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Editor's Note

This edition of the *Bulletin* contains three articles. Two of the articles deal with the Bank's core function of monetary policy, although covering very different aspects of it, while the third article covers matters relating to the Bank's financial stability function.

The first article summarises the outcomes of the review of monetary policy conducted by Professor Lars Svensson, with a particular emphasis on the changes to the Bank's governance arrangements resulting from the review. Following the completion of Professor Svensson's report in February this year, and the response to it from the Reserve Bank, the Bank's Board of Directors and the Treasury, the Government announced on 7 August its decisions in respect of the review. The most significant changes arising from the review relate to the Bank's governance arrangements, particularly the removal of the Governor as chairperson of the Board in favour of a non-executive chairperson. The review has also contributed to a further strengthening of the monetary policy decision-making structure, whereby the Bank will engage one or two people from outside the Bank to provide advice on monetary policy issues on a part time basis. In addition to summarising these and other outcomes of the review, the article also compares the Bank's governance arrangements with those applicable to a number of other central banks, focusing in particular on those aspects of governance that relate to monetary policy decision-making.

Still on a monetary policy theme, but focusing on a very different aspect of it, the second article looks at the issue of the neutral real interest rate and the role it plays in monetary policy. The article explains the Bank's conception of the neutral real interest rate and describes how it is used by the Bank and other central banks in formulating monetary policy. It notes the difficulties inherent in measuring the neutral real interest rate and the uncertainties this creates for central banks. But within these uncertainties, the article lays out a framework for thinking about the neutral real interest rate and sets out some broad estimates of it for New Zealand.

The final article in this *Bulletin* is on macro-prudential indicators and analysis. This is a theme that was featured in an article in last year's *Bulletin*, when we explained the international context within which increasing attention is being given to macro-prudential indicators as a means of

monitoring and assessing potential instability in countries' financial systems. The article in this issue of the *Bulletin* builds on the earlier article by explaining the way the Bank thinks about macro-prudential indicators and related issues in a New Zealand context. It outlines the kinds of indicators to which we have regard when assessing financial system stability in New Zealand and discusses a range of indicators for the financial system. This is the first in what is intended to be a series of articles on macro-prudential analysis and related issues.

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Independent review of the operation of monetary policy: final outcomes

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On 7 August 2001, the Treasurer announced the results of the independent review of the operation of monetary policy. This article outlines these outcomes, focusing particularly on the modifications to the Bank's governance arrangements resulting from the Review.

1 Introduction and background to the independent review of the operation of monetary policy

In May last year, the Government announced the Terms of Reference for an independent review of the operation of monetary policy in New Zealand ("the Review") and appointed Professor Lars Svensson of Stockholm University to conduct the Review. At that time, the legislation that established the framework under which New Zealand monetary policy operates, the Reserve Bank of New Zealand Act 1989 ("the Act"), had been in place for a little over 10 years. It therefore seemed timely to the Government to examine whether that framework, and the Reserve Bank's operations within it, were appropriate to the characteristics of the New Zealand economy and consistent with best international practice. The Reserve Bank welcomed the Review as an opportunity to obtain an independent perspective on the monetary policy framework and to take stock of its own performance over the preceding decade.

In announcing the Terms of Reference of the Review, the Treasurer, Hon. Dr Michael Cullen, emphasised that some central features of New Zealand's monetary policy framework were not open for review. Dr Cullen stated that the statutory objective of monetary policy – price stability – was a critical feature of the monetary policy framework and would not be subject to review. The Government also indicated that it would not be considering changes that would lessen the

Reserve Bank's autonomy in formulating and implementing monetary policy. Although these key elements of New Zealand's monetary policy framework were ring-fenced from the Review, the Terms of Reference did require the reviewer to examine a wide range of issues related to the operation of monetary policy. In particular, the reviewer was required to:²

- 1 examine the way in which the Reserve Bank interprets and applies its inflation target, with a view to ensuring that this approach is consistent with avoiding undesirable instability in output, interest rates and the exchange rate;
- 2 assess whether the Reserve Bank has an adequate range of policy instruments and is using its current instruments effectively in altering monetary conditions in the desired direction;
- 3 consider the range of sources, availability, type and timeliness of data available to the Reserve Bank, and the impact of these variables on the Reserve Bank's forecasting and decision-making;
- 4 consider whether the Reserve Bank's decision-making process and accountability structures promote the best outcomes possible;
- 5 examine the co-ordination of monetary policy with other elements of the economic policy framework; and
- 6 review the Reserve Bank's communication of monetary policy decisions to ensure that these decisions are explained to the public and financial markets in the simplest, clearest and most effective way.

¹ The author would like to thank Geof Mortlock for his contribution to this article. The appendix to this article draws heavily on the work of Dean Minot and Dominick Stephens.

² A copy of the Terms of Reference can be found at <http://www.rbnz.govt.nz/monpol/review/index.html>

Professor Svensson presented the Treasurer with a report containing his conclusions and recommendations on 28 February 2001³ and the report was made available to the public at that time. On 7 August, after considering Professor Svensson's report, consulting with other political parties and receiving advice from the Treasury, the Bank, and the Bank's non-executive directors,⁴ the Treasurer announced the Government's final decisions emerging from the Review. At the time this article was written, the decisions requiring amendments to the Act had not been passed by Parliament. However, in announcing these outcomes the Government noted that they had cross-party support for these amendments.

This article summarises the Government's decisions in relation to the Review, with a particular focus on the outcomes pertaining to the Bank's governance arrangements. There are two key strands to this topic: the monetary policy decision-making framework; and the arrangements for ensuring that monetary policy decision-making is subject to effective accountability and monitoring. These issues attracted the most attention during the course of the Review. These were also the areas where Professor Svensson proposed the most far-reaching changes.

In section 2 of this article, we briefly summarise Professor Svensson's recommendations and the Government's response. In section 3, we discuss in more detail Professor Svensson's recommendations relating to governance and the Government's related final decisions. Section 4 makes some concluding comments. An appendix to this article puts the Bank's governance arrangements into an international context by summarising the key governance features of a number of other central banks.

³ A copy of this report can be found at <http://www.rbnz.govt.nz/monpol/review/index.html>

⁴ The Treasury, the Reserve Bank, and the Bank's non-executive directors each provided the Treasurer with a written response to Professor Svensson's report. These can be found at www.rbnz.govt.nz/monpol/review/index.html

2 Summary of Review recommendations and outcomes

1 Overall assessment of the operation of monetary policy. Although Professor Svensson noted that there were some episodes where, with the benefit of hindsight, monetary policy moves could have been better timed, his overall assessment of New Zealand's monetary policy over the 1990s was very positive. However, Professor Svensson was critical of the Bank's use of the Monetary Conditions Index between mid-1997 and March 1999. This was a shortcoming that the Bank itself had acknowledged in its submission to the Review. On the current operation of monetary policy, Professor Svensson concluded that "...monetary policy in New Zealand is currently entirely consistent with the best international practice of flexible inflation targeting...".

2 Monetary policy decision-making structure. Professor Svensson believed that vesting monetary policy decision-making power in a single person (the Governor) means that the quality of monetary policy decisions is too dependent on one person. To address this risk, he recommended that monetary policy formulation become the responsibility of a committee consisting of the Governor, the two Deputy Governors and two other senior members of the Bank's staff, to come into effect at the end of the Governor's current term of office.

The Government decided not to adopt this recommendation. The judgement of both the Treasurer and the Bank was that the current framework has significant benefits in terms of providing a clear accountability structure and clarity of communications. Moreover, the framework contains sufficient safeguards to protect against the single decision-maker risk. However, as noted later in this article, the Bank's governance arrangements will be modified to further reduce any risks associated with a single decision-maker structure.

3 Recommendations relating to the Bank's Board of Directors. Professor Svensson argued that the capacity of the Bank's Board of Directors to monitor the performance of the Bank and the Governor would be enhanced if the Board were chaired by a non-executive

director (rather than the Governor, as at present) and if those holding the positions of Governor and Deputy Governor ceased to be members of the Board. He also recommended that the Board publish an annual report outlining its assessment of the performance of the Bank and Governor as a way of increasing the transparency of the Board's role and strengthening the Bank's accountability arrangements.

The Government accepted the recommendation that the Board should be chaired by a non-executive director and that those holding the positions of Deputy Governor should cease to be on the Board. However, it was decided to retain the Governor as a Board member in order to ensure good communication flows between the Bank and the Board. The recommendation for the Board to publish an annual report has been adopted.

4 Other measures intended to strengthen monitoring.

Professor Svensson recommended that the Bank should hold an annual conference on the performance of monetary policy and related issues. He also recommended that the Finance and Expenditure Committee (FEC), the Parliamentary select committee responsible for overseeing financial and economic matters, should be provided with sufficient resources to enable it to review the Bank's monetary policy performance more effectively.

The recommendation to hold a regular conference on monetary policy issues was supported, although it was decided that these conferences will probably be held about every two years rather than annually. At the time this article was prepared, the recommendation concerning the FEC was being considered by the Government.

5 The Policy Targets Agreement. Professor Svensson recommended that the Policy Targets Agreement (PTA), the document that sets out the operational objective of monetary policy, should generally only be re-negotiated once every five years, at the start of a Governor's term of office. This recommendation reflected a desire for the PTA to be an enduring document and not subject to frequent review. It was also recommended that the wording of the PTA be altered to make it explicit that

monetary policy should have a medium-term focus. And Professor Svensson recommended that the operational target for monetary policy should be specified as a "point target" of 1.5 per cent (the mid-point of the current inflation target), rather than as a 0 to 3 per cent band.

The Treasurer did not support the recommendation that the PTA should generally only be re-negotiated at the start of a Governor's term. He took the view that, at times it can be useful for the PTA to be renegotiated, because it is important that the Government of the day shares ownership of how the price stability objective is operationalised.

In addition the move to a point target was not accepted. Although the adoption of a point target would be making explicit the Bank's current practice of targeting the mid-point of the band so as to minimise inadvertent breaches of the band, the Treasurer considered that a point target could be misinterpreted as a move towards a stricter inflation target. However, the Government did see merit in being explicit about the medium-term focus of monetary policy in the wording of the PTA when it was next negotiated.

6 Data availability. Professor Svensson recommended that Statistics New Zealand produce a monthly series of the Consumers Price Index (currently available at a quarterly frequency) and a monthly measure of industrial production (currently unavailable at any frequency). He considered that monthly data for consumer prices would assist the Bank to monitor and react to inflation developments and that a monthly industrial production index would enable the Bank to track economic activity more effectively.

These recommendations were not adopted. It was considered unlikely that a monthly series of consumer prices or industrial production would provide sufficiently meaningful information for monetary policy purposes to warrant the cost, given that New Zealand data tend to be volatile over short periods. It was therefore decided that, within the limited resources available for data generation, other areas of data development could be more usefully pursued.

7 Technical recommendations for the Bank to pursue.

In his report, Professor Svensson provided the Bank with some suggestions of a more technical nature that he believed would enable it to further improve its analysis and communications. The suggestions were that:

- i the Bank should more systematically collect and report on medium and long-term inflation expectations as a way of assessing the credibility of the regime;
- ii the Bank should develop more informative ways of expressing uncertainty – Professor Svensson was critical of the Bank’s move to round its published projections to the nearest half per cent, a move intended to convey the uncertainty that inevitably surrounds projections;
- iii the Bank should publish a regular report outlining its activities and findings with respect to its financial system oversight role, such as indicators of financial system stability;
- iv there were some areas where the Bank’s macroeconomic model, the Forecasting and Policy System (FPS), could be further refined, although Professor Svensson noted that the refinements he proposed would probably not make a material difference to policy outcomes.

The Bank saw merit in all of these suggestions and, in its response to the Review, undertook to follow up on them. In the case of the recommendation to publish more information in relation to the Bank’s financial system oversight responsibilities, the Bank noted in its response to Professor Svensson’s report that an annual Bulletin article is published covering some of these issues. We indicated that the Bank has recently increased the resources it directs to financial system oversight by forming a new team to monitor and analyse macro-prudential indicators and capital market developments. As a result, it is likely that the Bank will increase its publication of financial system stability issues.⁵

We will be considering how best to implement the other three suggestions as part of our on-going research and policy development agenda.

⁵ This issue of the *Bulletin* contains the first of what is intended to be a regular series of articles on macro-prudential indicators and related issues.

3 Governance-related recommendations and outcomes of the Review

The most far-reaching recommendations made by Professor Svensson relate to the Bank’s monetary policy decision-making structure and the monitoring role of the Bank’s Board. This section discusses the rationale underlying Professor Svensson’s recommendations in these areas, and the Bank’s and Government’s reactions to them.

3.1 Recommendations and outcomes related to monetary policy decision-making

As noted earlier in this article, Professor Svensson recommended that monetary policy decisions should be made by a committee consisting of the Governor, the two Deputy Governors and two other senior members of Reserve Bank staff, rather than by the Governor alone, and for this to come into effect after the end of the Governor’s current term of office.

Professor Svensson’s view was that vesting responsibility for monetary policy decisions in a single individual carried with it the risk that the quality of monetary policy was too reliant on the judgement and personal qualities of one person. He acknowledged that this had not yet been problematic in New Zealand, but argued that this was “...to a large extent because of the exceptional qualities of the current Governor, Dr Brash”. He noted that there was no guarantee that future appointees would be of such a high calibre. Professor Svensson argued that assigning responsibility for monetary policy decisions to a committee would mean that monetary policy would not be so heavily dependent on the qualities of one individual.

Professor Svensson cautioned against the inclusion of people who are not full-time employees of the Reserve Bank on the monetary policy committee. He noted that the inclusion of external members on a decision-making committee might be desirable if it were thought that people within the Bank were too narrow in their approach to monetary policy or not sufficiently ‘in-touch’ with the economy. However, he concluded that the openness of the Bank’s staff, and the Bank’s practice of regularly consulting with a wide range of

participants in the economy, obviated the need for external members to be included on a decision-making committee.

Moreover, Professor Svensson argued that there were a number of practical factors that would make having external members on a decision-making committee problematic in New Zealand. He argued that, in a country as small as New Zealand, the supply of suitable candidates who would not have conflicts of interests was too small to make having external members on a monetary policy committee viable over time. Also, because external members were not dealing with monetary policy issues on a day-to-day basis, he thought it likely that they would require a significant amount of assistance from Bank staff in order to participate effectively in policy-making, undermining their independence. Professor Svensson concluded that a committee of full-time Bank employees would avoid these disadvantages.

It was the Government's judgement – a judgement shared by the Bank and its non-executive directors – that there was little to be gained, and potentially something to be lost in terms of clarity of accountability and communications, by substantially altering a governance framework that has served this country well since its inception in 1989.

In particular, it was considered that, although there are some risks inherent in a single decision-maker model, the risks are adequately countered by a number of safeguards. We outline these below.

- The process prescribed in the Act for appointing the Governor is one that lends itself to careful selection of a suitable person. Although it is the Treasurer who appoints the Governor, no appointment can be made without the recommendation of the Board of Directors. Therefore, an appointment can only be made where both parties agree on the candidate. This reduces the risk of an unsuitable candidate being appointed to the position of Governor.
- Although the Act gives the Governor independence to formulate and implement monetary policy, the Governor's discretion is constrained by the need to ensure that the policy adopted is consistent with the agreed policy target. The Governor does not have the discretion to vary the target without the agreement of the Treasurer.

- The Board of Directors is charged with monitoring the performance of the Governor on behalf of the Treasurer and informing the Treasurer if it considers that the Governor's performance is inadequate. As a result of the Review, some changes will be introduced to strengthen the Board's monitoring role further. We discuss these changes shortly.
- The Act requires the Bank to be transparent with respect to its monetary policy decisions. Most important in this respect is the requirement to publish *Monetary Policy Statements*. This transparency not only assists the Board in its monitoring duties but also makes it possible for the news media, financial analysts, and the general public to monitor the Governor's performance closely. This again strengthens the incentives for the Governor to formulate policy in accordance with the agreed policy target and in ways that can be justified before a wide and critical audience.

When announcing the Government's decision to retain a single decision-maker for monetary policy, the Treasurer suggested that the monetary policy decision-making process might be further enhanced by expanding the range of views that the Governor is exposed to in the lead-up to monetary policy decisions. Dr Cullen's suggestion was consistent with moves that the Bank had been making to broaden and give more profile to its external consultation processes. Some measures that we had already implemented were:

- *The extension of the business visits programme.* Every quarter, as part of the monetary policy process, Reserve Bank staff visit around 50 organisations that are selected to represent a broad cross-section of industries and regions. These visits have been a regular part of the monetary policy process for a number of years and are one important source of up-to-date information on economic conditions. More recently, we have further increased the profile that we give to these visits by involving staff at a more senior level, including the Governor and Deputy Governors in some cases. From the March 2001 *Monetary Policy Statement*, we have published the list of companies and organisations consulted in order to increase the visibility of the consultation process.

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- *The initiation of a peer review process.* Over the past year, we have initiated a programme where experts in monetary policy from overseas central banks are invited to participate in the monetary policy process and to provide an evaluation of the process and suggestions for improvements. We see peer review as a way of ensuring that our internal processes are subject to frequent evaluation by suitably experienced experts and as an opportunity to draw on international best practice.

Since the Review, we have taken a further step towards diversifying the processes by which we seek external input in the lead-up to monetary policy decisions, by establishing positions for one or two part-time external advisers.⁶ These advisers will be chosen for their broad knowledge of the New Zealand economy and will likely be appointed for one or two year terms. They will be expected to participate in the Bank's internal discussions in the monetary policy process and to contribute their perspectives to those discussions. They will also be expected to provide the Governor with advice in relation to OCR decisions. This advice should provide a useful complement to the OCR recommendations currently prepared by senior Bank staff.⁷ As with senior Bank staff who already provide policy recommendations to the Governor, the new advisers are purely advisory in nature, with decision-making power remaining with the Governor.

The single decision-maker model, although used by several other central banks as well as New Zealand, is by no means the only monetary policy decision-making model in use within central banks. The appendix to this article puts New Zealand's monetary policy framework into international context by summarising the monetary policy arrangements of the Reserve Bank of New Zealand and seven other central banks.

3.2 Recommendations and outcomes aimed at strengthening the monitoring role of the Board

Professor Svensson made some recommendations relating to the Board that he believed would further strengthen its role. In particular, he recommended that the Board be chaired by a non-executive director, rather than the Governor as at present, and that the Board comprise only non-executive directors (ie that the Governor and Deputy Governors cease to be directors of the Bank). Professor Svensson also recommended that the Board issue a public report annually, setting out its assessment of the Bank's and Governor's performance. He believed that making the monitoring activities of the Board more visible would increase public confidence that the operation of monetary policy is subject to careful monitoring.

Professor Svensson was concerned about the conflicts of interest that could potentially arise from having the Governor and Deputy Governors as Board members, given that the Board's primary role is to monitor the performance of the Governor and the Bank. The Board has to date avoided these conflicts by forming a committee comprising the non-executive directors and delegating the Board's monitoring role to this committee. Professor Svensson's view was that it would be preferable to remove the Governor and the Deputy Governors from the Board completely.

Some, but not all, of Professor Svensson's recommendations with respect to the Board were adopted by the Government. The Government agreed that the Deputy Governors should cease to be on the Board, but decided to retain the Governor on the Board, principally for the sake of facilitating information flow between the Bank's executive and the Board. However, it was decided to remove the Governor as chair of the Board, and to provide for a non-executive chair, appointed by the non-executive directors. It is intended that the Reserve Bank of New Zealand Act will be amended in 2002 to give effect to these changes, with a view to the new arrangements coming into force on or about 1 July 2002.

The Bank and Government accepted Professor Svensson's recommendation that the Board publish an annual report containing its assessment of the conduct of monetary policy.

⁶ On 6 September 2001, the Reserve Bank announced that Dr Brent Layton and Ms Kerrin Vautier had been appointed to these positions.

⁷ For a discussion of the role of the OCR advisory group in the process leading up to monetary policy decisions see "The monetary policy decision-making process", one of the supporting documents to the Bank's submission to the Review. This can be found at www.rbnz.govt.nz/monpol/review/index.html

Reflecting this decision, the Bank's annual report for the year to 30 June 2001 contains a report from the non-executive directors. The scope of this report is broader than that proposed by Professor Svensson in that it covers all areas of the Bank's activities. In its first report, the Board details how it has monitored the performance of the Governor and the Bank over the preceding 12 months. The report then evaluates the performance of the Bank and Governor over the past year against the goals set out in the annual plan for that year. In cases where a planned outcome was not achieved, the Board sets out its assessment of the reasons for these deviations and its view as to whether these deviations were acceptable given the circumstances.

4 Concluding comments

The Review has been a very useful process from the Bank's perspective. It provided a formal opportunity to obtain an independent assessment of New Zealand's monetary policy framework and the Bank's operation within it. The Bank is pleased that the single decision-maker structure for monetary policy was retained because we believe that this arrangement provides significant benefits in terms of clarity of accountability and communications. And we believe that the planned modifications to the Bank's governance arrangements resulting from the Review, in particular the changes relating to the Board of Directors, should further strengthen the accountability arrangements.

Appendix: How do the Reserve Bank of New Zealand's governance arrangements compare to those of other central banks?

This appendix summarises the key features of the monetary policy framework of the Reserve Bank of New Zealand and compares it with the frameworks in seven other central banks.

As noted in the article, the issue of monetary policy decision-making structures was one that received a lot of focus during the Review. In the process of preparing its submission to the Review, the Bank had regard to the decision-making arrangements at some other central banks. In the remainder of this appendix, we provide a brief outline of the decision-making arrangements in these central banks.

At a general level, monetary policy decision-making models can be divided into three broad categories, although we recognise that within each category the specific organisational structure can vary significantly:

- i Monetary policy decisions made by a single decision-maker (usually the Governor of the central bank).* As noted above, the New Zealand model involves monetary policy decisions being vested in a single decision-maker – the Governor of the Reserve Bank. This model is also formally adopted in some other central banks, for example the Bank of Canada (although in Canada a committee is closely involved in making decisions). As well as being solely responsible for the formulation of monetary policy, it is conventional for the Governor to have formal responsibility also for all other areas of the central bank's operations.
- ii Monetary policy decisions made by a committee that is responsible only for monetary policy.* Another model for monetary policy decision-making is for the power to determine policy to be vested in a monetary policy committee, rather than in just one person. Such a committee is usually accountable to a board that is responsible for monitoring the central bank's performance. This decision-making structure is in place at the Bank of England.

iii Monetary policy decisions made by a board that is also responsible for making decisions in respect of all of the central bank's functions. The third basic model for allocating decision-making power is for the power to be vested in the governance board of a central bank, where the board has decision-making responsibility for all aspects of the central bank's operations. The Reserve Bank of Australia and the Bank of Japan are examples of central banks that operate under this model.

One major source of variation between central banks where committees make monetary policy decisions (categories ii and iii above) is in respect of committee composition. In some cases, for example in the case of the ECB and the Riksbank, all members of the monetary policy committee are 'internal' to the central bank—that is, they are full-time monetary policy specialists. Some other decision-making committees contain both internal members and 'external' members who, prior to their appointment to the committee, and sometimes during their tenure, held or hold professional positions outside the central bank. Committees with external membership vary further according to whether the external members have backgrounds closely related to monetary policy or whether they are appointed on the basis of a broader knowledge of the economy.

Each of the decision-making structures outlined above is likely to have different strengths and weaknesses. For example, committee decision-making structures will mean that policy is less reliant on the judgements and qualities of a single individual and will more naturally lend themselves to ensuring that a range of views are taken into account in the policy-making process. However, relative to a single decision-maker, these arrangements have the drawbacks of more complex accountability structures and potentially make the task of communicating monetary policy decisions more complicated.

The fact that different decision-making models exist around the world, and that central banks operating under each of these structures succeed in meeting their monetary policy targets, suggest that there is no single 'right' or 'wrong' monetary policy decision-making model.

The following tables summarise the key features of the governance arrangements applicable to a number of central banks.

Table 1 sets out the objectives of each central bank and the degree of independence from the government that the central bank has in pursuing those objectives.

Table 2 outlines the role and composition of the Board of Directors of each central bank. The role of the Board can vary quite substantially from country to country. Some central bank boards are responsible for the management of all areas of the central bank's activities, including monetary policy formulation, while others, like the Reserve Bank of New Zealand's Board of Directors, do not have management responsibilities, but are charged with monitoring the central bank's performance.

Table 3 summarises the composition of the body responsible for formulating monetary policy at each central bank.

Table 1
Central Bank independence and objectives

Independence	Legislated objectives	Legislation	Operational objective	Date adopted
RBNZ Independent to pursue an inflation target agreed upon by the Governor and the Treasurer.	Formulation and implementation of monetary policy aimed at achieving and maintaining stability in the general level of prices.	RBNZ Act 1989.	Inflation target of 0 to 2% adopted in 1988, 0 to 3% in 1996.	1988
Reserve Bank of Australia (RBA) Independent to determine monetary policy, but currently an inflation target has been agreed to with the Treasurer.	To ensure that monetary and banking policy . . . will best contribute to: (a) the stability of the currency of Australia; (b) the maintenance of full employment in Australia; (c) the economic prosperity and welfare of the people of Australia.	Reserve Bank Act 1959.	Pursues average inflation of 2 to 3% over the business cycle.	1993
US Federal Reserve Has independence to conduct monetary policy in pursuit of legislated objectives for policy.	Maximum employment, stable growth, and moderate long-term interest rates.	Act of November 16, 1977.	The Federal Reserve has no numerical inflation target, but holds the view that price stability is necessary for achieving its legislated goals.	
Bank of Canada Has operational control over monetary policy to pursue a goal agreed to by the Bank and the Government.	To promote the economic and financial wellbeing of Canada.	Bank of Canada Act 1934.	Initial inflation target adopted in 1991. Price stability is currently defined as inflation of 2% +/- 1%.	1991
Bank of England Has operational independence to pursue price stability. The Chancellor of the Exchequer informs the Bank every year of what price stability is taken to mean, and of the government's economic policy.	To maintain price stability, and subject to that, to support the economic policy of Her Majesty's Government, including its objectives for growth and employment.	Bank of England Act 1998.	Initial inflation target of 1 to 4% adopted in 1993. Price stability is currently defined as inflation of 2.5% +/- 1% reporting range.	1993
Bank of Japan Has autonomy regarding currency and monetary control.	Currency and monetary control shall be aimed at, through the pursuit of price stability, contributing to the sound development of the national economy.	Bank of Japan Law 1997.	To maintain price stability. There is no explicit inflation target.	1998
Sveriges Riksbank (Sweden) Has operational independence to pursue price stability.	To maintain price stability.	1999 amendment to Sveriges Riksbank Act.	Maintain price stability – a target of 2% inflation +/- 1%.	1993
European Central Bank (ECB) Completely independent.	To maintain price stability.	Protocol no 18 of the Statute of the European System of Central Banks and the European Central Bank.	The ECB has an inflation target of less than 2%. Their strategy involves having a reference value for the growth of the M3 monetary aggregate of 4.5%. They also stress that they are interested in inflation, and thus the growth of M3, over the medium term.	1999

Table 2
Board of central banks

	RBNZ (after Review amendments)	RBA	US Federal Reserve	Bank of Canada	Bank of England	Bank of Japan	Sveriges Riksbank	ECB
1	Composition of the governing board	Reserve Bank Board: consists of Governor, Deputy Governor, Secretary of Treasury, 6 other. Note: At least 5 of the 6 "other" board members must be from outside the RBA or the Aust . public service.	Board of Governors (BoG): consists of Chair, Vice Chair, 5 others (all full-time members).	Board of Directors (BoD): consists of Governor, Senior Deputy Governor, and 12 regional representatives. The Deputy Minister of Finance sits on the Board as a non-voting member.	Court of Directors (CoD): consists of Governor, 2 Deputy Governors, 16 non-exec directors.	Policy Board: consists Governor, 2 Deputy Governors, 6 full-time deliberative members.	Governing Council: consists of 11 members. Appointed by parliament, usually from among its members, and tends to reflect the political make-up of parliament.	Governing Council: consists of the Executive Board, and national central bank governors. The Executive Board comprises the President, Vice-President of the ECB and 4 others.
2	Appointed by	The Governor General, on recommendation of the government of the day.	The President, confirmed by the Senate.	BoD appointed by Minister of Finance; Governors appointed by BoD on the recommendation of the government of the day.	The Crown, on the recommendation of the government of the day.	Cabinet with the consent of both Houses of the Diet.	Parliament.	Executive Board appointed by the Council of the European Union; central bank governors appointed by own government.
3	Length of term	Governors – 7yrs; others – 5yrs.	14yrs; the chair serves for 4yrs.	Governors – 7yrs; Other directors – 3yrs.	Governors – 5yrs; others – 3yrs.	5 yrs.	Unclear from legislation.	Executive Board -8yrs; CB governors – at least 5yrs.
4	Duties of board	The Board is responsible for all Bank policies except payment systems.	Oversees operations of entire Federal Reserve System.	BoD appoints and oversees the Governing Council, and ensures management of the Bank.	To ensure that quality data is used by the Monetary Policy Committee.	To decide on all matters of monetary policy and Bank policy, as well as overseeing the execution of duties by executives.	Appoints and oversees the Executive Board, and oversees the running of the Bank. Reports to Parliament on performance of monetary policy.	Formulates monetary policy.
5	Does the governing board formulate monetary policy?	✓	✓ ⁸	✗	✗	✓	✗	✓

⁸ The Board of Governors constitutes a majority on the Federal Open Market Committee, which is the Federal Reserve's monetary- policy-making body.

Table 3

Responsibility for monetary policy formulation

	RBNZ (after Review amendments)	RBA	US Federal Reserve	Bank of Canada	Bank of England	Bank of Japan	Sveriges Riksbank	ECB
1 Monetary policy decision making body	Governor.	Reserve Bank Board. (Decision by vote)	Federal Open Market Committee: 7 members of BoG, 5 Presidents of Regional Reserve Banks. (Decision by vote)	The Governor by statute. However, in practice the Governor has agreed to be bound by the decision of the Governing council: Governor, Senior Deputy Governor, 4 Deputy Governors.	Monetary Policy Committee: Governor, 2 Deputy Governors, 2 staff, 4 non-exec. (Decision by vote)	Policy Board. (Decision by vote)	Executive board: Governor, Deputy Governor, 5 others. (Decision by vote)	Governing Council.
2 Length of term	5yrs.	Governors - 7yrs; others - 5yrs.	BoG - 14yrs; Regional Fed Presidents – rotate every year ⁹	Governor and Senior Deputy Governor – 7yrs. 4 other Deputy Governors – no fixed term.	Governors – 5yrs.	Whole board - 5 yrs	6 yrs.	Central bank governors - min. of 5 yrs; Executive Board - 8 yrs.
3 Appointed by	Treasurer on the recommendation of Board of Directors.	Governor General on recommendation of the government of the day.	US President appoints BoG, regional Fed Boards appoint Regional Presidents.	Governor and Senior Deputy Governor – Board of Directors with the approval of Government. Deputy Governors – Board of Directors.	Governors appointed by Crown on the recommendation of the Government of the day; 2 staff appointed by Governor; 4 non-exec appointed by Chancellor of the Exchequer.	Cabinet with the consent of both Houses of the Diet.	Governing Council.	Central bank governors appointed by own govt; Executive Board appointed by Council of European Union.
4 Do any members of the policy making body have paid fulltime positions outside of the Bank?	X	✓	X	X	✓ However, current MPC members have given up all outside employment other than academic appointments.	X	X	X
5. Government representative on body?	X	Secretary of Treasury.	X	X	Treasury Representative. (non-voting)	The Minister of Finance and the minister for economic and fiscal policy (non-voting).	X	X
6. Advisory structures	Monetary Policy Committee made up of governors and senior bank staff. OCR advisory group, consisting of the Governor, 2 Deputy Governors and 6 other members of Bank staff and 1 or 2 external advisers.	Bank staff.	Research staffs of Board of Governors and Federal Reserve Banks.	Regional advice from Board of Directors; data and analysis from bank staff.	Bank staff; regional representatives (send regional info); Treasury representative.	Bank staff.	Bank staff.	National central banks provide regional info; ECB staff.

What is the neutral real interest rate, and how can we use it?

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This article sets out the Reserve Bank's conception of the "neutral real interest rate", and identifies factors that influence its level. These factors provide a starting point for thinking about what might cause the neutral real interest rate to change over time, or differ across countries. We consider the uses and limitations of neutral real interest rates in answering some of the questions that are relevant to monetary policy, and present a range of estimates of the neutral real interest rate for New Zealand.

1 Introduction

The focus of this article is the neutral real interest rate. In order to understand the concept of a neutral real interest rate, it is first necessary to understand what we mean by the term 'real interest rate'.

The interest rates that we observe in day-to-day life are almost always expressed in nominal terms. For example, if an investor has money in a savings account, the nominal interest rate tells the investor how much money the bank will pay them as a return on their savings. The nominal interest rate does not tell the investor how much the return on their savings will be worth in terms of actual goods and services. To find this out, the investor would need to adjust the nominal return on their savings by the amount by which they think prices will change during the time when their money is held in their savings account. In other words, to determine the expected real interest rate, the investor would need to subtract the expected inflation rate from the nominal interest rate.

Assuming that we care about the quantity of goods and services that we can buy with money, rather than money itself, it would seem reasonable to suppose that it is the real interest rate, rather than the nominal interest rate, that drives our economic decisions. For many central banks, including the Reserve Bank of New Zealand, the policy instrument that the central bank can directly control is a short-term nominal interest rate. However, because inflation expectations tend

to be stable over short periods of time, a change in nominal interest rates also changes the real interest rate.²

Central banks use their policy instrument, usually a short-term nominal interest rate, to lean against inflationary pressure when they judge that this can be done effectively.³ Sometimes interest rates will be increased to lean against the possibility of inflation rising too much, and sometimes they will be lowered to avoid the possibility of inflation falling too much. But how do we know how high is high enough – or how low is low enough? One concept that sheds some light on this question is the *neutral* real interest rate.

A neutral real interest rate provides a broad indication of the level of real interest rates where monetary policy is neither contractionary nor expansionary. In this sense a neutral real interest rate can be thought of as a benchmark, where a contractionary real interest rate is sometimes referred to as 'above neutral', and a stimulatory real interest rate is 'below neutral'. The gap between the current real interest rate and the neutral real interest rate can be thought of as a rough measure of the degree to which monetary policy is stimulating or contracting the economy. However, it is important to remember that the real interest rate is not the only influence on economic activity; many factors influence the level of activity in an economy.

¹ The authors would like to thank Reserve Bank colleagues for comments on earlier drafts of this article. Special thanks are due to Anne-Marie Brook, Geof Mortlock, Christie Smith, and Bruce White.

² When there is a change in the short-term nominal interest rate, the short-term real rate will move in the desired direction, so long as there is less than a one-for-one movement in short-term inflation expectations.

³ This will depend on the amount of time it takes for a change in the interest rate to have an effect on inflation. If, on balance, the inflationary pressure is anticipated to subside before the change in the interest rate would have any effect on inflation, then there will be little or no reason for the central bank to act.

Unfortunately, as explained later in this article, the neutral real interest rate is not directly observable and must therefore be derived from other data, with all the uncertainty that that entails. Another difficulty is that the phrase “neutral real interest rate” may mean different things to different people. How relevant different concepts of the neutral real interest rate are depends on the types of questions we are asking. For example, we may be able to use a neutral real interest rate to decide whether interest rates are *contractionary to demand*, but we will not necessarily be able to use it to answer whether interest rates will actually *cause demand to contract*.

In this article we expand on the above distinction and clarify alternative concepts of the neutral real interest rate. We argue that it is possible to think of neutral real interest rates in a short-run, medium-run or a long-run context. Although a central bank may wish to make use of all three of these ways of thinking about neutral real rates, this article’s primary focus is the medium-run concept of neutral. We reserve the abbreviation ‘NRR’ to refer exclusively to the *medium-run* concept of the neutral real rate.⁴

In section 2, we set out what we mean by the NRR. In section 3, we outline the uses and limitations of the NRR. In section 4, we consider issues surrounding alternative interpretations of neutral real interest rates and the relevance of these interpretations for monetary policy. In section 5, we sketch out the key drivers of interest rates more generally, and explain how the NRR relates to observed nominal interest rates. This discussion helps us to pin down the factors that are likely to cause differences in the NRR across countries and variations in the NRR for a given country through time. In section 6, we outline the approaches taken to estimating the NRR and discuss the results. Lastly, we provide some concluding comments.

2 Understanding the NRR

This section sets out our understanding of the NRR. To provide context for this discussion, we first outline the role of monetary policy in influencing real interest rates over the business cycle, for the purpose of maintaining price stability.

Inflationary pressure can come from a number of sources. One important source of inflation is capacity constraints in the economy, which can give rise to increased pressures on factor prices, such as labour and capital costs. The level of output that is consistent with an economy operating at its highest sustainable level, *without* exceeding capacity constraints, is known as “potential output”. The difference between actual and potential output is known as the “output gap”. If actual output is greater than potential output (a positive output gap), then supply constraints tend to result in inflationary pressure.⁵ Conversely, if actual output is below potential output (a negative output gap), this means that there is an under-utilisation of resources, which may contribute to deflationary pressures. As the level of potential output cannot be directly observed, it is often proxied by the trend level of actual output (see Claus et al (2000)).

In general, when a positive output gap is expected to persist, monetary policy-makers will set interest rates at a level that places downward pressure on demand, hence alleviating capacity constraints and thereby dampening the inflationary pressure that may otherwise arise. Conversely, when the central bank’s assessment is that actual output will be lower than potential output, the central bank will set short-term interest rates at a level that places upward pressure on demand so as to avoid the emergence of deflationary pressures.

Of course, the output gap is only one of many sources of inflationary pressure that central banks have regard to when formulating monetary policy. Central banks will sometimes also wish to lean against persistent deflationary or inflationary pressures arising from other sources, such as changes in

⁴ Allsop and Glyn (1999) and Blinder (1998) explore concepts of the neutral real interest rate that are close to the NRR, as defined in this article.

⁵ For example, some people might have to work longer hours, or machinery might have to be used for longer than would usually be the case. Workers need to be compensated for their extra effort, and machines may require additional maintenance. Therefore, the extra output produced is more costly than the output produced at normal capacity levels. If firms pass these higher costs on to consumers, inflation can result.

inflation expectations, exchange rate pass-through, or changes in price-setting behaviour.

For working purposes, we define the NRR as the interest rate that would prevail if there were no inflationary or deflationary pressures requiring the central bank to lean in either direction. In other words, the NRR is the interest rate that is consistent with a situation in which inflation and inflation expectations are stable at the inflation target and the output gap is zero and is expected to remain zero over the medium run. Note that this definition implicitly assumes that there is a corresponding neutral level for the exchange rate, such that the exchange rate neither stimulates nor contracts demand, and that the exchange rate is at this neutral level.

In order to understand the implications of this definition, let us suppose, for the sake of argument, that the real interest rate is held above the NRR for a prolonged period of time. Let us suppose further that, over time, positive and negative economic shocks have counter-balancing effects on inflation. And similarly, let us assume that the effects of downturns will exactly offset the effects of business cycle upswings on inflation, and that inflation expectations are stable unless they are disturbed by a shock to the economy. Under these assumptions, even if the real interest rate is held only marginally above the NRR, inflation will eventually fall.⁶ Conversely, if the real interest rate is held marginally below the NRR, inflation could be expected to rise.

In section 4 we explain the distinction between our medium-run working definition of the NRR, and alternative ways of thinking about neutral real interest rates that are more short-run or long-run in focus. Before doing so, we discuss how the NRR, as we define it, may be used by monetary policy-makers.

3 How can policy-makers use the NRR?

Given that monetary policy-makers must take a view on the impact that different interest rate settings will have on the economy, they also must, at least implicitly, have a view on the level of the NRR. However, this view need not be set in stone. Indeed, as discussed later in this article, given the uncertainties surrounding the determination of the NRR, there are very good reasons for not attempting to quantify the NRR precisely and for not regarding the NRR as being stable over time. Different estimation methods and data may yield different, though arguably equally valid, results. This uncertainty is not unique to the NRR. There are many other unobservable variables that monetary policy-makers need to take a view on in order to determine appropriate policy settings, including, for example, the determinants of household saving and consumption decisions, the responsiveness of exports to the exchange rate, and the level of the equilibrium real exchange rate.

Given the uncertainty surrounding the 'true' value of the NRR, it is more common to describe a given interest rate setting as being 'broadly', rather than 'exactly', neutral. Given some agreement on what constitutes broadly neutral conditions, we can have a common understanding of the levels at which interest rates would be broadly stimulatory or contractionary. A range of estimates of the NRR is therefore used to give an indication of where appropriate interest rate settings may be, depending on whether a stimulatory, contractionary or neutral policy stance is required.

There is one particular time when we need to use a point estimate of neutral. This is when we use the NRR for modelling purposes. Models, and the various assumptions that they are built on, are used to arrive at a simplified, but internally consistent view of the linkages in the economy. Models cannot, and are not meant to, fully capture the real world. Instead, they are tools to be used in conjunction with, and to provide crosschecks on, judgement and experience.

⁶ This is a similar idea to that advanced by Wicksell (1907), when he wrote "If, other things remaining the same, the leading banks of the world were to lower their real rate of interest, say 1 per cent. below its ordinary level, and keep it so for some years, then the prices of all commodities would rise and rise without any limit whatever; on the contrary, if the leading banks were to raise their rate of interest, say 1 per cent. above its normal level, and keep it so for some years, then all prices would fall and fall and fall without any limit except Zero."

The NRR that has been calibrated into the Reserve Bank’s baseline economic model is 4.5 per cent.⁷ While there is no guarantee that this, or any particular assumption, will be maintained indefinitely, this number is well within the range of NRR estimates that we present later in the article.

Given the uncertainty that inevitably surrounds model assumptions, model-builders and users need to be pragmatic. Problematic assumptions may not be easily observable, as they may be offset by incorrect assumptions elsewhere in the model. Furthermore, when using the model for forecasting purposes, we may override the assumptions to some extent, as the output from the model may be altered in order to include influences that the model structure cannot automatically capture. We manage the uncertainty inherent in the assumptions of the model by paying close attention to the sensibility of the model as a whole, and by treating the judgementally-adjusted model forecast as part of a range of possibilities of how the future will unfold.

The NRR provides policy-makers with an indicative benchmark, by telling them whether a given level of the interest rate is likely to be contractionary or stimulatory. However, it does not tell the policy-maker the exact level at which to set interest rates. To decide on the appropriate interest rate setting, the policy-maker needs to decide *how* stimulatory or contractionary monetary policy needs to be, and for how long that stance needs to be maintained. These decisions will depend on a number of factors, the most important being:

- 1 The policy-maker’s assessment of the strength and persistence of the inflationary pressure that they are trying to offset. Generally, stronger and more persistent inflationary pressures will lead to higher interest rate settings.

- 2 Preferences regarding the trade-offs between deviations of inflation from the target, and volatility in other economic variables, such as output or the real exchange rate.

Policy-makers face a trade-off between the variability in inflation and the variability in output. For instance, in some circumstances, in order to adhere strictly to an inflation target, aggressive monetary policy actions may be required (ie large movements in the policy rate – the OCR in the case of New Zealand). The advantage of aggressive policy is that the inflation target may be able to be better maintained. However, this may cause increased volatility in economic activity.

Recent authors have put this trade-off into an analytical framework that characterises inflation targeters as either ‘strict’ or ‘flexible’ (see for example Svensson (1997)). A ‘strict’ inflation targeter will be relatively more willing to accept greater variation in output in order to achieve reduced variation in inflation. A ‘flexible’ inflation targeter will be relatively more willing to accept greater variation in inflation in order to achieve reduced variation in output. In the event of an inflationary shock, the stricter an inflation targeter is, the faster they will try to return inflation back to the target. In comparison, a flexible inflation targeter will allow for longer periods of time to elapse before the inflation target is restored.⁸

4 Alternative ways of thinking about a neutral real interest rate

A central bank may also use the NRR as one piece of information to consider when addressing questions such as “is the current interest rate setting going to cause inflation to increase or decrease?” However, implicit in this type of

⁷ Note that 4.5 per cent is an annualised short-term real interest rate. The reader should not confuse the maturity of the interest rate with the lengths of time over which we discuss various concepts of neutral real rates. In this article all interest rate maturities are short-term. We consider neutral interest rates of short-term maturities in short, medium, and long-run contexts. In section 4 we discuss short, medium and long-run concepts of neutral real rates in more detail.

⁸ Note that points 1 and 2 above are not independent. For example, if inflationary shocks have the effect of destabilising inflation expectations, then a relatively more aggressive monetary policy response may be justified in order to prevent persistent inflation expectations from building. Conversely, if people believe that the central bank is relatively ‘strict’, then they may set their inflation expectations to be more in line with the inflation target, thus reducing the persistence of inflationary shocks.

question is an unspecified time horizon. For example, is the central bank asking whether interest rates will cause inflation to increase or decrease *soon*, or are we asking whether inflation will increase or decrease *ever*? If interest rates are contractionary to demand, *when* will they cause demand to contract? The time horizon that one has in mind when talking about neutral is relevant. Related to the question of the relevant time horizon, the central bank is also concerned with how many (and which) variables it thinks of as being in equilibrium when discussing the 'neutral real interest rate'.

As a working assumption, it may take one to two years for interest rates to have their full effect on inflation. The time it takes to return inflation and inflation expectations back to the mid-point of the target band, the output gap back to zero, and the exchange rate back to equilibrium, assuming an absence of new disturbances, may be longer. It is this longer horizon, which we loosely characterise as the 'medium run', which is relevant for the NRR.⁹

Because the Bank's definition of the NRR falls short of requiring *all* economic variables to be in equilibrium, it is not a 'long-run' definition. Furthermore, we argue that there is a difference between thinking about what real interest rate is neutral over the medium run, and what real interest rate is neutral at the current point in time, or in the short run. We choose a medium run concept for our NRR definition because it is less abstract than the long run concept, yet more stable than the short run concept.

The "short run neutral real interest rate" and the "long run equilibrium real interest rate" are discussed in the next sections.

⁹ The horizon relevant for the NRR should not be confused with the period by which the policy-maker would wish to return inflation to the target rate. There is no clear link between the length of the horizon that is relevant for the NRR, and the preferences of the inflation targeter over volatility outcomes, as described above. Although, in the event of an inflation shock, a strict inflation targeter will achieve the inflation target sooner, they may create instability in the real side of the economy, which may cause the real interest rate to deviate from neutral for a long time. The more flexible the inflation targeter is, the less likely it is that the real interest rate will deviate much from the NRR, but the more likely it is that inflation may deviate from the target rate.

4.1 A shorter run concept of neutral real interest rates

At any given point in time, an economy will almost certainly be in a state of disequilibrium. For example, it is unlikely that an economy will simultaneously have a sustained zero output gap, and the exchange rate at neutral. An economy may be in a position where the interest rate is above the NRR, the exchange rate is below its neutral level, and the output gap is positive. In these circumstances, holding the real interest rate above the NRR will cause inflation to fall eventually. However, it is unclear whether the combined effect of these influences will be to push inflation up or down over the time period with which the policy-maker is concerned.

This suggests that another way of thinking about the NRR is to ask whether the real interest rate, in combination with other variables in the economy, will actually cause demand and inflation to expand or contract in the short run, where we define the short run as the time that it takes for interest rates to affect inflation. The NRR in this context would be the real interest rate that is consistent with inflation neither increasing nor decreasing over the short run. A short run definition of the neutral real interest rate takes us closer to the actual policy setting in that it takes account of current and expected economic conditions.

4.2 The long run equilibrium real interest rate

Over longer periods of time the structure and features of economies change dramatically. Social, political and technological influences can lead to large upheavals. Yet, over a long enough span of time we expect economies to settle down to more or less stable ways of operating.

We think of this abstract horizon as the 'long run, steady-state equilibrium'. This is a period of sufficient length to enable all markets to clear and to allow all variables in the economy to settle at constant growth rates, in the absence of new economic disturbances. Note that this includes equilibrium in stocks as well as in flows - for example, the long run equilibrium ratio of total foreign assets/liabilities to output. For expositional reasons, we consider the long run equilibrium state of the economy to be without risk and without impediments to capital flows.

A distinguishing feature of these three concepts is their associated degree of volatility. We would expect the short run concept of a neutral real interest rates to be the most volatile of the three concepts, as it is affected by shocks that hit the economy. For example, in response to a sudden appreciation of the exchange rate, the short run concept of the neutral real rate would tend to fall. In contrast, the medium and long run concepts would be unaffected. The long run equilibrium real interest rate is the most stable, as it is a feature of the economy in the abstract notion of the long run - when all markets are in equilibrium and there is therefore no pressure for any resources to be redistributed or the growth rates for any variables to change.

Between these short and long-run extremes lies the medium run concept that we apply to the NRR. The NRR shifts over time not in response to temporary disturbances to the economy, but rather, in response to changes in the structure of the economy. Examples of these changes include demographic features, technological change, industrial organisation, international relationships (eg trade agreements), long-term government policies for health, education, social welfare etc.

As the economy moves towards long run equilibrium, the NRR will be converging to some long run equilibrium real interest rate. Therefore, the determinants of the long run

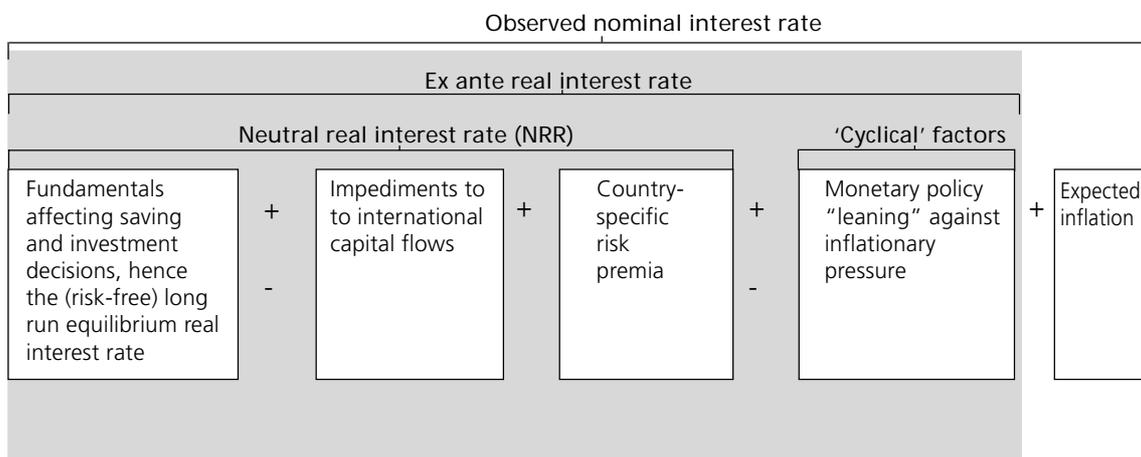
equilibrium real interest rate may help us to understand movements in the NRR over long periods, and may help explain differences in the NRR between countries. Towards this end, in the next section we discuss the theoretical determinants of long run equilibrium real interest rates, in the broader context of factors that influence the NRR and interest rates more generally.

5 Decomposing observed nominal interest rates

Figure 1 decomposes the observed nominal interest rate into different component parts. First, we identify factors that would influence the risk-free long run equilibrium real interest rate. We can then arrive at the NRR by incorporating risk premia and impediments to capital flows, to the extent that these exist. For reasons we will outline later, for any given country, impediments to the free flow of capital could have a positive or negative effect on the level of the NRR. However, a country risk premium will always add to our estimate of the NRR relative to our starting point of a riskless world. Hence both “+” and “-” signs precede the box for impediments to capital flows, but only a “+” sign precedes the box for country-specific risk premia.

When we bring cyclical influences into the analysis, we add another component to figure 1 - the degree to which monetary policy is leaning against inflationary pressure. These components are discussed in more detail below.

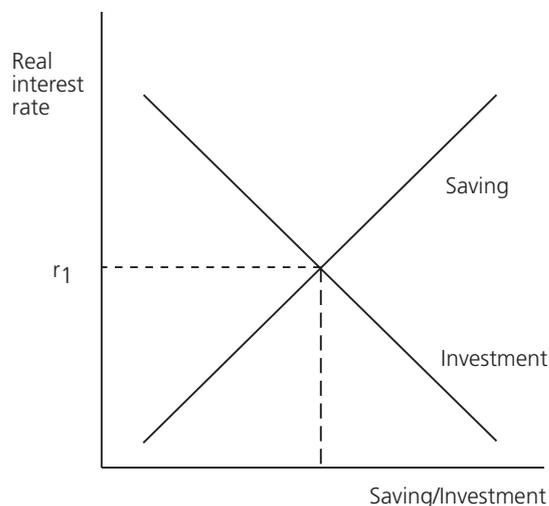
Figure 1
Decomposition of short-term nominal interest rates



5.1 Fundamentals affecting savings and investment decisions

Just as for price of a good can be thought of as the mechanism which equates the demand and supply of that good, the interest rate can be thought of as the mechanism which equates the demand for, and supply of, loanable funds. In the stylised representation given in figure 2 below, we refer to the supply of loanable funds as 'savings' and we loosely refer to the demand for loanable funds as 'investment'. Other things being equal, we would expect savings to increase with the interest rate, as people are prepared to save more in order to reap the benefits of higher returns. Correspondingly, we would expect investment to fall, as the cost of borrowing increases, since fewer investment projects would be financially viable. We expect the market real interest rate to be approximately the one that prevails at the intersection of the savings and investment curves, r_1 , in figure 2.¹⁰

Figure 2
Stylised relationship between saving, investment and the real interest rate



¹⁰ Empirical evidence on the impact of interest rates on savings is in fact inconclusive. We have omitted the 'income effect' from this discussion, but it is possible that an increase in interest rates would lead to more current consumption and less savings, as people realise that to arrive at a given level of wealth in the future they do not need to save as much as they would have had to with lower interest rates. If the income effect did in fact dominate for some levels of the interest rate then it would be more realistic to assume a non-linear relationship between interest rates and savings rather than the simple linear relationship depicted in figure 2. For a recent discussion of determinants of saving rates in New Zealand see Choy (2000).

For the time being, we assume that funds can flow freely between countries. This means that the saving and investment curves in figure 2 refer to total world saving and total world investment. In a riskless world with no impediments to capital flows, the shape and position of these world savings and investment curves would determine a single "world" real interest rate for all countries.

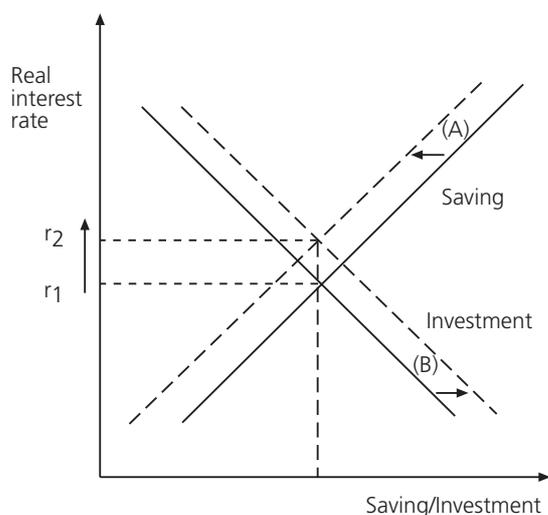
The position of the saving curve in figure 2 will depend on preferences that affect consumers' willingness to delay consumption. The standard assumption in economics is that people would rather consume today than consume the same quantity at a later date. The less willing people are to delay consumption, the higher the interest rate they will require in order to induce them to save, and the further to the left the saving curve will lie.

The position of the investment curve in figure 2 will depend on factors related to the productivity of capital, or in other words, how profitable investment in capital is. The productivity of capital will be affected by how, and in what combination, capital is used with other inputs in the production process. For example, the more labour that is available to be used with a particular level of capital stock, the more output can be produced with that capital. Similarly, advances in technology can make a given amount of capital more productive.

If capital becomes more productive we would expect the investment curve to shift to the right (and vice versa for a decrease in the productivity of capital). Thus, for example, if the position of the saving curve is unchanged, then an increase in the productivity of capital would lead to a rightward shift of the investment curve, and an increase in the real equilibrium interest rate.

In figure 3, we reproduce figure 2, identifying some of the factors that could cause the saving and investment curves to move in such a way that would be consistent with a rise in the equilibrium real interest rate from r_1 to r_2 .

Figure 3
Effects of shifts in the saving and investment curves



- (A) A preference change leading to a decreased appetite for saving would shift the saving curve to the left.
- (B) An increase in the return to capital - eg an increase in the rate of technological progress, would shift the investment curve to the right.

5.2 Impediments to international capital flows

Previously, we assumed that capital is free to flow between countries to wherever it earns the highest (risk-adjusted) rate of return. This led to the result that, in a world without risk and without other frictions, the real interest rate would be the same in all countries. The situation changes when we relax this assumption and allow for the reality that capital will not always flow freely across countries.

At one extreme, consider a world where each economy is completely closed to capital from other countries. In this world it is not possible for a saver in one country to lend to a borrower in another country, even if such a transaction would be mutually beneficial. The interest rate in any given country would be determined by the factors that influence saving and investment in that country alone.

When capital can flow between countries it becomes possible to match the preferences of savers and borrowers in different countries. For example, funds would flow out of low interest rate countries as savers from those countries take advantage

of higher interest rates elsewhere. For these countries, the supply of loanable funds decreases, causing their interest rates to rise. As funds flow into high interest rate countries, the supply of loanable funds increases and interest rates fall. Opening up capital markets would theoretically have the effect of drawing risk-adjusted interest rates across countries closer together.

In reality, in most cases there are impediments to the flow of capital across national borders so that capital does not flow across countries to the point where risk-adjusted real interest rates are equalised.¹¹ In some cases regulatory impediments such as capital controls or taxes will interfere with cross-border capital flows. Even where such impediments do not exist, some degree of friction will generally arise due to investor 'home bias'.

Home bias suggests that investors will accept lower returns for investing in their home country than they could obtain from investing in an equally risky asset offshore. One explanation for home bias is that investors are relatively better equipped to make decisions on where investment funds should be allocated within their home country, and by comparison are less familiar with the risk dimensions and legal frameworks of a foreign jurisdiction.

In this article we do not attempt to isolate the role of impediments to international capital flows in determining interest rates. We merely acknowledge that these impediments may be one source of cross-country differences in neutral real interest rates.

5.3 Country-specific risk factors

Until now, we have assumed that investment in all countries is equally risky. However, from an investor's perspective, some economies are inherently more risky than others. Just as savers are interested in inflation-adjusted rather than nominal returns, investors make their allocation decisions on the basis of *risk-adjusted* returns. Countries that are considered to be more risky than others must offer an additional return, known

¹¹ For example, see Feldstein and Horioka (1980).

as a 'risk premium', in order to attract investment funds.¹² In practice, the risk premium may vary considerably from country to country, depending on a wide range of considerations, including:

- factors that lead to an increased chance that borrowers will default on their obligations, for example large and persistent private sector or government external debt positions, poor quality balance sheets, and inadequate risk management systems in the banking and corporate sectors;
- poor quality economic policy and inadequate transparency;
- concerns that the currency may move unexpectedly in an unfavourable direction, thus eroding the returns to the investor when converted into their home currency (see Hawkesby, Smith and Tether (2000) for a discussion of the sources of currency risk premia); and
- small or illiquid markets making it more difficult or costly to pull out of an investment.

The fact that different economies have different risk profiles, and hence different risk premia, means that, even if there were no impediments to international capital flows, we would not expect interest rates to be exactly the same across all countries.

As illustrated in figure 1, the NRR is arrived at by adding country-specific risk premia and the impact of any impediments to cross-country capital flows to the long run equilibrium real interest rate.

5.4 'Cyclical' factors

As discussed earlier, the central bank adjusts nominal interest rates to lean against inflationary pressure. This means that interest rates tend to be increased in cyclical upswings and

decreased in downturns. As figure 1 shows, at a given point in time, the short-term real interest rate is arrived at by adding this monetary policy cyclical factor to the NRR.

5.5 Expected inflation

The final piece of figure 1 is the influence of expected inflation. *Ex ante* real rates are obtained by subtracting expected inflation from nominal interest rates. Adding expected inflation to the real interest rate gets us back to the actual nominal interest rate – ie the interest rate one sees quoted day by day in the financial markets.

We have identified the key drivers of the neutral real interest rate as being the structural factors that affect savings and investment decisions and country-specific risk premia. We generally expect these factors to change slowly through time, implying that the NRR also changes slowly rather than varying significantly over the business cycle.

6 Estimating the NRR

Like some other variables that are relevant for monetary policy purposes, such as the output gap and the neutral real exchange rate, the NRR cannot be observed directly and may vary over time. Not surprisingly, therefore, there is no "right" way to estimate the NRR. The estimation methods that are commonly used, and which are used in this article, have their limitations. Furthermore, different estimation methods and different data yield different estimates - which is to be expected, given the practical difficulties of reliably calculating such things as the risk premium, inflation expectations, and the problems of measuring the output gap. Consequently, we are reluctant to base estimation of the NRR on any single estimation method, and we focus on a range of estimates, rather than trying to tie down a point estimate.

Our first approach to estimating the NRR involves taking observed nominal interest rates, converting these to real interest rates, and stripping out an estimate of the 'cyclical' component by averaging interest rates over the business cycle.

Our second approach to estimating New Zealand's NRR is to take estimates of the NRR for Australia and the United States

¹² In reality investors do not tend to hold a single asset but instead hold portfolios of assets. According to the 'capital asset pricing model', the returns that investors require of a given asset will depend not only on the risk characteristics outlined below but also on how the price of that asset co-moves with the other assets they hold, see Lintner (1965), Sharpe (1964). For example, investors will accept a lower return on an asset whose price is expected to be high when the prices of other assets are low, as such an asset will decrease the expected volatility of their overall portfolio.

Table 1
Estimates of New Zealand's NRR

	NRR estimate	Average NRR estimate
Method 1:		
Estimates based on historical real interest rates over the period 1992 to 2000 <i>Real interest rate estimated by deflating nominal 90 day interest rate with:</i>		
Consensus forecast inflation	5.3]----- ----- ----- ----- ----- -----]----- 5.1
Reserve Bank survey of inflation expectations	5.3	
National Bank survey of inflation expectations	4.6	
Headline CPI inflation	5.5	
GDP deflator	5.6	
Non-tradables inflation	4.3	
<i>Estimates based on Taylor rule using</i>		
Headline CPI inflation	5.2	
Method 2:		
Estimates based on the NRR for Australia, United States		
<i>Resident expert estimate + HST estimate of risk premia*</i>		
Estimate of NRR for Australia + risk premium 3.5 + (0.0 to 1.5) =	3.5 to 5.0	4.3
Estimate of NRR for the United States + risk premium (2.0 to 2.8) + (0.8 to 2.8) =	2.8 to 5.6	4.2
<i>*HST estimates are taken from Hawkesby, Smith and Tether (2000)</i>		

and add a risk premium to account for New Zealand-specific risk factors.

The table above summarises the results obtained using these two methods. These methods are discussed in detail below. Approaches to estimating concepts of neutral real interest rates that correspond less directly to the NRR, as defined in this article, are discussed in the appendix.

Method 1: Estimates based on historical interest rates

Monetary theory and evidence suggests that monetary policy can only affect the real economy in the short or perhaps medium run. In the long run, monetary policy is neutral. This means that in the long run monetary policy can affect nominal variables such as prices, but not real variables such as the actual quantity of goods and services produced by a country or the long run equilibrium real interest rate.

Suppose we can assume that over long periods of time monetary policy leans against disinflationary pressure roughly as often as it leans against inflationary pressure. Then it follows that if we compute the average level of the real

interest rate over a long period of time, the cyclical component of interest rates should average out to zero. The average would therefore give us an estimate of the NRR. Estimates of the NRR constructed using this approach are presented in the top section of table 1.

We also derive estimates of the NRR by using a version of the "Taylor rule" with the standard weight settings suggested by Taylor (1993). This rule was put forth as a simple description of how the United States Federal Reserve sets interest rates in response to deviations of inflation from the inflation target, and the level of spare capacity in the economy, as proxied by estimates of the output gap. We specify the Taylor rule as:

$$i = \text{NRR} + \text{inflation} + 0.5(\text{inflation} - \text{inflation target}) + 0.5(\text{output gap}) + \text{residual}$$

where i is the historical nominal short-term interest rate, and all the variables in the equation are contemporaneously related. The *residual* term picks up the difference between

the nominal interest rate implied by the Taylor rule, and the behaviour of the nominal interest rate over history.

If we plug in values for the nominal interest rate, inflation, the inflation target, and an estimate of the output gap, then we can solve for the term that is required to make this equation hold at each point in time. This term is equal to the NRR plus the residual, and we take the average of this term as an estimate of the NRR. This method assumes that the Taylor rule, as specified above, gives an unbiased estimate of the policy response of the central bank at each point in time, so that the average of the residual terms is zero.

Two main issues arise when using historical interest rates to estimate the NRR:

i What time period should be used?

Ideally, we would average the real interest rate over a number of complete business cycles in order to estimate the NRR. However, structural change in the New Zealand economy means that data from the period prior to the economic and financial reforms undertaken in the mid-1980s is often an unreliable source from which to make inferences about the economy today. In particular, in the years prior to 1992, the Reserve Bank held interest rates high in order to bring inflation down within the then 0 to 2 per cent target band. This period of unusually high interest rates is not matched by a period of unusually low interest rates, and would therefore cause an upward bias in our estimate of the NRR. For this reason, we select 1992 as the start of our sample period.

ii What measure of inflation/inflation expectations should be used?

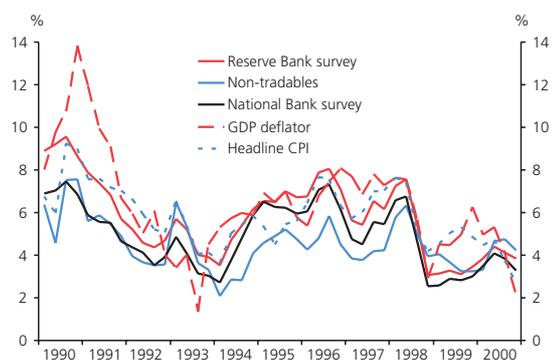
Conceptually, real interest rates should be calculated using expected inflation over the life of the asset concerned. In this article, we convert historical nominal interest rates into *ex ante* real interest rates using three alternative measures of CPI inflation expectations. These are average one year-ahead CPI inflation forecasts published by *Consensus*,¹³ and

one year-ahead CPI inflation expectations as measured by the *National Bank Business Outlook* and the *Reserve Bank Survey of Expectations* surveys.

However, there are a variety of survey measures, which lead to different estimates of real interest rates, and it is debatable which measure of inflation or inflation expectations is the most appropriate. Because measures of expectations are not readily available for alternative measures of inflation, we also calculate *ex post* real interest rates using actual data for the GDP deflator, inflation in non-tradable goods prices, and inflation in the headline CPI. In table 1 we present results calculated using both *ex ante* and *ex post* measures of real interest rates.

Figure 4 illustrates the sensitivity of our estimates of the real interest rate to the measure of inflation that is used to convert nominal interest rates into real interest rates. Figure 4 also shows that real interest rates appeared unusually high in the period from 1990 to 1992, as we would expect given that this was a period of disinflation.

Figure 4
Estimates of New Zealand's real 90 day interest rate calculated using selected inflation measures



It is possible that the estimates of the NRR produced using the methods described above overstate the current NRR. Our sample period only includes one complete business cycle, and it is possible that this business cycle was characterised by more inflationary shocks than disinflationary ones. This would mean that, on average, policy had to be tighter than the 'true' NRR over this period. For example, Brook, Collins and Smith (1998) argue that the period from 1991 to 1997 was characterised by two inflationary shocks of unusually

¹³ Every month, *Consensus Economics Inc* conducts a survey of economic forecasters in New Zealand, asking them for their forecasts of, among other things, inflation. They then compute the average forecast of all respondents. We use the *Consensus* average one-year-ahead inflation forecast to construct an estimate of the real interest rate.

large magnitude. These were the rapid rise in immigration from 1992 to 1996 and the sharp increase in household debt levels that resulted from financial sector deregulation. Of course, the disinflationary impact of the Asian crisis of the late 1990s may counter-balance the impact of these inflationary shocks to some extent.

Alternatively, we may think of the deregulation and subsequent increase in debt holdings as an example of structural change that influenced the level of the NRR over the 1990s. Given the new structure of the economy, new choices that better reflected household preferences over saving and consumption became available, and these conditions may have had an upward influence on the NRR over that period.

Another reason to argue that the NRR estimated from the 1992-2000 sample period may overstate the current NRR is that during the early 1990s the Reserve Bank's formal inflation targeting approach was still quite new. During this time inflation expectations may have been less well-anchored and hence more easily destabilised if inflation were to move out of the target range, particularly if it were to go through the top of the range. Thus, for a given level of inflationary pressure, the Reserve Bank probably had to set interest rates further above neutral than would be required now that inflation expectations are better anchored.

Method 2: Estimates based on the NRR for other countries

The second method takes estimates of the NRRs for Australia and the United States and adjusts these for New Zealand-specific risk factors.¹⁴ As we have noted earlier, cross-country differences in NRRs could be due to country-specific risk premia, or differences in fundamentals that influence savings and investment, which are not eliminated by international capital flows.

The estimates of the risk premium that we use in this article are taken from Hawkesby, Smith, and Tether (2000).¹⁵ A key

feature of their work was identifying the considerable uncertainty that surrounds estimates of the currency risk premium. Naturally, this uncertainty also affects our estimates of the NRR. Hawkesby et al assume that there is no default or liquidity premium between short-term interest rates in New Zealand and those in Australia and the United States. The currency risk premium was then derived from actual interest rate differentials between New Zealand and Australia and New Zealand and the United States.

We do not explicitly allow for the possibility that the NRR could differ across countries due to differences in fundamentals, such as consumption/saving preferences, that are not eliminated by international capital flows. However, because the estimates of the risk premium from Hawkesby et al are derived from actual interest rate differentials, they are likely to capture both true risk factors and cross-country differences in fundamentals, to the extent that capital market imperfections allow these to persist.

Australia

We take 3.5 per cent as a point estimate of the NRR for the Australian economy.¹⁶ When we add Hawkesby et al's estimates of the risk premium of New Zealand's short-term assets over equivalent Australian assets, we obtain estimates of the New Zealand NRR that range from 3.5 per cent to 5 per cent (see table 1).

United States

Estimates of the NRR cited by economic commentators in the United States generally range between 2.0 and 2.75 per cent.¹⁷ Adding Hawkesby et al's estimates of the risk premium on interest rates for New Zealand short-term assets relative to equivalent US assets implies that New Zealand's NRR ranges from 2.8 to 5.6 per cent. The range of estimates of the New Zealand NRR based on the NRR for the United States is very wide, encompassing both the highest and the lowest of all of our estimates. However, the mid-point of this range is

¹⁴ The NRR estimates for these other countries are subject to the same uncertainties surrounding estimates for the New Zealand NRR that are derived directly from New Zealand data.

¹⁵ Here we eliminate the estimates of the risk premium that Hawkesby et al identified as unreliable.

¹⁶ For example, 3.5 per cent is the NRR embedded in the Reserve Bank of Australia's macroeconomic model, see Beechey et al. (2000).

¹⁷ See for example, *The Economist* (March 2001), *Financial Times* (April 2001), Judd and Rudebusch (1998).

close to the mid-point of the range of estimates based on Australian data.

7 Summary and conclusions

The estimates of the NRR that we discuss in this article cover a wide range, from around 2.8 per cent to around 5.6 per cent. The concept of the NRR used in this article, or any definition of a neutral real interest rate for that matter, is just one of the many unknowns with which monetary policy-makers must contend. Research is continually being undertaken to improve our understanding of how such unobservable variables might best be estimated. Unfortunately, there are no conclusive answers.

One way that monetary policy-makers could learn that the estimate of the NRR implicit in their policy decisions is incorrect would be by observing the feedback from monetary policy settings to inflation and activity outcomes. For example, an estimate of the NRR that is *significantly* higher than the actual NRR would lead the policy-maker to consistently set policy tighter than intended and this would tend to lead to inflation outcomes that were consistently lower than the policy-maker's expectations. However, given the number of unknowns that the policy maker has to make judgements on, it will still be difficult for them to correctly identify what is causing persistent inflation 'surprises' in the inflation rate, once such surprises are observed.

The Reserve Bank, like other central banks, must therefore continue to operate on the basis of well-informed, but inherently subjective, judgements about unobservable economic variables such as the NRR. Because of the uncertainty involved, the Reserve Bank must also avoid placing excessive reliance on the NRR, or on any other single indicator, when formulating monetary policy and deciding on the appropriate level for the official cash rate.

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Appendix

There are alternative estimation approaches suggested in the literature, which are not adopted in this article because they do not completely accord with our medium run NRR definition. For example, one approach to estimate what we characterise as a long-run concept of neutral is to use an estimate of the steady state growth rate for an economy. This method was used by Taylor (1993) in estimating the "equilibrium" real rate used in his policy rule (discussed in section 5 above). Conway (2001) recently used this method to produce an estimate of 3.3 per cent for New Zealand. Theoretically this approach can be motivated from growth theory models, such as Solow (1956) and Swan (1956), or the model of Ramsey (1928), Cass (1965) and Koopmans (1965). However, note that some care should be taken here, as although these models imply a link between the steady state growth rate of output and the real interest rate, they do not imply that one can take the steady state growth rate of output as a direct estimate of the long run equilibrium real interest rate.

Nelson and Neiss (2001) also take an approach that fits better with a long run concept of neutral. Their paper takes the "natural" rate as the real interest rate that would prevail in an environment of completely flexible prices. They create a historical series for their natural real interest rate by modelling it as being determined by demand and technology shocks.

Other approaches include Hall (2000) who uses the Taylor rule intercept to consider how the real interest rate may have changed over time. A possible approach using a time-series statistics technique would be to treat the NRR as an unobservable variable in a state-space modelling framework, and then to use the Kalman filter to estimate the behaviour of the NRR over time.

Macro-financial stability and macroprudential analysis

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The Reserve Bank has recently extended its efforts to monitor and analyse financial stability issues. This article discusses the establishment of the Macro-Financial Stability (MFS) section in the Reserve Bank and some of the potential financial instability issues New Zealand faces. The role of macroprudential analysis is also discussed, along with a limited number of macroprudential indicators for illustrative purposes.

1 Introduction

This article outlines how the Reserve Bank is extending and developing its understanding of the financial system, and the points of potential vulnerability. A new section, called Macro-Financial Stability, has recently been established to carry this work forward.

The article:

- discusses the establishment of the MFS section;
- briefly recaps the concept underlying macroprudential analysis, and lays out the Bank's broad approach to macroprudential analysis, including a cautionary note about the use and interpretation of macroprudential indicators;
- discusses some potential sources of financial instability for New Zealand;
- introduces a number of examples of macroprudential indicators;
- discusses stress testing in the context of macroprudential indicators; and
- discusses the phenomenon of contagion.

2 Background

One of the key lessons of recent financial crises, including the Asian crisis, was to remind policy-makers of the important linkage between financial system soundness and

macroeconomic stability. In one respect this is common sense, and economic historians can point to an unfortunately long list of financial crises and macroeconomic disruptions in many countries in various stages of economic development. In another respect, however, there was a feeling in some quarters of the international community that it was not so much that policy-makers had 'forgotten' about the linkage, as that there was something 'new' about the crisis (if only the magnitude of the disruption). The growing concern over the extent of financial crises led to pressures to reform the global financial system, with the aim of decreasing the likelihood of major disruptions.²

While there were some aspects of the Asian crisis that were unique, its origins go back to the gathering pace of financial liberalisation around the world over the 1980s and the 1990s. With liberalisation came the increasing role of wholesale financial markets, and an increase in the share of portfolio flows in total capital flows. With increased integration, the incidence of the so-called 'twin crisis' – a combined banking and balance-of-payments (currency) crisis – rose. Thailand during the Asian crisis is an example of a twin crisis, but so too was Finland in 1992, Mexico in 1994, and Turkey this year.

Research into the twin crisis phenomenon finds that they are typically far more severe than banking or currency crisis in isolation, and therefore more costly, but that early warnings of imbalances and vulnerabilities can help limit financial instability. Research into indicators of financial instability, whether it is of a twin or single crisis nature, has gained

¹ I thank Michael Reddell and Geof Mortlock for comments.

² See Mortlock (2000) for a detailed treatment of reforms to the international architecture.

increasing prominence in the last few years, and the IMF also began to encourage member countries to adopt the macroprudential analysis approach to surveillance.

3 Establishment of the MFS section

Against this backdrop, some central banks, including the Reserve Bank of New Zealand, have re-examined the way in which they assess the health and stability of the financial system as a whole; that is, not only individual banks nor the banking segment of the financial system, but the system in its entirety and the linkages from the financial system to the real economy.³ The Bank has taken a broader view of financial stability issues for some years, and, in part, this led to the establishment of the Financial System Oversight (FSO) Committee in 1996 to oversee a wide range of matters relating to financial stability. The FSO committee is made up of Governors and senior managers from across the Bank's core policy departments, and is the main internal 'client' of the macroprudential analysis.

This interest has also been reflected in the Bank's research, speeches, and Bulletin articles on financial crisis issues, including in respect of vulnerabilities surrounding the balance of payments and the structure of capital flows. To strengthen further the Bank's ability to analyse these issues, a small Macro-Financial Stability section was established last year to enhance our understanding of the financial system and to monitor potential vulnerabilities at the system and economy-wide level.

This requires drawing together the various strands of analysis and interests. One way in which the MFS section will seek to achieve this is by developing a framework for monitoring macroprudential indicators that are relevant to New Zealand. This article describes in some detail the nature of macroprudential indicators and analysis, and makes the point

that important indicators cover both domestic and international developments. In this regard, the role of the section is broader than just the compilation and monitoring of some standard set of domestic macroprudential indicators, and extends into the monitoring and analysis of international developments. Developments in international capital markets (including institutional trends, and the role of highly leveraged institutions) and the capital account of the balance of payments are particularly relevant for macroprudential analysis.

The MFS section is part of the Financial Markets Department of the Bank, but by the very nature of the job, its interests span across the various activities and responsibilities of the Bank's three policy departments: the Banking System Department, Economics Department, and Financial Markets Department. The Banking System Department's primary role is to regulate individual banks, promote financial system soundness, manage the disclosure regime, and maintain the capacity to respond to a bank distress or failure event, if and when one arises. The role of the MFS section is broader in one sense, in that the monitoring role covers the financial system as a whole, draws external vulnerability more fully into the analysis, and brings the macroeconomic and financial market linkages into sharper focus.

While the two areas are separate in some respects, they are related in that the Bank is seeking to build a more holistic and integrated assessment of financial stability factors, and generally making itself better informed of how financial markets operate. Individual institutions that get into difficulty could transmit financial instability pressures to the wider system in many ways. Enhancing our understanding of the way in which market decision-makers structure their balance sheets and address attendant risks, and the general interaction of the various segments of financial markets, will assist in our analysis.

This year, work has concentrated on establishing an internal reporting framework for macroprudential analysis. In the initial developmental stage, the work of the section was focussed on the identification, collection, and compilation of relevant macroprudential indicators. Looking ahead, two priorities are to develop our understanding of the New Zealand financial system from a macroprudential analysis

³ For many years, the Bank's supervisory efforts have focussed not only on individual institutions but also on issues of systemic soundness. The Reserve Bank of New Zealand Act, for example, requires the Bank to use its supervisory powers to promote the maintenance of a sound financial system. Of course, the soundness of individual institutions and the systems as a whole are closely related, as the failure of a specific institution could affect the stability of the system and vice versa.

perspective, and to give greater transparency to macroprudential indicators.

These developments are consistent with one of the recommendations in the Svensson Report. The main focus of the report was on the conduct of monetary policy, accountability and governance issues, but Professor Svensson also advocated a heightened profile for macroprudential indicators and the associated analysis:

“The current prudential-supervision arrangements are fully consistent with the price stability objective, but the profile of prudential policy could be raised. *I recommend that the Reserve Bank summarize its information about the financial system, including a number of macro-prudential indicators of financial stability, in a regular report, modelled on those published by the Bank of England and Sveriges Riksbank.*”⁴

We envisage publishing an annual Bulletin article reviewing key indicators and trends in financial stability, augmented by occasional articles on specific MPI-related issues. The recommendation to publish a stand-alone report was not considered practical given the relatively modest size of the Bank’s resources.

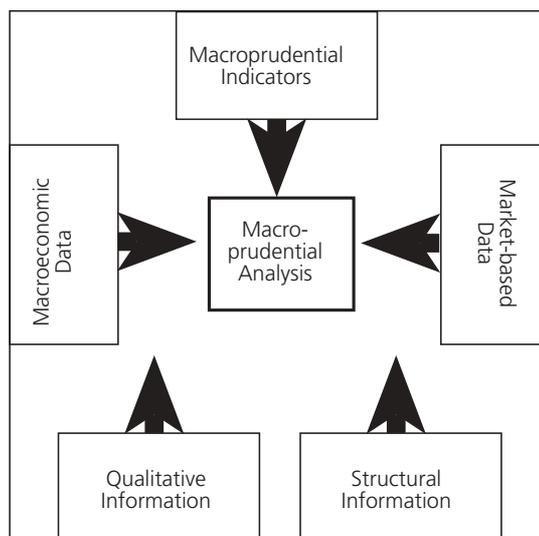
4 Macroprudential analysis

In a Bulletin article last year, the causes and costs of financial instability were discussed, and the conceptual framework underpinning macroprudential indicators was introduced.⁵

Macroprudential indicators include aggregated micro-prudential data (the aggregated prudential data of individual institutions), but extend beyond this to include a broad range of indicators that help us assess the potential vulnerability of the financial system to a wide range of possible shocks. The indicators come from several sources, including banking system data, data from the corporate and non-bank financial institutions, and macroeconomic and market-based data. As one example, macroprudential analysis looks at the same data that is used by the Economics Department for monetary

policy formulation, but through a different lens. For example, growth in the credit or monetary aggregates can influence how we think about the current state of the economy, whereas household debt ratios provide information about household balance sheets, and potential vulnerabilities to financial stability.

Figure 1
Macroprudential analysis



Source: IMF (2001).

Our approach to macroprudential analysis is to monitor indicators from a variety of sources and seek to identify broad patterns in the indicators that might suggest growing imbalances and the potential for financial instability (figure 1 illustrates this). An important facet of the analysis is the inclusion of structural and qualitative information into macroprudential analysis. Structural information helps put the shape and size of the financial system in context – examples for New Zealand might be the foreign ownership of the banking system, or that four retail banks each have approximately 20 per cent of market share. Qualitative information also helps frame the analysis; an example could be judgements on bank management quality. These two inputs are very important for a number of reasons.

New Zealand has important differences from many of the countries where research on macroprudential indicators originates. Our economy is very dependent on foreign capital and is highly, and increasingly, indebted. Our financial

⁴ See Svensson (2001).

⁵ See Hawkesby (2000) for background on macroprudential indicators, and a definition of financial instability.

markets are small but quite highly developed and that makes us unusual in that most of the borrowing can be hedged, leaving few direct foreign currency exposures. Our banking sector is pre-dominantly subsidiaries and branches of foreign-owned multinational banking groups. Banks owe most of the private sector foreign debt (often in the form of funding from the parent company). Information about the ownership structure of institutions, and the relative size of industries, the main segments of the financial system, and exposures also feed into macroprudential analysis.

Evidence suggests that the mechanical application of macroprudential indicators cannot predict a period of instability.⁶ For example, some researchers have estimated 'early-warning system' models (EWS) that focus on a number of variables to help predict an impending crisis.⁷ More recently, the IMF has been developing its Financial Soundness Indicators, which it hopes will help governments and international investors detect financial crises at an early stage, although they are unlikely to be operational for approximately two years. These models are often used to try to predict the likelihood of a currency crisis, rather than purely as indicators of domestic financial instability. However, as noted earlier, a banking crisis and currency crisis often go hand in hand, with either one able to cause the other. That is, a currency crisis could put pressure on domestic balance sheets and lead to a banking crisis, or a banking crisis could cause sharp movements in the currency.

Any models are prone to mechanical interpretation, and although they can be useful as a tool for organising the way to think about the relationship between variables, they can give rise to false signals. Because of this, particular care must be exercised in analysing their output. Macroprudential indicators—or any indicators, for that matter—are a tool to provoke further enquiry. To extend the analysis beyond mechanical interpretations requires experience and judgement. Part of the reason for setting up a small team to follow developments in macroprudential analysis theory and practice, and to liaise with others in Banking System and Financial Market Departments, is to concentrate on developing just such judgement.

⁶ See Hawkesby *op cit* for a discussion of the effectiveness of macroprudential indicators as leading indicators.

⁷ See Kaminsky *et al* (1996) for examples.

A second reason why more searching information and judgement are so important in macroprudential analysis is that every crisis is different, and the causes and dynamics of financial instability are complex. The policy adviser should look for the kind of broad patterns that *may* indicate emerging stresses, imbalances, or vulnerabilities, desirably in sufficient time to enable an effective response to be implemented so as to reduce the extent of financial turbulence.⁸ In practise, one has to strike a balance between providing enough data to be general enough to capture the warning signals in the next crisis – a crisis that may be quite different from the last – against swamping decision-makers with too much information. The latter risk is really one of losing sight of the forest for the trees.

Another way in which qualitative information comes into the analysis is through an assessment of the extent to which a country's regulatory frameworks and institutional arrangements comply with international standards and codes. A cornerstone of the reforms to the global financial architecture has been for the international community to place more emphasis on a framework of standards and codes, as a means by which countries can assess their own regulatory frameworks against international 'good practice'. Gaps or deficiencies in those frameworks may help identify potential vulnerabilities.

The number of standards and codes has grown dramatically over the last few years, but some of the main ones that relate to the financial system include:

- transparency of monetary, fiscal, and financial policies;
- macro-financial data standards;
- banking supervision;
- securities regulation;
- corporate governance;
- payment system principles;
- insurance industry;
- accounting and auditing standards; and
- financial crime.⁹

⁸ See, primarily, Davis (1999), but also BIS (2001), and IMF (2000).

⁹ See Mortlock (2000) for a discussion of standards and codes in the context of the global financial architecture.

Standards and codes are potentially useful tools. However, they are only a tool and not a panacea for poor policy or surveillance. One of the natural tensions that arises with standards and codes intended for international application is that they need to be general enough to be broadly applicable, but detailed enough to be useful. Another issue is whether codes should be set as minimum benchmarks for (developing) countries to strive for, or as international best practice (which is difficult to define). Finally, there is always the concern that standards and codes will be applied in a rigidly prescriptive manner.

Notwithstanding these reservations, the Bank has conducted a self-assessment of its banking supervision and transparency arrangements against relevant international standards, and has also been involved in similar exercises on money laundering and financial crimes.¹⁰ It is likely that an in-depth, external, assessment will be done some time over the next two to three years. These assessments are led by the IMF and World Bank and are known as Financial Sector Assessment Program (FSAP) assessments. They have been likened to a health check of a country's financial sector.

Sources of instability

Stable financial systems may become unstable for a variety of reasons, individually or in combination. Many of the main sources of potential financial instability are domestic, although there are also important external channels by which vulnerabilities can arise and crises can spread. Even so, to some extent the choices that the domestic authorities make influence to some degree a country's exposure to external sources of instability.

Some of the common causes of financial instability include:

- rapid financial sector liberalisation unsupported by measures to encourage prudent risk management in the financial sector;
- unsustainable macroeconomic policies, such as loose monetary policy and excessive fiscal spending – such policies can contribute to asset price volatility and a

subsequent erosion of asset quality in the financial system;

- exchange rate arrangements that lack credibility, including unsustainable exchange rate pegs – this is particularly important where financial institutions and corporations have come to rely on an exchange rate peg, and fail to hedge their currency risk, only to sustain currency losses when the peg collapses;
- poor banking supervision;
- inadequate financial disclosure arrangements, including poor quality accounting and auditing standards; and
- weak market disciplines in the banking and corporate sectors, reducing the incentives for high quality risk management by banks.¹¹

The New Zealand financial sector experienced difficulties at the end of the 1980s and early 1990s following the period of rapid financial liberalisation over the latter half of the 1980s. This experience is not unusual, as liberalisation exposes the financial system of a country to new markets, products, and opportunities – nor is it comfortable (see figure 5, which shows the high level of impaired assets in the New Zealand banking system in the early 1990s, compared to recent years). Like so many other countries, financial liberalisation in New Zealand found risk management processes and skills wanting, especially in the face of large swings in asset prices that were seen in the share market and commercial and housing property markets. As is often the case, the quality of lending decisions by banks deteriorated in the lead up to the share and property market crashes (a form of 'irrational exuberance' that often accompanies pronounced market upswings).

External vulnerabilities

Over the last decade there have been a series of financial crises that have had at least one thing in common: a crisis in one country had a tendency to spread to other countries. An important dimension of monitoring the health of the financial system therefore is to pay adequate attention to external vulnerabilities. In broad terms these stem from the

¹⁰ See Dench (1999), Griffin (1998), and Ledingham, Rodgers, and Stinson (2000) for a discussion of the self-assessments against financial crime, banking supervision, and payments systems, respectively.

¹¹ See Brash (2001).

two mechanisms of interdependence (actual substantive linkages between economies) and contagion (effects over and above those warranted by substantive linkages).

In the context of New Zealand, interdependence is probably the greater threat, given the various international linkages, and this is one of the central areas of vulnerability. As a relatively open economy, these linkages include the foreign ownership of the banking sector, the extent of exposures within the banking system to connected parties, the extent of trade linkages between New Zealand and other countries and the extent of foreign company involvement in our economy.

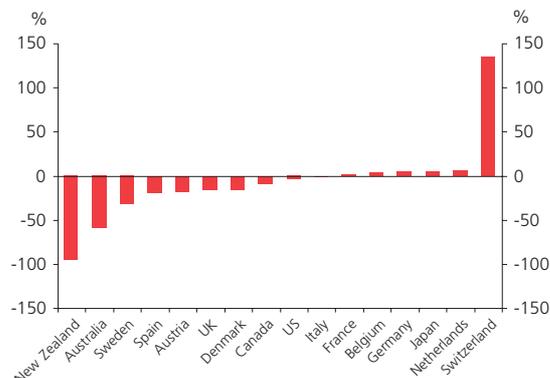
One channel by which New Zealand's financial system is potentially vulnerable is through exogenous shocks such as a sharp contraction in overseas demand for our exports, and consequently an exchange rate shock. At the time of the Asian crisis, exports to Asia accounted for approximately 40 per cent of total New Zealand exports, and consequently exports to the countries most affected declined sharply. The increased uncertainty and generalised slowdown in regional growth that followed also affected growth in New Zealand, and contributed to the New Zealand dollar falling by around 30 per cent from the 1997 peak. Fortunately, the adjustment was relatively orderly and didn't place undue stress on the financial system, in large part due to good risk management practices by banks and corporates.

A potentially more disruptive channel, and one that is less well understood, relates to the foreign funding of New

Zealand consumption and investment. New Zealand has run large current account deficits for many years, the counterpart to which is overseas borrowing, or, capital inflows. Figure 2 illustrates that the level of New Zealand reliance on foreign capital (debt and equity) relative to GDP is large compared to other developed countries. As with an individual, the higher the level of debt, the more vulnerable the sector or country is to unfavourable developments and the potential for a sharp withdrawal of capital. At some point, foreign lenders could re-evaluate the level of indebtedness of the New Zealand corporate and household sectors against future earning prospects, potentially leading to a higher risk premium for borrowers.

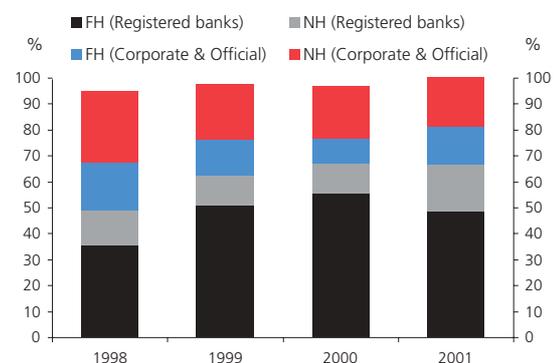
One way in which importers, exporters, and financial firms manage fluctuations in the exchange rate is by 'hedging'.¹² Hedging is used to reduce currency risk in international transactions, and can be accomplished with forward foreign exchange contracts, swaps, structural balance sheet hedges, invoicing export sales in local currency, and by the use of foreign exchange option contracts. Statistics New Zealand data suggest more than 95 per cent of foreign exchange exposures are hedged (see figure 3).¹³ This level of hedging is relatively unusual by world standards, as often households and businesses in countries with a high dependence on foreign capital have to borrow in foreign currency, but can't

Figure 2
Ratio of net foreign assets to GDP



Note: March 1999 data, except for Switzerland, Italy, and France (December 1998), and Netherlands (December 1997).

Figure 3
Hedging of total foreign currency debt



¹² See Brookes, Hargreaves, Lucas, and White (2000) for a discussion of various types of hedging.

¹³ Financial hedges (FH), such as swap arrangements, reduce the risk of adverse future price movements; natural hedges (NH) are balance sheet positions that provide offsets – for example borrowings in one currency offset by income in the same currency.

hedge away the risk of exchange rate movements.¹⁴ This was the situation many businesses were in during the Asian crisis.

However, while the high level of hedging confers many benefits, it is contingent on the continued willingness of overseas market participants (in the main) to hold New Zealand dollar risk. If this willingness were to diminish, the loss of protection against exchange rate movements could expose corporate and bank balance sheets to uncomfortable pressures. This is another potential avenue by which financial stability might be threatened. One of the tasks ahead, therefore, is to try to understand the nature of these exposures better, including who ultimately holds the New Zealand dollar risk, and how behaviour might change if hedging became difficult.

Another potential external source of instability is the direct linkages between institutions, which can transmit shocks. This is true both for the corporate sector, mainly through multinational ties between New Zealand businesses abroad and foreign multinationals in New Zealand, and the banking sector. There are eighteen banks registered in New Zealand, and all but one are foreign owned. The high level of foreign ownership in the New Zealand banking system, on balance, is a source of strength for the sector. However, locally-incorporated banks and branches of foreign banks may transmit episodes of major instability in the banking systems of other countries where the parent bank has large exposures, particularly given the extent of the borrowings of the New Zealand operations from their parent banks.

So a central task of MFS will be to examine the role of capital flows and balance sheet vulnerabilities, along with market structure information. The high market share of Australian-owned banks in the New Zealand financial system is a good example. While the Bank has taken a close interest in the Australian banking system for a number of years, given the importance of these linkages in a macroprudential analysis setting, our monitoring in this area will continue to develop.

¹⁴ In the literature this is often referred to as the 'original sin'. That is, countries without a track record of sound economic management find it impossible to persuade foreigners to take exposure to their local currency (directly or through hedges). This results in the country borrowing overseas in foreign currency without protection from exchange rate movements, thus exposing themselves to future potential crisis.

The phenomenon of contagion – the spillover from one country's crisis to other countries, independently of any effects warranted by the second economy's fundamentals – has received a great deal of attention over the last several years, especially after the Asian crisis. While one can theoretically distinguish between interdependence and contagion as two external sources of instability, in reality the two overlap quite a lot. For example, in Malaysia and the Philippines, weaknesses existed in the financial systems and real economies in the now familiar form of large exposures to commercial property, loans of dubious quality, and problems with corporate governance. While the imbalances were not as severe as those that had built up in Thailand and Indonesia, the crisis 'spilt over' to some extent from Thailand and Indonesia to the Malaysian and Philippine currencies. In the event, both countries avoided a full-blown crisis, albeit with some discomfort. In these cases, therefore, contagion was a factor, but it resulted from markets taking a closer look at the respective country fundamentals and re-pricing risk.

5 Macprudential data

The indicators for macroprudential analysis come from three broad sources – banking system data, macroeconomic data, and financial market data (see table 1).

Table 1 presents a selection of indicators that are generally expected to be analytically relevant.¹⁵ Most indicators will be relevant across a broad range of countries. However, as noted above, this is not an off-the-shelf product, and testing, judgement, and experience are important in determining the most appropriate indicators for New Zealand.

There are several issues that are important in identifying appropriate macroprudential indicators for New Zealand.

- **Relevance.** The indicators should be analytically relevant – that is there should be a sensible basis for expecting a relationship between the indicator and financial instability – and empirically relevant. One way in which indicators are empirically relevant is when they have predictive

¹⁵ Based on a large-scale survey of IMF member countries, and research by academics, central banks, and supervisory agencies.

Table 1
Data for macroprudential analysis

<p>Banking System indicators</p> <p><i>Capital adequacy</i></p> <ul style="list-style-type: none"> - Total and tier I capital to risk-weighted exposures - Assets to capital <p><i>Asset quality</i></p> <ul style="list-style-type: none"> - Non-performing loans (NPL) to total loans - Ratio of NPLs (net of provisions) to capital - Specific provisions relative to NPLs - Sectoral loan distribution - Geographical loan distribution - Related party exposures - Concentration of exposures to individual borrowers <p><i>Earnings and profitability</i></p> <ul style="list-style-type: none"> - Return on assets - Return on equity - Interest margin to gross income - Non-interest expenses to gross income <p><i>Liquidity</i></p> <ul style="list-style-type: none"> - Liquid assets to liquid liabilities - Market segmentation - Customer deposits to total (non-interbank) loans <p><i>Sensitivity to market risk</i></p> <ul style="list-style-type: none"> - Net open position in foreign exchange to capital - Net open position in equities to capital 	<p>Macroeconomic data</p> <p><i>Credit growth</i></p> <p><i>Debt levels</i></p> <ul style="list-style-type: none"> - Corporate - Household <p><i>Capital flows</i></p> <p><i>External debt</i></p> <ul style="list-style-type: none"> - Maturity - Composition - Degree of hedging <p><i>Economic growth</i></p> <p><i>Corporate sector</i></p> <p><i>Household sector</i></p> <ul style="list-style-type: none"> - Disposable income - House prices - Financial assets and liabilities - Net financial wealth - Bankruptcies <p><i>External sector</i></p> <ul style="list-style-type: none"> - Current account - Economic growth - Investment 	<p>Market indicators</p> <p><i>Bank share prices</i></p> <p><i>Credit spreads</i></p> <p><i>Credit ratings</i></p> <p><i>Wholesale market liquidity</i></p> <p><i>Market volumes</i></p> <p><i>Asset prices</i></p>
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power, or can be classified as leading indicators.¹⁶ However, good macroprudential indicators won't always be good leading indicators in isolation; they may be coincident indicators, and only of interest in combination with other indicators - in much the same way that a fire alarm isn't a leading indicator of a fire, but is very useful nonetheless.

- **Country-specificity.** While a lot of research on macroprudential indicators has been undertaken around the world, every policy-maker should ensure that they take account of the unique structural features of their own economy. These features should include institutional features, local laws, exchange rate regime and so on. Awareness of the New Zealand context is particularly important when benchmarking the indicators against other country experience.

- **Data availability and quality.** While the quality of statistics in New Zealand is generally good, as a small country we do not have the same depth or breadth of data as some larger developed countries. Some macroprudential indicators recommended by researchers and the IMF are not available for New Zealand. Banking system indicators vary across countries, but as the New Zealand approach to banking supervision relies to a high degree on information publicly disclosed by banks there is good coverage in this sector of the financial system. The macroprudential indicators principally come from the Quarterly Disclosure Statements of individual banks, aggregated for the system as a whole. On the other hand, the coverage and availability of macroprudential indicators for non-bank financial institutions in particular, and the corporate sector more generally, are not always at the same level as larger developed countries. Macroeconomic data are also generally available, as is financial market information, although much less than in many developed countries.

¹⁶ That is, changes in one variable that precedes changes in another. For example, rapid credit growth may imply poor lending criteria and an increased likelihood of future bank losses, especially when the ratios reach unusual levels.

The banking system data are typically aggregated microprudential data, and reflect the banking sector as whole, rather than individual institutions. Like its microprudential counterpart, the banking macroprudential indicators can be thought of as based on the so-called CAMELS framework, which uses six categories of data to assess the health of the financial system. CAMELS is an acronym that denotes:

- **Capital adequacy.** Various ratios are used to measure the amount of capital to act as a buffer to absorb losses.
- **Asset quality.** Various direct and indirect indicators of asset quality are used to identify potential risks to the solvency of financial institutions.
- **Management soundness.** This category reflects how important good quality management is for a bank to be sound. In practice, it is difficult to have robust indicators of management soundness at the banking system level, and judgements in this area feed into the analysis by way of qualitative information (see figure 1).
- **Earnings and profitability.** Several indicators are used to monitor potential risks to solvency from deteriorating earnings and profitability.
- **Liquidity.** Market liquidity can impact on the capacity of the financial system to meet its obligations as they fall due and, in extreme situations, illiquid conditions can trigger or exacerbate a banking panic and potentially affect the solvency of institutions (and the system as a whole), and indicators can point to emerging problems.
- **Sensitivity to market risk.** Indicators of system-wide exposure to volatile assets can alert policy-makers to the vulnerability of the system to fluctuations in prices.

The macroeconomic data tend to be of two types: data of a sectoral nature (for example, household debt, or corporate foreign direct investment), and broader measures such as economic growth. The broader measures tend to reflect pressures on the market and credit risk banks face through various sectors.¹⁷ For example, a contraction in GDP could reduce the household and corporate sectors' ability to service bank loans, and ultimately result in an increase in impaired assets.¹⁸ Market data tend to be higher frequency information such as financial prices (interest rates, sovereign

or private debt spreads over US treasury bills, and the like). Other types of financial market indicators, such as credit ratings, are useful, although they may be less timely and tend to be co-incident with financial instability, rather than leading indicators of problems.

6 Macprudential analysis for New Zealand

In this section, some important New Zealand macroprudential indicators are presented and briefly discussed to illustrate the sort of information that is useful to assess broad trends in financial system stability. As noted above, future Bulletins will include regular macroprudential analysis articles that will cover a wider range of macroprudential indicators, with more in-depth analysis. However, for the purposes of this article, only a subset of the important macroprudential indicators is discussed.¹⁹

Banking system indicators²⁰

The focus of banking system macroprudential indicators tends to be on developments in the banking system as a whole. However, a proper analysis of banking sector vulnerability needs to take into account individual bank data, particularly for banks of systemic importance. This is because the aggregate data might portray the banking system as a whole to be in good health, whereas individual banks may be feeling pressures, or building up ill-advised exposures, that can then lead on to wider financial system weakness.

¹⁷ Banks are exposed to different types of risk: market risk is the risk of losses arising from movements in interest rates, exchange rates, or equity prices; settlement risk reflects potential problems associated with the payments system; liquidity risk arises in part because of the mismatch of funding long-term assets through short-term liabilities; and credit risk reflects potential losses on loans to businesses and households.

¹⁸ See Hawkesby (2000) and IMF (2001) for a more detailed discussion of the intuition behind the various indicators.

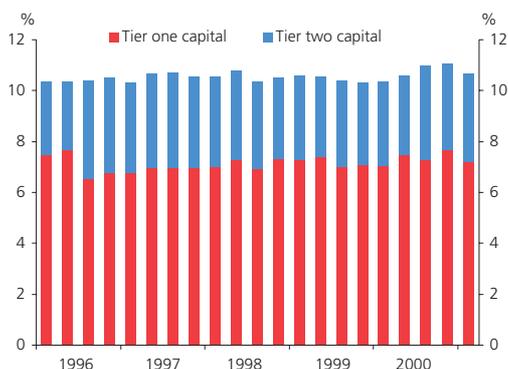
¹⁹ See IMF (2001) for an overview and numerous academic references.

²⁰ See DeSourdy (2001) for a detailed discussion of developments in the New Zealand banking system over the year to December 2000.

Capital adequacy

The most common indicator used to assess the banking sector's ability to withstand shocks is the risk-weighted capital ratio.²¹ Capital adequacy is also useful in that it shows how aligned the shareholders' incentives are with the health of the bank. If, for example, there is little capital in the bank then shareholders have little to lose if it fails and hence little incentive. On the other hand, if it is well capitalised shareholders have a lot to lose and hence the incentive to make sure systems are in place to keep the bank healthy. A decline in this indicator can suggest that the banking system as a whole, or particular banks within it, may be vulnerable to any future deterioration in asset quality or to market risk losses. Deterioration may arise from poor lending practices and/or economic shocks, such as a sharp contraction in the economy and a fall in asset prices. Figure 4 shows that New Zealand incorporated banks sit very comfortably above the tier one capital ratio of 4 per cent of risk-weighted exposures and an overall 8 per cent total capital ratio (measured using the standard Basel capital methodology).

Figure 4
Capital adequacy
(capital as a percentage of risk-weighted exposures)



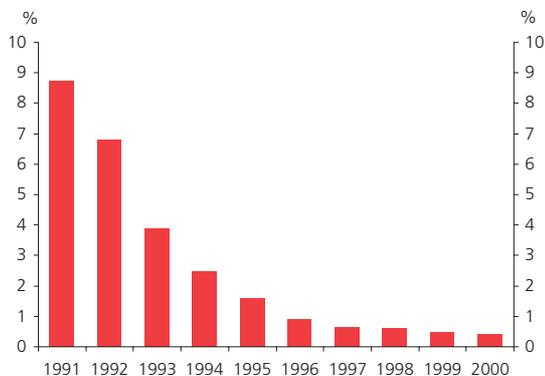
Asset quality

Asset quality is extremely important to banks and the economy more generally. Poor quality loans can be a leading indicator of erosion in profits and capital, and in extreme cases can threaten bank solvency. Poor asset quality also represents poor resource allocation in the economy, with

potential implications for longer-term growth prospects and the health of the financial system.

One indicator that is used as a proxy for asset quality is impaired assets. In New Zealand a loan is classified as 'impaired' when interest or principals are in arrears for 90 days or longer. International definitions of impaired assets – or 'non-performing loans' as they are often known – vary, but the levels recorded over recent years in New Zealand are low by international standards.

Figure 5
Impaired assets of banks
(as a percentage of total assets)



Earnings and profitability

A variety of indicators are used to assess the financial performance and profitability of banks. Different measures can be used to derive various ratios, such as operating asset ratios, operating income ratios, and operating equity ratios. Banks are complex institutions and no single measure will capture, in a robust fashion, bank performance. Similarly, no single measure encapsulates banking system performance, and a variety of indicators needs to be examined. Figures 6 and 7 show that, across a few measures, banking system profitability has been growing over recent years, reflecting, in part, growth in interest earning assets. Profits are above the common benchmark of one per cent of total average assets for international banks.

²¹ The risk-weighted capital ratio is the ratio of bank capital to on and off-balance sheet credit exposures, where the exposures are weighted by broad categories of relative credit risk.

Figure 6
Income and expenses

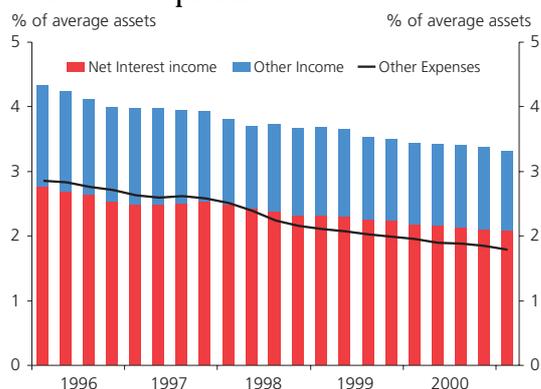
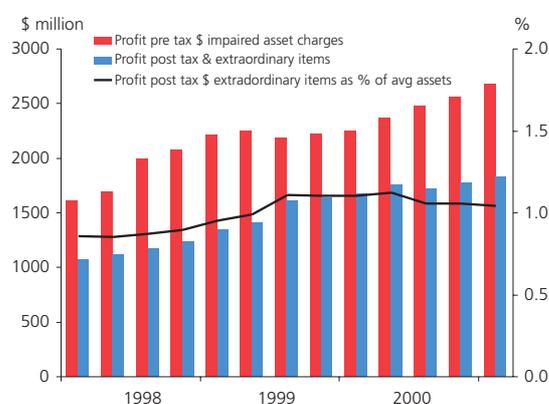


Figure 7
Profitability



Corporate sector

There is not as much information for the non-bank corporate sector as there is for banks. This is the case both in terms of coverage and timeliness. This limits our ability to monitor this sector comprehensively from the macroprudential analysis perspective (although there is obviously a lot of information available about individual companies). One area that we intend to collect data on and monitor more closely is the corporate debt and commercial paper markets.

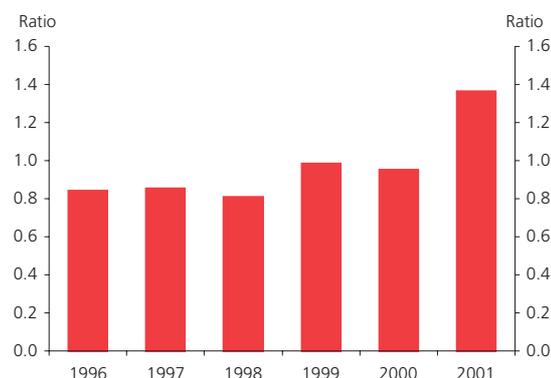
However, in general, corporate cash flow and balance sheet data are useful indicators of the soundness of the corporate sector, and, by extension, the credit risks faced by banks. While there are a number of indicators used by business and equity analysts to assess the soundness of individual companies, it is less easy to obtain a robust consistent measure of the corporate sector as a whole.

Corporate liquidity

Figure 8 presents the quick ratio (sometimes called the acid-test ratio).²² This ratio is considered a relatively good indicator of a company's ability to meet its short-term financial obligations. The ratio is calculated as current assets minus inventories (as inventory can sometimes be difficult to liquidate at short notice), divided by current liabilities. Therefore, a ratio of 1:1 means the institution has a dollar's worth of easily convertible assets for each dollar of current liabilities. While low ratios may indicate liquidity problems, some sectors routinely operate on tight liquidity ratios (the retail and supermarket sectors for example). On the other hand, high ratios may point to poor management of funds.

As with all macroprudential indicators, care is needed in interpreting the data, and this is particularly true with an aggregate quick ratio, as the acceptable benchmark ratio will vary from industry to industry, is not particularly timely, and there is more than one way to calculate the aggregate measure. However, as a rough guide it is still illustrative to calculate these measures. They show that on a weighted basis, some of the large companies in the retail and natural resource sectors (where the ratios are typically lower) lower the ratio, but even then the corporate sector appears relatively liquid.

Figure 8
Aggregate 'quick ratio' of corporates



Source: Datastream and RBNZ estimates.

²² The weighted average is calculated using total company assets, and the companies account for over 75 per cent of New Zealand market capitalisation.

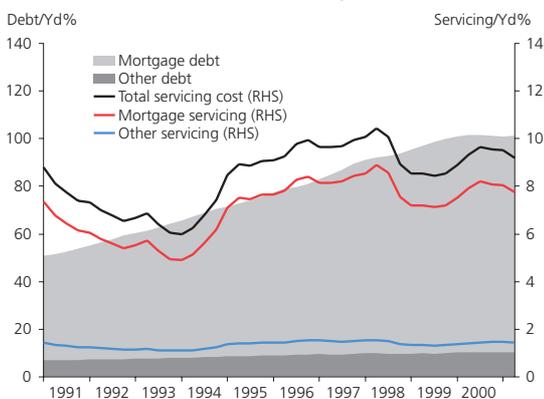
Household sector²³

There are several indicators of the health of the household sector, including financial and real assets, debt levels, income growth, and so on. The household sector linkage to overall financial stability occurs through two channels in particular. The first is through the credit risk that banks face – primarily by the level of household indebtedness and debt-servicing capacity. The second linkage is the market risk that households face in terms of their ability to withstand fluctuations in interest rates, asset prices, and equity prices. Real estate asset bubbles have played a significant role in several financial crises around the world over the last fifteen years.²⁴ In the New Zealand context, exposure to the housing market, housing-related debt, and interest rates are important indicators. The Bank has closely monitored developments in the New Zealand real estate market for many years because of the role house prices play in influencing inflation, and in shaping inflation expectations, and in part because of the potential linkage to financial instability.

Over the 1990s, New Zealand households increased their debt levels from approximately 60 per cent of disposable income in 1990 to around 110 per cent in 2000. This level of debt is not uncommon for developed countries, especially following a period of financial liberalisation, and it appears that, even in the face of ongoing growth in real disposable income the debt to income ratio has stabilized.²⁵ Much of the debt accumulated was in the form of bank mortgages, especially in the light of the relatively high house price inflation of the mid-1990s, potentially exposing both the household and banking sectors to vulnerabilities over the latter part of the 1990s as house prices fell.²⁶ However, the debt service burden is not high by historical standards (at least in nominal terms) and consumer defaults on housing debt are very rare in New Zealand. This latter point is

important given that mortgages comprise approximately one third of bank assets and half of bank lending.

Figure 9
Household debt and servicing cost



(yd is household disposable income)

Market indicators

A range of market data provides useful information about financial system vulnerabilities. Share prices of banks or sectors and credit spreads provide timely information about the markets' assessment of the institution, sector, or country in question. They are also a tractable way of assessing developments in other countries; a sharp increase in emerging market sovereign spreads provides information about the perceived risks and vulnerabilities of a group of countries without having to directly monitor those countries. Prices, therefore, convey important information, but so do volumes. Both the threat of disorderly foreign exchange market behaviour (and hence the possible need for intervention) and the threat at times from restricted liquidity are good examples of when looking at market turnover and volumes is important.

Sovereign and corporate credit ratings can also provide useful information, but they are not generally good leading indicators of financial instability. The credit rating of registered banks in New Zealand is good, and improving, with 10 banks being rated at AA- or above, reflecting their strong capacity to repay interest and principal in a timely manner.

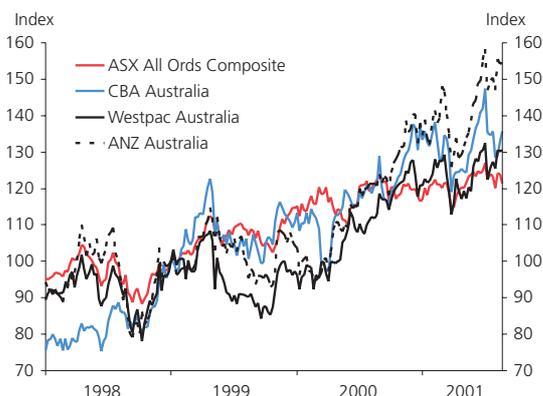
²³ See Thorp and Ung (2000) and Thorp and Ung (2001) for a detailed discussion of trends in household balance sheets since 1978.

²⁴ See Davis (2001).

²⁵ While debt levels are comparable to those of some other developed economies who have been through a similar process of financial deregulation, debt levels for those countries may also be a point of vulnerability – it is still too early to gauge what constitutes prudent levels in deregulated markets.

²⁶ Of course, some proportion of mortgage lending is for purposes other than housing.

Figure 10
Bank share prices



Another indicator of health for a sector is the performance of its shares relative to a wider benchmark.²⁷ Figure 10 shows that over the last few years the share prices of Australian-owned banks registered in New Zealand have performed well relative to the Australian All Ordinaries index, suggesting the market perception is that these banks are in good health.

However, as always, structural factors must be kept in mind, as foreign ownership of almost all New Zealand banks means that individual stock prices must be monitored in the relevant foreign equity markets. For example, while CBA is the owner of ASB Bank Limited and monitoring the performance of the parent is important, they are not the same legal entity. The linkage is important though: a strong parent company could provide additional support in times of stress, but a weak parent could transmit its own difficulties to its subsidiary.

²⁷ However, care in interpretation is needed, in that if the broad index is falling rapidly but the bank shares are falling a little less rapidly, this is not necessarily comforting (as a relative measure would suggest). That is, the absolute level of bank share prices also matter.

Box

Macroprudential analysis and stress tests

The approach the Bank takes to macroprudential analysis is to monitor a range of indicators to identify the kind of broad patterns and growing imbalances that precedes a period of financial instability. This approach recognizes that while there are recurrent signals in crisis, every event is unique in its own right.

Another way macroprudential indicators can be used to assess the soundness of the financial system is in 'stress tests.'²⁸

A stress test is a mechanism to determine the system's robustness to a variety of shocks that would have a sizeable adverse impact on the system, and are of a plausible nature. A test of one macroprudential indicator against a given shock in a single market price or event is a type of stress test generally known as 'sensitivity analysis', whereas a test of a range of indicators in a more dynamic setting possibly including inter-linked shocks is known as 'scenario analysis.'²⁹

Typically, the type of shocks reflect risks the financial system is exposed to:

- credit risk;
- liquidity risk; and,
- market risk (which includes interest rate risk, exchange rate risk, equity price risk, and commodity price risk).

Stress tests range from the very simple to the very complex, depending on the nature of the test and the methods employed. Scenario analysis may trace the transmission of the shock through various portfolios using the sort of sophisticated techniques individual institutions use for internal risk management purposes. In system-wide tests careful attention to model specification and aggregation issues is essential.

²⁸ Other analytical methods include Value-at-Risk (VaR) models, and sectoral balance sheet analysis.

²⁹ This section is based on the discussion of stress tests in IMF (2001) and Blaschke *et al* (2001).

An example of a simple, partial equilibrium, model would be to examine the actual impact of a shock on a macroprudential indicator, such as a large movement in the exchange rate and resultant movements in impaired assets. Of course, while the shocks could originate in the financial system and be transmitted to macroeconomic and financial variables the focus is on financial vulnerability stress tests, and therefore tends to examine macroeconomic and financial shocks on financial system balance sheets and indicators.

Banking system vulnerabilities from exchange rate risk arise directly by way of exposure to exchange rate fluctuations and indirectly by way of the credit risk from borrowers (although the impacts are multi-faceted and, at times, unexpected). Figure 11 illustrates that banks in New Zealand have only negligible exposures to foreign exchange positions (including off-balance sheet positions) compared to shareholder equity.³⁰ For example, over the period since the disclosure regime began the peak open foreign exchange position (as the percentage of equity) of 0.51 per cent was recorded in June 1997. Even if the exchange rate depreciated by 50 per cent, only one quarter of one per cent of equity would have potentially been lost. Of course, in such an event, the story would not end there, as other factors would come into play. For example, following a fall in the exchange rate of that magnitude, the New Zealand-specific credit premium would widen, borrowing for households and businesses would become more expensive, balance sheets would deteriorate, and credit and market risk would increase.

In terms of the indirect impact, figure 12 indicates that although the exchange rate first rose by some 14 per cent and then depreciated by more than 30 per cent the ratio of impaired assets fell by 70 per cent over the entire period. Appreciation and depreciation of the

Figure 11
Net open position

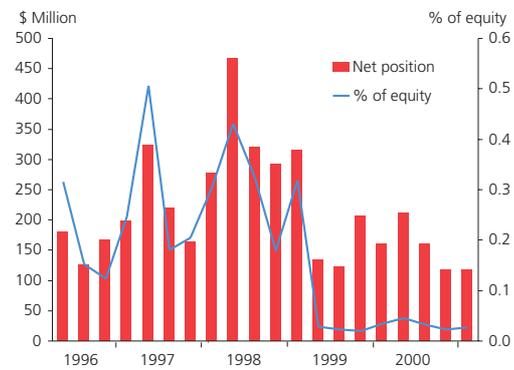
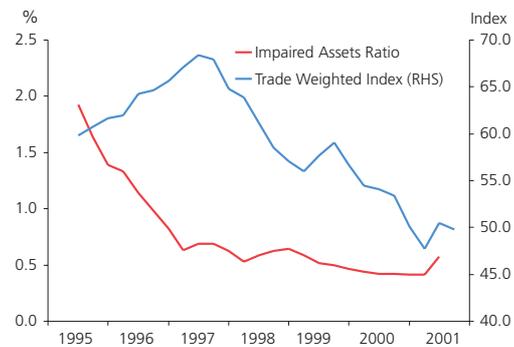


Figure 12
Impaired assets and TWI



exchange rate affect importers and exporters in different ways of course, but the steady increase in asset quality suggests very good risk management by the corporate sector (which is consistent with the recorded financial and non-financial hedging of around 95 per cent).

³⁰ The percentage is an unweighted average of registered banks.

7 Conclusion

This article discussed the establishment and early work of the Macroeconomic Financial Stability section of the Bank, including an illustrative discussion about the challenges and issues surrounding the collection and analysis of New Zealand specific macroprudential indicators. Good progress has been made to date in identifying a core set of relevant macroprudential indicators, and work is continuing on extending data coverage, especially for the corporate sector. From next year, an annual Bulletin article will discuss in detail developments in New Zealand financial stability.

Some of the potential risks and vulnerabilities the New Zealand financial system faces were discussed. In particular, the potential risks that arise because of the high level of external indebtedness are a priority area for future research.

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Comments by Dr Don Brash, Governor of the Reserve Bank of New Zealand on: *Three perspectives on an Australasian Currency Union*

By Andrew Coleman, The University of Michigan, Future Directions for Monetary Policies in East Asia. At a conference hosted by the Reserve Bank of Australia, HC Coombs Centre for Financial Studies, Kirribilli, Sydney on 24 July 2001.

At the outset, I would like to thank Andrew Coleman, not only for this very interesting paper, but more importantly for his personal contribution in opening out the issue of New Zealand joining a currency union.

Without Andrew's contribution, I don't think that the discussion would yet have developed as far as it has, or reached into the territory that it has.

New Zealanders from all walks of life are currently trying to work out what drives economic success. As a topic of dinner table discussion, New Zealand's economic performance – both absolutely and relative to other countries, especially Australia – is starting to rival rugby and politics!

This is the territory into which Coleman has taken the discussion of currency union. Do the current monetary arrangements – which feature a floating exchange rate and an inflation target to tie down the independent monetary policy that results – maximise growth?

My standard response when asked what monetary policy can do to help maximise economic growth is to say that maintaining price stability is the best contribution that monetary policy can make. However, that contribution is a small one and more akin to removing an impediment than being an active accelerant or a catalyst for transformation.

I do not resile in any way from that answer when I say that it is incomplete. My standard answer addresses the mostly macro-economic question of whether the long-run Phillips curve is vertical. But there are other, more complete, aspects of the question. What monetary arrangements would best support growth, and is what we currently have the best?

One might note at the outset the irony of asking this question now. We have recently learned how to deliver price stability, and thereby how to remove the impediment to growth that comes from an unstable pricing mechanism. So why are New Zealanders not satisfied?

We are not satisfied because as we have progressively removed various impediments to growth, we have found that the gains have fallen short of expectations and desires. Macro-economic and structural policy reforms almost certainly delivered an improvement in economic performance in New Zealand, but not sufficient to begin the process of clawing back New Zealand's four-decade long decline in relative living standards. So we are now looking for the deeper reasons for under-performance.

The case for the current monetary arrangements being perhaps a part of these deeper reasons for under-performance comes from four interconnected lines of thinking. Many of these points have been made by Andrew Coleman in this and earlier papers. Let me comment on each of them.

1 Floating exchange rates aren't what they were cracked up to be

This is the argument that the current monetary arrangements do not deliver the benefits that we used to think they would. In particular, floating exchange rates are not as good at insulating open economies from external shocks, or at keeping open economies close to equilibrium, as we previously believed.

Andrew Coleman has referred to a very significant body of work that goes to show how much “noise” there is in market-determined exchange rates, and how difficult it is to relate exchange rate movements to economic fundamentals. I have a good deal of sympathy with the point he is making. Having been on the receiving end of much criticism about exchange rate developments that have not been justified by economic circumstances, and about which I could do nothing, that sympathy is heart-felt. I am sure that Ian Macfarlane likewise accepts the force of the point, especially in the context of the Australian dollar sitting at historic lows after a decade of truly outstanding economic performance and an unusually small degree of structural imbalance. However, we should be careful not to get carried away with the idea that foreign exchange markets are imperfect. By and large, over the history of floating exchange rates, they do reflect relative economic circumstances. And that seems to be more true for smaller economies than the large, relatively closed, economies for which much of the research has been undertaken. International commodity prices do seem to have been very important determinants of both the Australian and New Zealand dollars (notwithstanding the Arthur Grimes’ results that Coleman cites, which relate the exchange rate to very odd looking — albeit official — terms of trade data). And I well recall the episode from early 1997 through 1998 when the New Zealand exchange rate fell rather faster than we could explain at the time, only to find that the fall was well justified by the gathering Asian financial crisis. I think it is probably true to say that real exchange rates are more volatile, and “unreasonably” so, for floating exchange rate economies than for regions within currency unions. The point is far more true at short-term frequencies than at business cycle frequencies, where for regions within a currency union the scale of real exchange rate change can also be very large, but it is also probably true at business cycle frequencies.

2 Exchange risk is a significant non-tariff barrier to trade

Second, it is argued that the current exchange rate arrangements create a barrier to the kinds of activities and enterprise that would contribute to faster growth. In

particular, the existence of exchange rate risk inhibits trade, and hence economic integration with external markets, to a greater extent than we previously believed. From my perspective, this is getting to the nub of the issue. It is one thing to argue that floating exchange rates aren’t as useful as we previously thought. Once one allows for the point that real exchange rates sometimes have to adjust, whatever the monetary arrangements, one is trading off one imperfect monetary arrangement for another, and we don’t know exactly how large the costs and benefits of such a trade-off actually are. But if one monetary arrangement adds a barrier to trade that the alternative does not, there is an important issue to be addressed. To be frank, I don’t know what to make of the evidence that others have presented and that Andrew Coleman has cited. Logically, I would expect that the introduction of transactions costs would constitute a barrier. And I would expect that the introduction of risk would also constitute a barrier. But how big of a barrier, given the increasing efficiency and growing accessibility of financial markets? Past research has struggled to show that exchange rate volatility makes any difference to trade. The new research, such as that generated by Andy Rose, shows that currency unions have a very big effect on trade above and beyond the effects of volatility – so big that I am left wondering about the plausibility of the results. For example, do we really think that trade between the Cook Islands and New Zealand is large because we have a common currency? Or are there other more important reasons?

3 Gains from trade with a larger region really matter for growth

It is one thing to argue that separate currencies inhibit trade. It is still another to argue that that inhibition to trade damages growth. Interestingly, in the recent thinking about growth that has been going on in New Zealand, economic integration with the rest of the world figures large. Our distance from markets, our relative scale, our relative lack of diversification, and the limited extent to which our potential risk-takers rub shoulders with more entrepreneurial types, all figure in the discussion. If greater trade with a larger area can break down or overcome these kinds of constraints, the growth gains

might well justify giving up one's currency and monetary independence. Again, however, I don't know what to make of the arguments. I am convinced that there are gains from trade that New Zealand hasn't yet exploited. We often describe New Zealand as a small open economy, but with exports now accounting for a little over one-third of total activity we are far from being as open as many economies of comparable size. To be sure, we are not located in the middle of Europe, but nor is Singapore or Malaysia or Hong Kong. Leaving aside the question as to whether the existence of a separate currency is a significant barrier to further openness, are the kinds of gains that *might* come with greater trade likely to be highly relevant to how fast New Zealand can grow? Or instead are such gains mostly relevant to the *level* of productivity and real incomes in New Zealand? Tariff barriers can make an economy poorer, but do they usually hamper growth?

4 Economic adjustment doesn't need the help of a floating exchange rate

Those of us in countries with a floating exchange rate regime normally suppose that, as circumstances change, the process of economic adjustment will be usefully smoothed by a changing nominal exchange rate. Andrew Coleman asks some pointed questions about the standard analysis of adjustment to region-specific shocks. How prevalent are region-specific shocks? Are they big enough, and frequent enough, to make business cycles behave very differently? For the countries and regions that we are concerned about, how different is the mobility of factors between different regions within currency blocks and between the currency blocks themselves? And how much of such mobility differences as do exist is a product of the very existence of separate currencies? How important is a single fiscal authority, once one allows for the ability of separate fiscal authorities to smooth out income shocks by borrowing? And one might add some other equally pointed questions. Do we want adjustment to be "smoothed" by floating exchange rates or fiscal transfers in the first place? If the region-specific shock is temporary, won't individuals smooth consumption anyway; and if the shock is permanent, shouldn't we just

get on with the adjustment process? One of the more intriguing (and if correct, compelling) arguments in favour of currency union that I hear these days is that the floating exchange rate favours the "wrong" kind of entrepreneur. An exchange rate that buffers swings in commodity prices makes commodity-based activities more attractive, and commodity-based activities are a less dynamic base for growth. And an exchange rate that is volatile and discourages potential entrepreneurs from engaging via trade with other entrepreneurial types also hampers dynamism. These arguments about harm to the dynamism of the economy are important ones to get to grips with, and we are only just starting to scratch the surface of the issue. Interestingly, if these arguments turn out to be valid, it probably points to the desirability for New Zealand of currency union with the United States rather than Australia. Again, I'm not sure of the answer to these very important questions. One sense I have is that we haven't yet posed the question properly. It seems to me that we tend to analyse the issue of region-specific shocks as if the issue was adjustment to shocks within the "normal" range of events that different regions are exposed to. For common-garden variety shocks, there's not much of an adjustment issue. The real question is whether one would desirably have a buffering mechanism available when a truly large region-specific shock hit. What if some disease took out New Zealand's dairy industry entirely, for several years? If we pose the question this way, we are asking about the scale of the premium we might be paying – if indeed we are paying a premium – in order to preserve the option to have a massive shift in the real exchange rate occur partly through a change in the nominal exchange rate. Ladies and Gentlemen, I have spent too much time already telling you how little I know about the answers to these questions. I am, however, quite certain that the questions are much more important than we have allowed up until recently. Our understanding of the importance of the issue, and the growth-dynamic frame within which the issue should be set, has been greatly helped by the innovative contributions of people at this conference, such as Andrew and Andy Rose. For that we owe a debt of gratitude.

Faster growth? If we want it

An address by Donald T Brash, Governor of the Reserve Bank of New Zealand to the Catching the Knowledge Wave conference, Auckland on 2 August 2001

Fundamentally, this conference is about economic growth, and how New Zealand can get more of it.

Many New Zealanders do not see increasing growth as a high priority objective. What we want is to have access to better housing, better health-care, and better education. What we want is to protect the relatively egalitarian society of our past from increasing income disparities. What we want is more attention paid to preserving our natural environment. What we want is less stress and more leisure time.

But the reality is that if we want better housing, better health-care and better education, we certainly need economic growth – we have difficulty funding our collective desire for health care and education now, and those costs look certain to rise in the years ahead. If we want to retain a relatively egalitarian society, we absolutely need economic growth – without it, too many of our highly skilled people will leave our shores, forcing up the relative incomes of the skilled people who choose to stay. Perhaps surprisingly, even if we want more attention paid to preserving our natural environment, we need growth – international experience suggests that it is the relatively affluent countries which can afford to spend resources on protecting the environment.

So a conference on economic growth is not “just about money” but concerns many of the issues of vital relevance to all of us. It also concerns issues which go well beyond the statutory responsibilities of the Reserve Bank, and for this reason I must stress that my comments this morning reflect personal views, and not necessarily those of the Bank.

Our growth performance: much improved

How have we been doing in the economic growth stakes? Unfortunately, not too well if we judge from the last three decades. Over that period, our growth in GDP per capita has averaged 0.8 per cent per annum, compared with an average of 2.0 per cent per annum in the countries of the

OECD.¹ As a result, we have slid from 9th in the OECD “rankings” in 1970 to 20th in 1999 (comparisons made on a purchasing power parity basis, rather than at market exchange rates), and have also been well surpassed by some countries which are not OECD members at all (Singapore being the best example).

As recently as 1990, New Zealand’s GDP per capita was roughly on a par with Ireland’s and Singapore’s. By 1999, both countries had very considerably surpassed us. In 1990, Australia’s GDP per capita was only some 5 per cent above New Zealand’s; by 1999, it was nearly 40 per cent above New Zealand’s.²

What should we make of these figures? The first thing to say is that for a whole range of reasons GDP per capita is not a very precise measure of human well-being. We New Zealanders have more cars per capita than people in all but a tiny handful of countries. We have substantially more EFT-POS terminals per capita than any other country in the world. We have easier access to uncrowded beaches and countryside than people in most other countries. We spend much less time commuting, even in Auckland, than people in many other countries. Our life expectancy at birth is the same as that in, say, Germany, the United Kingdom and the United States, and infant mortality is identical to the developed country average. As Paul Carpinter recently observed, quality of life measures often show Auckland in the top ten cities world-wide,³ something hardly consistent with New Zealand’s being towards the bottom of the OECD “ladder”.

But having said that, there can be little doubt that there has been some relative decline in our living standards in recent decades.

¹ “Climbing the OECD ladder: what does New Zealand have to do?”, a memo written by Grant Scobie and Peter Mawson to Alan Bollard, New Zealand Treasury, 4 April 2001.

² *Ibid.*

³ Speech to the annual conference of the New Zealand Association of Economists, Christchurch, 28 June 2001.

At first sight, our relatively slow growth seems surprising. We have many characteristics which make for rapid economic growth. For more than a decade, we have had macroeconomic stability, with a sound fiscal position and monetary policy delivering consistently low inflation. We have a competent and corruption-free judiciary implementing a legal system based on British common law. We have a civil service which is also competent and corruption-free. We have a stable political environment, with a substantial measure of consensus across political parties on the important aspects of macroeconomic policy. We are an English-speaking society, and one where people tend to be highly receptive to the adoption of new technology. On several indices, we are ranked among the freest economies in the world.

And we've had an extensive period of economic reform, specifically designed to help us to grow more quickly. Doesn't our poor growth performance suggest that the reforms were seriously flawed? Not at all. I don't think there is much doubt that the reforms of the mid-eighties and early nineties have helped our growth potential a great deal. I have mentioned the decade of macroeconomic stability – which also delivered a huge reduction in the net public sector debt, from over 50 per cent of GDP in the early nineties to under 20 per cent at the present time. The reforms also delivered a very big improvement in the quality of service in areas such as banking, retailing, telecommunications, postal services, health-care, and airlines.

Recent years have also seen very rapid growth in a whole host of relatively new industries – wine, mussels, software, furniture, specialised manufacturing, education services – to say nothing of a rapid increase in the sophistication of some of our traditional industries.

Moreover, while GDP per capita grew at a rate of only 0.8 per cent per annum over the last three decades on average, it grew at almost 1.7 per cent during the nineties, virtually identical to the average OECD per capita growth over the same decade.⁴ So the reforms seem to have arrested our relative decline, but not, as yet, enabled us to begin the process of reducing the gap in per capita incomes which

emerged over earlier decades. We are now keeping up, roughly, but not catching up.

Why have we not done better still?

Given that many of our reforms were, at the time, regarded as world-beating, why haven't we done better? I don't think anybody has a totally satisfactory answer to that question, but let me suggest a few factors which seem relevant.

First, New Zealand is a very long way from all of its export markets, and there is a growing awareness that this imposes a considerable handicap on our performance. As The Treasury observed in its *Briefing* for the incoming Government in 1999, "Draw a circle with a radius of 2,200 kilometres centred on Wellington and you capture within it 3.8 million New Zealanders and rather a lot of seagulls. Draw a similar circle centred on Helsinki and you capture within it a population of over 300 million, from 39 countries."⁵ And for Helsinki, The Treasury could equally well have said Dublin or Singapore.

Second, our natural resource endowment makes us extremely efficient at producing some things that we are effectively banned from selling to many of the consumers of the world. Thus for example, although we are one of the world's largest cheese exporters, and have developed a range of sophisticated cheeses in recent years, we are limited to a tiny quota of about 0.6 per cent of the US cheese market. If New Zealand producers want to sell butter to Japan, they find that Japan has limited total butter imports, from all sources, to less than 2,000 tonnes each year, with sales beyond that tiny quota facing a tariff of more than 500 per cent.

Our distance from world markets and a resource endowment which favours the production of goods which face major obstacles in international markets are facts of life. To make matters worse, we have compounded matters by creating some of our own obstacles to economic growth.

For example, as a country we squandered a large amount of capital investing in projects of very low or negative value in the late seventies and early eighties, most as a result of strong

⁴ Scobie and Mawson, *op. cit.*

⁵ *Towards Higher Living Standards for New Zealanders: Briefing to the Incoming Government 1999*, The Treasury.

government encouragement – the Clyde dam, NZ Steel, and the synthetic petrol plant to name just three.

Second, because of very high effective rates of protection in many parts of the manufacturing sector, we probably squandered even more capital over several decades by investing in industries where New Zealand had no prospect of ever being internationally competitive. (Many studies have suggested that economic growth tends to be fairly closely correlated with the degree of openness of the economy, and, while New Zealand is now a very open economy, that was not true until about a decade ago.)

Third, we have paid a high price for years of encouraging investment in real estate while discouraging investment in plant and equipment – the result of the interaction between a period of high inflation and a tax system based on the assumption that prices are stable⁶, plus perhaps the bitter memories of the 1987 share-market crash.

Fourth, we have paid a high price for not encouraging the acquisition of education and skills – the result of decades of protection for industries requiring only a modest level of skill and, perhaps, a welfare policy providing benefits of unlimited duration.

Fifth, we have paid a high price for tolerating an education system which produces too many people with inadequate literacy and numeracy skills, unable to fill the jobs available in a modern economy.

And we have paid a price too for disdaining commercial success, with the consequence that too few of our youth aspire to make money growing a business and too many of our most able entrepreneurs have chosen to leave our shores. (It has to be a strange society which cheers somebody being paid millions of dollars for a few minutes of belting the daylights out of his opponent in the boxing ring, or somebody

who wins millions in a highly regressive game of chance; but criticises somebody paid one million dollars for a year of running a complex company providing services to hundreds of thousands of customers, or somebody else paid \$300,000 for running a large hospital with hundreds of staff and thousands of patients.)

What about the future?

Can we be optimistic about the future? There are clearly some factors adversely affecting our growth rate which we can never change. Most obviously, we will always be thousands of kilometres from our major markets, and it will take years before the high protection impeding our agricultural exports is eliminated. We can not avoid the fact that, as a country, we have squandered large amounts of capital on projects which have only a minimal benefit for future growth.

But perhaps the significance of our distance from major markets is diminishing as transport and communications systems become ever cheaper and more efficient (I suspect that there are both costs and benefits for New Zealand in that development), and barriers to our exports continue to reduce, though painfully slowly.

Moreover, within New Zealand we have eliminated the protection and the subsidies which caused so much misallocation of resources in the past. Inflation no longer interacts with the tax system to steer investment into real estate and out of investment in plant and equipment. And most of the other factors which have adversely affected our growth are ones which we ourselves can change, if only we have the will to do so.

In recent times, many political leaders have suggested that as a country we should be aiming to return New Zealand's income levels to the top half of the OECD. As far back as 1990, the Trade Development Board, now Trade New Zealand, proposed that that goal be achieved by 2010.

Would it now be *feasible* to raise New Zealand's per capita GDP to the median OECD level by 2010? What such a goal would imply in terms of growth rates over the next decade would clearly depend in part on how fast other OECD countries themselves grow over the decade, but plausible

⁶ It is not hard to see why a tax system that allows the deductibility of nominal interest payments in full – even when much of the interest paid in a high inflation environment is, in reality, a compensation to the lender for erosion in the capital value of the loan – but does not tax the increase in the nominal value of the asset strongly encourages people to borrow heavily to invest in real estate in an inflationary environment. It is also the case that, in allowing deductions for depreciation based on historical cost and taxing profits on inventory on the basis of the historical cost of acquisition, the tax system, in an inflationary environment, over-taxes, and thus discourages, investment in other kinds of businesses.

numbers – which assume that other OECD countries achieve the same per capita growth rates over the next 10 years as they did in the nineties – would require GDP per capita growth in New Zealand of about 3.6 per cent per annum, somewhat more than double the growth in per capita GDP achieved by New Zealand in the nineties.⁷

Can a doubling of our per capita growth rate, as compared with the average of the nineties, be achieved? I am sometimes surprised to hear people argue that such a goal should be easy to accomplish. Why, it is occasionally argued, some companies have grown by 10 per cent annually for years! Even whole regions sometimes grow at rates which are well above the growth rates suggested as being necessary to raise per capita income levels to the median of the OECD. But what is often overlooked in making such comments is that a company may grow at a high rate for years because it can absorb resources of people and capital from outside itself; regions can similarly grow rapidly by absorbing people and capital from other areas. New Zealand as a whole may increase its gross output more rapidly by bringing in lots of additional people and lots of additional capital, but that increase in gross output *may* produce only a modest increase in the *per capita* incomes of New Zealanders.

No, doubling the growth in per capita incomes would be extremely difficult. But perhaps it would not be impossible. Some other small countries – Finland, Ireland, and Singapore are the most frequently cited examples – have achieved similar or even greater increases in per capita income, but it has been a very rare achievement, sometimes made possible in part by starting from a situation of economic collapse (Finland), and sometimes made possible in part by being able to bring very large numbers of unemployed people into the workforce (Finland and Ireland). Finland and Ireland also derived substantial benefits by being inside the European Union. We do not start from a position of economic collapse, and our unemployment rate is already low compared with that in many other OECD countries. We do not have large numbers of unemployed people with appropriate skills and attitudes waiting to leap into the workforce. We are not part of a very large market of 300 million people. To have any chance of doubling our per capita growth rate we will

need to see quite radical changes in people's attitude and behaviour, and quite radical changes in public policy to encourage those changes in attitude and behaviour. Minor changes at the margin simply won't do the trick.

Even major changes might not do the trick, since we seem to have some deeply-engrained cultural characteristics which are not conducive to rapid growth – surprisingly widespread disdain for commercial success, no strong passion for education, and a tendency to look for immediate gratification (as reflected in our very low savings rate and strong interest in leisure) – and it usually takes years, and perhaps generations, to change such cultural characteristics.

Indeed, this attitudinal change is probably the most important single need if we are to radically increase our per capita growth rate. We need to *want* faster growth or, in personal terms, higher income. This may sound like a rather odd comment, but many of us know people who, having started a successful business, were happy to sell out of it for a few million dollars because that was more than sufficient to buy a nice house, a bach by the sea, a boat, and a decent car. And let's not criticise those who make that choice – after all, economic growth is a means to an end, and not an end in itself – but recall that retiring to enjoy the good life is not usually the attitude of entrepreneurs in the United States or other more successful economies.

But let's assume that most New Zealanders do in fact want to see faster economic growth, so that our more able children will not feel obliged to leave as soon as they can afford a one-way air-ticket to Sydney or London, so that we can keep and attract able people without creating Latin-American-style income disparities, and so that we can afford the health-care and quality of life which our Australian cousins will increasingly enjoy.

What might be required?

Increasing per capita GDP is about increasing the proportion of the population who are contributing to the production of goods and services in the market economy, and about increasing the productivity of those people.

What scope is there for increasing the proportion of the population who are contributing to the production of goods

⁷ Scobie and Mawson, *op. cit.*

and services in the market economy? Not very large. Certainly, not nearly as large as was the case in Ireland and Finland when they began their period of rapid growth, with very high levels of unemployment. Participation in the workforce by those between 15 and 64 is currently around 66 per cent in New Zealand, not far below participation rates in Singapore and Ireland (68 to 70 per cent) currently, and unemployment, while higher than anybody feels comfortable with, is already approaching levels which are relatively low by OECD standards.

Getting still more people into employment in the market economy may involve making some difficult social and political trade-offs. For example, does the present welfare system – with largely unrestricted access to benefits of indefinite duration, and with a very high effective marginal tax rate for those moving from dependence on such benefits into paid employment – provide appropriate incentives to acquire education and skills and to find employment?

Nobody that I have ever met in New Zealand wants to deny those who are temporarily down on their luck sufficient income support to enable them to get back on their feet. In that respect, we are not willing to pay the price which Singapore paid to achieve very high growth, a society almost devoid of taxpayer-funded income support. But increasingly it is recognised that we will not achieve a radical improvement in our economic growth rate while we have to provide income support to more than 350,000 people of working age – 60,000 *more* than when unemployment reached its post-World-War-II peak in the early nineties – to say nothing of the 450,000 people who derive most of their income from New Zealand Superannuation.

This is partly because of the huge fiscal costs of these transfer payments – amounting to an estimated \$13 billion this financial year, or some 11 per cent of estimated GDP (both figures include the fiscal cost of New Zealand Superannuation)). This cost substantially constrains the government from devoting more resources to education, law and order, research and development, and tax reduction. Indeed, it is probably fair to say that there is no other part of the government budget which can provide resources for these things. Certainly, it is hard to see scope for big reductions in the health or education budgets, the only other really major categories of government spending.

But I mention these transfer payments and the very high effective tax rates faced by those trying to get off them at this point not simply to draw attention to the fiscal costs but mainly because these payments have an influence on the numbers of those contributing to the production of goods and services in the market economy.

Are there ways in which we can change the incentives facing people now receiving such transfer payments? There are clearly a number of alternatives to the present way in which we provide income support short of adopting a cold-turkey Singaporean approach, and there is no single “right” way of doing it. Could we, for example, drop all benefits to the able-bodied and scrap the statutory minimum wage, so that pay rates could fall to the point where the labour market fully clears, but simultaneously introduce a form of negative income tax to sustain total incomes at a socially-acceptable level? Could we introduce some kind of life-time limit on the period during which an able-bodied individual could claim benefits from the state? Could we, perhaps, gradually raise the age at which people become eligible for New Zealand Superannuation, reflecting the gradual increase in life expectancy and improved health among the elderly? One of my colleagues has suggested the idea of abolishing the unemployment benefit but introducing some kind of “employer of last resort” system, perhaps run by local authorities with support from central government, under which every local authority would be required to offer daily employment to anybody and everybody who asked for it. Clearly, there would be huge benefits not just to economic growth but also to social cohesion if we were able to achieve a radical reduction in the number of those dependent on income transfers from the state.

Increasing productivity

But even more important than increasing the proportion of the population who produce goods and services in the market economy is increasing productivity. Ultimately, it is productivity – output per person – which mainly determines the standard of living, and it is clear that increasing GDP per capita by 3.6 per cent per annum means at least trebling the rate of productivity improvement which New Zealand has achieved in recent years (not much above 1 per cent).

How might we move in this direction? Before attempting to answer that question, let me stress that, while the Reserve Bank makes a useful contribution to the economy's performance, it can never make the difference between 1.7 per cent per capita growth and 3.6 per cent per capita growth. The Reserve Bank can and does operate monetary policy to maintain stability in the general level of prices, and that is a necessary condition if New Zealand is to maximise its growth, but it won't produce a doubling of our growth rate. The Reserve Bank can and does promote the stability of the financial sector, and that too is a vital contribution to maximising New Zealand's growth, but it won't produce a doubling of our growth rate.

No, most of what now needs to change if we want to double our growth rate involves policies and behaviour which fall well outside the Reserve Bank's areas of responsibility, as I have already noted.

The second point I want to make is that it is important as we talk about all the opportunities afforded by the "knowledge economy" not to forget that for many years to come most New Zealanders will not be employed in software companies or biotechnology research firms. They will be employed in "the old economy". But that does not mean that they will be employed in industries which lack scope for improving productivity. On the contrary: it is useful to recall that over the last 15 years, with average productivity improving by little more than 1 per cent per annum, productivity in agriculture improved by almost 4 per cent per annum – a rate of productivity growth which, if achieved across the economy as a whole and sustained for a decade, would easily see our per capita incomes reach the OECD median within a decade.

Improving productivity involves a whole host of things which can be loosely grouped under three headings – improving human capital, improving physical capital, and improving technology.

Improving human capital

To improve our human capital, we urgently (I almost said "desperately") need to improve the quality of our education system. And I say "improve the quality of our education

system" rather than increase the resources devoted to our education system. We might need to increase the resources devoted to education, but we already spend a higher fraction of our national income on government support for education than the great majority of other developed countries. Despite this, international surveys of educational achievement suggest that we are not getting educational outcomes consistent with this high level of expenditure.

It must be a source of grave concern that so many of the people coming out of our high schools have only the most rudimentary idea of how to write grammatical English; and that while Singapore, South Korea, Taiwan, and Hong Kong occupied the top four places for mathematics in the Third International Maths and Science Study, New Zealand ranked only 21st (out of the 38 countries in the study).⁸ It can not be good for our economic growth, or for the employment prospects of many of our young people, that, according to an OECD report released in April 1998, nearly half of the workforce in New Zealand can not read well enough to work effectively in the modern economy.⁹ It must be a matter for particular concern that 70 per cent of Maori New Zealanders, and about three-quarters of Pacific Island New Zealanders, are functioning "below the level of competence in literacy required to effectively meet the demands of everyday life".¹⁰

The University of Auckland is one of the two main hosts of this conference, so you would be surprised and disappointed if I did not stress the importance of doing more to improve the quality of tertiary education in New Zealand. And clearly, I believe that that is vitally important, though whether that means even more public sector resources going into the tertiary sector or other kinds of reform I am not in a good position to judge.

But I strongly suspect that improvements in pre-school, primary, and secondary education are even more important for our long term growth, and for the long-term social cohesion of our society, than are improvements in tertiary

⁸ *IEA Third International Mathematics and Science Study, 1998-1999.*

⁹ *Human Capital Investment: an International Comparison, OECD, 1998.*

¹⁰ *Adult Literacy in New Zealand, Ministry of Education, 1998.*

education. Indeed, it may well be that improvements in these pre-tertiary areas are the fundamental prerequisites for improving the quality of tertiary education in New Zealand.

But although there can be little doubt that improving our human capital by securing improved educational outcomes would contribute to New Zealand's long-term growth, the higher-growth dividend from improved educational outcomes would almost certainly accrue well into the future, not within the next few years, or possibly even within the next decade. Indeed, it is sobering to reflect that some of the countries which have had particularly good economic growth in recent years, such as Australia and the United States, have literacy levels not significantly higher than New Zealand's. It may well be that better educational outcomes would be more important in ensuring that more of our people have access to higher paid jobs, and thus in assisting social harmony, than in assisting economic growth directly.

Improving physical capital

One obvious way of increasing the output per person employed is to give people more physical capital to work with. (And by "physical capital" I mean not just plant and machinery but also roads and other infrastructure.) Of course, more physical capital is of no use whatsoever if it is the wrong sort of physical capital, and that points towards the huge importance of "getting the signals right" – by which I mean ensuring that investment takes place in areas which maximise the goods and services produced by that capital. As the Japanese have discovered in recent years, all the investment in the world will not encourage growth if the extra capital produces few of the goods and services which people actually want. Happily, as I have mentioned, we now have most of the signals right – businesses are no longer encouraged by high levels of protection to invest in industries where New Zealand will never be internationally competitive; the financial sector is free of the regulation (and the irrational exuberance which immediately followed the removal of that regulation) which used to distort the allocation of resources; and the misallocation caused by the interaction of inflation and the tax system is also now a thing of the past.

Under these circumstances, what might we do to encourage investment in *more* physical capital?

At very least, we need to seek and destroy those obstacles to investment which are within our own control. There is little doubt, for example, that businesses, especially small and medium-sized businesses, find the compliance costs of many public sector rules and regulations a significant obstacle to more investment. The recent report of the Ministerial Panel on Business Compliance Costs highlighted these issues, and noted that complying with a multiplicity of rules and regulations stifled the ability of businesses "to expand, innovate and compete". Businesses saw the biggest single problem as the way in which the Resource Management Act was being implemented, and described dealing with that legislation as being "cumbersome, costly and complex". It should not require two years to get all the approvals needed to set up an early child-care facility catering for only 30 children, or ministerial intervention to cut through the red-tape involved in setting up a boat-building yard. Most of us know similar horror stories.

We may also need to look at whether there are deficiencies in our national infrastructure which are acting as a deterrent to investment. Do we, for example, need to improve the transport infrastructure in some parts of the country – perhaps in some of the areas where forests are reaching maturity by upgrading roading systems, perhaps in Auckland by completing the originally-planned motorway system and by introducing more appropriate congestion charges?

Could we do more to encourage investment by expanding the size of the market? If the small size and isolation of the New Zealand market discourage investment in New Zealand, should we be doing more to encourage those with the skills and attitudes which can assist our growth to immigrate to New Zealand? Should we more vigorously seek economic integration into a much larger market? We have made a great deal of progress through our free trade arrangement with Australia, and the bilateral free trade arrangements with Singapore, and potentially Hong Kong and other countries in the region, are greatly to be welcomed. But if we really want to encourage investment in New Zealand for a much larger market, perhaps we should be devoting every effort to negotiating a free trade arrangement and greater economic integration with the United States also. There can be little doubt that one of the major reasons for the recent economic success of both Ireland and Finland is their

membership of the European Union, as I have mentioned. A closer economic integration with the United States would not make New Zealand any closer physically to California, but it would carry potentially enormous economic benefits. It is in this context that the time may have arrived when we need to give serious consideration to the pros and cons of alternative currency arrangements. Far be it from me to advocate the abolition of the Reserve Bank of New Zealand and, as I have said on a previous occasion, any decision to abandon the New Zealand dollar in favour of some other currency is finally a political decision, not a decision for central bankers. And frankly, I do not know whether there would be net economic benefit in adopting some other currency arrangement, but if we are to have a no-holds-barred discussion on how to improve New Zealand's economic performance, one of the issues which should be looked at is this.

Another matter relevant to how we might encourage more investment in physical capital is the tax regime. Do we need a substantial change in the tax structure to encourage investment in New Zealand by New Zealanders, by immigrants, and by foreign companies? And if so, what might that change look like? This isn't the place to go into detail, but it would probably involve a significant reduction in the corporate tax rate (it is disturbing that New Zealand's corporate tax rate is now the highest in the Asian region). The rate of company tax is rarely the only factor determining the location of a new investment, and indeed it is not often even the dominant factor. But it is a relevant factor, and is one of the issues to look at if we are serious about encouraging more investment in New Zealand.

Improving technology

And finally, how might we increase the growth rate of productivity, or of GDP per capita, by further increasing the rate at which we adopt new technology from abroad, and develop new technology of our own? Roger Ferguson, Vice Chairman of the Federal Reserve Board, cites research done by Fed economists which suggests that "the consolidated

influences of information technology investments account for about two-thirds of the acceleration in (US) productivity since 1995".¹¹ And there can be little doubt that a radical improvement in New Zealand's productivity growth rate will require a more rapid adoption of new technology than has been the case in recent years.

To some extent, we would see more rapid adoption of new technology if we saw more investment in human and physical capital. The three things often go together. But there are some things we probably need to do to encourage this.

To begin with, we should at least try to ensure that there are no obstacles to the development and adoption of new technology. In particular, we need to ensure that our regulatory framework does not close off developments in biotechnology, an area where we must surely have the potential to be world leaders. This does not, of course, mean that there should be no restrictions whatsoever on experiments in this area, but it does mean that we should remember that every restriction has a cost as well as a potential benefit, and sometimes the cost can be very substantial.

Do we need to go further, by providing positive incentives to undertake research and development in New Zealand? Our unhappy experience with governments providing incentives to particular private activities inevitably and rightly makes us nervous about such a suggestion, but might the "externalities" associated with research and development – the economic benefits which the individual firm can not itself capture and retain – justify an exception in this case? Recent OECD data suggest that Australian businesses spend about double what New Zealand businesses spend, relative to GDP, on research and development, while those in Ireland spend about three times as much, those in Finland spend about six times as much, and those in Sweden spend about nine times as much. Even allowing for some over-statement arising from businesses having an incentive to re-classify expenditure as R & D where there are tax benefits from doing so, New Zealand businesses seem to be spending substantially less on R & D than do businesses in other successful economies.¹²

Do we need to take steps to encourage the adoption of

¹¹ "The productivity experience of the United States: past, present, and future", a speech at the US Embassy in The Hague, 14 June 2001.

¹² *A new economy? The changing role of innovation and information technology in growth*, OECD, 2000, page 29.

new technology by encouraging a more entrepreneurial, a more risk-taking, culture? At a minimum we may need to try to make entrepreneurs feel more loved – if not our *only* national heroes at least *among* our national heroes! We also need to foster an understanding of financial matters, and an interest in business activities, in our schools, through programmes such as those run by the Enterprise New Zealand Trust.

We need to consider whether the personal income tax structure provides appropriate encouragement to entrepreneurial New Zealanders to stay in New Zealand, and encouragement to entrepreneurial *potential* New Zealanders to come here. Our top rate of personal income tax is not particularly high by the standards of other developed countries, but it cuts in at a level of income below that in many countries and our tax system allows relatively few deductions. Compared with the rapidly growing economies of Hong Kong and Singapore, our top rate of personal income tax is very high.

Perhaps we also need to think of some more innovative moves in the tax area. The United Kingdom attracts many entrepreneurial people from all over the world to live and work in that country by exempting from UK tax all income generated outside the UK for people not born in the UK. I understand that Switzerland effectively “negotiates” the tax to be paid by wealthy foreigners who want to live in Switzerland. It may be no accident that many entrepreneurial New Zealanders have moved to these countries in recent years.

Another idea was suggested in the discussion paper issued by the McLeod Committee recently, namely establishing a maximum amount of income tax to be paid by any individual during the course of a year. The McLeod Committee suggested that that might be \$1 million.¹³ Even a maximum of \$500,000 per annum would be more than enough to cover 10 times over the cost of public services likely to be used by a person paying that much tax, but would be a level of tax which would seem very attractive to many expatriate New Zealanders and other entrepreneurial people in the US, Europe and Asia, from whom we are currently collecting no tax revenue at all. I strongly suspect that establishing such a

maximum would actually generate significantly more tax revenue for the New Zealand government than the present tax structure does.

Yes, it would offend our traditional New Zealand values to waive income tax once \$500,000 had been paid, but what if very few current New Zealand residents pay more than \$500,000 in tax each year? And if such a regime encouraged 1,000 entrepreneurs to come to New Zealand *and* the government were to gain, say, an extra \$500 million a year in tax revenue to finance more early-childhood education and tax incentives for research and development, who amongst us would be worse off? Indeed, the likelihood is that such an injection of entrepreneurial drive might well play a major role in changing the rate at which New Zealand business adopted new technology, and so in improving the growth in New Zealand productivity.

More savings?

Before concluding, let me talk briefly about the role which increased national savings might play in helping us to increase New Zealand’s economic growth rate. “Briefly” because I am not at all sure what role national savings play in economic growth in a world where capital is free to move from country to country. We know that Japan has one of the highest savings rates in the world, but has had one of the worst growth records in the developed world for more than a decade. We know that the United States and Australia have had rather low national savings rates in recent years, but both countries have grown strongly. We certainly know that savings which are channelled into investments which yield little or no growth are of no benefit.

On the face of it, our own national savings performance has been poor over several decades, and that has been reflected in persistent balance of payments deficits over more than a quarter of a century – and very high private sector levels of indebtedness to foreign savers as a result. We know that, because of our heavy dependence on the savings of others, a significant fraction of the total output produced within New Zealand now accrues to those foreign savers. We know too that we probably all pay somewhat higher interest rates than would otherwise be the case because of the risk

¹³ Tax Review: Issues Paper, June 2001.

premium which foreign lenders charge as a result of our heavy dependence on the savings of others.

But even if we were sure that improving our savings performance was a vitally important ingredient in improving our growth performance, or our standards of living more generally, nobody knows for sure how best to do that.

In recent years, successive governments have sought to contribute to an improved national savings performance by running fiscal surpluses, though there is no certainty that that increases national savings in total – the possibility is that increased public sector savings may be offset by reduced private sector savings, perhaps because of enhanced public confidence that taxpayer-funded retirement income is assured.

What about special tax incentives for retirement saving? Alas, there is little evidence that such incentives have any significant effect on national savings – to the (limited) extent that they increase private sector savings, they may well simply produce an offsetting reduction in public sector savings (because of the reduction in tax revenue required to provide the incentives). They also tend to be quite regressive, in that most of the benefit of the incentives goes to those on the highest incomes, who might well be savers even without the incentives.

It is possible that some form of mandatory savings scheme might produce an increase in national savings. It is hard to avoid the conclusion that Singapore's breath-taking savings performance over several decades is related to the very high level of mandatory savings required by that country's Central Provident Fund. But on the other hand, it is not yet entirely clear that Australia's more modest mandatory savings scheme is having a marked effect on Australia's savings performance, although it is clearly having an effect on developing a pool of institutional savings.

On balance, I would probably be a supporter of some kind of mandatory savings scheme as one contribution to improving our growth performance. But the case is not yet conclusively proven, and I would prefer to see more informed debate on the subject (as distinct from the substantially ill-informed debate of the kind we saw when this matter was last on the public agenda in 1997).

One thing is clear however: we can not afford to lament the extent of foreign investment in New Zealand, and more generally the extent of our dependence on the thrift of foreign savers, unless we are also willing to save more ourselves. Our high level of dependence on foreign capital, year after year, is simply the other side of our lousy savings performance.

Conclusion

Mr Chairman, let me conclude by reminding you that we have some huge advantages in terms of economic growth – macroeconomic stability, a substantial measure of consensus on economic policy across the political spectrum, a competent and corruption-free judiciary and bureaucracy, an English-speaking population. After some decades of growing substantially more slowly than other developed countries, we have recently picked up our growth performance and during the nineties achieved per capita growth at a rate closely similar to average growth in other OECD countries.

There are, therefore, plenty of reasons to be optimistic. Getting ourselves back to around the middle of the OECD pack in terms of GDP per capita within a decade – indeed, even within two decades – will still be a major challenge to all of us. Fortunately, our history suggests that we thrive on major challenges.

SUMMARY OF RESERVE BANK DISCUSSION PAPER

Central banking: back to the future

Bruce White, Economics Department

Reserve Bank of New Zealand *Discussion Paper* DP2001/05

In this recently released *Discussion Paper*, Bruce White explores the nature of the transmission of monetary policy from the central bank to the financial markets in a modern, deregulated, financial system in which there are few impediments to financial efficiency. The subject is one on which there is debate amongst monetary theorists and central banking practitioners alike.¹ In particular, there has been a focus on the question of whether advances in information technology are changing the nature of money and undermining the ability of central banks to implement their monetary policies.

The *Discussion Paper* is mostly non-technical and the introductory section is reproduced here for Bulletin readers interested in the subject. The full *Discussion Paper* has been posted on the Reserve Bank's website at <http://www.rbnz.govt.nz>. Printed copies are available on request to the Bank's Knowledge Centre at: knowledge@rbnz.govt.nz. The views expressed are those of the author and do not represent an official position of the Reserve Bank.

Introduction

In recent years there has been increasing interest in the question: what is at the heart of a central bank's ability to dictate monetary policy? Why is it that if the central bank says the cash interest rate will be "x", it is "x", while if a commercial bank were to say it will be "y", it would remain "x"? What is it about a central bank, fundamentally, that gives it an ability to significantly control inflation? And why do other banks do not have the same ability?

These might seem odd questions. After all, there is little doubt that central banks can and do dictate monetary policy. But when people ask how and why it works, many central bankers find providing a simple, intuitive, explanation a challenging task.

Adding to the challenge have been two developments. First, whereas most textbook models of how monetary policy works centre on the role of the central bank in managing the money supply, these days central banks tend to set an interest rate, and allow the money supply to find its own level. This poses the question how to reconcile the textbook theory with contemporary central banking practice.

Second, monetary economists have become increasingly interested in the question whether innovations in information technology may result in the demise of central banking. Benjamin Friedman, for example, has suggested that "several trends already visible in the financial markets of many countries today threaten to weaken or even undermine the relevance of [the central bank's] role as monopolist over the supply of bank reserves". He sees these trends as including "the erosion of demand for bank-issued money, the proliferation of non-bank credit, and aspects of the operation of bank clearing mechanisms". In asking what to make of these threats, Friedman wonders whether "potentially aggressive regulatory measures [may be] required in an effort to forestall them" (Friedman (1999)).

This paper seeks to respond to these challenges to our understanding of how monetary policy works. It comprises three parts. Part I summarises the standard textbook model. It casts back to the underlying foundations of that model, and examines how they relate or, as the case may be, do not relate to the characteristics of a modern, deregulated, monetary system. Part II shows how, by modifying a key assumption in the textbook model, we arrive at a quite different understanding of how monetary policy is transmitted from the central bank to the financial markets. It also results in an understanding that better fits with the way central banks nowadays operate. Part III does two things. It draws the analysis in the preceding sections to a conclusion, and then offers some thoughts on how that analysis provides a platform for exploring a wider range of contemporary central banking issues.

¹ See, for example, Posen (2000), Woodford (1997) and Friedman (1999).

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NEWS RELEASES

For the record: recent press releases

Reserve Bank orders self-proclaimed “bank” to desist

5 June 2001

The Reserve Bank has ordered a Tauranga-based organisation to stop using the word “bank” in its name.

Banking System Department Chief Manager Peter Ledingham said: “A Tauranga-based organisation offering financial services has been using the word “bank” in its title. This is illegal under section 64 of the Reserve Bank of New Zealand Act 1989, given that the organisation referred to is not registered as a bank.

“Titles being used are “Sovereign Merchant Bank”, “Sovereign Bank” and “Bank of Tauranga”.

“There is no registered bank in New Zealand with any of these names and nor, as far as we can tell, is any such organisation registered as a bank in any other country.

“Under the Reserve Bank Act, any organisation calling itself a bank must be registered as a bank. Financial institutions that are not registered as banks are not permitted to use names that include the words “bank”, “banker” or “banking”. This is so the public can distinguish registered banks, which must meet minimum prudential and disclosure requirements mandated by the Reserve Bank, from other financial institutions which may not meet those standards. The Reserve Bank is responsible for registering banks and monitoring registered banks’ compliance with regulatory requirements.

“Under the Reserve Bank Act section 64 (2) (a) and (b), an individual who breaks the law in this regard can be fined \$100,000 and a body corporate can be fined \$300,000,” Mr Ledingham noted.

Reserve Bank Email Service

4 July 2001

The Reserve Bank today made available a new way for people who are on-line to receive information about the Reserve Bank’s activities and views.

Reserve Bank Corporate Affairs Manager Paul Jackman said: “The new Reserve Bank Email Service means people who subscribe can receive Reserve Bank press statements, speeches and the like by email as they happen.

“Subscriptions can be initiated by clicking on a button on the lower left hand side of the Bank’s homepage at www.rbnz.govt.nz.

“Then when the Reserve Bank issues statements to the news media through its normal channels, shortly afterwards subscribers will also receive them by email.

“This initiative is part of the Reserve Bank’s longstanding effort to provide up-to-date information about its activities to all those who have an interest,” Mr Jackman concluded.

OCR unchanged at 5.75 per cent

4 July 2001

The Reserve Bank today left the Official Cash Rate unchanged at 5.75 per cent.

Reserve Bank Governor Don Brash commented: “Inflation pressures since the OCR was reduced to 5.75 per cent in May are largely unchanged.

“The world economy is weak. The short-term outlook for most of our trading partners is deteriorating, although there are better signs in Australia. However, offsetting these factors, most export prices remain high, partly because of the low exchange rate.

“Investment in New Zealand has been relatively weak, but consumer spending has remained relatively robust. Overall, inflationary pressures don’t seem to have changed much. In the May 2001 *Monetary Policy Statement*, we thought these pressures were roughly neutral.

“Many inflation measures are still higher than is consistent with our target, but most of the recent signs suggest inflation will fall back into the target range over the next year or so.

“There are, however, risks. March GDP growth was slightly weaker than expected, although previous quarters were revised up, reducing the impact of the March number. The fact that export volumes have not responded strongly to the low dollar and high world prices may mean that the global slowdown is having more impact than previously thought. Whether these downside risks warrant a further cut in the OCR will be re-examined in the August *Monetary Policy Statement*,” Dr Brash concluded.

Faster Growth? If we want it

2 August 2001

Reserve Bank Governor Don Brash today said that if New Zealand is to achieve faster economic growth, first of all New Zealanders have to want it.

Speaking at the “Catching the Knowledge Wave” conference in Auckland, Dr Brash said that, to achieve markedly faster growth, an attitudinal change was required.

“This attitudinal change is probably the most important single need if we are to radically increase our per capita growth rate. We need to *want* faster growth or, in personal terms, higher income.

Dr Brash said that to regain income levels in the top half of the OECD within a decade “would require GDP per capita growth in New Zealand of about 3.6 per cent per annum, somewhat more than double the growth in per capita GDP achieved by New Zealand in the nineties. ... Increasing GDP per capita by 3.6 per cent per annum means at least trebling the rate of productivity improvement which New Zealand has achieved in recent years.”

Faster growth could not be engineered by monetary policy, he said. Rather, the quality of New Zealand’s education system urgently needed improvement, and bureaucratic and taxation obstacles to research and development, the adoption of new technology, and investment needed to be removed.

On the issue of R&D incentives, Dr Brash said that New Zealand’s unhappy experience of the past made us nervous of governments’ providing incentives to private activities, but it had to be a concern that businesses in, for example, Australia spend on average double what New Zealand firms spend on R&D relative to GDP.

“Getting ourselves back to around the middle of the OECD pack in terms of GDP per capita within a decade – indeed, even within two decades – will still be a major challenge to all of us. Fortunately, our history suggests that we thrive on major challenges,” Dr Brash concluded.

Hon. Michael Cullen Broad Support for Svensson Review Changes to the Reserve Bank Act

7 August 2001

Broad support for Svensson Review changes to RBA

“The Government has cross-party support for a series of minor changes to the Reserve Bank Act arising out of the Svensson Review of the Operation of Monetary Policy,” Finance Minister Michael Cullen said today.

“I welcome that as political consensus and stability are important in this area,” he said.

The proposed amendments were:

“the Bank’s Board to be chaired by a non-executive director rather than the Reserve Bank Governor

“the chairperson to be appointed by the non-executive directors

“the Governor to remain a member of the Board but the two deputy governors to be removed.

Dr Cullen said the changes, which were supported by all parties in the House, would be included in the Reserve Bank Amendment Bill set down in the government’s legislative programme for passage if possible this year.

“As I made clear in my initial response to the Review, the Governor will retain sole responsibility for monetary policy. But I believe there are benefits in exposing the Governor to a wider range of views when decisions are taken and have invited the Bank to consider how this might be done.

“The Bank is currently advertising to appoint one or two part-time external advisers, chosen for their broad knowledge of the New Zealand economy, to provide input into the decision-making process.”

Other initiatives which did not require legislation but were being introduced to raise both the transparency of the Bank's activities and the Governor's accountability included:

"publication by the Board of an annual assessment of the Bank's performance

"consideration by the Finance and Expenditure Select Committee of the appointment of monetary policy experts to lift the committee's ability to monitor the Bank

"hosting by the Bank of a conference for the evaluation of monetary policy to be held either at the request of the Board or at intervals of about two years.

In tandem with this, the Bank was pursuing a number of technical recommendations designed to improve its macro-economic and forecasting tools and the quality of the information it was able to produce about the financial system.

"The Review found monetary policy in New Zealand already compared well with international best practice. These changes should improve it further and should reinforce public confidence in the robustness and integrity of the regime," Dr Cullen said.

RBNZ response to Monetary Policy Review announcement

7 August 2001

Reserve Bank Governor Don Brash said the announcement made today by the Treasurer that "The Government has cross-party support for a series of minor changes to the Reserve Bank Act arising out of the Svensson Review of the Operation of Monetary Policy" was very welcome.

Dr Brash said "Indeed, as the Treasurer points out, political consensus and stability are important in terms of the governance arrangements that apply to central banks. The changes, as proposed, are in my view sensible, in accord with the spirit and intent of the Reserve Bank of New Zealand Act 1989, and workable.

"I look forward to assisting in the legislative process and believe we have the basis for continuing to provide New Zealand with best-practice central banking for many years to come," Dr Brash concluded.

OCR unchanged

15 August 2001

The Reserve Bank today left the Official Cash Rate unchanged at 5.75 per cent.

Speaking at the release of the Reserve Bank's August *Monetary Policy Statement*, Dr Brash said "Reasonable estimates suggest that so far the 'underlying trend in prices' remains well within the target range and, on present assumptions, the CPI should track back to somewhere near the middle of our inflation target by mid next year.

"But, there are risks to that relatively benign assessment.

"Inflation could turn out to be more persistent than currently seems likely. There are an increasing number of indicators suggesting that the economy may be operating slightly above full capacity. Also, if headline inflation remains close to the top of the target range, the risk is that inflation expectations may go up, leading to adverse consequences for wage- and price-setting.

"Indeed, with businesses confident about the outlook for their own activity, rural sector incomes at their highest level in many years, employment intentions at near-record levels, and strong signs of a pick-up in both confidence and activity in residential construction - previously one of the most sluggish parts of the economy - we have no reason to date to regret the relatively cautious manner in which we have reduced the Official Cash Rate in recent months.

"The current situation would point to an early increase in the Official Cash Rate were it not for the risk that the international environment will turn out to be even weaker than assumed. The flow of economic indicators from the United States, Japan, non-Japan Asia and Europe makes a deeper and more prolonged slowdown seem quite likely. If the international environment were to turn out substantially weaker than our projections have allowed, there seems little doubt that the disinflationary pressures on New Zealand coming from overseas would intensify. As a result, inflation could fall into the bottom half of our target range and this would necessitate further easing of monetary policy.

"Given the balance of risks that the Bank faces, leaving the Official Cash Rate unchanged seems appropriate for the moment," Dr Brash concluded.

External monetary policy advisers appointed

6 September 2001

The Reserve Bank today announced the appointment of two part-time external monetary policy advisers.

The appointees are Dr Brent Layton and Ms Kerrin Vautier.

Both will participate in the preparation of analysis and advice ahead of the Reserve Bank's quarterly *Monetary Policy Statements*.

Dr Layton is a professional company director from Christchurch and is currently chair of Lyttelton Port Company Ltd and a number of other companies.

Ms Vautier is a consulting research economist from Auckland. She lectures part-time at Auckland University, holds a number of directorships and chairs the New Zealand Committee of the Pacific Economic Co-operation Council.

Reserve Bank Governor Don Brash commented "These innovations follow on from suggestions that emerged as a result of Professor Svensson's *Independent Review of the Operation of Monetary Policy*. They are also part of the Bank's ongoing effort to be well-informed about developments in the New Zealand economy and to bring additional outside perspectives into our processes.

"For the same reason, in recent months the Bank has expanded its programme of visits to businesses and sector groups, and has invited senior central bankers from other countries to participate in the lead-up to *Monetary Policy Statements* and provide feedback on our processes. Our goal is to continue to achieve excellence in formulating monetary policy by actively challenging, reviewing and improving the way we work."

Dates for OCR announcements in 2002

11 September 2001

The following is the Reserve Bank's schedule for the release of its quarterly *Monetary Policy Statements* and Official Cash Rate announcements for 2002. Each *Monetary Policy Statement* includes within it an OCR announcement, so in

total, as usual there will be eight OCR announcements during 2002.

23 January	OCR announcement
20 March	<i>Monetary Policy Statement</i>
17 April	OCR announcement
15 May	<i>Monetary Policy Statement</i>
3 July	OCR announcement
14 August	<i>Monetary Policy Statement</i>
2 October	OCR announcement
20 November	<i>Monetary Policy Statement</i>

The Reserve Bank reserves the right to make changes to this schedule, if required due to unexpected developments. In that unlikely event, the markets and the media will be given as much warning as possible.

New Zealand banking system operating normally

12 September 2001

The Reserve Bank said today that events in the US are not expected to disrupt New Zealand's payments systems through which banks in New Zealand undertake domestic and foreign transactions.

The Reserve Bank's standard liquidity provision facilities are available and are operating as normal.

Reserve Bank Governor Don Brash said "In terms of effects on the world economy, and therefore on the stance of monetary policy, the Reserve Bank is monitoring developments."

RBNZ cuts OCR to 5.25 per cent

19 September 2001

The Reserve Bank today cut the Official Cash Rate (OCR) by 50 basis points from 5.75 per cent to 5.25 per cent.

Reserve Bank Governor Don Brash said "We are making this

unscheduled interest rate cut primarily because of recent tragic events in the United States.

“It seems more likely now that the current slowdown in the world economy will worsen. In these circumstances, New Zealand’s short-term economic outlook would be adversely affected, although any downturn might well be relatively short-lived.

“New Zealand business and consumer confidence will be hurt by recent international and domestic developments, and today’s move is a precaution in a period of heightened uncertainty.

“Our focus, as always, is to keep core inflation in check. Our present judgement is that interest rates do not need to be as high as previously to achieve this,” Dr Brash concluded.

The next scheduled review of the OCR is on Wednesday 3 October.

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Publications - no charge

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Published in October of each year

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Published quarterly. A statement from the Bank on the conduct of monetary policy. First copy free, subsequent copies \$12.00.

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