} \qquad (7.3)$$

where

ex is the relevant nominal exchange rate index facing domestic producers of tradeables

PX_T^W is the world price of tradeables which domestic producers of tradeables face.

Provided domestic costs, the world price of tradeables, and the domestic price of non-tradeables, P_{NT}, are independent of the nominal exchange rate, changes in that rate will alter internal competitiveness. Nominal exchange rate changes will, in these circumstances, also have implications for external competitiveness because of the impact on output price competitiveness.

Moreover, in many instances production costs contain intermediate imported inputs. So, although it is often assumed that the direct impact of the nominal exchange rate changes is on output prices, and hence competitiveness, there are also likely to be direct cost competitiveness implications arising from the nominal exchange rate change.

In order to examine fully the effect of an exchange rate change on the industry profit statement (7.2), we therefore need to capture the influence of exchange rate changes on unit costs, C_T. Obviously, only a proportion of costs have a direct import, and hence exchange rate-affected, component. Similarly, not all output is exported or subject to given world prices and so the profit statement must recognise this as well. These are the types of issues we wish to address and measure in the remainder of this report.

This analysis proceeds as follows. Firstly, we look at the relative importance of exports and direct imports in the revenue and cost structure of the individual tradeable industries. The estimation of appropriate industry specific exchange rate indices for both exports and inputs is discussed. Secondly, internal competitiveness is reconsidered and the contribution of the nominal exchange rate to changes in internal competitiveness is calculated. At this stage in the

analysis we are forced to confine our attention to manufacturing industries because of data constraints. Thirdly, we introduce and formally define the concept of external competitiveness. Finally, as for internal competitiveness, we attempt to estimate the direct contribution of the nominal exchange rate to changes in the external competitiveness of manufacturing.

7.2 A Descriptive Overview of Industry Cost and Revenue Structure

This section looks at the structure of 25 broad industrial groupings in New Zealand, based on the 1983-84 preliminary Input-Output tables. The objective is to identify those industries which are most likely to be directly affected by external price and exchange rate changes. The sensitivity of an industry's profitability to exchange rate changes is referred to here as "external exposure".

A convenient way of obtaining an indication of external exposure is to calculate the following indices from the Input-Output tables

> (i) the proportion of exports in total sales; call this parameter a, and
>
> (ii) the ratio of direct imports of intermediate goods to total sales; call this parameter b.

For purposes of comparison Table 7.1 lists the a and b parameters for the three inter-industry studies of the economy.

The parameters in Table 7.1 suggest that exchange rate changes are likely to have quite different immediate effects on the profitability of different industries. For example, an exchange rate appreciation might impact unfavourably on profitability in the Food and Beverages industry because it has a high export dependency (52% in 1983-84) relative to its direct import requirements (5%). On the other hand, an exchange rate appreciation would tend to lower a relatively large proportion of input costs (measured in New Zealand dollars) of industries which are heavily dependent on imported intermediate goods. An example of this type of industry is fabricated metals.

TABLE 7.1: SHARE OF EXPORTS AND IMPORTS IN TOTAL SALES BY INDUSTRY GROUP

PRODUCTION GROUP	IMPORTS TO TOTAL SALES			CUMULATED IMPORT COEFFICIENTS			EXPORTS TO TOTAL SALES		
	B1977	B1982	B1984	1977	1982	1984	A1977	A1982	A1984
Agriculture	.03	.04	.06	.116	.150	.166	.15	.14	.15
Fishing	.02	0	0	.099	.136	.121	.13	.11	.42
Forestry, Logging	.02	0	0	.096	.092	.096	.10	.06	.05
Mining, Quarrying	.09	.06	.06	.161	.159	.175	.06	.07	.04
Food, Beverages, Tobacco	.05	.05	.05	.145	.161	.163	.45	.46	.62
Textiles, Apparel	.15	.12	.13	.229	.221	.247	.30	.30	.36
Wood Products	.05	.04	.05	.146	.146	.247	.04	.09	.13
Paper Products	.08	.09	.10	.165	.189	.194	.18	.23	.22
Chemicals	.44	.45	.41	.507	.522	.497	.03	.03	.08
Non-Metallic Minerals	.07	.05	.05	.161	.137	.139	.02	.06	.07
Basic Metal Products	.38	.41	.43	.447	.481	.495	.21	.25	.41
Fabricated Metals	.24	.18	.22	.321	.278	.307	.04	.07	.09
Other Manufacturing	.06	.03	.03	.176	.159	.183	.05	.10	.21
TOTAL MANUFACTURING	.17	.16	.17	-	-	-	.21	.23	.28
Distribution	.03	.05	.05	.095	.098	.099	.10	.12	.11
Transport	.10	.12	.11	.182	.228	.200	.29	.31	.27
Utilities	.02	0	0	.078	.043	.045	0	.01	0
Construction	.05	.07	.08	.188	.195	.213	0	0	0
Communications	.06	.04	.02	.081	.057	.039	.05	.05	.05
Finance, Insurance	.02	.03	.03	.053	.065	.070	.01	.03	.03
Owner Occupied	.03	.05	.05	.112	.122	.129	0	0	0
Community, Social & Personal Services	.12	.10	.14	.172	.185	.206	.01	.01	.01
Private, Non-Profit	.02	.01	.02	.084	.086	.092	.05	.01	.01
Domestic Services	0	0	0	0	0	0	0	0	0
Central Government	.05	.04	.06	.081	.082	.102	0	0	0
Local Government	.02	.04	.04	.131	.128	.138	0	.01	.01

Sources: Inter-Industry Study of the New Zealand Economy, 1976-77, Department of Statistics, September 1983 (excludes import duty)
Provisional New Zealand Input-Output Tables 1981-82, Department of Statistics, November 1984
(unpublished) Computer Printout of Provisional Input-Output Tables 1983-84, Department of Statistics, September 1987

It must be stressed, however, that the medium- to long-term effect of exchange rates on profit is not clear cut. Although fabricated metals might have the advantage of cheaper intermediate goods under an appreciating exchange rate, they might also be faced with increased competition from imports of finished goods. This would tend to restrain output prices on the domestic market and possibly negate the benefit of cheaper inputs.

Moreover, the direct import coefficients ignore the fact that many industries derive inputs from other domestic industries which in turn may have an import component. This indirect reliance on imports is not captured by the b parameters. The importance of this can be gauged by examining the "Cumulated Import Coefficients". These coefficients extend the direct coefficients presented in Table 7.1. They take into account the "downstream" effects of industries dependent on other domestic industries for inputs which, in turn, have some import component. Thus the cumulated coefficients embrace this downstream or indirect reliance on imports via other domestic industries as well as the direct requirements presented in Table 7.1. There is an important conceptual difference between the measurement of the cumulated coefficients and the direct import coefficients. The latter refer to imports required for total output, regardless of whether the total output is for final or intermediate consumption elsewhere. The cumulated coefficients are the direct and indirect import requirements of an industry per unit of final demand only. Nevertheless the cumulated tables necessarily incorporate the various inter-industry linkages[7]. The cumulated coefficients suggest it is not uncommon for some industries to have two to three times the dependence on imports than that suggested by studying the direct import coefficients. This is an important aspect which must be kept in mind when evaluating the subsequent empirical results.

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7. The 1976-77 Input-Output study was the last full study conducted on an 128-industry basis. Although new information was incorporated in the two subsequent studies, they are based on the economy structure as at 1976-77. Thus it depends on the relative production mix for intermediate as opposed to final goods.

7.3 Exchange Rates and Internal Competitiveness

The discussion in Section 7.2 suggested that exchange rate changes are likely to have quite different effects on the 25 industrial groups because they exhibit differing "exposures" in terms of their import requirements and export dependency. Moreover, bilateral exchange rates can exhibit rather divergent behaviour over time. Countries from which imports are sourced may differ from those to which exports are sold. Such effects could have a strong influence on individual industries but these obviously cannot be determined from the Reserve Bank's Trade Weighted Index (TWI) of exchange rates.

One way of estimating the effect of exchange rate changes on individual production groups is to prepare "exposure indices" for each group. These are simple identities which decompose unit profitability into its constituent price and cost components under certain assumptions. The exposure index facilitates the analysis of the effect of exchange rate changes on industry profitability. This section and sections 7.4 to 7.6 develop the exposure index, outline the assumptions implicit in its use, and apply it to the various manufacturing industries.

For each industry, k, denote unit profitability as

$$\Pi_k = P_k - C_k \qquad (7.4)$$

where Π_k = Unit profit in industry k,
P_k = Unit output price in industry k, and
C_k = Unit input cost in industry k.

Assume that the inputs into production (embodied in C_k) are some combination of labour costs, L_k, and other intermediate inputs which may be supplied by other domestic production groups, I_k, or imported directly, M_k.

Thus the identity (7.4) can be written as

$$\Pi_k = P_k - (b_{1k} L_k + b_{2k} I_k + b_{3k} M_k) \qquad (7.5)$$

where $\sum_{i=1}^{3} b_{ik} = 1, \quad 0 \leq b_{ik} \leq 1.$

L_k = unit labour costs in industry k
I_k = unit input costs from other domestic producers
M_k = unit direct import costs for industry k.
b_{ik} = Proportion of each factor (i = 1,2,3) in cost structure of domestic industry.

The parameters, b_{ik}, can be obtained from the Input-Output tables. For example, the direct import parameters, b_{3k}, are presented in Table 7.1 for each of the 3 years for which an inter-industry study has been undertaken.

Identity (7.5) can be further extended to recognise explicitly the effect of exchange rates on unit profitability. If a proportion, a_k, of the output from k is exported, we can modify P_k to incorporate exchange rate, ex_k, and world price, PX_k^w effects. Similarly, M_k will comprise exchange rate, em_k, and world price, PM_k^w, effects. Therefore,

$$\pi_k = a_k\, ex_k\, PX_k^w + (1 - a_k)\, P_k^D - [b_{1k} L_k + b_{2k} I_k + b_{3k}\, em_k\, PM_k^w] \qquad (7.6)$$

where ex_k, em_k are indices of nominal exchange rates weighted by destination of industry k exports and source of industry k imports, respectively.

PX_k^w, PM_k^w are indices of world prices of industry k's exports and imports of intermediate goods, weighted by the destination of exports and source of imports, respectively. (See Appendix Three).

P_k^D is an index of prices of industry k's output sold to the domestic market.

a_k is the proportion of the total output of industry k that is exported. $0 \leq a \leq 1$.

Rearranging (7.6) yields (7.7) below

$$a_k\, ex_k\, PX_k^{w} - b_{3k}\, em_k\, PM_k^{w} = \Pi_k - [(1 - a_k)P_k^{D} - b_{1k}\, L_k - b_{2k}\, I_k] \qquad (7.7)$$

Identity (7.7) may be viewed as an index of the immediate impact of external price and exchange rate movements on unit profits of production group k.

To isolate the contribution of exchange rate changes to the unit profit rate we set $PX_k^{w} = PM_k^{w} = 1$ which yields index (7.8).

$$a_k\, ex_k - b_{3k}\, em_k \qquad (7.8)$$

In order to evaluate the effect of nominal exchange rate changes on changes in industry value added we need to take into account the relative importance of a and b_3 in terms of value added. Dividing (7.8) through by value added in the base period yields (7.9), the exposure index

$$\%\ \text{Exposure Index} = \frac{a}{(1 - b_{ik})}\ \%\Delta ex - \frac{b}{(1 - b_{ik})}\ \%\Delta em \qquad (7.9)$$

The exposure index shows the proportional effect of quarterly exchange rate changes on industry value added, holding constant all other costs and prices as well as all quantities. These latter assumptions imply that output prices whether for the domestic or foreign markets and other costs are independent of the exchange rate.

7.4 Construction of an Exposure Index

The objective of the exposure index is to determine the effect of nominal exchange rate movements on the value added of individual manufacturing industries. In order to achieve this it is necessary to assume that

(i) all domestic and foreign prices and costs other than direct imports are unaffected by the exchange rate;

(ii) all quantities are similarly unaffected. Obviously there may be potential effects of changes in export and domestic market competition by foreign firms in response to exchange rate changes depending on the characteristics of the markets;

(iii) the ratios a_k and b_{3k} are fixed at their 1983-84 levels. This simplifying assumption ignores the fact that, ceteris paribus, as soon as ex and em change from their average 1983-84 level, a_k and b_{3k} will also change. By invoking this assumption we implicitly impose the requirement that after exchange rate changes, the mix of domestic to foreign sales and intermediate goods usage alters to maintain a_k and b_{3k} at their 1983-84 level;

(iv) there is no change in profit margins in response to exchange rate changes either by exporters, import competing producers or overseas suppliers of intermediate inputs. That is, the "law of one price" holds. Imperfectly competitive markets generally yield price and profit margin adjustments to exchange rate changes. For example, Dornbusch (1987) and Mann (1986) have presented models of export and import pricing where the response of producers to exchange rate changes depends, *inter alia*, on the number of firms in the industry and the share of exports in total sales, and;

(v) the exchange rate prevailing when the sale or purchase was made is the relevant exchange rate for revenue and cost calculations. There is of course the possibility of forward contracting, settlement of the contract in an alternative foreign currency or other types of hedging. There is however little information to guide us as to the appropriate adjustments to make for the various types of hedging.

Most of the remaining problems arise from the use of fixed coefficient input-output tables and fixed country weights for export destinations and import sources.

The use of fixed weights for country sources of imports and country destination of exports is probably reasonable in the short-term but is not realistic in the longer term if producers change their markets in response to relative price differentials. Nevertheless, an examination

of the relative country weights for imports and exports in 1983-84 and 1986-87 suggests that changes over time occur quite slowly and the assumption might not be too unreasonable as we are mainly interested in the post-float period.

The assumptions and limitations underlying input-output analysis are well known. The 1976-77 Inter-Industry Study of the New Zealand Economy, lists the assumptions as follows.

1. Industries and commodities are homogeneous.
2. Returns to scale in production are constant.
3. The economy exists as represented by the input-output transaction tables for the year ended 31 March 1977.
4. The economic structure as measured by the input-output tables does not change as a result of any actual or hypothesized changes, the effects of which are being estimated (e.g. there are no substitution effects).
5. The time taken for any changes or effects to flow through the economy is indeterminate.

Thus our use of 1983/84 coefficients ignores, for example, the possibilities of changing labour to capital ratios or of substitution between domestic and foreign markets for output and also inputs. Moreover, the overall structure of the economy now is likely to be rather different from what it was in 1976/77, the year upon which the 1983/84 tables are based.

Some of these problems could potentially be redressed (for example, the updating of the share of exports in output), but the cost of doing so combined with the fact that some problems could not be resolved (for example updating the type of imports) precluded any further adjustments in this study.

One other potentially serious problem is that the import data used to obtain industry country weights do not distinguish between imports used for final consumption or investment rather than for the intermediate consumption in which we are interested. Thus, it is implicitly assumed that each country from which industries import provides intermediate and final goods in a proportion not significantly different from the average proportion for all goods of that industry type.

7.5 Application to the Manufacturing Sector

In this section a series of "exposure indices" are derived for each of the manufacturing industries. The data sources are given in Appendix Four. The exposure index is equation (7.10).

$$\text{Exposure index } k = \left(\frac{a_k}{(1 - b_{ik})}\right) \%\Delta ex_k - \left(\frac{b_{3k}}{(1 - b_{ik})}\right) \%\Delta em_k \quad (7.10)$$

where a_k is the share of exports in industry k's output
b_{3k} is the share of direct imports in industry k's inputs
ex_k is the weighted nominal exchange rate index, weighted according to the country destination of k's exports
em_k is the weighted nominal exchange rate index, weighted according to the source of k's imports.
b_{ik} is the proportion of total intermediate costs to total sales.

The parameters a_k and b_{3k} are assumed fixed for each industry. Other things being equal, an increase in the index implies that the change in $a_k\ ex_k$ exceeds the change in $b_{3k}\ em_k$. This may occur if

(i) ex_k falls less than em_k falls,

(ii) ex_k rises faster than em_k rises,

(iii) ex_k stays constant or rises and em_k falls.

The role of a and b_3 in (4.10) is to recognise the relative importance of exports and direct imported production inputs to each group.

For example, if $a = 2b_3$, exports are twice as important as direct imported product inputs in terms of relative share of sales. If em rose two points, this would be an advantage to the domestic producer because intermediate inputs become cheaper.[8] But if this reflected a general appreciation of the New Zealand dollar this would reduce export revenue expressed in New Zealand dollars. The exposure index with $a = 2b_3$ indicates that for profitability to remain the

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8. This is a short run analysis and it ignores the possibility of penetration into the home market by foreign suppliers.

same, the ex index would have to increase by not more than one point for the exposure index still to have the same value. This constancy indicates that total value added has remained the same. The exposure index measures the effect of a change in the nominal exchange rate on industry value added, holding all quantities, prices and costs (both domestic and external) constant.

The exposure index is constructed as follows. The exchange rate indices, ex and em, measure the cost in New Zealand dollars of a unit of foreign currency. Thus a rising ex is favourable for exporters as it means that, for a given foreign currency price, the value in New Zealand dollars increases. If em falls, the New Zealand dollar has appreciated and, ignoring any external competition effects, this has a positive effect on profitability as intermediate inputs costs fall.

Quarterly percentage changes in ex and em were calculated. These were then multiplied by a and b_3, respectively. The difference, a% ex - b_3% em was obtained. These quarterly percentage changes were then cumulated into an index.

The exposure indices are presented in Appendix 5 (Figures 5.1 - 5.9). If we concentrate upon the post-float period, the indices can be divided into two distinct groups

> (1) those industries for which the nominal exchange rate changes were beneficial to the industry in terms of value added. These are basic metals, food and beverages, and to a lesser extent wood products.
>
> (2) those industries for which value added has been adversely affected by nominal exchange rate movements. These industries are fabricated metals, textiles, chemicals, other manufacturing, paper products and non-metallic mineral products.

It is also important to distinguish changes in the trend value of the exposure index since the float. For example, in the period 1980-84, value added in the fabricated metals sector experienced a steady negative influence from exchange rate changes as it is strongly reliant on imports compared to exports. Although the exposure index appears to have fallen marginally in the 1985-87 period, this

represents a relative advantage compared with the previous trend. A similar comment could be made for chemicals. The post-float trends for food and wood products do not appear inconsistent with past trends. In the remaining industries there appears to have been a significant change in the trend value of the exposure index since floating. Of these only basic metals experienced an improvement.

Two general comments can be made. First, the relative importance of exports and imports to each industry determines the magnitude of the exchange rate effects on profitability. The a and b parameters in the exposure index are low for non-metallic mineral products, wood products, paper products, other manufacturing and textiles, in ascending order. Basic metals, chemicals and food, beverages and tobacco have the highest parameters in their indices and are also the most "exposed" groups by far. Of note is that the three groups with the largest exposures fared best in terms of revenue effects.

Second, the values of the exposure indices are heavily determined by the extent to which Australia is the main export market. In fact, it can be generalised that those industries faring worst tend to have Australia as their main export market. Moreover, it is nearly always the case that industries rely more heavily on Australia for exports than they do for imports, as a proportion of sales.

Australia is the largest export market by far for paper products, textiles, non-metallic minerals, other manufacturing and fabricated metals. It is the main market for wood products. Basic metals and, to a lesser extent, processed food and beverages, had Japan as their major market though Australia has since become dominant for the latter. Thus the revenue gain for food and beverages is somewhat overstated in the exposure index.

The significance of different countries as sources of imports and export markets arises because of the divergence in bilateral nominal exchange rate movements after the float. Specifically the New Zealand dollar appreciated strongly (relative to the TWI) against the Australian dollar as well as against other minor currrencies such as Canada and Korea. On the other hand, after early 1985, nominal parity was maintained with the pound and the US dollar. Significant depreciation occurred against the yen and the Dmark.
Figures 5.10 to 5.18 in Appendix 5 plot ex and em together to show

the relative movement. The TWI is plotted to provide an economy-wide relative measure. In all cases except basic metals, wood products and food and beverages, the exchange rate for the export market has appreciated vis-a-vis the TWI. In all cases, however, the exchange rate for intermediate imports, em, has closely tracked the TWI since floating.

7.6 Internal Competitiveness

In this section we use the exposure indices of section 7.5 to estimate the contribution of nominal exchange rate changes to the internal competitiveness of manufacturing industries. We have already observed that changes in input costs across industries are as diverse as output price changes. Therefore, changes in profitability - which we measured as ratios of output prices to input costs - were regarded as more useful indicators of resource flows between sectors and industries. In this section we retain this approach but extend it by also taking into account the structure of the industry - in terms of its intermediate requirements relative to total sales. This enables us to estimate the effect of price and cost changes on nominal value added. In other words, we extend the concept of an exposure index to the total industry level in terms of aggregate output prices and aggregate input costs rather than focussing on just exchange rate changes as we did in section 7.5.

If this procedure is carried out for the non-tradeables sector as a whole and for each manufacturing industry on the basis of producer output prices and input costs, we have a convenient technique for identifying the direct contribution of nominal exchange rates to internal competitiveness. That is, internal competitiveness is the difference between the proportional growth in value added due to price and cost changes (quantities of outputs and inputs are assumed constant) in the non-tradeables sector and the individual tradeables industry. The change in tradeables industry value added identifed here is then further broken down into its exchange rate contribution in the exposure index of section 7.5. Thus the exchange rate contribution to internal competitiveness can be easily identified.

The measures identified above were calculated for each of the manufacturing industries for the March years 1984 to 1987. The results are in Tables 7.2 through to 7.10 below.

TABLE 7.2: NOMINAL EXCHANGE RATE CONTRIBUTIONS TO INDUSTRY VALUE ADDED AND INTERNAL COMPETITIVENESS

- Basic Metals -

March Years	Internal Competitiveness[1]	Change In Exposure Index[2]	Other Influence On Industry Value Added[3]
83/84	2.3	6.3	1.4
84/85	11.2	2.7	16.4
85/86	-7.7	9.5	-1.0
86/87	-23.8	16.7	-18.0

1. Difference between non-tradeables' percentage change in value added due to price and cost changes and the percentage change in value added due to price and cost changes in the tradeable industry. A negative sign indicates a decline in internal competitiveness (i.e. a rise in the real exchange rate). All data are annual averages.

2. As calculated in section 7.5 on an annual average basis.

3. The difference between Industry Value Added (not listed) and exchange rate-induced changes in competitiveness (2). This comprises mainly domestic price and cost changes but it also includes export and import price changes. It will also capture changes in weightings on exports and imports which our exposure index does not.

TABLE 7.3: NOMINAL EXCHANGE RATE CONTRIBUTIONS TO INDUSTRY VALUE ADDED AND INTERNAL COMPETITIVENESS

- Chemicals -

March Years	Internal Competitiveness[1]	Change In Exposure Index[2]	Other Influence On Industry Value Added[3]
83/84	-10.7	-7.8	2.4
84/85	-13.0	-20.7	15.4
85/86	22.3	-1.0	39.5
86/87	-19.5	-2.3	5.4

TABLE 7.4: NOMINAL EXCHANGE RATE CONTRIBUTIONS TO INDUSTRY VALUE ADDED AND INTERNAL COMPETITIVENESS
- Fabricated Metals -

March Years	Internal Competitiveness[1]	Change In Exposure Index[2]	Other Influence On Industry Value Added[3]
83/84	-7.0	-3.2	1.6
84/85	1.1	-6.4	15.4
85/86	1.5	-2.3	20.0
86/87	-6.5	-2.5	18.5

TABLE 7.5: NOMINAL EXCHANGE RATE CONTRIBUTIONS TO INDUSTRY VALUE ADDED AND INTERNAL COMPETITIVENESS
- Food, Beverages and Tobacco -

March Years	Internal Competitiveness[1]	Change In Exposure Index[2]	Other Influence On Industry Value Added[3]
83/84	-2.3	15.7	-12.1
84/85	-0.8	30.0	-23.1
85/86	-7.1	-3.0	12.0
86/87	-9.6	10.0	3.0

TABLE 7.6: NOMINAL EXCHANGE RATE CONTRIBUTIONS TO INDUSTRY VALUE ADDED AND INTERNAL COMPETITIVENESS
- Non-metallic Mineral Products -

March Years	Internal Competitiveness[1]	Change In Exposure Index[2]	Other Influence On Industry Value Added[3]
83/84	-4.2	-0.2	1.4
84/85	-4.1	1.0	4.9
85/86	-3.4	-2.2	15.0
86/87	-9.5	-1.2	14.4

TABLE 7.7: NOMINAL EXCHANGE RATE CONTRIBUTIONS TO INDUSTRY VALUE ADDED AND INTERNAL COMPETITIVENESS
- Other Manufacturing -

March Years	Internal Competitiveness[1]	Change In Exposure Index[2]	Other Influence On Industry Value Added[3]
83/84	-4.8	1.2	-0.6
84/85	0.7	8.6	0.0
85/86	-1.3	-7.4	22.3
86/87	-7.3	-3.4	18.7

TABLE 7.8: NOMINAL EXCHANGE RATE CONTRIBUTIONS TO INDUSTRY VALUE ADDED AND INTERNAL COMPETITIVENESS
- Paper Products and Printing -

March Years	Internal Competitiveness[1]	Change In Exposure Index[2]	Other Influence On Industry Value Added[3]
83/84	-5.7	-0.5	0.2
84/85	-7.1	5.9	9.0
85/86	-11.2	-9.2	14.1
86/87	-5.9	-5.5	22.2

TABLE 7.9: NOMINAL EXCHANGE RATE CONTRIBUTIONS TO INDUSTRY VALUE ADDED AND INTERNAL COMPETITIVENESS
- Textiles, Clothing and Footwear -

March Years	Internal Competitiveness[1]	Change In Exposure Index[2]	Other Influence On Industry Value Added[3]
83/84	-8.1	-0.1	-2.6
84/85	-2.1	10.8	-5.0
85/86	-3.4	-12.8	25.5
86/87	-17.5	-7.7	12.8

TABLE 7.10: NOMINAL EXCHANGE RATE CONTRIBUTIONS TO INDUSTRY VALUE ADDED AND INTERNAL COMPETITIVENESS

- Wood and Wood Products -

March Years	Internal Competitiveness[1]	Change In Exposure Index[2]	Other Influence On Industry Value Added[3]
83/84	-8.7	1.6	-4.9
84/85	0.9	4.5	4.3
85/86	-2.6	-2.2	15.8
86/87	-6.6	-0.1	16.2

The results are broadly consistent with our observations in Chapter Six where we looked at overall profitability movements in specific industries. Most manufacturing industries have suffered a decline in competitiveness vis-a-vis the non-tradeable sector. This was generally most marked over 1985/86 and, in particular, in 1986/87. In these two years the exposure indices were generally strongly negative. The net competitiveness effect, though negative, was not nearly as weak as the exposure index would suggest because of the apparent effects of pricing and costs in the domestic market, as well as the possibility of external price gains (excluding exchange rate effects). That is, in most cases the net impact of domestic pricing and cost effects was very favourable for internal competitiveness, particularly over 1985/86 and 1986/87. In some instances, the domestic component of competitiveness changes was comparable to those of the non-tradeable sector. Examples of these type of industries include fabricated metals, and, to a lesser extent, non-metallic minerals. These two industries were identified in Chapter 6 as the two manufacturing industries most likely to benefit over the upturn in the domestic business cycle. As noted there, this was partly attributable to the relatively high share of domestic sales in total sales for these two industries. This aspect is automatically taken into account in the calculations of Tables 7.2 through 7.10.

A further interesting aspect of the tables is that the only industry not receiving a positive value added effect from non-exchange rate sources is the basic metals sector. This industry is also the one which is estimated to have benefitted the most from recent exchange rate

changes. Part of the reason for this is the downturn in world prices for base metals, particularly steel, from the beginning of 1985. Our estimates suggest wholesale output prices of manufactured base metals fell over 5% from early 1985 until the last observation, 1987. Given the high weight of exports in this sector, this probably accounts for much of the observed decline in non-exchange rate factors, though it is also probably fair to suggest that there was not a strong domestic impetus either.

In conclusion, our results provide further evidence for the contentions raised in chapter 5 and 6 concerning the role of the exchange rate and the business cycle in internal competitiveness. At this stage it would appear that firms (and industries) heavily reliant on the export of manufactured goods suffered a substantial decline in internal competitiveness. On the other hand, our results suggest that firms which service the local market (import competing firms) have suffered a much lower decline in internal competitiveness. The results probably underestimate this as the last column excludes the beneficial impact of the cheaper direct imports of intermediate goods on the value added of import competing firms. In the next section we examine the concept of export competitiveness and provide estimates of the effect of the exchange rate on manufacturing export competitiveness.

7.7 External Competitiveness

The term "competitiveness" is generally used when referring to the ability of domestic firms to compete with other firms, usually those foreign firms competing with domestic exporters. The term could equally apply to domestic firms competing with foreign firms supplying goods to the local market. "Competitiveness" is not a well defined concept and particular care must be taken in the derivation and interpretation of such measures. Competitiveness is usually measured by relative prices or costs adjusted for exchange rate changes.

Maciejewski (1983) has set out some theoretical criteria which should be considered when constructing competitiveness indices. He suggests that "to be economically meaningful, relative price (cost) indices adjusted for exchange rate changes should, ideally, have three basic economic properties. These are (1) a meaningful base

period; (2) adequacy with respect to the set of market conditions involved, and; (3) specificity of what they are intended to measure".

Looking at the last two properties only, the second suggests that the set of market conditions faced determines the selection of weights in the index. Specifically it is important to identify the "type of competitive relationship that predominates in the major international markets for which the reporting country is effectively competing". For example, the usual procedure in constructing an index of export competitiveness is to compare domestic prices or costs with the prices prevailing for those products on the foreign market. These in turn are generally the output prices of manufacturers resident in the foreign market. Thus, under this approach, it is implicit that domestic exporters compete solely with producers resident in the foreign market. Exports from other countries are not included. This implies that they do not directly compete with New Zealand exports.[9]

Specificity of what the index is measuring necessarily invokes considerations of product homogeneity or substitutability between alternatives. If the home country is a price taker (which normally implies strong homogeneity or substitutability), then competitiveness would be best measured by the ratio of domestic costs to foreign costs. This would indicate relative profitability between domestic and foreign producers and would probably be more meaningful than ratios of domestic to foreign prices.

Relative costs are also relevant for producers of differentiated products though relative prices will also be useful in this case. If manufactured exports are sufficiently differentiated from those produced by firms in the foreign market then there is scope for maintaining a price differential. Nevertheless, a comparison of prices between the two differentiated products might provide indications as to the extent to which non-price factors are being relied upon to maintain market share. The use of relative price indices implicitly assumes that demand is, at some stage, responsive to relative prices.

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9. See Cooper (1988) for a comprehensive review of these issues and the derivation of alternative aggregate competitiveness indices. Some of these recognise the potential impact on export competitiveness of countries other than the ones to which New Zealand exports.

Relative cost comparisons are also useful in this case because, for given output prices, they indicate relative pressures on profitability over time.

Table 7.11 below provides some simple measures of external competitiveness. Changes in export competitiveness are measured in two ways - first, as the difference between the annual average percentage changes in the New Zealand dollar price of exports (NZDPX) and producer output prices (PO); and second as the difference between the annual average percentage change in the NZDPX and producer input prices (PI). A positive sign indicates improved competitiveness. Unfortunately we did not have sufficient data to compare relative costs between domestic and foreign producers so the NZDPX-PI is something of a compromise. NZDPM is the New Zealand dollar price of imports.

In general the table shows that over 1985/86 and 1986/87, export competitiveness declined less when measured in terms of NZDPX-PI as opposed to NZDPX-PO. This is obviously due to the fact that manufacturing producer output prices growth exceeded that of input prices over these two years. The NZDPX-PO measure could be a relevant measure for export growth if exporters attempt to switch between domestic and foreign markets according to relative profitability. These results suggest a significant loss of competitiveness for exports vis-a-vis domestic output (from NZDPX-PO) and probably also for New Zealand exports vis-a-vis manufactured goods produced in the foreign market because NZDPX-PI shows that, if New Zealand exporters tried to compete on price, they will probably have suffered a fall in profitability compared with foreign firms; and if they did not compete on price and charged, say, PO rather than the estimated NZDPX, then NZDPX-PO indicates a significant fall in price competitiveness with the implication that non-price factors become increasingly important for the maintenance of market share.

Table 7.11 also provides a measure of competitiveness for the import-competing sector of manufacturing. Note that the import data used to derive the New Zealand dollar price of imports (NZDPM) did not distinguish final goods and intermediate goods. The results (NZDPM-PI) suggest that the competitiveness of import competitors has fallen somewhat less than that of exporters (this is

TABLE 7.11: MEASURES OF EXTERNAL COMPETITIVENESS

Measures of Competitiveness:												
NZDPM - PI				NZDPX - PO				NZDPX - PI			
84	85	86	87	84	85	86	87	84	85	86	87
Industry											
Basic Metals											
10.8	8.6	1.2	13.7	12.4	11.4	3.7	12.5	9.3	9.7	-0.7	3.5
Chemicals											
7.1	13.2	-23.1	-6.8	5.7	8.4	-15.2	2.5	6.3	8.3	-11.1	9.1
Fabricated Metals											
5.9	13.1	-23.6	-12.8	3.4	12.0	-21.8	-10.6	7.6	10.3	-5.8	1.7
Food, Beverages & Tobacco											
10.3	13.0	-8.0	9.5	8.6	10.9	-7.3	15.3	4.0	9.0	-11.4	6.5
Non-metallic Minerals											
7.0	18.7	-23.3	-12.0	6.4	17.5	-23.6	-11.4	6.7	13.9	-10.4	-3.7
Other Manufacturing											
9.6	15.9	-21.5	-8.6	9.1	15.6	-20.1	-5.0	10.2	13.8	-7.1	0.3
Paper Products											
9.1	14.5	-20.2	-10.1	8.5	16.8	-23.3	-7.0	8.1	15.6	-9.8	2.7
Textiles											
5.9	12.1	-15.0	-6.6	3.0	9.9	-12.7	-7.4	5.7	9.9	-4.8	-2.4
Wood Products											
11.1	15.9	-21.4	-7.8	9.2	15.8	-23.6	-5.9	9.0	14.7	-24.2	-8.6

Data sources for the foreign price components of NZDPX and NZDPM are listed in Appendix Three.

obviously also the case for NZDPM-PO). As we pointed out earlier in this part, this is probably mainly due to the fact that imports do not have such a high weighting on Australia (as a source) as do exports (as a destination) and the New Zealand dollar was particularly strong against the Australian dollar. It should be borne in mind, however, that these results are not conclusive if, for example, the imports into industry are used exclusively by that industry as intermediate goods. In this case a positive NZDPM-PI indicates that the New Zealand dollar price of imported intermediate goods has risen faster than domestic intermediate goods.

Now that we have identified some of the influences on, and change in, external competitiveness, it might be useful to isolate the role of nominal exchange rate changes in affecting export competitiveness. This is carried out in the same manner as for internal competitiveness in section 7.6. We are interested here in the hypothetical case of a producer exporting total output. None is sold on the domestic market. To do this we assume that, on average, export goods require exactly the same mix and quantity of domestic and imported intermediate goods for their manufacture as do domestic goods. Thus we can use the weights on intermediate goods in the Input-Output tables as representative of the production requirements of a single export good. Then we are able to work out

> (i) the hypothetical contribution of exports to value added after taking into account all non-quantity factors which influence value added in this special case, i.e. export prices, the prices of imported intermediate goods, the exchange rate, and domestic costs. This simply provides us with the "exposure" counterpart of the simple competitiveness index, NZDPX-PI, in table 7.11, and
>
> (ii) the exchange rate contribution to the change in competitiveness measured in (i). Thus all non-exchange rate changes are excluded from the analysis - that is, the difference between (i) and (ii) which is export prices, the prices of intermediate inputs and all domestic (non-labour) costs. Once again, this is simply a further adaptation of the original exposure index.

At this stage it is probably worth briefly reviewing the procedure. First, for each manufacturing industry, we obtained the original exposure index, given in expression (7.10). This showed the proportional change in industry value added attributable solely to nominal exchange rate changes. Its values depended upon the share of imported intermediate goods in purchases, as well as the industry's cost structure in terms of the proportion of value added in sales (that is, the gross profit margin). Second, we calculated the effect of total output price and total input costs (these being producer output prices, PO, and producer input prices, PI, each of

which is a weighted average of domestic and foreign price or costs changes) on nominal value added for the years 1983-84 through to 1986-87[10]. These values were calculated for each of the manufacturing industries and compared with the equivalent measure for the non-tradeables sector. This gave us an estimate of the way in which price and cost changes have influenced internal competitiveness. Furthermore, by referring back to the exposure indices we were able to determine the extent to which nominal exchange rate changes have contributed to the observed changes in internal competitiveness.

In the present section we have developed a methodology whereby we focus exclusively upon export competitiveness. Assuming that the aggregate industry production (cost) structure is appropriate for exporters (that is, the cost structure for exports is the same as that of domestic goods) we can examine, firstly, changes in total export competitiveness for each industry, and, secondly, the contribution of the nominal exchange rate to changes in total competitiveness. This differs from the original purpose of the exposure index because in analysing export competitiveness we ignore the relative importance of exports, and hence the relative importance of the exchange rate, to industry profitability. The original exposure index (7.10), accurately measured the contribution of the exchange rate to industry value added by taking into account the relative importance of exports to the whole industry. The export competitiveness index looks at how the competitiveness of domestic exporters has changed vis-a-vis producers in the foreign market and then looks at the contribution of the nominal exchange rate to this. Thus it is necessary to refer back to the original index and the comparisons of tables 7.2 through 7.10 to assess how important these changes in export competitiveness are for total industry value added and internal competitiveness. Tables 7.12 to 7.20 list the results of the export competitiveness estimations.

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10. We could also use the difference between nominal and real value added growth for each industry in the SNA.

TABLE 7.12: EXPORT COMPETITIVENESS AND VALUE ADDED
Basic Metals

March Year	NZDPX - PI[1]	EX - EM[2]
1983/84	41.9	32.1
1984/85	45.5	43.8
1985/86	10.3	19.8
1986/87	36.3	54.0

1. This is total export competitiveness. It shows the percentage change in value added arising from changes in export prices, exchange rates, and total input prices.

2. This is the change in total competitiveness due to exchange rate changes only. It shows the percentage change in value added caused by changes in the nominal exchange rate. The difference between (1) and (2) is due to the non-exchange rate influences.

TABLE 7.13: EXPORT COMPETITIVENESS AND VALUE ADDED
Chemicals

March Year	NZDPX - PI[1]	EX - EM[2]
1983/84	23.6	4.9
1984/85	41.9	38.8
1985/86	-41.2	-35.2
1986/87	-14.6	-18.7

TABLE 7.14: EXPORT COMPETITIVENESS AND VALUE ADDED
Fabricated Metals

March Year	NZDPX - PI[1]	EX - EM[2]
1983/84	15.8	5.5
1984/85	46.9	43.3
1985/86	-46.0	-37.1
1986/87	-23.2	-20.5

TABLE 7.15: EXPORT COMPETITIVENESS AND VALUE ADDED
Food, Beverages and Tobacco

March Year	NZDPX - PI[1]	EX - EM[2]
1983/84	33.8	32.1
1984/85	43.7	64.3
1985/86	-17.7	-10.1
1986/87	39.9	16.7

TABLE 7.16: EXPORT COMPETITIVENESS AND VALUE ADDED
Non-Metallic Minerals

March Year	NZDPX - PI[1]	EX - EM[2]
1983/84	17.6	6.1
1984/85	47.2	38.6
1985/86	-37.2	-32.2
1986/87	-16.5	-14.6

TABLE 7.17: EXPORT COMPETITIVENESS AND VALUE ADDED
Other Manufacturing

March Year	NZDPX - PI[1]	EX - EM[2]
1983/84	28.2	7.9
1984/85	52.3	48.9
1985/86	-39.8	-37.4
1986/87	-10.6	-19.6

TABLE 7.18: EXPORT COMPETITIVENESS AND VALUE ADDED
Paper Products

March Year	NZDPX - PI[1]	EX - EM[2]
1983/84	27.2	5.2
1984/85	58.3	46.4
1985/86	-47.8	-41.1
1986/87	-15.6	-22.2

TABLE 7.19: EXPORT COMPETITIVENESS AND VALUE ADDED
Textiles and Clothing

March Year	NZDPX - PI[1]	EX - EM[2]
1983/84	15.2	5.3
1984/85	41.9	44.9
1985/86	-31.5	-36.7
1986/87	-14.5	-21.0

TABLE 7.20: EXPORT COMPETITIVENESS AND VALUE ADDED
Wood Products

March Year	NZDPX - PI[1]	EX - EM[2]
1983/84	28.8	21.9
1984/85	52.2	60.3
1985/86	-41.0	-23.7
1986/87	-9.3	-1.4

The percentage changes in the tables are somewhat larger than those of the NZDPX-PI column in table 7.11 because when the difference between revenue and cost changes is calculated to find value added, the proportional changes in value added become magnified. Nevertheless, the patterns and relative sizes of the two different estimations are the same. Use of the value added approach, however, facilitates the analysis of the relative (and weighted) contributions of nominal exchange rates to competitiveness.

These results suggest two things. First, changes in the nominal exchange rate appear to have been a major determinant, if not the major influence, of changes in competitiveness in manufacturing over the four years surveyed here[11]. In only a few instances do non-exchange rate influences appear to have had any major net influence on competitiveness (for example, base metals in 1985-86 and 1986-87, food and beverages in 1986-87, and wood products in 1985-86 and 1986-87). Second, the results indicate that manufactured export activities suffered a considerable loss of internal, as well as external, competitiveness. The first column of tables 7.12 through to 7.20 shows the contribution of export activities to value added after taking into account all costs. If this is compared with the gains to value added arising from relative prices and cost changes in the non-tradeables sector over the same period, the implications for factor returns, and hence resource allocation, are clear cut. Nevertheless, as we pointed out earlier, industry export competitiveness is not the same as industry internal competitiveness. Export competitiveness does have an influence on internal competitiveness and this was approximated with the original exposure index (7.10). We commented on the results of our study of internal competitiveness that internal competitiveness has declined far less in manufacturing than exchange rate, and export competitiveness, movements suggest.

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11. Unless some or all of the remaining influences exhibit the same proportional movements as exchange rates have but cancel each other out. This has not generally been the case.

CHAPTER 8

SUMMARY AND CONCLUSIONS

The objective of this report has been to consider the impact of two changes which frequently occur side-by-side during a process of liberalisation and which are relevant to discussions about the appropriate sequencing of economic reform. In the first part we looked at the macroeconomic consequences of financial deregulation in New Zealand; in the second we examined the influence of the nominal exchange rate on the profitability and competitiveness of some of the tradeable industries during the disinflation and liberalisation processes of 1984-87.

Financial deregulation has, in many international instances, occurred simultaneously with the disinflationary policy and liberalisation of other markets. This has also been the case in New Zealand. Since these measures are usually designed to achieve structural change, it is very difficult to identify the various effects empirically. However, since these policies interact and as their interaction has appeared in some countries to lead to the abandoning or indeed reversal of financial deregulation, it was desirable to consider them jointly. The second part of this study was directly motivated by the theoretical debates on the sequencing of market reforms during a process of liberalisation and the closely related issue of the role of the exchange rate in a monetary disinflation programme.

This monograph seeks to make a contribution in a number of areas:

First, it has detailed the consequences of financial deregulation. This involved outlining the moves taken in order to achieve financial liberalisation, combined with an outline of the theory involved in the removal of prior financial regulations.

Second, it has highlighted the problems involved in analysing economic deregulation in isolation, without placing these changes in the context of the coinciding period of disinflation. Here the importance of sequencing of macroeconomic policy was emphasised and discussed in detail in the context of the 'booming sector' theory developed by Corden (1982).

Third, the discussion of financial deregulation will enable New Zealand's experience to be contrasted not only with its own historical economic relationships, via the use of the NZIER's VAR model, but also with international precedents.

Fourth, it has clarified the vital distinction between internal and external competitiveness. It has also extended traditional measures of these concepts embracing a wider range of factors which influence industry profitability. These could replace more narrowly focussed competitiveness measures, which usually depend on relative costs or relative prices.

Fifth, it has emphasised the importance of industry structure when assessing price and cost effects. Structures were found to be important in terms of the relative significance of exports compared to domestic sales and also in terms of the importance of imports of intermediate goods in the industry cost structure. This enabled us to examine the relative strengths of exchange rate effects on industry profitability from both the demand-side (export prices) and supply-side (input prices). In a macro sense we touched upon the importance of an individual industry's links with the rest of the economy for that industry's real exchange rate and profitability. We suggested that the strength of the link from the macro economy depended not only upon the importance of domestic sales for the industry but also the composition of those sales (for example, the derived demand for investment goods from manufacturing industries for use in the non-tradeables sector).

Sixth, we have formally quantified the extent of changes in competitiveness in the various manufacturing industries, at the same time identifying those changes directly attributable to nominal exchange rate changes.

8.1 Financial Deregulation: Costs and Benefits

The direct controls which precede financial deregulation tend to suppress the level of saving and the level of lending. The most important outcome of financial deregulation, therefore, is that, in the less regulated environment which follows, saving and investment may be expected to increase. When there are restrictions constraining resources, lenders are likely to confine their loans to those with the

lowest risks. Since higher return projects are likely to be associated with higher risks, it is likely that removing these restraints will result in a higher average return on the investment projects. Thus not only will there be more investment, but that investment will tend to have a higher pay-off (with an associated higher risk) for the economy, raising the rate of growth and level of welfare.

The removal of favoured categories for non-commercial reasons will help direct funds to the areas with the greatest pay-off. Removal of controls on entry and segmentation are likely to produce a supply-side response with increased competition driving down transactions costs, providing higher quality services and a much more flexible range of financial instruments. This should increase the chance of satisfying the needs of borrowers and lenders. Accompanied by the coincident rise in computerisation, the process of financial intermediation is then conducted more efficiently and effectively. Inevitably this process of reorganisation in the market seems likely to result in amalgamations, resulting in firms which can gain economies of scope and scale by providing ancillary services.

Another supply-side benefit from the removal of reserve ratio requirements is that institutions no longer have to hold low yielding stocks or assets unbalanced with their liabilities.

However, not all the results of the financial deregulation are necessarily beneficial. The removal of controls and more flexible operation of the market appears to increase volatility and risk in both interest rates and exchange rates. It is argued that, on the one hand, this holds back projects at the margin and, on the other, that transactors need to undertake further transactions to cover their risk, thereby increasing their costs. Evidence from the US and UK suggest that these effects have a noticeable downward influence on investment and hence growth.

As financial deregulation proceeds the general experience is for an expansion in the main monetary and credit aggregates relative to the level of nominal national income, while interest rates also rise in real and nominal terms. However, it is possible that the demand for narrow aggregates for transactions purposes may actually fall as the efficiency of the system increases. This creates difficulty when the control of monetary aggregates is an aim of monetary policy. Not

only is the link between these intermediate targets and the ultimate objectives of inflation and growth obscured, but the credibility of the policy may be weakened. In general this has led to abandonment of explicit targetting for all but the narrowest of aggregates.

It is in this relationship between policies that the main interest lies. A disinflationary policy which proceeds through monetary control drives up real interest rates. These, on the one hand, lead towards a contraction in economic activity and, on the other, to an inflow of funds from overseas and a rise in the exchange rate (assuming it is free to float). This change in the exchange rate is both a major route to bringing inflation down through lower import prices and a route to the economic slowdown and a current account deficit, by lowering the competitiveness of exports.

Where there is also trade liberalisation a major change in structure is entailed, encouraging imports in some sectors and requiring export growth in others. It is thus clear that if there is an exchange rate rise in the short run this will emphasise the downside of the process of change, while slowing the export recovery. It is at this point that the main debate over the sequencing of the process of change occurs.

It is clear that sequencing matters, but there is also a political dimension. There is a great temptation for governments to tackle what they can deregulate readily first. It does emphasise their intent. Firms will delay action if they believe policies will be modified or delayed under short-run pressures. With strong and obvious political pressure and the credibility that policies will continue, speedy and substantial change may then take place and succeed where the gradualist approach would take so long it would stand the chance of being stalled.

The outcomes for changes in monetary aggregates and interest rates in New Zealand have been as the literature would lead one to expect: the exchange rate has risen and a capital inflow ensued. However, the resulting recession has not been as deep as in the other countries which have experienced the same change. Exports have held up via high OECD growth rates and the current account deficit has been restrained by the fall in the price of imports, particularly oil, by the development of Motunui, and the end of the major projects and their associated demand for imports.

If the real exchange rate falls, the rise in debt will slow and domestic output pick up without undue inflationary pressure. New Zealand then will be able to pass through the initial phase of financial deregulation, with the associated disinflation and other policies, successfully. However, the risks remain, that the real exchange rate will be too slow in adjusting downward and the financial movements too extreme, that world growth rates will slow and New Zealand's export markets dwindle or that government will renege on the changes due to the three year political cycle and high costs of deregulation and disinflation.

8.2 Monetary Disinflation in a Booming Sector Environment

Since overseas experience and some recent literature suggested that New Zealand's policy programme, particularly monetary disinflation, was likely to generate a significant appreciation of the real exchange rate with a resulting profitability and output squeeze on the exporting and import-competing industries in the economy, we were also interested in assessing the importance of this type of exchange rate effect for different industries in the tradeables sector. At the same time, the particular impact of the presence of a "booming" non-tradeables sector, i.e. financial services, needed to be taken into account. It has been hypothesised that the presence of a booming sector will produce a spending effect which would lower the real exchange rate and be beneficial for tradeables and import-competing industries. It was thus necessary to assess the net impact of these two factors.

The net effect on internal competitiveness of the relative price and cost changes which followed the real exchange rate appreciation was to yield a profitability advantage to the non-tradeables sector. This gain in profitability, and hence internal competitiveness, was much less than that implied by the real exchange rate appreciation. It was also uneven. This highlights the importance of studying relative cost movements as well as relative price movements when assessing changes in internal competitiveness.

Since the output of those industries with a high proportion of domestic sales in their total output is most sensitive to the domestic business cycle, it was hypothesised that these industries would therefore be the most likely to benefit from the spending effects of a

booming non-tradeables sector. The two most sensitive manufacturing industries were non-metallic minerals and fabricated metals. In terms of real exchange rate appreciation, fabricated metals was significantly below the average for the tradeables sector. This might be consistent with the above result. However, when the relative profitability of this industry was compared to other manufacturing industries there did not appear to be any advantage to the fabricated metals industry, though its rate of growth since the float has been roughly equal to that of non-tradeables. Non-metallic minerals appeared to have fared worse than most other tradeable industries in terms of relative profitability.

The results of constructing "exposure indices" to measure the effect of nominal exchange rate changes and identifying exchange rate and non-exchange rate contributions to changes in internal competitiveness indicated that the internal competitiveness of domestic manufacturers fell sharply between 1983/84 and 1986/87. This was particularly so after floating in 1985. There were two strong opposing forces operating on manufacturing value added. The exchange rate generally made a negative contribution to manufacturing industry value added, with the remaining influences strongly positive. In many cases, the non-exchange rate influences were of similar magnitude to the value added increases accruing to the non-tradeables sector.

For the majority of the industries this positive contribution came from domestic sources. Overseas prices, for both exports and imports, are not likely to have been major contributors given the relatively low weighting of exports and direct imports in the industry cost and revenue structures and the relatively low inflation of our trading partners (possibly with the very important exception of Australia). The implication of the results is that manufacturers supplying the domestic market recovered a considerable portion of the value added lost on export markets by raising prices on the domestic market. This might also partly explain the marked divergence in average costs faced by the tradeable and non-tradeable sectors. The manufacturing sector provides considerable inputs to the non-tradeable sector. Thus there existed, to some extent, scope for the tradeables sector to increase prices to the non-tradeable sector as the latter expanded rapidly in the last four years.

Adapting the exposure index technique to external competitiveness, in particular export competitiveness, indicated that export competitiveness had fallen significantly - much more so than internal competitiveness. Exceptions to this generalisation were basic metals and food and beverages which gained in external competitiveness in the post-float period. Moreover, in every case, except possibly wood products, basic metals and food and beverages, the exchange rate appeared to have been the major determinant of changes in competitiveness and in most cases this has been a negative influence on competitiveness.

It appears, therefore, that non-exchange rate influences have not had a major net influence on competitiveness in most cases. Changes in external competitiveness in manufacturing over the four years studied were primarily influenced by the nominal exchange rate. The extent to which manufacturing could absorb that impact is likely to have depended on industry structure, internal competitiveness and the ability to increase prices domestically to the non-tradeables sector.

8.3 Conclusions

The theoretical and analytical framework we developed in this monograph has provided a number of insights into the sectoral consequences of recent micro- and macroeconomic policies. First, we were able explicitly to account for an important channel in the disinflation process - the reduction in the growth of prices of imported intermediate goods and identify the net effect of exchange rate changes on industry profitability. Second, we were able to identify those industries disadvantaged or advantaged by the country of destination of their exports or source of imports. This arose through the divergence of bilateral exchange rates following the float. Third, by explicitly recognising the concept of a "booming sector" we highlighted the difficulty of disinflation. We showed that the observed real exchange rate appreciation may simply be the marking up of domestically produced inputs received by the non-tradeables sector from the tradeables sector, particularly manufacturing.

Finally, the results have shown that the "squeeze on tradeables" is not an even squeeze across the whole sector. Exporters have appeared to

bear considerably more burden than import competing firms within most of the industries. This has been solely due to the strength of the exchange rate. Our results suggest that some manufacturers (those producing for the domestic market) have done as well as the booming non-tradeable sector (in terms of the price and cost influences on value added).

This brings us back to our introductory remarks concerning the sequencing of liberalisation. Theory and evidence suggested that exchange rate and capital account liberalisation early on in the reform process would, if accompanied by a tight monetary policy, place much of the disinflation pressure on the tradeables sector. Our results suggest that this has occurred, but that the exporting part of the tradeables sector has been the most disadvantaged. Presumably, the import-competing sectors have been able to delay or even avoid the types of adjustment (in terms of pricing behaviour) required by exporters under disinflation.

APPENDIX ONE

REAL EXCHANGE RATES AND RELATIVE PROFITABILITY OF THE TRADEABLE SECTOR

FIGURE 6.2: THE REAL EXCHANGE RATE AND AGRICULTURE
QUARTERLY INDEX (BASE = 1 IN 1982(4))

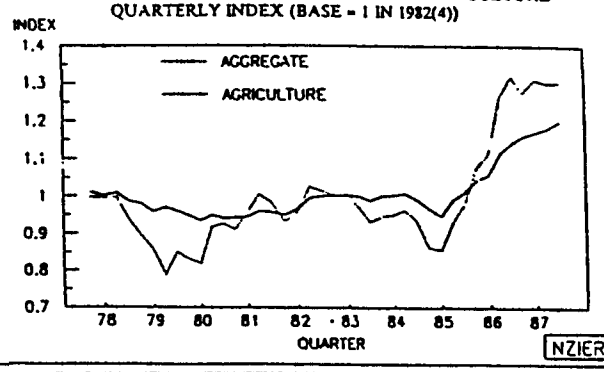


FIGURE 6.3: THE REAL EXCHANGE RATE AND FISHING
QUARTERLY INDEX (BASE = 1 IN 1982(4))

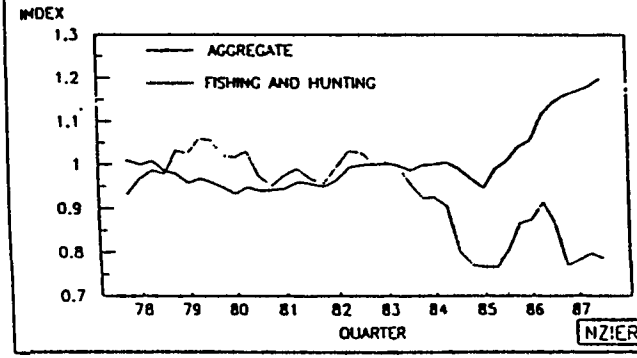
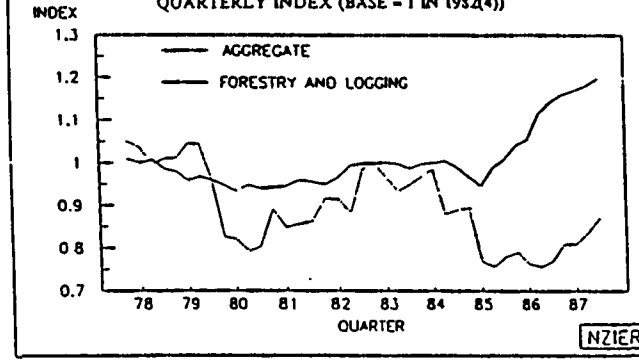


FIGURE 6.4: THE REAL EXCHANGE RATE AND FORESTRY
QUARTERLY INDEX (BASE = 1 IN 1982(4))



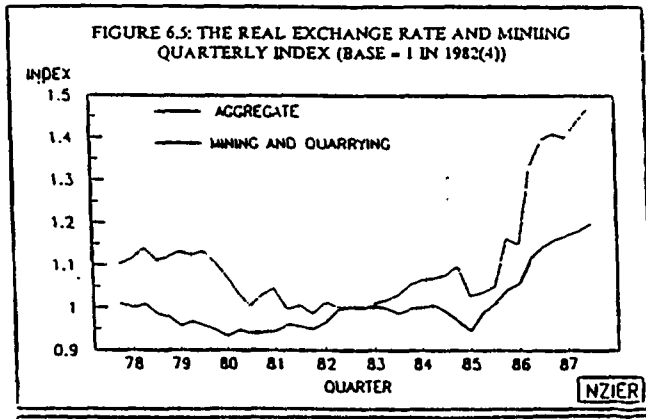


FIGURE 6.5: THE REAL EXCHANGE RATE AND MINING
QUARTERLY INDEX (BASE = 1 IN 1982(4))

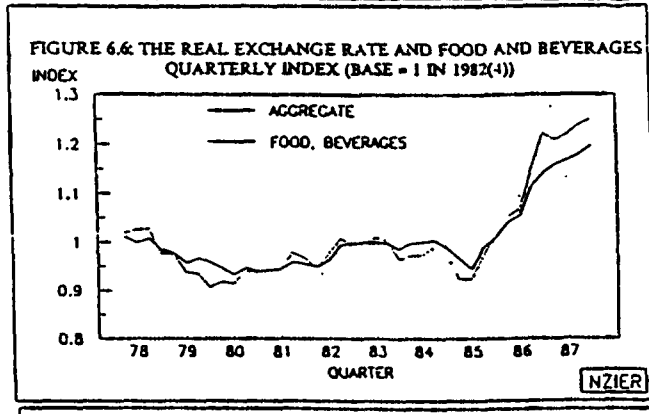


FIGURE 6.6: THE REAL EXCHANGE RATE AND FOOD AND BEVERAGES
QUARTERLY INDEX (BASE = 1 IN 1982(4))

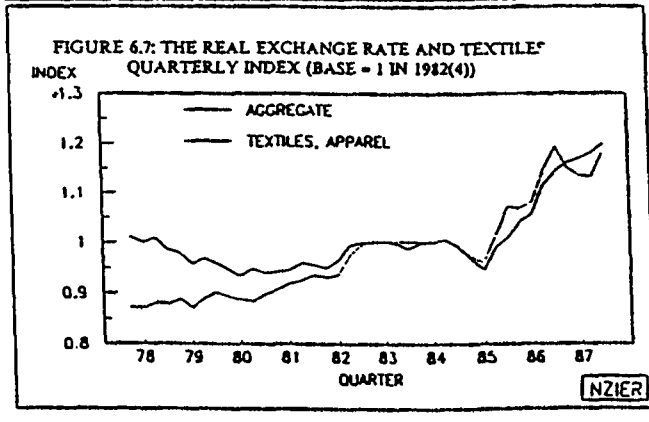


FIGURE 6.7: THE REAL EXCHANGE RATE AND TEXTILES
QUARTERLY INDEX (BASE = 1 IN 1982(4))

FIGURE 6.8: THE REAL EXCHANGE RATE AND WOOD PRODUCTS
QUARTERLY INDEX (BASE = 1 IN 1982(4))

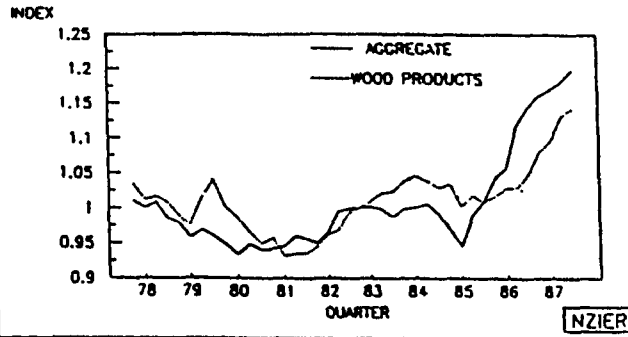


FIGURE 6.9: THE REAL EXCHANGE RATE AND PAPER
QUARTERLY INDEX (BASE = 1 IN 1982(4))

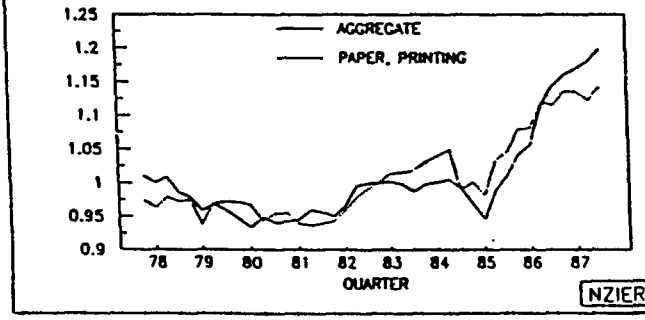


FIGURE 6.10: THE REAL EXCHANGE RATE AND CHEMICALS
QUARTERLY INDEX (BASE = 1 IN 1982(4))

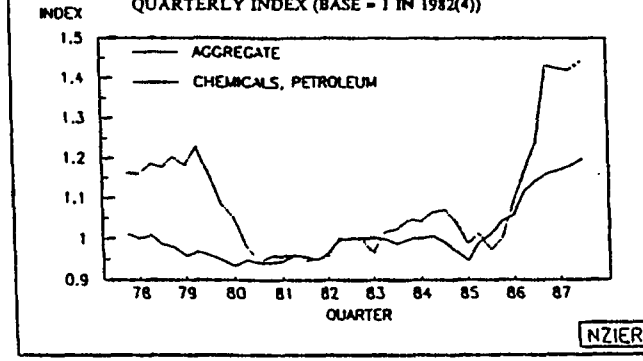


FIGURE 6.11: THE REAL EXCHANGE RATE AND MINERALS
QUARTERLY INDEX (BASE = 1 IN 1982(4))

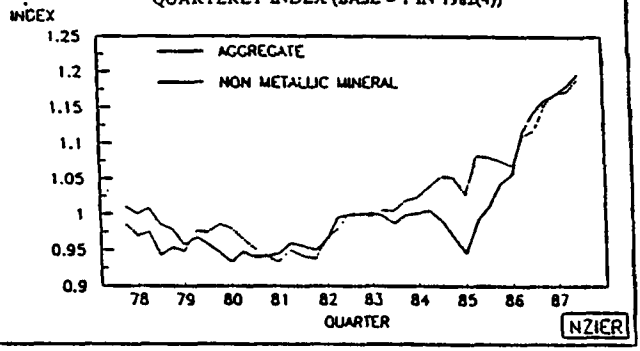


FIGURE 6.12: THE REAL EXCHANGE RATE AND BASE METALS2
QUARTERLY INDEX (BASE = 1 IN 1982(4))

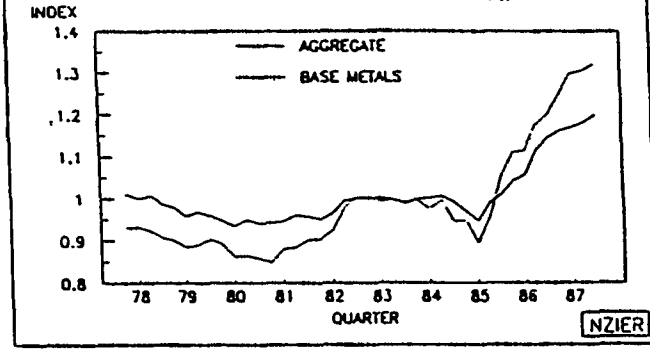


FIGURE 6.13: THE REAL EXCHANGE RATE AND FABRICATED METALS
QUARTERLY INDEX (BASE = 1 IN 1982(4))

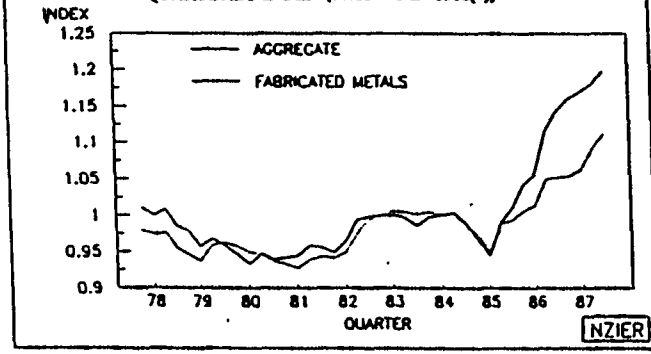


FIGURE 6.14: THE REAL EXCHANGE RATE AND OTHER MANUFACTURING QUARTERLY INDEX (BASE = 1 IN 1982(4))

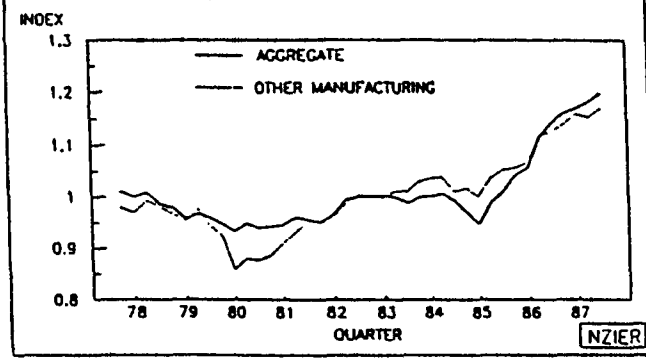


FIGURE 6.15: THE REAL EXCHANGE RATE AND DISTRIBUTION QUARTERLY INDEX (BASE = 1 IN 1982(4))

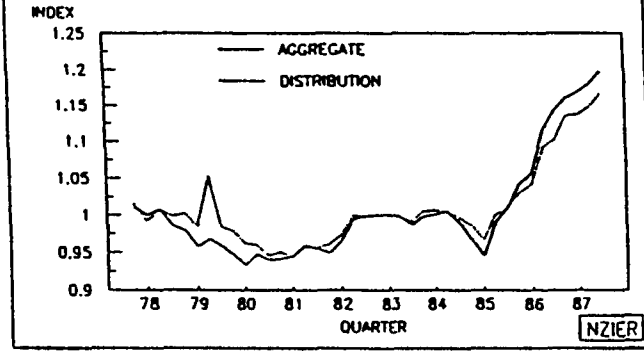


FIGURE 6.16: THE REAL EXCHANGE RATE AND TRANSPORT QUARTERLY INDEX (BASE = 1 IN 1982(4))

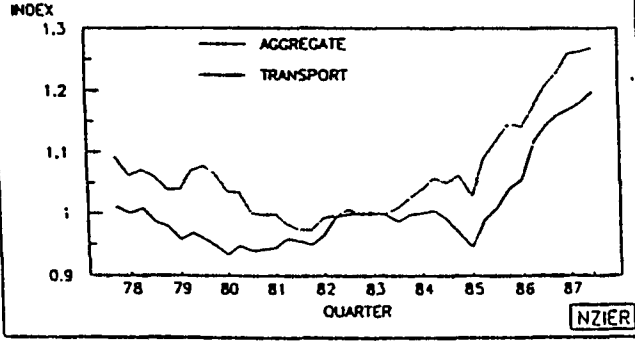


FIGURE 6.18: PROFITABILITY RATIOS: NON TRADEABLES AND TRADEABLES QUARTERLY INDEX (BASE = 1 IN 1982(4))

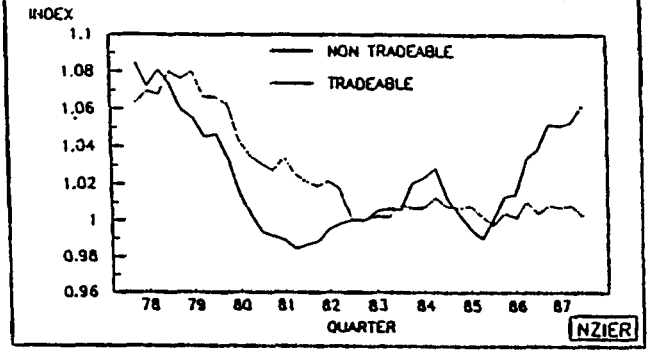


FIGURE 6.19: PROFITABILITY RATIOS: NON TRADEABLES AND AGRICULTURE QUARTERLY INDEX (BASE = 1 IN 1982(4))

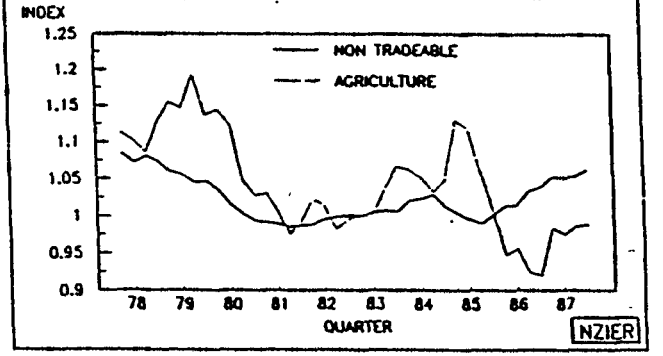
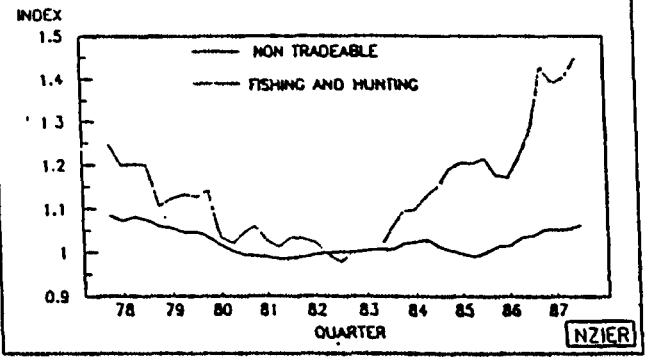


FIGURE 6.20: PROFITABILITY RATIOS: NON TRADEABLES AND FISHING QUARTERLY INDEX (BASE = 1 IN 1982(4))



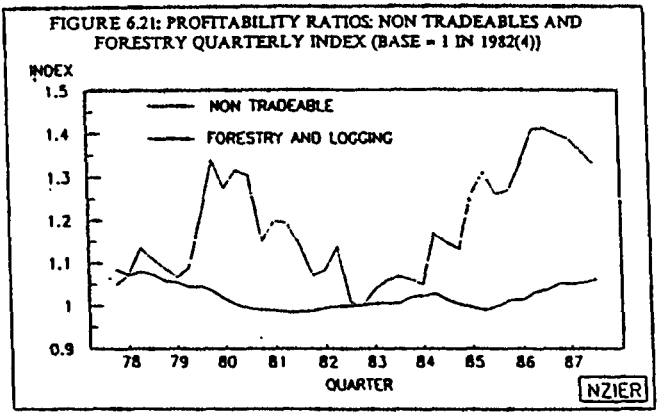


FIGURE 6.21: PROFITABILITY RATIOS: NON TRADEABLES AND FORESTRY QUARTERLY INDEX (BASE = 1 IN 1982(4))
INDEX
1.5
1.4
1.3
1.2
1.1
1
0.9
NON TRADEABLE
FORESTRY AND LOGGING
78 79 80 81 82 83 84 85 86 87
QUARTER
NZIER

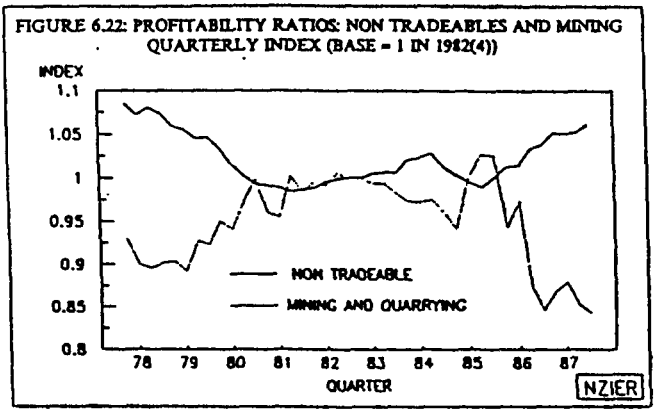


FIGURE 6.22: PROFITABILITY RATIOS: NON TRADEABLES AND MINING QUARTERLY INDEX (BASE = 1 IN 1982(4))
INDEX
1.1
1.05
1
0.95
0.9
0.85
0.8
NON TRADEABLE
MINING AND QUARRYING
78 79 80 81 82 83 84 85 86 87
QUARTER
NZIER

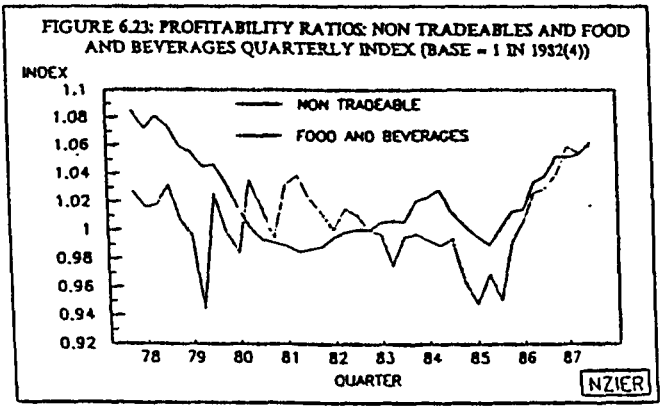


FIGURE 6.23: PROFITABILITY RATIOS: NON TRADEABLES AND FOOD AND BEVERAGES QUARTERLY INDEX (BASE = 1 IN 1982(4))
INDEX
1.1
1.08
1.06
1.04
1.02
1
0.98
0.96
0.94
0.92
NON TRADEABLE
FOOD AND BEVERAGES
78 79 80 81 82 83 84 85 86 87
QUARTER
NZIER

FIGURE 6.24: PROFITABILITY RATIOS: NON TRADEABLES AND TEXTILES QUARTERLY INDEX (BASE = 1 IN 1982(4))

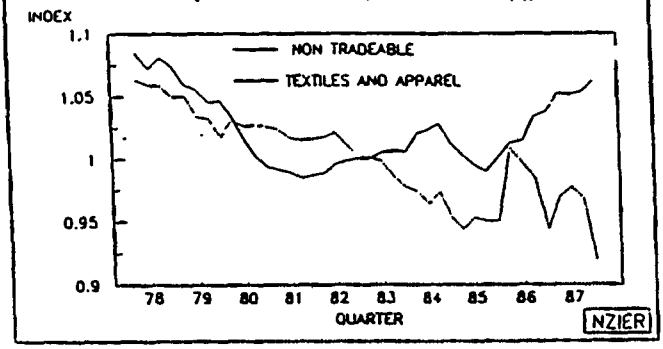


FIGURE 6.25: PROFITABILITY RATIOS: NON TRADEABLES AND WOOD PRODUCTS QUARTERLY INDEX (BASE = 1 IN 1982(4))

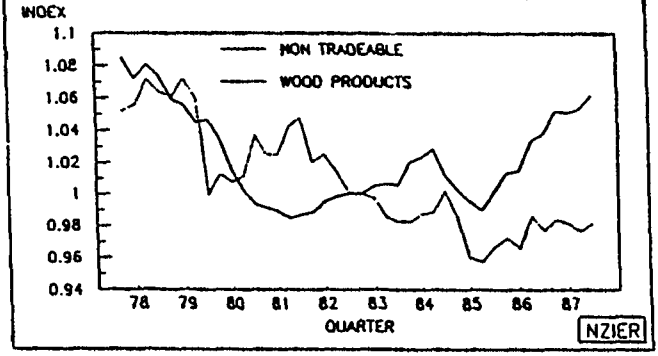


FIGURE 6.26: PROFITABILITY RATIOS: NON TRADEABLES AND PAPER QUARTERLY INDEX (BASE = 1 IN 1982(4))

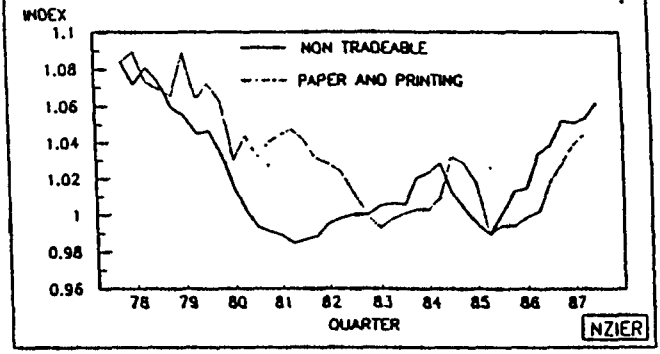


FIGURE 6.27: PROFITABILITY RATIOS: NON TRADEABLES AND CHEMICALS QUARTERLY INDEX (BASE = 1 IN 1982(4))

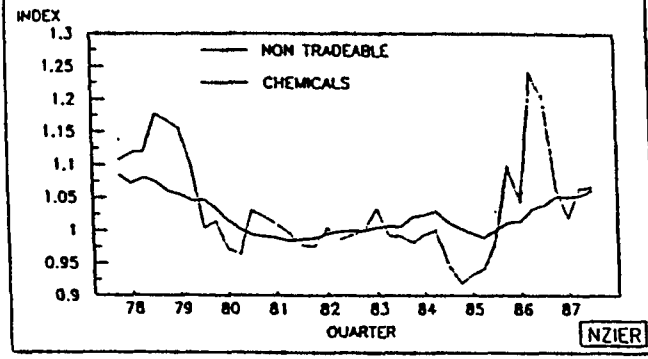


FIGURE 6.28: PROFITABILITY RATIOS: NON TRADEABLES AND MINERALS QUARTERLY INDEX (BASE = 1 IN 1982(4))

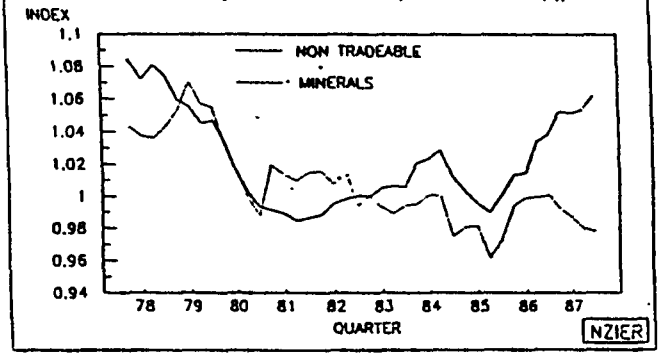


FIGURE 6.29: PROFITABILITY RATIOS: NON TRADEABLES AND BASE METALS QUARTERLY INDEX (BASE = 1 IN 1982(4))

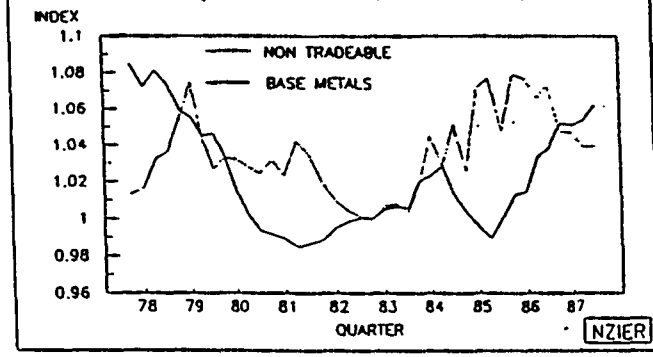


FIGURE 6.30: PROFITABILITY RATIOS: NON TRADEABLES AND FABRICATED METALS QUARTERLY INDEX (BASE = 1 IN 1982(4))

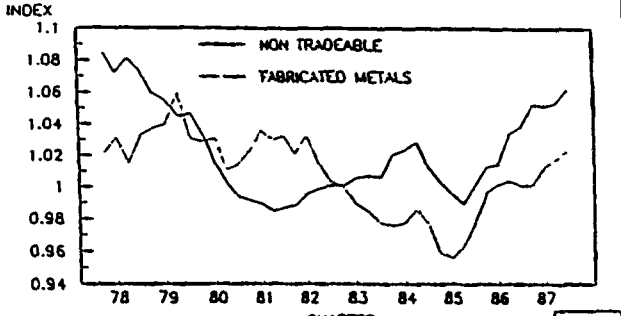


FIGURE 6.31: PROFITABILITY RATIOS: NON TRADEABLES AND OTHER MANUFACTURING QUARTERLY INDEX (BASE = 1 IN 1982(4))

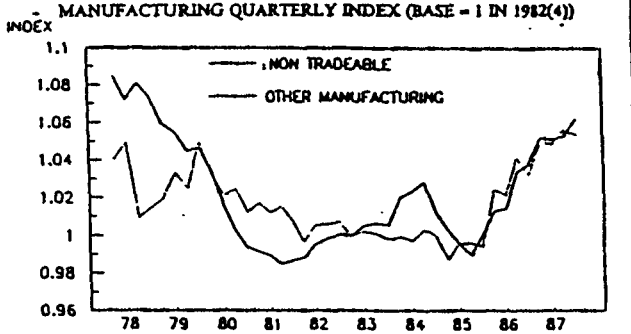
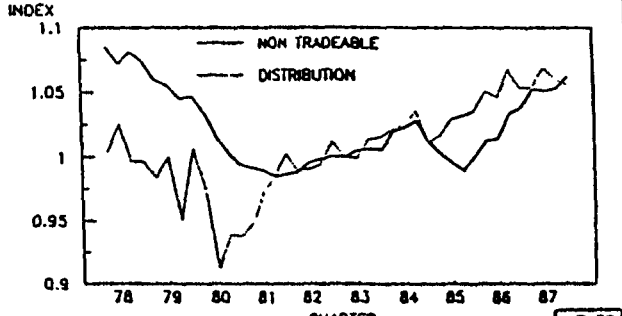


FIGURE 6.32: PROFITABILITY RATIOS: NON TRADEABLES AND DISTRIBUTION QUARTERLY INDEX (BASE = 1 IN 1982(4))



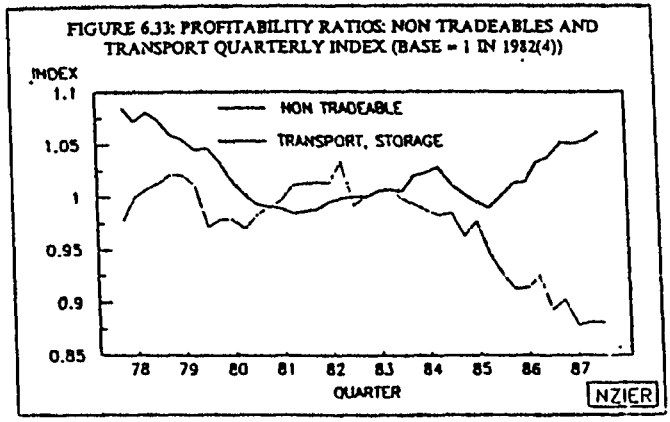


FIGURE 6.33: PROFITABILITY RATIOS: NON TRADEABLES AND TRANSPORT QUARTERLY INDEX (BASE = 1 IN 1982(4))
INDEX
1.1
1.05
1
0.95
0.9
0.85
NON TRADEABLE
TRANSPORT, STORAGE
78 79 80 81 82 83 84 85 86 87
QUARTER
NZIER

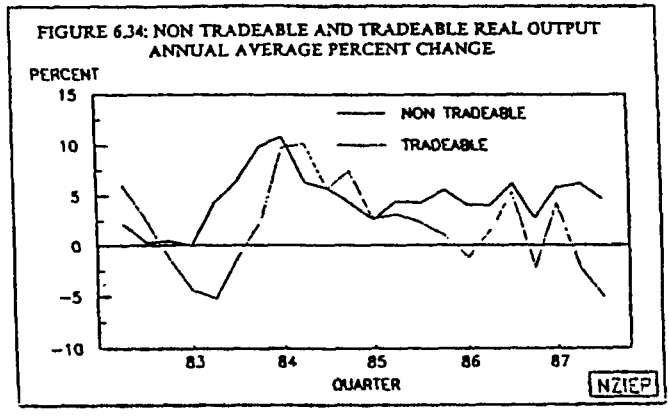


FIGURE 6.34: NON TRADEABLE AND TRADEABLE REAL OUTPUT ANNUAL AVERAGE PERCENT CHANGE
PERCENT
15
10
5
0
-5
-10
NON TRADEABLE
TRADEABLE
83 84 85 86 87
QUARTER
NZIER

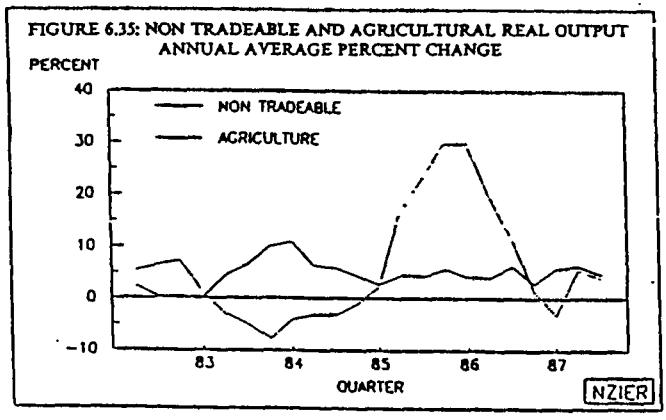


FIGURE 6.35: NON TRADEABLE AND AGRICULTURAL REAL OUTPUT ANNUAL AVERAGE PERCENT CHANGE
PERCENT
40
30
20
10
0
-10
NON TRADEABLE
AGRICULTURE
83 84 85 86 87
QUARTER
NZIER

FIGURE 6.36: NON TRADEABLE AND PRIMARY REAL OUTPUT
ANNUAL AVERAGE PERCENT CHANGE

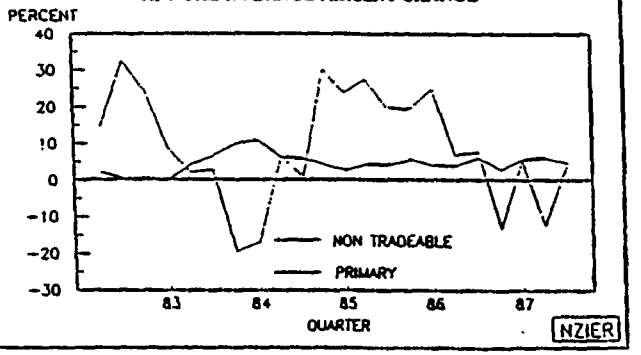


FIGURE 6.37: NON TRADEABLE AND MANUFACTURING REAL OUTPUT
ANNUAL AVERAGE PERCENT CHANGE

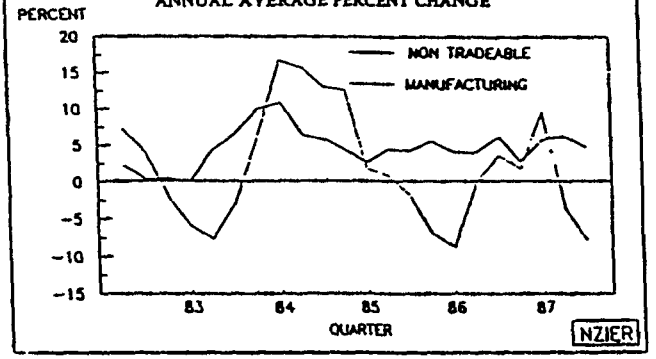
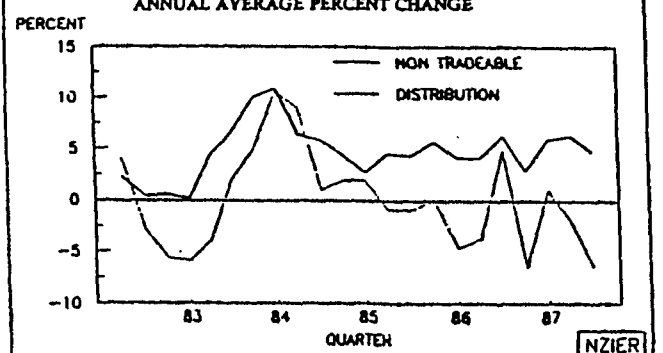


FIGURE 6.38: NON TRADEABLE AND DISTRIBUTION REAL OUTPUT
ANNUAL AVERAGE PERCENT CHANGE



APPENDIX TWO

SECTORAL SENSITIVITIES OVER THE BUSINESS CYCLE

Business cycle theory suggests that different components of demand exhibit different behaviour over the business cycle. The same is probably true for different sectors of the economy. A useful technique for classifying sectors of the economy relative to aggregate economy-wide influences is the simple Capital Asset Pricing Model (CAPM). Widely applied in the finance literature, CAPM states that the return on a financial asset is a function of:

(i) the risk-free rate of return available on an asset whose expected return has no correlation with the expected market return, and

(ii) a return related to the difference between the expected market return and the risk free rate. In notation,

$$R_i = R_F + B_i (R_m - R_f) + e_i \qquad (A2.1)$$

Where R_i = return on risky asset i
R_f = return on the risk free asset
R_m = market return (an average of all assets)
B_i = beta factor of asset i
e_i = residual
and all returns are one period expectations.

The beta factor is a measure of the sensitivity of asset i to excess returns (R_m-R_F) to the market. Equation (A2.1) can be estimated using OLS.

This approach might usefully be applied to measuring the nature of relationships between various industries and sectors of the economy. Business cycle theory suggests that different items of aggregate spending, as well as prices, respond in different ways over the business cycle[1]. For example, fixed business investment has historically been observed to lead the business cycle. Moreover

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1. By the "business cycle" we refer to deviations of GDP around its trend rate of growth. In the New Zealand context we usually think of short term cycles as lasting approximately three years from peak to peak.

investment spending has been observed to be more volatile than other components of spending, for example, more volatile than non-durable consumer spending. These types of relationships are therefore likely to have implications for output and profitability of the different sectors of the economy. Continuing our example, we would expect to see the construction industry as well as the fabricated metal industry (which manufactures much investment equipment plus consumer durables) leading the business cycle and also exhibiting a greater amplitude than GDP over the cycle.

Equation (A2.1) is rewritten as (A2.2). The rate of growth (or level of output) of an individual sector, X, is assumed to be a function of a "risk free" growth rate, Y_t, which is the trend rate of growth of GDP and an "excess return" which is the deviation of GDP from its trend growth. This is the "cyclical" component of GDP, Y^c_t.

$$X_{it} = a_i Y + b_i Y^c_t + e_{it} \qquad \text{(A2.2)}$$

where X_{jt} = log level of sector i output in period t
Y_t = trend level of the log of GDP in period t
Y^c_t = log of cyclical GDP in period t
b_i = beta of sector i - the cyclical sensitivity of sector X_i to cyclical movements in Y.

It is assumed here that in the medium term all sectors of the economy grow at a constant trend rate relative to trend GDP growth. Of course, some sectors will grow faster than average and this would be reflected by a coefficient greater than 1 on the Y term. Slower growth rates have a coefficient on Y_t less than 1.

Similarly, each sector is assumed to have a particular sensitivity to cyclical fluctuations in overall aggregate demand or GDP. This is captured by the "Beta" coefficient which is the slope coefficient of the regression. The beta measures the sensitivity of each sector's output to the business cycle. As previously discussed, the construction sector will probably have a beta greater than one whereas the distribution sector might be expected to have a beta less than (but very close to) one as a reasonable proportion of its sales consist of non-durable consumer items (such as food) which fluctuate much less than overall spending fluctuates[2]. Other sectors might not have any stable relationship with the business cycle.

Equation (A2.2) is estimated using OLS in two different forms, log level and logged first differences in order to gauge how robust the results are to the functional form. Before analysing the results of (A2.2) it might be instructive to look first as the results of de-trending.

Trend Estimation

The cyclical component of a time series is its deviation from trend. There are a number of ways of estimating the trend of a time series and some of the issues are briefly summarised below. First, different cycles are obtained if the data are measured at different intervals. The shorter the measurement rest, the shorter the measured cycle by definition. Furthermore, transforming the data by way of moving totals or averages also tends to lengthen the observed cycle as these transformations tend to "smooth" out irregularities which occur within the same time horizon as the smoothing. For example, four quarter moving averages remove all cyclical components occurring within one year (which are the seasonal fluctuations). Although moving averages can be useful in the study of broad cyclical movements over longer time periods they also tend to mask turning points. Similarly, annual series compared with, say, quarterly series tend to conceal information on shorter term relationships between variables and sectors. For these reasons, and also as the data source used here only dates from 1977(2), the data are retained in their raw quarterly form.

The second factor also concerns transformation. Logarithmic levels or growth rates are preferred to actual dollar values or index numbers because changes in logs represent proportional, rather than absolute, changes in the series. The third factor concerns the choice of estimation technique applied to the transformed data. The simplest approach is to apply a deterministic time trend as in (A1.3). Other options include polynominal trends or the use of time series techniques such as an ARIMA model. Both of these can produce quite different trends (and hence cycles).

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2. On the other hand hotel and restaurant trade would be expected to be pro-cyclical. Also, tourism expenditure might also be pro-cyclical.

$$\ln Y_t = a + bT_t + \text{seasonals} \qquad \text{(A2.3)}$$

$$\text{or } d \ln Y_t = a + \text{seasonals}$$

where Y_t = economic time series
T = time trend
d = first difference operator.

The data used are the quarterly SNA production group accounts. At the time of estimation the latest available observation was 1986(4) with the first observation being 1977(2). Since estimation two more observations have become available and there have been revisions to the data used here.

TABLE A2.1:
VARIABILITY OF CYCLICAL COMPONENTS OF PRODUCTION GROUPS

	St. Deviation of Cyclical Components	Rank
Agriculture	.0533	3
Primary	.0118	1
Manufacturing	.043	4
Utilities	.030	6
Construction	.080	2
Trade, Restaurants	.031	5
Owner Occupied	.003	9
Services	.026	7
Government	.011	8
GDP	.022	

Table A2.1 shows the variability of the cyclical components of each of the series. Of the four most variable sectors three are the traded sectors and the other is construction (which would be expected given the variability of investment). The least variable are owner occupied dwellings and government employment. This provides some insight into the expected results from the regression on (A2.2). These results are tabulated in Table A2.2.

TABLE A2.2: ESTIMATES OF EQUATION (A2.2)
- Log level form -

Sector (X_i)	a_i	b_i	R^2	se	DW
Agriculture	.894	.564	.949	.093	.228
		(.827)			
Primary	1.008	2.137	.519	.141	.426
		(2.056)			
Manufacturing	1.016	1.472	.899	.031	.525
		(6.541)			
Utilities	1.039	.073	.885	.046	.312
		(0.218)			
Construction	.979	2.750	.697	.059	.685
		(6.353)			
Trade	.991	1.153	-	.054	.152
Owner Occupied	1.004	-.004	.686	.028	.032
		(0.022)			
Services	1.017	.830	.897	.034	.149
		(3.254)			
Government	1.007	-.121	.152	.048	.084
		(0.342)			

N.B. t values are in parenthesis.
se = standard error of estimate.

Taking into account confidence intervals these results can be classified in terms of sensitivity to GDP as follows:

Highly Sensitive B>1	Unit Sensitivity B=1	No sensitivity
Construction	Distribution	Utilities
Manufacturing	Services	Agriculture
	Primary	Owner Occupied Homes
		Government

These results broadly correspond to a priori expectations. Of those sectors exhibiting no sensitivity, only agriculture and utilities are important in the context of this research.

Agriculture's apparent independence from cyclical fluctuations in GDP is misleading. This result reflects agriculture's dependence on external factors which do not necessarily impact on the new Zealand economy or, if they do, it is probably with a rather long and variable lag. A similar comment could be made for the primary sector. The chronic autocorrelation evident in the residuals is not surprising given that the dependent and explanatory variables also exhibit considerable serial correlation with each other as they are simultaneously determined.

Table A2.3 presents a correlation matrix which shows the contemporaneous correlations of the cyclical components amongst all the sectors.

TABLE A2.3: CONTEMPORANEOUS CORRELATION COEFFICIENTS

1	2	3	4	5	6	7	8	9
1. Agriculture								
-	.289	-.078	.053	.097	-.071	-.133	.009	-.381
2. Primary								
	-	-.079	-.579	.650	.201	-.156	.474	-.590
3. Manufacturing								
		-	.123	.411	.625	-.018	.311	.098
4. Utilities								
			-	-.361	.096	.310	.068	.189
5. Construction								
				-	.619	-.228	.641	-.402
6. Distribution								
					-	-.025	.649	.007
7. Home Ownership								
						-	.028	.044
8. Services								
							-	-.420
9. Government								
								-

Table A2.3 suggests that the strongest contemporaneous links involve the distribution and services sector. Other important links exist between construction and manufacturing, and construction and services.

So far the results have been framed in terms of contemporaneous links between sectors. Leading and lagging correlation coefficients of the cyclical components were calculated, each for four quarters, first for GDP and each sector, and, second, between all sectors. The most significant results are tabulated below.

TABLE A2.4: CROSS CORRELATIONS OF CYCLICAL COMPONENTS BETWEEN SECTORS AND GDP

Sectors/Lag	-4	-3	-2	-1	0	1	2	3	4
1. GDP, Agriculture	.135	.277	.326	.306	.236	-.060	-.246	-.231	-.133
2. GDP, Primary	.546	.660	.600	.497	.398	.139	.002	-.089	.013
3. GDP, Manuf	-.460	-.211	.011	.308	.757	.505	.171	.038	-.053
4. GDP, EGW	-.235	-.383	-.361	-.098	.054	.079	.058	.051	-.155
5. GDP, Construct.	.142	.217	.238	.481	.760	.447	.178	.139	.072
6. GDP, Distribution	-.074	-.013	.084	.407	.829	.545	.283	.149	.002
7. GDP, Services	.170	.228	.334	.507	.707	.621	.474	.349	.166
8. GDP, Govt	-.130	-.283	-.439	-.463	-.249	-.136	-.088	-.047	-.139

N.B. This table shows the correlation between the first named series and the lag of the second named series. Thus a negative lag means the second series leads the first.

Table A2.4 shows some interesting aspects of intertemporal inter-sectoral relationships. For example agriculture and primary

output, particularly the latter, have relatively high and positive leading correlation coefficients which become negative or die out quickly when agriculture and primary are assumed to lag GDP.

Construction exhibits similar characteristics in leading cyclical changes in GDP but in this case there appears to be a lagged relationship as well. The pattern of correlations for services shows a leading and lagging relationship with the lag coefficients having the greater magnitude. Cyclical distribution activity is sensitive one period prior to an increase in cyclical GDP but the relationship appears to dampen relatively quickly - by the third quarter following the cyclical change. The cyclical level of manufacturing output appears sensitive one quarter prior to, and up to only two quarters after, a change in the level of cyclical GDP.

It must be kept in mind that these preliminary results are in log level form and that the autocorrelations observed in the regressions suggested the existence of the significant lead/lag relationships documented here.

Table A2.5 repeats this exercise across various sectors. The correlations documented were selected from the entire matrix on the basis of the magnitude of the coefficients.

As would be expected, distribution and services tend to have the largest correlations with the other sectors and this relationship appears a predominantly lagging one. A surprising feature of the table is the strength and duration of relationships between the primary sector and other sectors, particularly construction. The relationships are surprising in that cyclical primary output is particularly volatile and represents a relatively small proportion of GDP. Two of our major sectors of interest, manufacturing and services, did not appear to have a particularly strong inter-relationship. The robustness of these relationships will be tested when the results are replicated using first differenced data.

TABLE A2.5: CROSS CORRELATIONS OF CYCLICAL COMPONENTS OF SECTORS

-4	-3	-2	-1	0	1	2	3	4
Agric, Manuf								
-.244	-444	-.508	-.368	-.078	.131	.237	.288	.197
Agric, Utilities								
-.255	-.252	-.242	-.095	.053	.324	.491	.570	.557
Agric, Services								
-.145	-.201	-.177	-.125	.009	.110	.242	.290	.301
Prim, Manufacturing								
-.283	-.485	-.399	-2.97	-.079	.116	.352	.477	.453
Prim, Construction								
.194	.246	.306	.424	.650	.641	.618	.598	.470
Prim, Distribution								
.213	.103	.083	.117	.201	.358	.421	.492	.446
Prim, Services								
.381	.355	.376	.399	.474	.499	.538	.549	.503
Con, Distribution								
.194	.229	.168	.397	.619	.479	.175	.155	.062
Con, Services								
.401	.397	.450	.518	.641	.492	.297	.212	.058
Distribution, Services								
.146	.229	.315	.498	.649	.577	.418	.292	.106
Manuf, Distribution								
-.172	-.208	-.106	.320	.625	.357	.200	.017	-.240

Sectoral Equations in First Difference Form

Equation (A2.2) is now estimated in first difference form. A comparison of results obtained from the alternative specifications indicate the robustness of the theory. The trends in this set of results were obtained by regressing the change in the log of each sector on a constant and seasonals.

TABLE A2.6:
RESULTS OF EQUATION A2.2
ESTIMATED IN FIRST DIFFERENCES

Sector	a_i	b_i	R^2	Se	DW
Agriculture	34.36	.479	.993	.044	2.36
		(1.055)			
Primary	-4.57	-.018	.480	.085	2.52
		(0.021)			
Manufacturing	-2.53	1.77	.825	.022	2.49
		(7.983)			
Utilities	-6.39	0.393	.949		
		(1.534)			
Construction	-3.09	1.996	.665	.047	2.804
		(4.123)			
Distribution	-1.49	1.394	.885	.020	2.48
		(6.738)			
Owner Occupied	-0.092	.007	.139	.004	3.48
		(0.148)			
Services	-0.498	.355	.469	.010	1.80
		(3.50)			
Government	-3.388	0.204	.937	.012	2.36
		(1.682)			

These results can be summarised as follows:

Highly Sensitive b>1	Unit Sensitivity0<b<1	No Relationship
Construction	Distribution	Agriculture
Manufacturing	Services	Primary
		Utilities
		Owner Occupied Homes
		Government

The only change in the overall results has been the removal of the other primary sector from the unit sensitivity category. This is not a surprising result given the apparent variability of the series. Although the Durbin-Watson statistics have improved there is still significant (negative) first-order autocorelation in the equations.

Table A2.7 shows the leading and lagging correlations between the cyclical changes in the various sectors and those of GDP. As expected, the strength of the correlation observed for levels of the cyclical component in Table A2.5 are reduced when the data is in first difference form. The primary sector's relationships are now reduced to just a slight suspicion of a two or three quarter leading relationship. Agriculture exhibits a similar pattern although the relationship is stronger overall. Manufacturing appears to be related to GDP contemporaneously and with a one quarter lag. Cyclical changes in construction do not appear to lead GDP and this sector exhibits a one quarter lagged response to cyclical changes in GDP. Distribution has only a contemporaneous relationship with cyclical changes in GDP whereas the extended response of services to cyclical GDP observed in level form is still very much evident when the data are differenced.

TABLE A2.7: CROSS CORRELATION OF CYCLICAL COMPONENTS

Sector/Lag	-4	-3	-2	-1	0	1	2	3	4
1. GDP, Agric	.107	.200	.275	.063	.181	-.098	.207	-.110	-.067
2. GDP, Primary	.046	.294	.195	.207	-.004	-.079	.086	-.363	.135
3. GDP, Manuf	-.203	.008	.075	.051	.812	.308	-.108	-.036	-.042
4. GDP, Utilities	-.085	-.183	-.189	.235	.258	.06	-.029	.327	-.272
5. GDP, Const	-.127	.066	-.102	.123	.583	.214	-.113	.092	-.131
6. GDP, Distribution	-.125	.009	-.202	-.013	.761	.105	-.003	.003	-.073
7. GDP, Owner Occ	.051	-.127	-.031	.092	.026	-.095	.051	-.063	-.054
8. GDP, Services	-.245	-.222	.002	.032	.520	.413	.167	.230	-.080
9. GDP, Govt.	.119	-.024	-.209	-.287	.281	.007	-.061	.144	-.077

Table A2.8 shows the contemporaneous cross correlations between each of the sectoral cyclical components.

TABLE A2.8: CONTEMPORANEOUS CROSS CORRELATIONS BETWEEN SECTORAL CYCLICAL COMPONENTS

1	2	3	4	5	6	7	8	9
1. Agric.	-	.277	-.035	-.180	.160	-.017	-.242	-.045	-.11
2. Primary		-	-.140	-.658	.119	-.281	-.003	-.104	-.331
3. Manuf			-	.144	.377	.567	.172	.446	.273
4. Utilities				-	.128	.351	.010	.165	.204
5. Construction					-	.291	-.059	.470	-.140
6. Distribution						-	-.076	.349	.383
7. Owner							-	-.058	-.202
8. Services								-	.089
9. Government									.

The strong relationships between the manufacturing and the construction, distribution and services sectors is quite evident. Similarly, services is closely linked with construction and distribution. It should be pointed out that we are not suggesting any type of causal relationship by calculating these simple correlations. For some of the sectors showing reasonable correlation there may be no direct relationship at all[3]. What is identified, though, is a series of empirical regularities between various important sectors. Identification of these regularities might help understand recent developments in the economy.

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3. The use of partial correlation coefficients might help identify this.

To help determine the inter-termporal nature of some of the above regularities the correlation coefficients at leading and lagging quarters between selected production groups were calculated.

The results (not tabulated) suggested that manufacturing tended to have a weak lagged relationship with agriculture, presumably capturing the primary food processing aspects of manufacturing. Services tended to have a lagged relationship with most other sectors. The exception was the relationship between services and distribution which did not tend to lag as much as some of the other sectors. Manufacturing and construction had a reasonably strong relationship although it is not particularly extended over time. On the other hand, there did appear to be some relationship between changes in the cyclical output of services and that of manufacturing up to three quarters after the change in services.

Manufacturing

Detailed coverage of the manufacturing sectors is provided in the Quarterly Survey of Manufacturing (QSM). Indices of real gross output (base year 1978/79 = 100.0) were constructed using the Producer Price Index (PPI). Table A1.9 tabulates the results of the CAPM model applied to the first difference of the log of each of the manufacturing sectors. The dependent variables are the change in the trend and cyclical components of GDP. The sample period begins in March 1978 as the PPI only commenced in December 1977 and the first price change was necessary to deflate stock changes.

The results in the following table can be summarised as follows:

Highly Sensitive, b>1	Unit Sensitive, b=1	Not Sensitive, b=0
Chemicals	Other Manufacturing	Primary Food
Fabricated Metals	Other Food	Textiles
	Wood	Basic Metals
	Minerals	Paper, Printing
	All Manufacturing (except PFP)	

TABLE A2.9:
RESULTS OF EQUATION A2.2 ESTIMATED IN FIRST DIFFERENCES
Manufacturing Industries

Sector	a_i	b_i	R^2	se	DW
Other Food	.569	1.442	.440	.050	2.65
		(2.334)			
Textiles	.678	.493	.336	.068	2.79
		(0.587)			
Wood	1.622	1.905	.719	.058	2.43
		(2.667)			
Paper, Printing	1.553	-1.465	.363	.077	2.29
		(1.538)			
Chemicals	1.803	2.370	.488	.073	2.27
		(2.615)			
Minerals	1.618	2.547	.672	.054	3.01
		(3.796)			
Basic Metals	0.785	1.165	.405	.086	2.41
		(1.100)			
Fabric Metals	1.684	3.240	.830	.0482	.22
		(5.452)			
Other Manuf.	4.298	2.167	.717	.097	2.12
		(1.802)			
Primary Food	-1.626	2.456	.405	.127	2.45
		(1.561)			
All Man (exc. PFP)	.788	1.604	.691	.031	2.02
		(4.167)			

t values are in parenthesis

PFP refers to primary food processing

It is interesting that in some respects the summary table is consistent with our earlier results. For example, the highly sensitive industries are investment-related activities. The apparently insensitive industries tend to have a higher export component in their output and this export proportion declines as sensitivity increases - an expected result. Overall, all manufacturing excluding primary food processing (PFP), has a beta coefficient which fails marginally to be

significantly greater than unity. This result is slightly different from that obtained earlier and is presumably due to a combination of different measurement techniques (the use of QSM as opposed to SNA) and a shorter sample period.

Table A2.10 examines the lead/lag correlations between GDP and each of the manufacturing sectors.

TABLE A2.10: CORRELATIONS AT QUARTERLY LEADS/LAGS BETWEEN GDP AND MANUFACTURING SECTORS

Sectors	-4	-3	-2	-1	0	1	2	3	4
1. GDP, Other Food	.121	.050	-.174	.182	.392	-.083	.085	.056	-.170
2. GDP, Textiles	-.112	.105	.088	.179	.107	.055	-.082	.115	-.199
3. GDP, Wood	-.243	-.083	.061	.172	.438	.038	.118	.307	-.226
4. GDP, Paper Ptg	-.066	-.333	.316	.189	-.270	.303	.255	-.145	-.106
5. GDP, Chemicals	-.047	-.261	.237	.192	.431	.276	-.146	.213	-.313
6. GDP, Minerals	-.089	-.137	.259	-.021	.570	-.040	.034	-.017	-.245
7. GDP, Basic Metals	-.220	-.187	.016	.269	.197	.172	-.078	-.033	-.098
8. GDP, Fabrics	-.191	-.024	.008	.165	.705	.155	.009	-.047	-.184
9. GDP, Other Man.	-.196	-.013	.132	.185	.313	.232	.082	.238	-.262
10. GDP, PFP	-.068	.230	-.137	-.220	.274	.140	-.288	.032	-.114
11. GDP, All Man. (excl. PFP)	-.136	-.093	.159	-.029	.606	.376	-.053	.032	-.232

Although most of the sectors are relatively strongly correlated contemporaneously few exhibit any form of stable pattern with leading or lagging GDP. Paper and printing is unusual in that the contemporaneous correlation is negative while the correlations two quarters either side are positive and of a reasonable size. Of the remaining sectors only wood, chemicals and other manufacturing manifest any suggestion of a lagged response to cyclical movements in GDP. The sectors identified as investment-intensive, fabricated metals and, to a lesser extent, non-metallic minerals and basic metals, do not appear to have a significant leading relationship with GDP changes.

Testing For Structural Change

A simple test for the existence of structural change is now undertaken. "Structural change" refers to a fundamental change in the behaviour of a sector relative to all others - as captured by GDP - in terms of either:

(i) changes in the trend rate of sectoral growth relative to that of GDP growth, or

(ii) changes in the sensitivity of de-trended sectoral growth to cyclical GDP growth.

The null hypothesis is that the processes of liberalisation and disinflation have not significantly affected the response of the sectors to either the trend or cyclical rate of growth of GDP. Of course, liberalisation has, in itself, probably affected GDP growth but the hypothesis is that, <u>given</u> GDP growth <u>and</u> its assumed decomposition into trend and sectoral components, has the sectoral composition in terms of both growth rates and sensitivities changed?

The process of liberalisation is assumed to have influenced output from 1984(4) onwards (until 1986(4)). The econometric tests consist of taking the equations applied to the various subsectors previously and adding a binary dummy variable that takes the value of 1 from 1984(4) to 1986(4) and O elsewhere. The dummies are applied to the trend and the beta coefficients to allow for change over the period of interest. The t-test on the dummies indicates whether the addition of the dummy term is significant. An indication of overall change

(that is, in trend and slope) is provided by a comparison of the change in the sum of residuals between the original regression and a regression which includes the dummies allowing for a change in both trend and cyclical growth rates. This is the basic Chow test.

There are a number of problems with this approach. The choice of when the "structural change" occurred is, of course, completely arbitrary. The period chosen here represents an attempt to capture the start of the liberalisation period. Floating of the exchange rate occurred in the subsequent quarter. There is not really any way of knowing whether "structural change" was occurring over the entire sample period and therefore there is a possibility that spurious results occur. For example, a slowly changing economic structure which has been evolving over many years could show up as a structural change in the last few quarters of the sample period.

Furthermore, the liberalisation period is so short (1984(4) - 1986(4)) in terms of observations that a sound statistical result will probably be difficult to obtain. This is even more so in the present case where structural change is then arbitrarily allocated between a change in the trend response and a change in the cyclical response. As noted earlier in this appendix there have been significant revisions to the quarterly production group data since these estimations were performed. Two new quarterly observations also became available. It is possible that these data changes could alter the results.

The test is further weakened by the failure to recognise any lead or lag relationships between the individual sectors or industries and GDP. Our previous analysis established that such relationships do exist and so even if the contemporaneous relationship has changed it might not necessarily mean the overall relationship has changed, and vice versa. There are other statistical problems. As with the preliminary regressions there is the problem of simultaneity between the regressor and regressand which probably requires an indirect estimation technique. However, as only a rough guideline was required, the OLS technique was used.

Also, the use of a deterministic time trend could conceivably bias the results. Enforcing this type of trend may lead to spurious estimation of the cyclical component of the time series - particularly in a period of structural change. In other words, we cannot be sure that

an apparent cyclical response in a sector represents a new trend rate of growth which might persist for some time. This will make the interpretation of the results rather hazardous. Finally, there is the aggregation problem. Although the results might suggest no structural change this is only a relevant conclusion at this particular level of aggregation. There could well be significant structural change occurring within each production group which is not reflected in the aggregate measure. Table A2.11 below sets out the results of the tests for structural change on the first set of equations estimated in first difference form. These are tests on equation (A2.2) (in first difference form) where Y is GDP and x_i is each of the nine SNA groups.

TABLE A2.11:
TESTS FOR STRUCTURAL CHANGE: PRODUCTION GROUPS

Sector	Dummy on Cyclical Coefficient	Dummy on Trend Component
Agricultural	1.505	0.005
	(1.358)	(0.292)
Primary	-.436	0.0198
	(-.201)	(0.592)
Manufacturing	-.538	-.0086
	(-.993)	(1.032)
Utilities	-0.294	-.251
	(-.459)	(0.025)
Construction	0.475	0.0127
	(0.394)	(0.686)
Trade	0.667	-.001
	(1.319)	(-.253)
Owners	-0.1602	0.00485
	(1.486)	(0.292)
Services	-0.10205	0.509
	(0.401)	(0.130)
Government	0.446	-0.127
	(1.520)	(0.282)

N.B. t-values are in parentheses
Sample 77(3)-86(4), Dummies 84(4)-86(4)

F-tests were calculated on the sum of squared residuals of each of the equations. In each case the null hypothesis of no structural change in the post 1984 period could not be rejected. This result is confirmed by the insignificance of the dummy coefficients as indicated by the reported t-values. A similar exercise was then undertaken for the industries within the manufacturing sector. The results are tabulated below. Once again the equations are first differences of the natural log of the variables.

TABLE A2.12:
TESTS FOR STRUCTURAL CHANGE:
MANUFACTURING INDUSTRIES

Sector	Dummy on Cyclical Response	Dummy on Trend Response
Other Food Processing	2.253	0.0033
	(1.595)	(0.167)
Textiles, Clothing	-1.168	-0.009
	(-.587)	(0.314)
Wood & Furnishings	-3.105	-0.222
	(1.965)	(1.017)
Paper, Printing	-6.695*	-0.0093
	(3.540)	(0.355)
Chemicals	-3.8985	0.0171
	(1.936)	(0.616)
Minerals	-4.487*	-0.0020
	(3.302)	(0.1083)
Basic Metals	-3.884	-0.0273
	(1.619)	(0.823)
Fabricated Metals	-2.6149	-0.0288
	(2.041)	(1.629)
Other Manufact.	-2.772	-0.048
	(1.007)	(1.262)
Primary Food	9.897*	0.0374
Processing	(3.0555)	(0.8362)
All Manufact.	-1.242	-0.0199
(exc. Primary Food)	(1.459)	(1.694)

l-tail 5% significance level for 30 dof = 2.042; 28 dof = 2.048

* denotes significance at 5 per cent level.

F-tests indicated that there had been a significant reduction in the sum of squared residuals in three industries - paper and printing; non-metallic minerals; and primary food processing. The primary food result is particularly difficult to interpret. The broad sectoral analysis showed agricultural production has apparently become more responsive to GDP (although the beta coefficient dummy is insignificant). This has a strong flow-on effect to the primary food processing industry (although there is the aberration of the meat strike in 1986(1)). The decline in output prices faced by the agricultural sector appears to have been accompanied by a strong positive output response. This might be interpreted as an income effect - the desire of the agricultural sector to maintain real income - in the face of falling relative prices which would be expected to induce a substitution effect away from agricultural production to more profitable sectors. The lack of mobility of factors or production which might, for example, be due to asset specificity, could reinforce the income effect and result in the more intensive use of the existing factors. This effect in the agricultural sector might be responsible for the observed effect in the primary food processing sector.

Table A2.12 shows that all the manufacturing industries except primary food and other food have experienced a negative output effect over the cycle, although the overall effect for the manufacturing sector (exclusive of primary food) is not significantly different from zero. The non-metallic minerals and fabricated metals industries may have experienced a down-turn due to relatively weak investment, particularly in manufacturing, over the last two years. Paper and printing output has also declined relative to cyclical GDP output over the last two years despite relatively buoyant external pulp prices.

Unfortunately, from a theoretical view point the magnitude of the coefficients are implausible. Allowing for the full-sample coefficients reported in Table A2.11 the combined results suggest that most of the manufacturing industries have large negative betas over the recent liberalisation period.

This is not consistent with any theoretical predictions and it suggests that the problems with this approach that we outlined earlier may be degrading the results. Specifically, the dummy variables would be

easier to interpret if the sample period was longer and covered a full cycle rather than a growth recession. Furthermore, this type of test fails to capture the change in the lead/lag relationships between the individual sectors or industries and GDP. It is also worth reiterating that the results do not suggest anything about the relative profitability of the sectors. We are measuring real output responses (in the case of manufacturing) which are only one aspect of sectoral adjustment to changes in relative prices and demand. In summary, these tests may be inadequate in capturing the nature and extent of any sectoral changes during the liberalisation period.

APPENDIX THREE

DATA SOURCES FOR THE DERIVATION OF WORLD PRICES

The New Zealand manufacturing groups are referred to by the following abbreviations.

Food, Beverages and Tobacco	FBT
Wood and Wood Products	WOOD
Paper Products and Printing	PAP
Chemicals, Petroleum, Plastics	CHEM
Non-metallic Mineral Products	NON
Fabricated Metal Products	FAB
Basic Metal Products	BAS
Textiles, Leather, Apparel	TEX
Other Manufacturing	OTH

Country	Statistical Publication(s)
Australia	Monthly Summary of Statistics Australia Australian Bureau of Statistics Price Indexes of Articles Produced by Manufacturing Industry Division and Sub-Division Index Numbers
U.S.A.	Survey of Current Business U.S. Department of Commerce/Bureau of Economic Analysis Producer Prices (not seasonally adjusted)
Germany	Wirtschaft und Statistik Statistisches Bundesamt - Verlag W. Kohlhammer Index der Erzeugerpreise gewerblicher Produkte
United Kingdom	Monthly Digest of Statistics Central Statistical Office Government Statistical Service Index Numbers of

	Producer Prices (Output) and prior to 1980 Index Numbers of Wholesale Prices (Outputs)
Canada	Canadian Statistical Review Statistics Canada Industry Selling Price Indexes, Selected Industries
France	Indices de Prix de Vente a la Production
Italy	Media Statistico Italiano and Annuario Bolletino Statistico Italiano Istituto Centrale di Statistica Prezzi All'Ingrosso Indice Generale e Indici per Destinazione Economica dei Prodotti
Korea	Monthly Statistics of Korea Economic Planning Board Wholesale Price Indexes
Singapore	Monthly Digest of Statistics Department of Statistics Wholesale Price Index of Singapore Manufactured Products, and The General Wholesale Price Index
Japan	Price Indexes Annual and Economic Statistics Monthly Research and Statistics Department, The Bank of Japan Domestic Wholesale Price Index: Indexes for Basic Group by Group
Taiwan	Taiwan Statistical Data Book Council for Economic Planning and Development, and Quarterly National Economic Trends Taiwan Area, The Republic of China

Directorate General of Budget, Accounting and Statistics, Executive Yuan, Republic of China Group Indices of Wholesale Prices in Taiwan Area

Country PX_k^w	Group k	Equivalent Index Used for and PM_k^w
Australia	FBT	Food, Beverages and Tobacco
	WOOD	Wood, Wood Products and Furniture
	PAP	Paper, Paper Products and Printing
	CHEM	Chemical, Petroleum and Coal Products
	NON	Glass, Clay and Other Non-metallic mineral Products
	FAB	Fabricated Metal Products
	BAS	Basic Metal Products
	TEX	Textiles
	OTH	Miscellaneous Manufacturing Products
U.S.A.	FBT	Foods and Feeds, Processed
	WOOD	Lumber and Wood Products
	PAP	Pulp, Paper and Allied Products
	CHEM	Chemicals and Allied Products
	NON	Non-metallic Mineral Products
	FAB	Machinery and Equipment
	BAS	Metals and Metal Products
	TEX	Textile Products and Apparel
	OTH	Proxied by Intermediate Materials

Germany	FBT	Erzeugnisse des Ernahrungsgewerbes (zusammen)
	WOOD	Holzwaren
	PAP	Holzschliff, Zellstoff, Papier and Pappe
	CHEM	Kunststofferzeugnisse
	NON	Glas und Glaswaren
	FAB	Maschinenbauerzeugnisse (einschl. Ackerschlepper) (zusammen)
	BAS	Eisen und Stahl (zusammen)
	TEX	Textilien
	OTH	Proxied by an average of above
United Kingdom	FBT	Food Manufacturing Industries
	WOOD	Timber Industries
	PAP	Paper Industries
	CHEM	Chemicals and Allied Industries
	FAB	Metal Manufacturing (also Engineering and Allied Industries)
	NON	Non-metallic Mineral Products (also Pottery and Glass Industries)
	BAS	Metal Goods (and Steel Industry)
	TEX	Textile Industry
	OTH	Other Manufacturing Industries
Canada	FBT	Food and Beverage Industries (Total)
	WOOD	Wood Industries (Total)
	PAP	Paper and Allied Industries (Total)
	CHEM	Chemical and Chemical Products (Total)
	NON	Non-metallic Mineral Products (Total)

	BAS	Primary Metal Industries (Total)
	TEX	Textile Industries (Total)
France	FBT	Verre mecanique, verrerie de minage
	NON	Mineraux divers
Italy	WOOD	Legno e manufatti in legno
	PAP	Paste per carta e carte
	NON	Prodotti a base di minerali non metalliferi
	TEX	Cuoio, pelli e calzature (N.B. individual indices were proxied by the Wholesale Price Index, 1978-1982, *Source:* IMF Statistics)
Korea	BAS	Non-ferrous metal products
	TEX	Knitted or Twisted Yarn Products (N.B. First 3 years of quarterly data were interpolated from annual average indices)
Singapore	FBT	Food
	WOOD	Proxied by Miscellaneous Manufacturers
	CHEM	Chemicals and Chemical Products (N.B. From 78(1) to 79(1) all indices proxied by Total Wholesale Price Index, *Source:* IMF Statistics, 79(1) - 80(4) interpolated from annual indices)
Japan	FBT	Foodstuffs
	WOOD	Lumber and Wooden Products
	PAP	Pulp, Paper and Related Products
	CHEM	Chemicals

	NON	Ceramics, Stone and Clay Products
	FAB	Metal Products
	BAS	Iron and Steel
	TEX	Textile Products
	OTH	Miscellaneous Products
Taiwan	WOOD	Wood and Bamboo Products
	BAS	Basic Metals
	TEX	Textile Products
	OTH	Other Manufactured Products (N.B. Prior to 1983 indices are derived by interpolation of annual indices. After 1985 the indices are proxied by the Wholesale Price Index obtained from Quarterly National Economic Trends, August 1987).

APPENDIX FOUR

DATA SOURCES AND EXPOSURE INDEX CONSTRUCTION

In this appendix data sources and index construction are briefly outlined.

(i) Imports and Exports

Merchandise is valued at the New Zealand customs frontier i.e. exports f.o.b. and imports c.i.f.

Import duties imposed on imports of commodities into New Zealand are regarded as commodity indirect taxes. Its incidence in the input/output tables is proportional to the usage of each import.

(ii) Input-Output Valuation

The input-output tables value transactions at approximate basic values.

Approximate basic valuation is at the point of sale from the establishment before addition of any net commodity indirect taxes, or transport and distribution margins, to the output. 'Approximate' means that the value of net commodity indirect taxes already embedded in the inputs of the industries has not been removed. To arrive at the value of producers' output in the SNA add on net commodity taxes.

Imports are valued at c.i.f. which is equivalent to approximate basic values.

(iii) Exchange Rates, ex and em

These arithmetic indices are derived from the IMF Financial Statistics[4]. The exchange rates are quarterly averages. All rates were vis a vis the US dollar and they were then converted to an

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4. The exception is Taiwan. The Taiwan rate was obtained from the Taiwanese Publications listed in Appendix 3.

appropriate $NZ cross rate.

(iv) Weights a and b

These were obtained from the 1983-84 Inter-Industry study of the economy as listed in Table 4.1.

(v) Destination of Exports

A series of print outs of New Zealand manufactured exports reclassified from a Trade basis to an SNA basis were obtained from the Department of Trade and Industry. For each production group the f.o.b. value of exports and their destination was available on a June year basis. The weights used are the June 1984 weights.

(vi) Weights for Import Exchange Rates

These indices were derived in a two step procedure. First, the Christchurch branch of Department of Statistics was commissioned by NZIER to reclassify quarterly import data into a framework consistent with the SNA production groups. This was done using 7 digit SITC codes and apportioning them to the appropriate manufacturing production group. The countries from which the imports were obtained were also listed.

Second, the 1983-84 Inter-Industry study "Imports into Industries Transactions" attempts to classify direct imports into production groups according to which domestic industry the import would have been produced by. So for each industry group we knew

> (a) the *type* of imports it uses according to which production group would have produced the import (Step II)
>
> (b) from Step I for each production group (or in this case *type* of import) the countries of origin of that type of import.

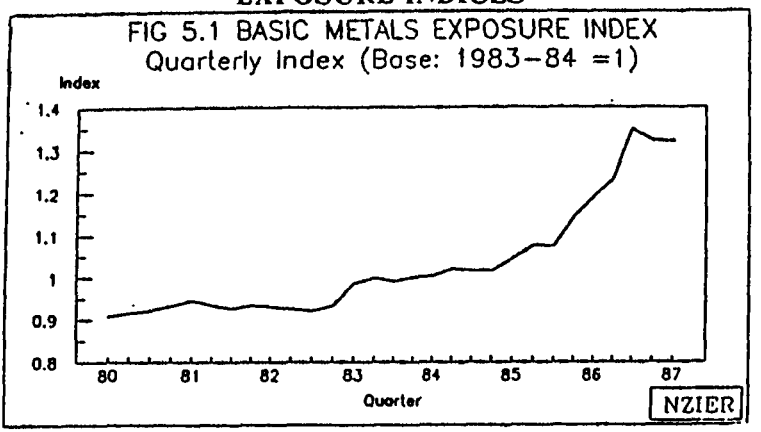
Thus, using the country results in Step I and the inter-industry knowledge in Step II, appropriate country weights for imports into each manufacturing production group were obtained. For example,

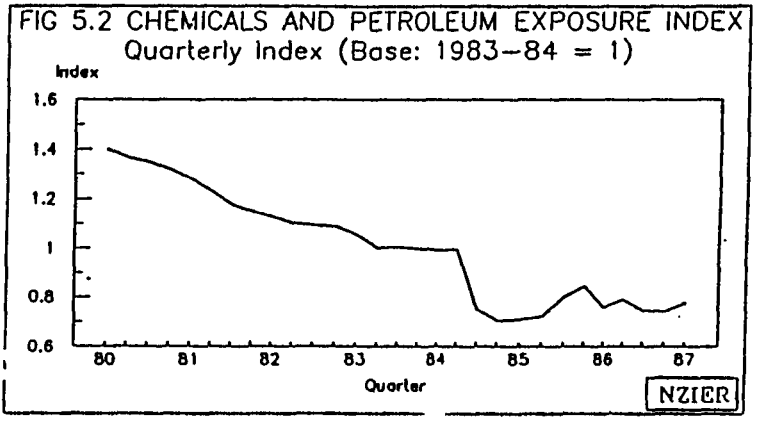
say imports of industry-type good A come from Australia (50%) and USA (50%) while for industry B they come from UK (40%) and Japan (60%). This is Step I. According to the Input-Output tables assume that A's direct import requirements are 70% of type A goods and 30% type B goods. This is Step II. Combining this we obtain the following estimate of the country weights for industry A.

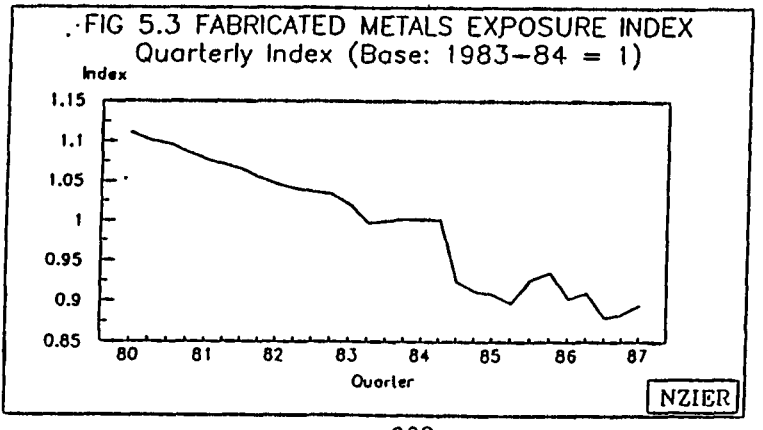
	Proportion of Imports (Step I)		Source of Imports by Industry (II)	Country Weights (IxII)
Imports required:				
by A	.7	(Australia)	.5	.35
		(USA)	.5	.35
by B	.3	(UK)	.4	.12
		(Japan)	.6	.18
	1.0			1.00

APPENDIX FIVE

EXPOSURE INDICES







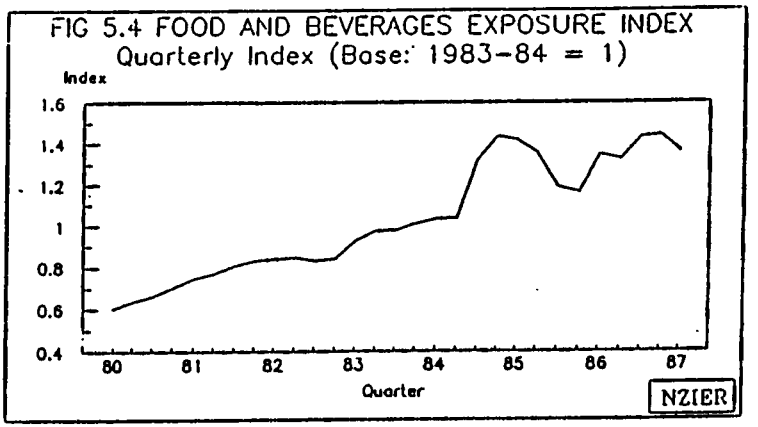


FIG 5.4 FOOD AND BEVERAGES EXPOSURE INDEX
Quarterly Index (Base: 1983-84 = 1)
Index
1.6
1.4
1.2
1
0.8
0.6
0.4
80
81
82
83
84
85
86
87
Quarter
NZIER

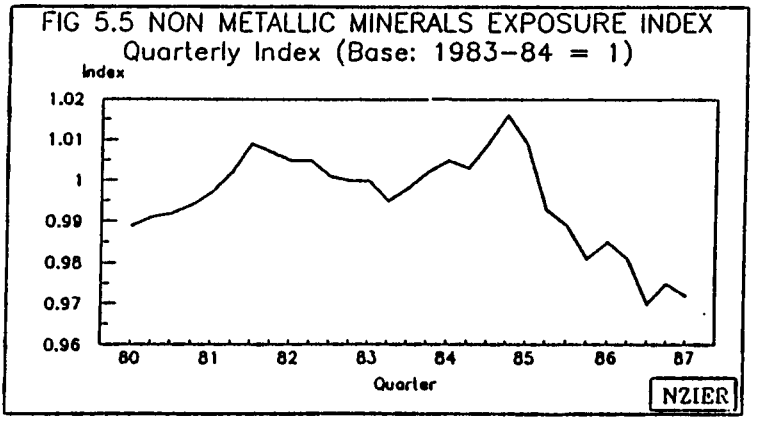


FIG 5.5 NON METALLIC MINERALS EXPOSURE INDEX
Quarterly Index (Base: 1983-84 = 1)
Index
1.02
1.01
1
0.99
0.98
0.97
0.96
80
81
82
83
84
85
86
87
Quarter
NZIER

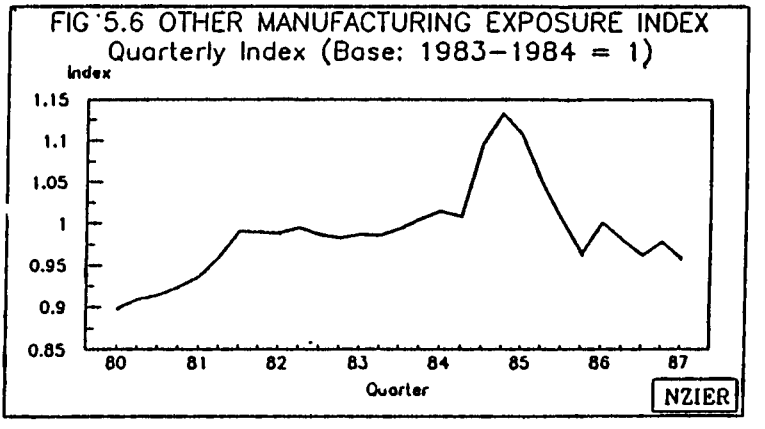


FIG 5.6 OTHER MANUFACTURING EXPOSURE INDEX
Quarterly Index (Base: 1983-1984 = 1)
Index
1.15
1.1
1.05
1
0.95
0.9
0.85
80
81
82
83
84
85
86
87
Quarter
NZIER

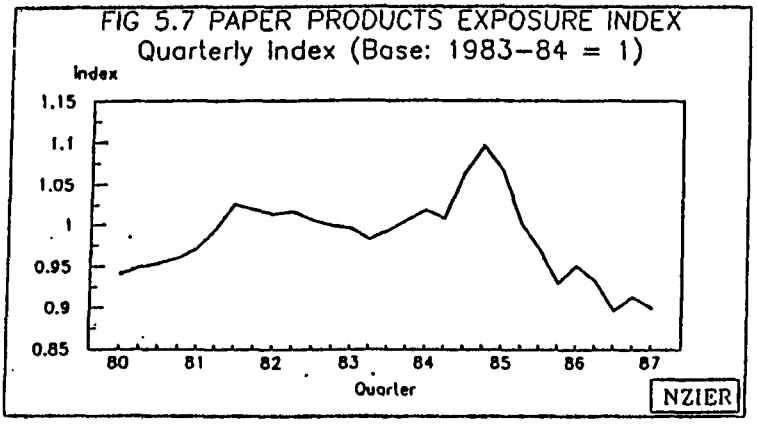


FIG 5.7 PAPER PRODUCTS EXPOSURE INDEX
Quarterly Index (Base: 1983–84 = 1)
Index
1.15
1.1
1.05
1
0.95
0.9
0.85
80
81
82
83
84
85
86
87
Quarter
NZIER

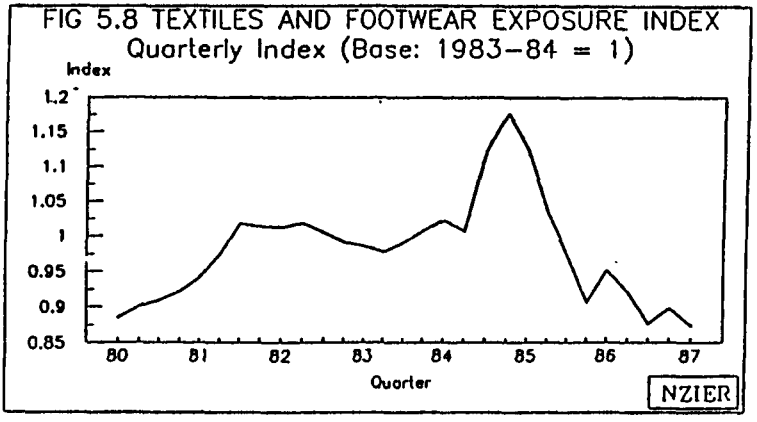


FIG 5.8 TEXTILES AND FOOTWEAR EXPOSURE INDEX
Quarterly Index (Base: 1983–84 = 1)
Index
1.2
1.15
1.1
1.05
1
0.95
0.9
0.85
80
81
82
83
84
85
86
87
Quarter
NZIER

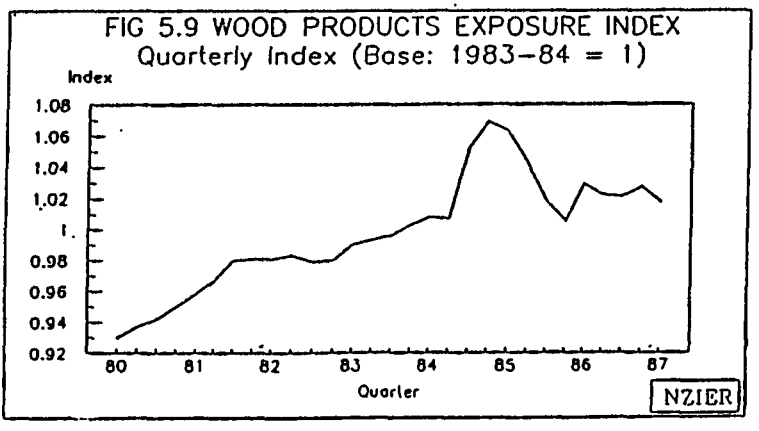


FIG 5.9 WOOD PRODUCTS EXPOSURE INDEX
Quarterly Index (Base: 1983–84 = 1)
Index
1.08
1.06
1.04
1.02
1
0.98
0.96
0.94
0.92
80
81
82
83
84
85
86
87
Quarter
NZIER

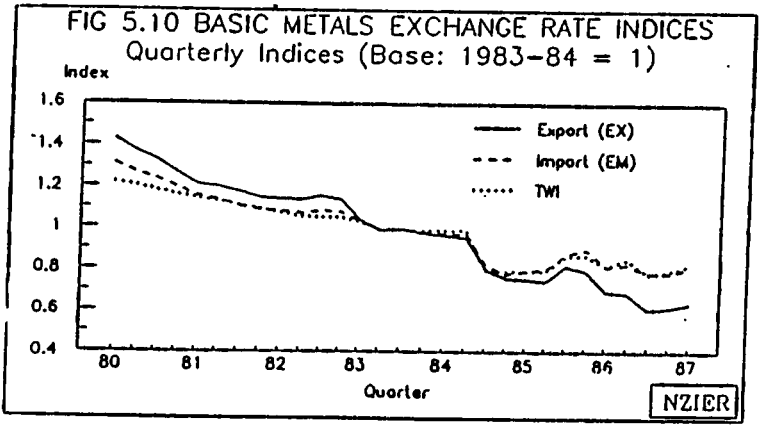


FIG 5.10 BASIC METALS EXCHANGE RATE INDICES
Quarterly Indices (Base: 1983–84 = 1)
Index
1.6
1.4
1.2
1
0.8
0.6
0.4
80
81
82
83
84
85
86
87
Quarter
Export (EX)
Import (EM)
TWI
NZIER

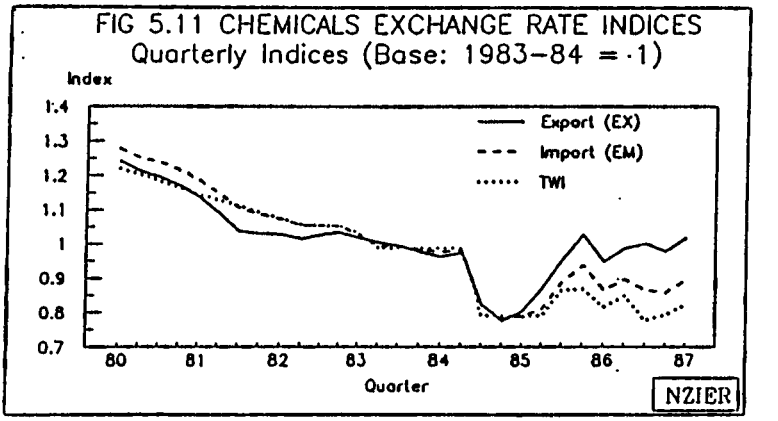


FIG 5.11 CHEMICALS EXCHANGE RATE INDICES
Quarterly Indices (Base: 1983–84 = 1)
Index
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
80
81
82
83
84
85
86
87
Quarter
Export (EX)
Import (EM)
TWI
NZIER

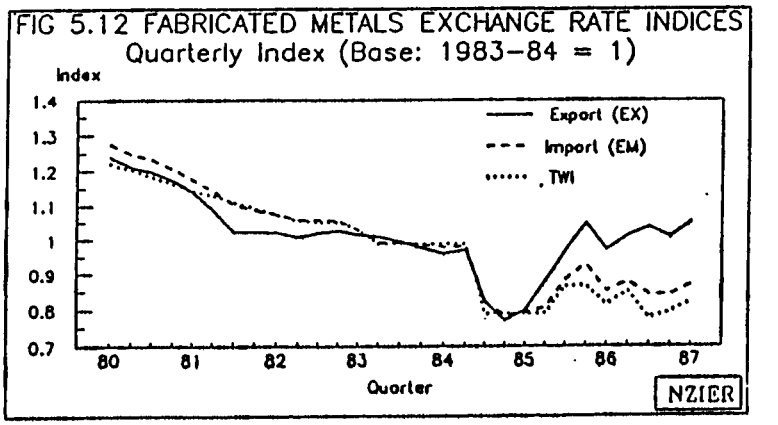


FIG 5.12 FABRICATED METALS EXCHANGE RATE INDICES
Quarterly Index (Base: 1983–84 = 1)
Index
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
80
81
82
83
84
85
86
87
Quarter
Export (EX)
Import (EM)
TWI
NZIER

FIG 5.13 FOOD AND BEVERAGE EXCHANGE RATE INDICES
Quarterly Index (Base: 1983–84 = 1)

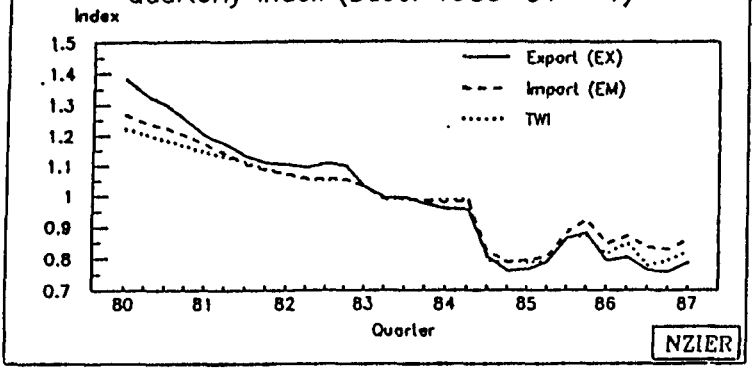


FIG 5.14 MINERALS EXCHANGE RATE INDICES
Quarterly Index (Base: 1983–84 = 1)

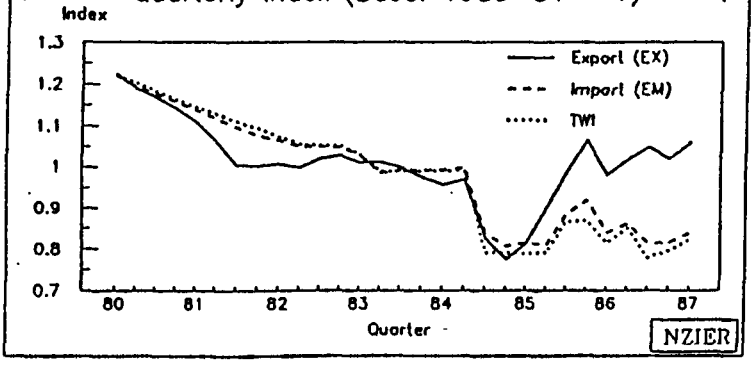


FIG 5.15 OTHER MANUFACTURE EXCHANGE RATE INDICES
Quarterly Index (Base: 1983–84 = 1)

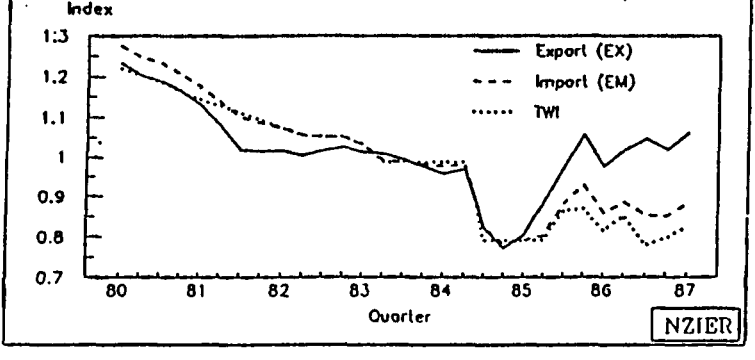


FIG 5.16 PAPER PRODUCTS EXCHANGE RATE INDICES
Quarterly Index (Base: 1983–84 = 1)

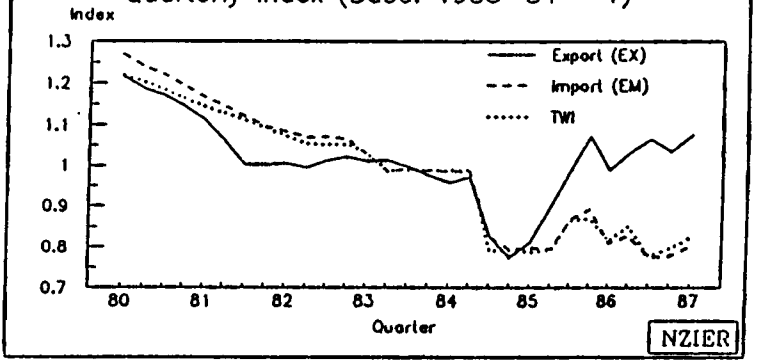


FIG 5.17 TEXTILES EXCHANGE RATE INDICES
Quarterly Index (Base: 1983–84 = 1)

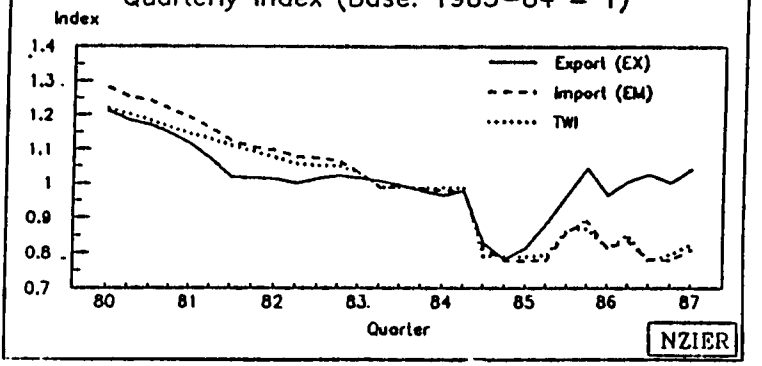
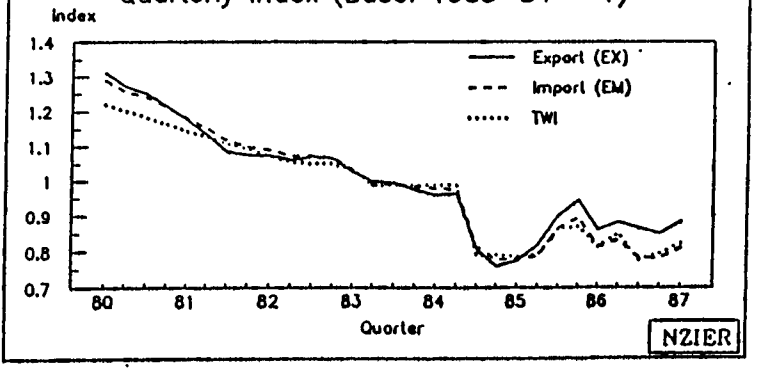


FIG 5.18 WOOD PRODUCTS EXCHANGE RATE INDICES
Quarterly Index (Base: 1983–84 = 1)



BIBLIOGRAPHY

Akhtar, M A, Financial Innovations and Their Implications for Monetary Policy : an International Perspective, Bank for International Settlements, Economic Paper No 9, 1983

Atkinson, P and J C Chouraqui, The Formulation of Monetary Policy : A Reassessment in the Light of Recent Experience, OECD Working Paper, No. 32, 1981

Bain, A D, The Economics of the Financial System, Martin Robertson, Oxford. 1981

Baldwin, S and P R Krugman, Persistent Trade Effects of Large Exchange Rate Shocks, NBER Working Paper, No. 2017, September 1986

Beenstock, M, A Neo-classical Analysis of Macroeconomic Policy, Cambridge University Press, 1980

Benston, G and C Smith, Jr, A Transactions Cost Approach to the Theory of Financial Intermediation, Journal of Finance, v.31, 1976

Bollard, A and R Buckle (eds), Economic Liberalisation in New Zealand, Allen and Unwin, 1987

Bowie, R and B Easton (eds), Business Opinion in New Zealand : the NZIER Survey, NZ Institute of Economic Research, Research Paper no 36. 1987

Briggs, P, The NZIER VAR Model, NZ Institute of Economic Research, Working Paper no 5. 1986

Buckle, R A, Sequencing and the Role of the Foreign Exchange Market, Ch. 11 (in Bollard and Buckle (1987))

Buiter, W H and M Miller, Monetary Policy and International Competitiveness : The Problem of Adjustment, Oxford Economic Papers, Vol. 33, July 1981

Carter, H, and I Partington, Applied Economics in Banking & Finance, Oxford University Press, 1984 (3rd edition)

Chant, J, Regulation of Financial Institutions - A Functional Analysis, Bank of Canada Technical Report no 45, 1987

Chiang, T C, On the Relationship Between the Exchange Rate and the Interest Rate Differential in Monetary Models, Quarterly Review of Economics and Business vol 24 no 3. 1984

Cho, Y J, Inefficiencies of Financial Liberalisation in the Absence of Well-functioning Equity Markets, Journal of Money, Credit & Banking, vol. XVIII, no 2, May 1986

Cooper, S A, Estimating New Zealand's Real Effective Exchange Rate, paper presented to the Summer Conference of the New Zealand Association of Economists, Victoria University of Wellington, February 1988

Corden, W M, The Exchange Rate, Monetary Policy and North Sea Oil : The Economic Theory of the Squeeze on Tradeables, Oxford Economic Papers, Vol. 33, July 1981

Corden, W M and J P Neary, Booming Sector and De-industrialisation in a Small, Open Economy, The Economic Journal, Vol. 92, No. 368, December 1982

Cuddington, J T, P O Johansson and K G Lofgren, Disequilibrium Macroeconomics in Open Economies, Blackwell. 1984

Currie, D, Macroeconomic Policy Design and Control - A Failed Partnership, The Economic Journal, 95, June 1985

Dornbusch, R, Expectations and Exchange Rate Dynamics, Journal of Political Economy, Vol. 84, No. 6, December 1976

Dornbusch, R, Exchange Rates and Prices, American Economic Review, Vol. 77, No. 1, March 1987

Dwyer, J, Real Exchange Rates as Indicators of Competitiveness, paper presented to the Economic Society of Australia

Conference, Surfers Paradise, August 1987

Edwards, S, The Order of Liberalisation of the Balance of Payments: Should the Current Account Be Opened Up First? World Bank Staff Working Papers no 710. 1984

Edwards, S, Stabilisation with Liberalisation : An Evaluation of Ten Years of Chile's Experiment with Free-Market Policies, 1973-1983, Economic Development & Cultural Change, University of Chicago. 1985

Edwards, S and van Wijnbergen, The Welfare Effects of Trade and Capital Market Liberalisation, International Economic Review vol 27 no 1. 1986

EMG, The Foreign Exchange Market, NZ Planning Council, Report no 4. April 1985

Emminger, O, The Exchange Rate as an Instrument of Policy, Lloyds Bank Review, July 1979

Foxley, A Latin American Experiments in Neo-Conservative Economics, University of California Press, Los Angeles. 1983

Goldstein, M, M Khan and L Officer, Prices of Tradeable and Non-Tradeable Goods in the Demand for Total Imports, The Review of Economics and Statistics, Vol. LXII, No. 2, May 1980

Goodhart, C A E, Money, Information and Uncertainty, Macmillan, London. 1975

Goodhart, C A E, Monetary Control, the British Experience, in Monetary Conditions for Economic Recovery. C van Ewijk and E E Klant, eds. (Financial and Monetary Policy Studies, no 11). Martinus Nijhoff Publishers. 1985

Harberger, A C, The Chilean Economy in the 1970s: Crisis, Stabilisation, Liberalisation Reform. Carnegie Rochester Conference Series on Public Policy, no 17, Autumn, 1982.

Harper, D A, The Financial Services Industry : Effects of Regulatory Reform, NZ Institute of Economic Research, Research Paper no 35. 1986

Hester, D D, Innovations and Monetary Control, Brookings Papers on Economic Activity, vol 1. 1981

Johnson, H G, The Monetary Approach to Balance of Payments Theory in Further Essays in Monetary Economics, London, George Allen and Unwin, 1972

Jonson, P D and R W Rankin, On some Recent Developments in Monetary Economics, Economic Record, vol 62, no 178., September 1986

Judd, J P and J L Scadding, Financial Change and Monetary Targeting in the United States. Paper presented at the Conference on "Interest rate Deregulation and Monetary Policy" in Monterey, California, November 1982

Keenan, P and D Mayes, Monetary Targets and Monetary Management: The New Zealand Experience, Societe Universitaire Europeenne de Recherches Financieres paper on Monetary Policy and Financial Systems, no 3. 1987

Keller P M, Implications of Credit Policies for Output and the Balance of Payments, IMF Staff Papers vol 27 no 3, September 1980

Khan, M S and R Zahler, The Macroeconomic Effect of Changes in Barriers to Trade and Capital Flows : a Simulation Analysis, IMF Staff Papers, vol 30 No 2, June 1983

Khan, M S and R Zahler, Trade and Financial Liberalisation Given External Shocks and Inconsistent Domestic Policies. IMF Staff Papers, vol 32, no 1. March 1985

Krueger, A O, Economic Liberalisation Experiences - the Costs and Benefits, New Zealand Treasury Public Information Programme. 1985

Maciejewski, E B, Real Effective Exchange Rate Indices, IMF Staff Papers, Vol. 30, 1983

Mann, C L, Prices, Profit Margins and Exchange Rates, Federal Reserve Bulletin, June 1986

Mathieson, D F, International Capital Flows, Capital Controls and Financial Reform, Ch. 17 in H.S. Cheng (ed), Financial Policy and Reform in Pacific Basin Countries, Lexington Books, 1986

Mayes, D G, Change, NZ Institute of Economic Research, Occasional Paper no 31. 1986

Mayes, D G and C S Nicholas, The Impact of Leasing on the Economy, Macmillan, London. 1987

Mayes, D G and D Savage, The Structure, Performance and Simulation Properties of the Monetary Sector of the National Institute Macroeconometric Model, National Institute of Economic and Social Research, Discussion Paper no 36. 1980

McKinnon, R, Currency Substitution and Instability in the World Dollar Market, American Economic Journal, 72, June 1982

McKinnon, R I, Money and Capital in Economic Development, Brookings Institution, Washington DC. 1973

McKinnon, R I, The Order of Economic Liberalisation : Lessons from Chile and Argentina, Carnegie Rochester Conference Series on Public Policy vol 17, North-Holland. 1982

Miller *et al*, Price Setting and the Commerce Act, NZ Institute of Economic Research. 1987

Minford, P, The Exchange Rate and Monetary Policy, Oxford Economic Papers, Vol. 33, July 1981

Molho, L E, Interest Rates, Saving and Investment in Developing Countries, IMF Staff Papers vol 33 no 1, March 1986

Nicholl, P W E, Deregulation of a Financial System: the New Zealand Experience 1976-1980, Reserve Bank of New Zealand, Discussion Paper G80/8, 1980

Poole, W, Deposit Deregulation and Monetary Policy : a comment. Carnegie-Rochester Conference Series on Public Policy, no 24. 1986

Pope, R, Revaluation : Help or Hindrance to Australian Manufacturing. Centre for Applied Economic Research, University of New South Wales. CAER Paper No. 14, December 1981

RBNZ, Monetary Policy and the New Zealand Financial System, Reserve Bank of New Zealand. 1983 (2nd edition).

RBNZ, Financial Policy Reform, Reserve Bank of New Zealand, 1986.

RBNZ, Prudential Policy in a Deregulated Environment. Reserve Bank Bulletin, March, 1987.

RBNZ, Press Release on Monetary Aggregates, Reserve Bank of New Zealand, August 1987

RBNZ, Post Election Briefing Paper to the Minister of Finance, Wellington, August 1987

Reynolds, C W, Comment on: R C Vogel and S A Buser, Inflation, Financial Repression and Capital Formation in Latin America *in* Money and Finance in Economic Growth and Development. Essays in honour of Edward S Shaw. Proceedings of the Conference held at Stanford University, edited by R I McKinnon, M Dekker. 1976

Santomero, A M and J J Siegel, Deposit Deregulation and Monetary Policy in The National Bureau Method, International Capital Mobility and Other Essays 1986

Shaw, E S, Financial Deepening in Economic Development, Oxford University Press, New York. 1973

Sims, C A, Macroeconomics and Reality, Econometrica vol 18, January 1980

Sims, C A, Policy analysis with Econometric Models, Brookings Papers on Economic Activity, no 1. 1982

Street, J H, Monetarism and Beyond : the Dilemma of the Southern Cone Countries : a Review Article, Journal of Economic Issues, vol 19, no 4. December 1985

Tobin, J and W.C Brainard, Financial Intermediation and the Effectiveness of Monetary Controls, American Economic Review, vol 53, May 1963

van Wijnbergen, S, Interest Rate Management in LDCs, Journal of Monetary Economics, vol 12, September 1983

Wells G and L Evans, A Critique of New Zealand Structural Macro-Economic Models and a Vector Autogressive Alternative, Victoria University of Wellington Department of Economics, Discussion Paper 17, September 1982

Wells G and L Evans, Issues and Estimation of the Impact of Traded-Goods Prices on the New Zealand Economy, NZ Institute of Economic Research, Occasional Paper no 18. 1983

Wojnilower, Albert N, The Central Role of Credit Crunches in Recent Financial History, Brookings Papers in Economic Activity, 2. 1980

Wolf, M, Timing and Sequencing of Trade Liberalisation in Developing Countries, Asian Development Review, vol 4, no 2. 1986

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