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Editor's Note

Although this is the last *Bulletin* for 2004, it is my first as editor, having recently taken over the role from Geof Mortlock. I hope readers will continue to find the *Bulletin* interesting and informative and would welcome any feedback on this or future issues.

The first article in this issue provides a comprehensive discussion of the Bank's liquidity management function. Liquidity management plays an important role in helping to maintain the stability of the banking system and in supporting monetary policy. There have been subtle changes to the framework in recent years and an update of earlier material published in the *Bulletin* is warranted. Jan Frazer of the Bank's Financial Stability Department describes the objectives of liquidity management as well as the framework and tools currently used to carry it out. Liquidity management is an area ripe with acronyms, but these are all carefully defined and explained. I am sure the article will serve as an invaluable reference for those wishing to learn about this area.

In the second article, Phil Briggs of the Economics Department reports on some recent work examining foreign exchange hedging practices by New Zealand exporters and importers. Much of this work involved discussions with businesses and the banks providing hedging instruments to customers. The article contains some interesting simulations showing how exporters and importers may have fared in the face of the recent sharp appreciation of the New Zealand dollar. It shows that in the case of exporters in particular, hedging appears to have had a significant smoothing impact on the pattern of incomes.

Regular readers of the Bank's monetary policy statements will be familiar with the 12 region index of GDP that the Bank uses as a proxy for demand in its main trading partners. In response to regular requests from readers, the third article by Mark Smith of the Economics Department, provides further details about how we construct this index, its uses and shortcomings.

Last year, the Reserve Bank released a web-based inflation calculator, enabling users to select two dates and a dollar amount, and calculate an amount adjusted for inflation between those two dates. The calculator can be accessed at

www.rbnz.govt.nz. The calculator has been expanded and is now capable of providing estimates of purchasing power as far back as 1862. A brief note by Matthew Wright and Graham Howard contains further details.

This issue also documents two recent Reserve Bank speeches. The first, delivered by Governor, Alan Bollard, addresses the issue of how a banking supervisory authority can most effectively maintain a sound banking system and respond to bank failures when the system is dominated by foreign-owned banks. The second is in the form of a brief extract from an address by Deputy Governor, Adrian Orr, on the level of household indebtedness and the issues that this may create for financial sector stability.

I hope readers enjoy the material in this *Bulletin*. On behalf of the staff of the Reserve Bank, I would like to wish all readers a Merry Christmas and rewarding year ahead.

Bernard Hodgetts

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Liquidity management in the New Zealand banking system

Jan Frazer, Financial Stability Department

This article provides an overview of how the Reserve Bank (the Bank) conducts liquidity management. It describes the two areas of liquidity management conducted by the Bank – what the Bank does to maintain a stable and sufficient supply of system liquidity and what it does to ensure individual banks have access to liquidity to meet daily transactional obligations through the payments and settlement system. It also explains how the Bank supports its monetary policy implementation by managing the level of liquidity in the banking system so as to avoid large fluctuations in short-term interest rates.

1 Introduction

The Reserve Bank, as New Zealand's central bank, has responsibility for the implementation of monetary policy, the operation of the inter-bank payments settlement system, and the promotion of a sound and efficient banking system. As part of its responsibilities in these areas, the Bank has an active role in managing the liquidity of the banking system by conducting open-market operations in the financial markets and by entering into transactions with individual banks to provide them with the liquidity they need to meet their settlement obligations.

The broad objectives of the Bank's liquidity management function are to ensure that the banking system has sufficient liquidity to enable the payment settlement system to function effectively and to avoid large swings in the volume of available cash that would undermine the implementation of monetary policy. The Bank also conducts securities tenders on behalf of the government, thereby providing the means by which market participants can secure intra-day or inter-day repurchase transactions with the Bank.¹ These transactions enable individual banks to meet daily obligations to make and receive cash transactions on behalf of their customers.

This article discusses the main features of the Bank's liquidity management functions and how they relate to the Bank's monetary policy and banking system responsibilities.

¹ The Bank conducts repurchase transactions with counterparties in which the Bank buys securities against cash with a commitment to sell the securities back to the counterparty at a pre-determined time and interest rate. When securities are bought by the Bank, the securities are lodged into the Bank's name.

2 What is liquidity management and why does it matter?

Liquidity is one of the essential requirements for the effective functioning of the banking system. Without adequate liquidity, banks are not able to perform some of their core functions, including the settlement of their inter-bank obligations (wholesale transactions occurring between banks). Excessive or insufficient liquidity in the financial market also has the potential to undermine the implementation of monetary policy by creating expectations of a firming or weakening of interest rates in ways that may contradict current and intended monetary policy settings. Too much liquidity in the banking system on a regular basis fosters an expectation of falling interest rates; too little liquidity increases the expectation of higher interest rates. Maintaining smooth cash flows and reducing short-term interest rate volatility produces a stable environment where businesses and individuals can make more informed decisions about savings, investment, and other expenditures.

Effective management of liquidity in the banking system is therefore an important element in maintaining a well-functioning banking system and in complementing monetary policy.

The Bank's liquidity management role has three broad elements. First, the Bank implements monetary policy through the Official Cash Rate (OCR),² a cash interest rate

² OCR reviews occur approximately six weeks apart, giving eight reviews during the year; four coinciding with *Monetary Policy Statement* releases. A schedule of these dates appears on our website. The Bank has the discretion to act outside these dates, but does so only in exceptional circumstances.

Box 1

Agency Agreement between New Zealand Debt Management Office (NZDMO) and the Bank

The Bank's responsibilities are to:

- Provide NZDMO with a Crown Settlement Account (CSA)³ facility.
- Conduct OMOs when necessary. The Bank reviews and verifies known cash flows between the government, the Bank, and banking system. When the net change in the CSA for all banks is determined the Bank either injects cash into or withdraws cash from the banking system to help maintain a broadly stable level of liquidity.
- When required, provide advice to NZDMO on the levels and structure of government domestic borrowings. The NZDMO take this advice into account when informing the Minister of Finance on the domestic borrowing programme.
- Conduct government securities tenders and provide administrative services connected to these tenders on behalf of NZDMO.
- Repurchase government bonds. These repurchase transactions normally occur within the six months prior to a bond maturing. The Bank will repurchase the bond and pay the cash to the bond holder. The Bank may then on sell the bond to NZDMO, instead of holding the bond on its balance sheet until maturity.
- Switch government bonds. Periodically, NZDMO may wish to switch out of one bond maturity and into another. The Bank conducts these transactions on behalf of NZDMO.
- Provide assistance in the setting of Kiwi bond interest rates.
- Provide market support by producing and publishing a variety of surveys and schedules: these include the weekly survey of the turnover of government bonds in the secondary market, the monthly survey of non-resident holdings of government bonds and treasury bills, and schedules of future issuances of government bonds and treasury bills.

system adopted by the Bank in March 1999. There is an interest rate corridor around the OCR of plus or minus 25 basis points. At 25 basis points above the OCR exchange settlement account system (ESAS) account holders (currently only registered banks) can obtain cash from the Reserve Bank, while at 25 basis points under the OCR, ESAS account holders⁴ can deposit funds with the Bank (ie those with credit balances in their settlement accounts overnight). By setting this corridor the Bank is able to exert a strong influence on short-term interest rates, which in turn affects economic activity and inflationary pressures through a number of channels.

Second, the Reserve Bank provides facilities to registered banks enabling them to maintain sufficient settlement cash

³ All flows between the government and the private sector and the government and the Bank end up flowing through this account. An example of this is when NZDMO funds the Ministry of Education's (MoE) Westpac Government Branch Account and then the MoE uses this money to pay fortnightly salaries to teachers.

⁴ The ESAS accounts must maintain a zero or positive balance.

at the Bank to meet their payment obligations to other banks through Austraclear.⁵ Whether banks settle their inter-bank obligations intra-day or at the end of the day with deferred settlement (intra-day and deferred settlement are via real time gross settlement⁶), they require sufficient credit balances in their settlement accounts at the Reserve Bank in order to make payments to other banks. The facilities the Reserve Bank provides enable banks to obtain cash from the Bank for the purpose of maintaining sufficient settlement cash to meet their obligations.

Third, the Reserve Bank manages the liquidity associated with government transactions; the Bank injects liquidity to compensate for net payments from the banking system to

⁵ Austraclear is a real-time gross settlement system that members access from their premises. All payments, whether security transactions or cash transfers, are irrevocable once they are accepted by the system.

⁶ Real time gross settlement is provided through the Exchange Settlement Account System (ESAS) allowing payments to be irrevocably settled, transaction by transaction, throughout the day. All transactions are completed in this manner, thus helping reduce the risk that the collapse of one bank may cause others to collapse.

the government (eg tax payments) on any given day, and it withdraws liquidity to compensate for net payments from the government to the banking system (eg pension payments) on any given day. These liquidity transactions are generally conducted via open market operations (OMOs).⁷ In performing this role, the Reserve Bank works closely with the New Zealand Debt Management Office (NZDMO), which is part of Treasury and has responsibility for managing the government's debt programme. The Bank has an agency arrangement with the NZDMO, which sets out the main elements of the Bank's liquidity management functions with respect to the neutralising of liquidity effects of government transactions, and sets out other reporting and analysis functions that the Bank performs for the NZDMO. The agency agreement is discussed in Box 1, previous page.

In addition to these functions, the Reserve Bank's liquidity management function plays an important role in keeping the Bank well apprised of developments in the financial markets and banking system, thereby better equipping the Bank to respond to emerging financial distress situations than would otherwise be the case. Participating in market transactions (eg, OMOs, processing securities tenders, and foreign exchange swaps) allows the Bank to gain knowledge about interest rate movements and the availability, or not, of various securities.

3 Implementation of monetary policy

Settlement Cash

Liquidity can be defined in many ways, but in the context of the banking system, it essentially comprises banks' holdings of monetary instruments that can be used for inter-bank settlement or can be converted quickly to such instruments. In practice, liquidity in this context is largely measured by banks' holdings of settlement cash – cash held at the Bank in Exchange Settlement Account System (ESAS) accounts. This cash is used to settle wholesale obligations between the banks and provides the basis for settling most of the retail banking transactions that occur every working day between corporates and individuals.

One of the ways the Bank maintains a stable liquidity environment is to provide a constant amount of settlement cash to the ESAS account holders. Settlement cash is the aggregate amount of surplus cash held by all ESAS account holders at the end of a given banking day.

Box 2 explains what banks use settlement cash for.

ESAS account holders' settlement cash balances constantly change during the day as transactions flow between other ESAS accounts, the government and the account holder, and the Bank and the account holder. For a description of

Box 2

Settlement Cash

Banks use settlement cash to:

- Settle obligations with the government. For example, a BNZ customer uses a cheque to make a tax payment to Inland Revenue Department (IRD). IRD then deposits the cheque to their account held at Westpac Government Branch. At the end of the business day, if the net balance of all government departments in the Westpac Government Branch is a credit balance, this cash is transferred to the Crown Settlement Account (CSA) at the Reserve Bank. If the net balance is an overdraft, then cash is transferred from the CSA to Westpac Government Branch.
- Settle obligations with the Reserve Bank (eg: purchasing currency from the Bank or settling liquidity management operations they have transacted).
- Settle obligations amongst themselves (eg: a Westpac customer pays for goods or services from a BNZ customer).

⁷ What OMOs are and how they are calculated is explained in box 6.

Box 3

Repurchase Agreements

There are two master repurchase agreements that counterparties can enter into with the Bank. The Reserve Bank Master Intra-day Securities Repurchase Agreement sets out the terms and conditions under which counterparties may obtain cash from the Bank. Specified securities are sold to the Bank and the same security is repurchased by the counterparty within a 24 hour period. Some of the core features covered by the agreement outline the legal nature of intra-day repurchase transactions, how to initiate and confirm a transaction, how cash and securities are exchanged, how to substitute securities, and what actions are taken in the event of a default.

The second agreement is the Reserve Bank Master Inter-day Securities Repurchase Agreement. This agreement sets

out the terms and conditions under which counterparties may obtain cash from the Bank for overnight periods or longer. Specified securities are sold to the Bank and the same security is repurchased by the counterparty at a specific date and interest rate. Some of the core features covered by the agreement outline the legal nature of repurchase transactions, how to initiate and confirm a transaction, how cash and securities are exchanged, how to substitute securities, and what actions are taken in the event of a default.

The Bank pays an overnight interest rate 25 basis points (a quarter of 1 per cent) less than OCR for any cash held in the ESAS accounts at the Bank. This rate forms the lower bound of the OCR corridor. Use of the ORRF is charged at 25 basis points above the OCR. This rate forms the upper bound of the OCR corridor.

how and why account holders obtain intra-day borrowings to ensure payments are made continuously throughout the day, please refer to section 4 of this article.

ESAS accounts are basic current accounts. They have no overdraft facility and therefore their balance cannot fall below zero. ESAS account holders have no right of access to cash from the Bank. If an ESAS account holder needs to make a payment and has insufficient cash in their account they are required to acquire the cash. They can obtain cash from other banks, or they may sell securities to the Bank for

cash using autorepo or the Overnight Reverse Repurchase facility (ORRF) (see Box 4 for more details on this facility), if they have signed the Intra- or Inter-day Master Repurchase Agreement (see Boxes 3 and 4 for more details). If an ESAS account holder does not have such an agreement in place with the Bank, then they will have to acquire cash from another source (eg: other banks).

A counterparty must sell government securities (government bonds, inflation-indexed bonds and treasury bills) in exchange for cash against a future repurchase date. There is no limit

Box 4

Overnight Reverse Repurchase Facility

There may be occasions when a registered bank is unable to acquire cash from another bank. When this happens, the counterparty is able to exchange securities for cash with the Bank for one working day. The only restriction on the amount the counterparty may request is the value of the acceptable securities held by the borrower.

The Bank enters into these overnight agreements with any counterparty that has signed the Inter-day Master Securities Repurchase Agreement through an on-demand facility known as the Overnight Reverse Repurchase Facility

(ORRF). Under this arrangement, the Bank credits a bank's settlement account with the required amount of cash and buys the eligible securities from the ESAS account holder. These securities are bought by the Bank on contractual terms that require the ESAS account holder to buy the securities back at a stipulated price the next banking day.

The facility is open from 09:00 to 12:00 and 13:00 to 14:30 to all registered counterparties who have signed a Reserve Bank Master Inter-day Securities Repurchase Agreement. In addition, ESAS account holders can approach the Bank between 14:30 to 16:00 and 07:30 to 08:00 the following business day to access the ORRF.

Box 5

Monetary policy implementation statistics for the last financial year (to June 2004)

Facility	Maximum amount	Minimum amount	Daily average transacted
ORRF	\$439m	\$0m	\$38m
ESAS account balance	\$1,077m	\$0.58m	\$62m

to the amount of cash the counterparty can ask for as long as they have sufficient securities to cover the transaction. This means that the Bank does not take a credit risk against the counterparty when providing them with overnight cash; the credit risk has been effectively eliminated by the purchase of government securities. The market risk for the Bank associated with these transactions (ie: the risk that the market value of the government securities may fall due to a rise in interest rates) is offset by applying a "haircut"⁸ to the security purchased in the transaction. The Bank calculates the face value of the security required using a haircut of 1 per cent for securities with less than 3 years to maturity, and 3 per cent for securities with 3 years or more to maturity.

Market convention ensures that ORRF transactions are repaid within the first hour of the following day's trading and the securities are sold back to the ESAS holder.

4. The Bank's liquidity management

Liquidity in the market is greatly affected by flows between the government and the banking system as previously outlined. This includes transactions between the government and banking system as well as between the Bank and the banking system.⁹ When the government makes disbursements to the private sector (eg in the form of social welfare payments, tax refunds, or salaries to public servants) and this exceeds the cash it receives from the private sector¹⁰ (eg: in the form of tax payments, fines or fees for government services) on any given day, this results in an increase in liquidity of the banking system. Conversely, liquidity is reduced when the government receives more cash from the private sector than

it distributes. These fluctuations in liquidity could have an impact on interest rates and monetary conditions unless neutralised by open market operations.

The Bank needs to know the value of the payments the government and the Bank expect to receive and pay out on any given day. The Bank does this by forecasting liquidity based on information provided to it by the NZDMO and the larger government departments (such as the Ministry of Social Development, the Ministry of Health, and the Ministry of Education). The flows between the government and the banking system, together with flows between the NZDMO and the Bank, are generally large, although flows between the NZDMO and the Reserve Bank do not affect the banking system. Total government revenue and expenditure on any given day averages around \$450 million. Other large periodic government flows include maturing government securities such as treasury bills (typically around \$650 million) and bonds (around \$2,500 million). While the value of transactions is large, there are regular patterns to the flows. For example, PAYE tax is due on the 5th and 20th of each month, and pension payments occur every second Tuesday. The regularity of these payment dates helps to provide greater certainty for liquidity forecasts, thereby facilitating effective liquidity management.

The NZDMO assists the Bank by ensuring that the government departments responsible for approximately 95 per cent of the government's receipts and payments provide the Bank with forecasts of their transactions in a timely manner. The Bank's responsibility is to review both the accuracy of the timing of these flows and then calculate the net impact on the banking system. Consequently, the Bank maintains a fairly close dialogue with some of the government departments in order to maintain a reasonably accurate and complete understanding of the magnitude and timing of cash flows. The NZDMO is also required to inform the Bank of transactions it has instigated that will impact on

⁸ If a 1 per cent haircut is taken, then an additional 1 per cent of security is obtained from the counterparty.

⁹ Transactions between the Government and the Bank do not impact on the level of settlement cash.

¹⁰ The Government receives revenue through tax receipts from IRD and excise and duties through the Customs Department.

Box 6

Open Market Operations

An Open Market Operation (OMO) is an operation whereby the Bank offers to inject cash into or withdraw cash from the banking system in an endeavour to maintain a stable level of cash in the ESAS accounts (currently \$20 million).

The Bank receives forecasts giving details of all receipts and payments from various government departments, NZDMO and the Bank itself. From this information, the Bank calculates whether to inject or withdraw cash from the banking system and the maturity date or dates it will offer. The Bank makes this offer daily to all institutions that are registered to participate. If the Bank injects cash, it also calculates a minimum rate at which it will accept bids from registered bidders. If the Bank withdraws cash it calculates a maximum rate at which it will accept bids. The minimum or maximum rate is calculated for each maturity date using the relevant market rates.

When the Bank announces an OMO, it provides the following information:

- settlement cash balance for the previous business day;
- forecast cash influence for today (the net amount of government and Reserve Bank cash flowing to or from the banking system on a given day);
- the size of the OMO and whether it is an injection or withdrawal;
- instrument (eg: reverse repurchase, repurchase, seasonal treasury bill);
- date (maturity date of the instruments offered);
- limit (maximum amount the Bank will inject or withdraw to the maturity date);
- minimum or maximum rate.

The table below gives an example of calculating the size of an OMO.¹¹

Example of cash flows between NZDMO and the banking system

NZDMO	Banking system	
	\$20m	Banking system balance at start of day
NZDMO transfers cash to Ministry of Education <i>(Non impact on banking system)</i> \$45m ↓		
Ministry of Education pays teacher's salaries <i>(Impact on banking system)</i>	→ +\$45m	
	← -\$100m	IRD collects GST revenue <i>(impact on banking system)</i>
Forecast cash influence (net government transactions)	-\$55m	
Size of OMO to inject cash into the banking system leaving \$20m settlement cash	→ +\$55m	
	\$20m	Forecast system balance at end of day

¹¹ These numbers are fictitious and are being used to demonstrate the calculation of the OMO's size only.

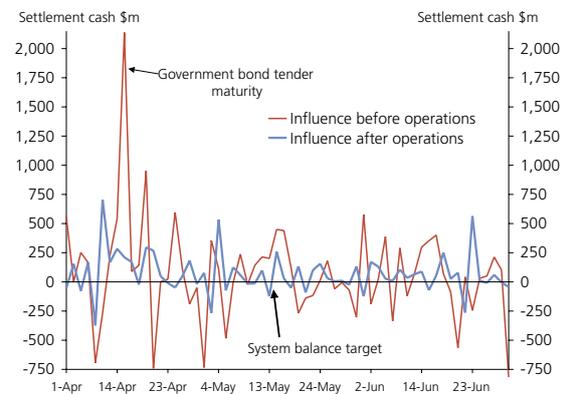
the banking system. Once the net position is calculated, the Bank conducts an OMO to counter the effect of the daily cash flows. Box 6 provides an OMO calculation.

While every endeavour is made to provide accurate forecasts, variations between what is forecast and what transpires can and do occur. These variations impact on ESAS account holders. If the banking system is left with surplus cash (ie more than \$20 million), this cash is held by ESAS account holders, which are remunerated at 25 basis points under the OCR. When the banking system does not have enough cash to enable banks to fulfil their daily obligations, they are forced to acquire additional cash from the Bank using the ORRF at 25 points above the OCR.

At the end of each banking day, the Bank reconciles the day's forecasts against the actual movements to highlight any variations that have occurred, including their source(s). Examples of this are when cash does not get transferred as forecast or if there have been settlement failures.

Figure 1 shows the government's net cash influences before and after liquidity management operations.

Figure 1
Settlement cash before and after liquidity management operations – target is \$20 m



the Bank does so using reverse repurchase transactions. The Bank also uses foreign exchange swaps to inject cash, although these transactions are done outside the OMO. Box 7 explains a foreign exchange swap. Repurchase transactions and seasonal treasury bills are used to withdraw surplus cash from the banking system. An explanation of how reverse repurchase agreements, repurchase agreements and seasonal treasury bills are used to inject or withdraw cash from the banking system can be found further on within this section.

OMOs are generally conducted at the same time each day (ie: 9.30am). If for some reason the Bank is unable to hold the OMO at that time, it advises the financial market of the delay. The OMO is open for 15 minutes and only

Open Market Operations (OMO)

The OMO is the Bank's primary operation for managing flows between the government and the banking system. Depending on a day's net cash influence, cash is either injected or withdrawn from the banking system using the instruments available to the Bank. When injecting cash,

Box 7

Foreign exchange swaps

Foreign exchange swaps are used in the same way as reverse repurchase transactions and repurchase transactions. They allow the Bank to inject or withdraw New Zealand dollars (NZD) on specified dates.

Foreign exchange swaps have two "legs" (or sides) to the transaction. When the Bank injects cash, the first leg will involve selling NZD for another currency (eg: usually USD) on a given day at a given exchange rate (eg: 0.6850). The second or maturing leg of the transaction is when the NZD is bought back at a future date at a predetermined

exchange rate (eg: 0.6800). In this instance, the 0.0050 difference in the exchange rates between the first and second legs is called the forward points. These reflect the differential between New Zealand and the United States interest rates. In this example, the Bank invests the US dollars received in the first leg for the same term as the foreign exchange swap. By performing a specific calculation using the US deposit interest rate and the 0.0050 interest rate differential, it is possible to calculate a New Zealand interest rate return for the Bank.

those counterparties who have registered with the Bank and signed an Inter-day Master Repurchase Agreement can place bids. The Bank's Operating Rules and Guidelines detailing the actual process are provided to counterparties and are also published on the Bank's website. Box 8 highlights the key features of the Operating Rules and Guidelines.

When setting OMO maturity dates, attention is paid to forecast cash flows, and maturity dates are selected in an endeavour to bring future daily flows to a manageable level.¹² The average duration of an OMO maturity, for the six months until 31 October 2004, was 4 days. If the size of the OMO is large, the Bank may offer more than one maturity date for the securities being transacted in the OMO, giving participants more choices. When offering multiple dates, it is likely that the Bank will have a preferred date based on its liquidity management requirements. For example, the Bank may want to inject cash today to be withdrawn from the banking system at a future date. One of the future dates selected may be forecasting net government flows of +\$300 million and another date may already have forecast net flows of -\$125 million. The preferred date in this situation will be the date indicating the system has surplus cash.

Over much of the 1980s and 1990s, OMOs were often used as a supplement to monetary policy implementation, being conducted in a manner that provided financial markets with a signal about the Bank's desired policy stance. OMOs are no longer used in this manner. The week before an OCR

announcement date, the Bank will offer an overnight date in the OMO as well as the usual maturity date(s). This allows market participants bidding in the OMO the option of not having to transact beyond the OCR date. If the consensus of opinion is that the Bank will lower the OCR rate at its next review, then bidders will not be keen to borrow money at a higher rate than they could once the OCR rate is reduced.

Bidders tend to have a preference for shorter-dated transactions, as they prefer not to have securities tied up for too long. However, OMO counterparties have the ability to switch securities already sold to the Bank with other securities, if they require securities back before the OMO transaction matures. This is done at a small cost to the counterparty.

The OMO is not conducted entirely as a commercial operation. However, when the Bank announces the OMO, it also sets a minimum or maximum acceptable rate for each maturity date on offer. Minimum rates are indicated when injecting cash and the Bank will not accept bids under this rate. Conversely, when withdrawing cash, the Bank sets a maximum rate and will not accept a bid above this rate. OMO participants can choose to bid at these levels or not. On average in the last year, OMO participants have bid at eleven basis points above the minimum rate for injections.

Box 8

Operating Rules and Guidelines

Rules are the non-negotiable aspects of any operation or tender with which counterparties must, without variation, comply. Guidelines are aspects of operations which are desirably adhered to in the interest of operational efficiency.

The key features of the Bank's operating rules and guidelines explain:

- how to bid in the Bank's government securities tenders and domestic market operations, either electronically or using the telephone;
- the minimum size of bids;
- the allotment of successful bids, including any pro rating that may need to be calculated in the event of multiple bidders at the cut-off interest rate.

¹² This level is dependant on the balance in NZDMO's Crown Settlement Account (CSA).

Box 9

Liquidity management statistics for the last financial year (to June 2004)

Facility	Maximum amount	Minimum amount	Daily average transacted
Reverse repurchases	\$3,275m	\$0m	\$720m
Repurchases	\$0m	\$0m	\$0m
Seasonal treasury bills	\$120m	\$0m	\$0m
FX swaps (transacted)	\$717m	\$0m	\$56m

Measuring the “success” of the operation

The main aim of the Bank in its OMOs is to smooth out daily government revenue and expenditure impacts, leaving the desired amount of settlement cash in the banking system. The first measure of a successful OMO, whether an injection or withdrawal, is for the full amount on offer to be transacted. A second measure is to have the majority of successful transactions going to our “preferred” maturity date, while the third element of success is to receive bids at a margin to either our maximum or minimum rate.

Repurchase agreements

Under a repurchase agreement the Bank withdraws cash from the banking system by selling government bonds from its investment portfolio in exchange for cash on a given day. On a pre-determined maturity date, the Bank repurchases the securities in exchange for cash and the interest earned during the period of the repurchase agreement.

A reverse repurchase agreement is used by the Bank to inject cash into the banking system by purchasing government securities. The Bank agrees to sell back those securities at a predetermined date, receiving cash and interest. There is no restriction on the period of the transactions, although, as noted earlier, OMO counterparties tend to have a preference for shorter dates.

Seasonal treasury bills

Seasonal treasury bills have the same characteristics as regular treasury bills (ie: they are a government security sold at a discount¹³ to par and carry no coupon¹⁴). Seasonal treasury bills are generally issued for terms of 1 to 3 months. Regular treasury bills are issued in weekly tenders with maturities of 3, 6, and 12 months as part of the government's borrowing programme.

The issuance of seasonal treasury bills is governed by the agency agreement with the NZDMO. The Bank sets the maximum rate at which it will accept bids, and then issues seasonal treasury bills to the successful bidder(s). This is different to when the Bank conducts treasury bill tenders on behalf of the NZDMO. On those occasions, the NZDMO makes the decision to accept or reject bids. While seasonal treasury bills are more commonly issued through an OMO, they can also be issued in the regular treasury bill tender.¹⁵ Seasonal treasury bills do not remain on the Bank's balance sheet, with the cash generated being passed directly to the government.

Foreign exchange swaps

Foreign exchange swaps can be used to inject or withdraw cash from the banking system. The Bank will enter into these transactions at commercial rates with approved counterparties. These transactions are entered into directly with market participants and not via an OMO operation. The amount of foreign exchange swaps the Bank can transact is limited by internal dealing limits with counterparties, which are set in order to limit the Bank's exposure to individual counterparties. If the swap does not provide a return equitable to or better than the OMO, then swaps will not normally be transacted.

See Box 7 for an explanation of a foreign exchange swap.

¹³ A 30-day treasury bill with a face value of \$1 million that is sold at a rate of 6 percent will cost \$995,092.69. When the treasury bill matures, the holder of the bill will receive the face value (ie: \$1 million).

¹⁴ Government bonds carry a coupon, which is the interest amount paid semi-annually in arrears. Inflation-indexed bond coupon interest is paid quarterly in arrears.

¹⁵ Treasury bill tenders are held weekly on a Tuesday. Settlement of these transactions occurs on the following banking day.

Bond repurchases

When the NZDMO organises the bond tender programme, it selects bond maturity dates along the yield curve. In most years there is one bond reaching its maturity date and the amount maturing will normally be around \$2.5 billion. It is the responsibility of the Bank to reduce as much as possible the impact this transaction will have on the banking system on the maturity day. One method of doing this is to repurchase these bonds before they mature.

Around six months prior to maturity the Bank will normally advise the market that it is prepared to receive offers from them for the repurchase of bonds. This “repurchase window” is open for two hours each business day. Any counterparty meeting our credit requirements can approach the Bank during the time the repurchase window is open with an offer to repurchase the bond. The Bank will set a rate at which it believes is a fair market rate. This rate will relate to its activities in other liquidity management operations (eg: OMO's, foreign exchange swaps). The Bank will nominate a settlement date which aids the management of government cash flows. If the counterparty agrees with the rate and date, the repurchase transaction will occur. These repurchases have the impact of bringing forward the effect of the maturing bond and thus reduces the effect on the maturity date. If the Bank repurchases bonds, it can either hold them on its balance sheet until maturity or alternatively, it can on sell the bonds to the NZDMO which then cancels the security. The Bank advises the market when it will stop receiving offers one day prior to the cessation.

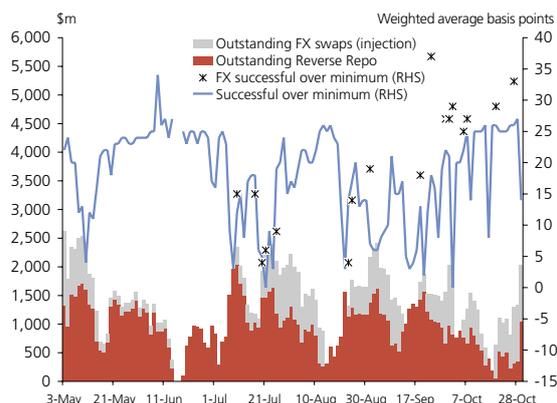
Graph 2 shows the volume of reverse repurchase transactions, foreign exchange swaps and treasury bills outstanding over the six months to 31 October 2004. No repurchase transactions have been transacted during this period.

5 Why banks need intra-day liquidity

An important part of the Bank's liquidity management function is the provision of liquidity to ESAS account holders to enable them to meet their intra-day inter-bank settlement requirements. As noted above, banks discharge payment system-related (and other inter-bank) obligations between each other through the transfer of settlement cash – the cash held in their ESAS accounts at the Bank. Prior to the introduction of real time gross settlement, these settlements occurred at the end of the banking day (ie prior to 9.00 am the following business day). Since the introduction of real time gross settlement, in 1998, inter-bank settlement for the bulk (by value) of payment system and other inter-bank transactions occurs throughout the business day. Under this system, transactions between banks “queue” until the paying bank has sufficient cash in its settlement account at the Bank to meet the payment required in relation to the transactions. Settlement typically occurs numerous times throughout the business day and cumulatively amounts to many billions of dollars on any given day.

The Bank provides the inter-bank settlement arrangements to facilitate real-time gross settlement. It debits banks' ESAS accounts for withdrawals from their accounts to meet inter-bank settlement obligations as well as other transactions (such as the acquisition by banks of notes and coin from the Bank), and it credits banks' ESAS accounts for payments received from other banks in the inter-bank settlement process and for other transactions (such as the sale by a bank of notes and coin to the Bank). The Bank also provides ESAS account holders with intra-day liquidity through an electronic autorepo facility to enable them to meet their settlement obligations throughout the day when they have insufficient credit balances in their ESAS accounts.

Figure 2
OMO results (May-October 2004)



Box 10

Autorepo agreement

The autorepo agreement is an automated facility between the Bank and ESAS account holders. ESAS account holders must have signed a Master Intra-day Securities Repurchase Agreement.¹⁶ If an intra-day transaction is not repaid at the end of the business day, it automatically becomes an inter-day transaction. As such, ESAS account holders must also have signed an Inter-day Master Securities Repurchase Agreement.

ESAS account holders obtain cash in order to enable the continuous flow of payments to other market participants. The cash is normally repaid on the same banking day to aid the continuing flow of existing system cash without permanently increasing the liquidity of the banking

system. Acceptable securities ESAS account holders can use are:

- treasury bills;
- government bonds;
- inflation-indexed bonds, and limited amounts of;
- registered, transferable and negotiable certificates of deposit with 365 days or less to maturity;
- bills of exchange with 365 days or less to maturity; and
- promissory notes and commercial paper of issuers approved¹⁷ by the Bank and with 365 days or less to maturity.

The autorepo facility is provided to ESAS account holders at no cost. Box 10 provides information on this facility. Therefore, when an account holder receives \$5 million in cash from the Bank, it will return the same amount before the close of the banking day.¹⁸ Automatic valuations of the securities being sold to the Bank for cash occur at the time the transaction is initiated. Interest rates covering the interest rate curve from overnight cash to the longest outstanding security, currently the 15 April 2015 bond¹⁹, are updated within the electronic system before the start of each working day. A haircut of 102 per cent is taken on all securities. This is different to inter-day repurchase agreements due to system constraints. For example, if on 29 September 2004 an ESAS account holder uses \$80 million of the 15 November 2011 bond in an autorepo transaction, and that bond is trading at 6.19%, they will receive approximately \$78.2 million. Without the haircut, the ESAS account holder would have received approximately \$79.8 million. The \$1.6 million difference is intended to protect the Bank from changes in the securities value (ie movement in interest rates).

Intra-day transactions are normally repaid to the Bank by the close of the banking day. An autorepo is automatically rolled over into an autorepo rollover (ARR), if a bank has insufficient cash in their ESAS account to complete (ie: buy back) any outstanding securities by the close of the banking day. However, if the ARR is rolled into a second day transaction, it is monitored manually by the Bank in its inter-day repurchase portfolio.

The charge for rolling an intra-day transaction into an inter-day transaction is 5 basis points above the ORRF facility (ie 30 basis points above OCR). This additional charge reflects a credit premium as ESAS account holders can sell a limited amount of non-government securities in autorepo. The same charge applies to the manually transacted second day rollovers.

Figure 3 highlights the volume of autorepos generated during the banking day for the last three months of the 2003/2004 financial year.

¹⁶ The agreement sets out all the terms and condition under which intra-day transactions with counterparties can occur. It also contains the terms and conditions for the transaction to roll into an inter-day transaction.

¹⁷ An issuer will normally be approved if its short term paper rating is at least A1 (Standard and Poor's) or P1 (Moody's).

¹⁸ The banking day starts at 9.00 am and continues through to 8.30 am the following working day.

¹⁹ The 15 February 2016 inflation-indexed bonds (IIBs) are manually transacted due to system constraints.

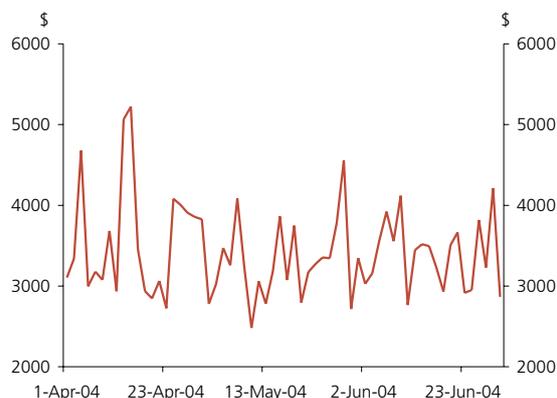
Box 11

Autorepo agreement statistics for the last financial year (to June 2004)

Facility	Maximum amount	Minimum amount	Daily average transacted
AAR	\$1.068b	\$0m	\$20m

Figure 3

Total autorepos generated during the day



6 Government securities tenders

The Bank conducts treasury bill and government bond tenders as part of the Bank's agency agreement with NZDMO. Box 12 gives details of the tender processes.

Treasury bills are issued as part of the government's short-term debt programme and tenders occur each Tuesday, or the next working day if Tuesday is a holiday. \$200 million of securities are offered each week in three tranches: \$75 million is offered in the first tranche with a maturity date of three months; \$75 million is offered in the second tranche with a six month maturity; and \$50 million is offered in the third tranche with a twelve month maturity date. Approximately \$5.5 billion of treasury bills are currently on issue.

Government bonds²⁰ are issued as part of the government's long-term debt programme with the tender timetable set by NZDMO, with advice from the Bank. NZDMO announce the tender programme for each financial year at the time of the government's budget (usually May). This includes total volume to be issued and tender dates. Currently, over \$24 billion in government bonds are on issue, of which more than \$19 billion are available for trading in the secondary market.

²⁰ The bonds have a fixed interest coupon paid semi-annually in arrears and are redeemable at face value on maturity.

Box 12

Treasury bill and government bond tender processes.

The tender processes for each security are similar.

Treasury bill tenders

On the day prior to a tender, the Bank releases details of the tender. This includes the amount being issued, the maturity profile, closing time and date for bids, settlement date, and when the results will be issued. On the day of the tender, the Bank processes the electronic bidding via Austraclear and provides results to the market. These results are issued via electronic media (such as Reuters and Bloomberg). A table (HD5) containing the historical tender results is available on the Reserve Bank's website. Settlement date for the tender is the first working day after the tender is processed.

Government bond tenders

One week prior to a tender, the Bank releases details of the tender. This includes the amount being issued, the bond(s) being issued, coupon rate, closing time and date for bids, settlement date, and when the results will be issued. On the day of the tender, the Bank processes the electronic bidding in Austraclear and provides results to the market. These results are issued via electronic media. A table (HD4) containing the historical tender results is available on the Reserve Bank's website. Settlement date for the tender is the third working day after the tender is processed.

7 Conclusion

The Reserve Bank, as New Zealand's central bank, has responsibility for the implementation of monetary policy, the operation of the inter-bank payments settlement system and the promotion of a sound and efficient banking system.

Monetary policy is implemented through the OCR rate setting and the use of the standing facilities. These standing facilities create the corridor around which the banking system operates. Deposits held at the Bank earn interest at 25 basis points below OCR, the lower bound of the corridor. Counterparties using the ORRF facility are charged at 25 basis points above the OCR, the upper bound of the corridor.

The broad objectives of the Bank's liquidity management function are to ensure that the banking system has sufficient liquidity to enable the payment settlement system to function effectively and to avoid large swings in the volume of available cash that would undermine the implementation of monetary policy. This is achieved through the Bank's liquidity management function of forecasting government cash flows and conducting operations (eg: OMOs and foreign

exchange swaps) to offset these flows. This interaction with the financial markets allows the Bank to collect data and information on market activity, which assists the Bank in its role of monitoring the stability of the banking sector.

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Currency hedging by exporters and importers

Phil Briggs, Economics Department

This article summarises recent work undertaken at the Reserve Bank on currency hedging by exporters and importers. The work involved interviewing bank staff and business executives, reviewing data sources and previous studies, and undertaking simulations to estimate firms' gains or losses from hedging. It seems that in recent years, hedging activity has had a significant positive impact on exporters' incomes. While the level of hedging activity has apparently changed over time, there are still some issues as to how such changes could be accurately measured and monitored.

1 Introduction

In early 2004, our discussions with businesses were indicating that exporters were coping reasonably well with a high exchange rate. They appeared to be coping much better than they had back in 1997 when the exchange rate was last at a high point. Furthermore, in early 2004 economic growth was continuing to surprise on the upside, with few signs of a long-anticipated slowdown being evident. Could it be that currency hedging by trading firms, especially by exporters, had played a part in keeping firms' incomes relatively high, and that this in turn had influenced economic growth? This article summarises some recent work investigating this issue.

Figure 1 and Figure 2 show how the value of the New Zealand dollar has moved against the currencies of our major trading partners. Over the past two years our currency has appreciated significantly, especially against the US dollar, and this has driven the Trade Weighted Index (TWI) to a level that is similar to the levels of the mid 1990s.

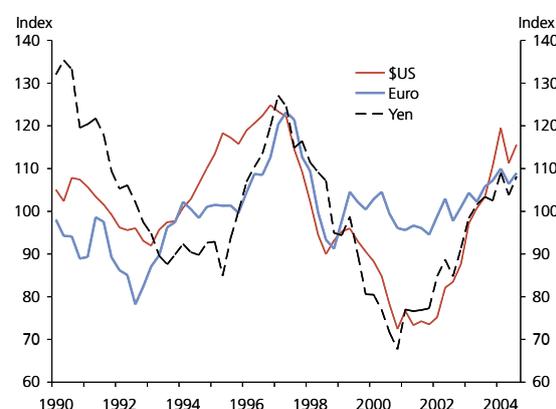
What is currency hedging?

Suppose a firm receives an export order with the delivery date being in 3 months time. The contract is worth, say, \$US100,000. At the time the contract is placed, the New Zealand dollar is worth say \$US 0.650. Hence the value of the order, when placed, is \$NZ 153,850 (100,000 divided by 0.650). But suppose that the exchange rate changes significantly between the date when the order is received and the date the order is paid for (which we will assume is one month after the delivery date). The value of the New Zealand dollar on payment date is \$US 0.680, which means that the

Figure 1

Value of the New Zealand dollar relative to trading partners' currencies

Index, base: average for 1990–2004 = 100

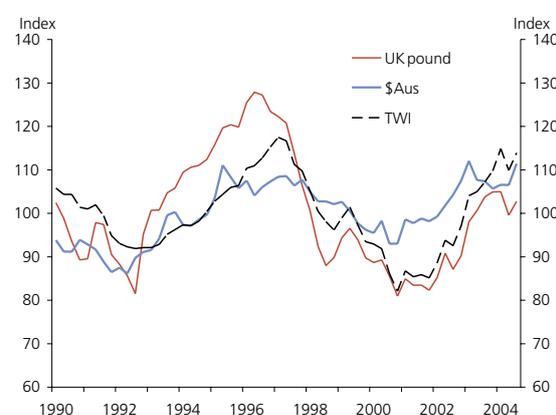


Sources: Reserve Bank of New Zealand; data for the euro prior to 1999 is a synthetic series from Bank of England (2002).

Figure 2

Value of the New Zealand dollar relative to trading partners' currencies

Index, base: average for 1990–2004 = 100



Source: Reserve Bank of New Zealand.

firm receives only \$NZ147,060 rather than \$NZ153,850. To insure against this happening, the firm can, at the time it receives the order, take out a forward exchange contract.

A forward exchange rate contract involves contracting to buy or sell a foreign currency at a future date at an agreed exchange rate. Generally this exchange rate will not be the same as the spot rate at the time the contract is signed, although the difference is unlikely to be large. The difference reflects the differential between New Zealand interest rates and foreign interest rates, which in our example above, would be US interest rates. (For a fuller explanation of this see Brookes et al, 2000).

A forward contract enables an exporter to “lock in” an exchange rate that will apply to its future export earnings, with this locked-in rate being similar to the spot rate at the time the contract is taken out. An importer can also use a forward contract; in this case the firm will agree to buy foreign currency at a future date in order to pay for the products that it intends to import.

A forward contract is a form of financial derivative. A derivative is a contract whose value depends on the value of some “underlying” asset. In this case, the underlying asset is foreign currency.¹ An exporter or importer in New Zealand would usually take out a forward contract with a domestically based bank, although other agencies offer similar products. However, forward contracts are not the only type of derivative used for currency hedging. A firm may choose instead to take out an option. An option gives a firm the right to buy or sell currency at a particular price on a particular day. However, the firm is not obliged to buy or sell the currency at that price; it can choose not to. With forward contracts, firms are generally obliged to go through with the contract. However, there is a catch to using options: the cost to a firm of taking out an option will generally be higher than the cost of taking out a forward contract (Brookes et al, 2000).

Gains and losses from hedging

In the short term, firms can make gains or losses from hedging. We can define a gain, or loss, as the difference between the income obtained using a hedged exchange rate and the income that would have been earned from the transaction if the spot rate had been used. In the example above, the gain from hedging to the firm would be \$6,790 (\$153,850 minus \$147,060). If, however, the value of the New Zealand dollar had actually fallen over the term of the forward contract, rather than risen, the contract would have produced a loss. Even so, the firm would have still received the amount that it had expected to get when taking out the contract (ie: \$153,850). The firm would have had the benefit of knowing exactly how much it was going to get from its export deal and would have avoided the uncertainty associated with future exchange rate movements.

Any gains or losses from hedging transactions are recorded in firms’ accounts. Under current accounting practices, some firms incorporate these gains or losses in final sales, while other firms identify them as foreign exchange gains or losses.

Over the long term, a firm might expect to lose as much as it gains from hedging. For example, suppose an exporting firm is hedging all of its forward orders. While the firm would make gains from hedging while the New Zealand currency was appreciating it would make losses while the New Zealand currency was depreciating. In this case, the main advantage to the firm in taking forward cover is that it knows what its final return from an export order will be. However, a firm might decide to “take a position” regarding the exchange rate. In this case, an exporting firm would increase the amount of forward cover that it takes when it expects the currency to appreciate, and lower the amount of cover when it expects the currency to depreciate.

One reason why economic analysts and forecasters are interested in the gains or losses from hedging is that they are not included in the values for exports or imports published as parts of the expenditure measure of GDP (see box). Hence, these published values do not reflect either the full returns to firms from exports or the full costs of imports. To get a better look at the impact of overseas trade on firms’

¹ See Hawkesby (1999) for more information on derivatives markets.

Box

Hedging and GDP

Values for exports and imports in the expenditure measure of nominal GDP do not include gains or losses from hedging. This is because GDP measures the value of production at market prices. Hence for merchandise trade, Statistics New Zealand aims to value imports and exports using the exchange rate on the date that goods enter or leave the country. This date is taken to be a good proxy for when the goods actually change ownership. In effect then, Statistics New Zealand is valuing goods on basis of the original (unhedged) transaction. (There are, however, some practical difficulties in doing this, and it seems likely that some hedging is included in the merchandise export figures.)

While the gains or losses from hedging are not in theory included in the values for exports and imports, they do nevertheless have an impact on firms' earnings and balance sheets. Within a full system of national accounts, which is the accounting framework used for economic aggregates, the gains or losses from hedging would appear in the reconciliation or revaluation account. As the name implies, this account covers revaluations of assets and liabilities. Unfortunately, reconciliation accounts, and balance sheets, are not available for some sectors of the New Zealand economy, or for the country as a whole.

While hedging gains or losses are not directly included in GDP, they can affect the level of economic activity, and can therefore have an indirect impact on GDP. If, for example, there was any substantial net gain from hedging, with the overall gains from hedging outweighing the losses, the likely effect would be to lift activity and GDP. However, this effect would be indirect, and probably lagged. The lift in GDP would occur via higher investment activity (because firms experience stronger cash flows) or higher private consumption (because firms are paying out higher dividends or higher wages, both of which affect household spending).

There may also be some direct effects from hedging on GDP. For example, hedging may allow a firm to keep exporting when it would have otherwise withdrawn from the export market. In such a case, export volumes would be higher than they would have otherwise been. In this project, we have made no attempt to estimate these direct effects.

incomes, we need to have estimates of the gains and losses from hedging.

There is a possibility that any net gains from hedging for non-financial sector firms are offset by corresponding net losses for financial sector firms, which are generally the other parties involved in hedging contracts. The final impact of hedging contracts on GDP is therefore likely to depend on whether financial sector firms have adequate forward cover for the contracts that they have with New Zealand firms. This is unlikely to be a problem. First, foreign exchange transactions related to trade flows are only a small proportion of all such transactions (less than 2 per cent according to figures in Munro, 2004). Most transactions

relate to flows of capital items. Hence it seems likely that most financial institutions, in the context of these larger flows, are able to arrange their assets and liabilities so that their own exposure to exchange rate fluctuations is relatively small. Second, financial sector firms will arrange financial derivatives with foreign counterparties as they seek to cover their own exposure to exchange rate movements.

In this project we focus on the gains and losses from hedging made by non-financial sector exporters and importers on trade. In doing this, we look at only a small part of the foreign exchange market. Nevertheless, it is an important part, given its possible impact on GDP.

Research questions and method

Our major research questions were:

- Has currency hedging significantly altered the incomes of exporting firms over recent years, thereby playing a part in keeping economic growth high?
- Has firms' hedging behaviour changed over time?
- How can hedging activity be measured and monitored in future?

Our approach to answering these questions involved:

- discussions with banks;
- reviewing existing data and previous studies on hedging in New Zealand;
- discussions with business: we used the results of these discussions to make initial estimates of the gains and losses from hedging over recent years.

The remainder of this article looks at this work and draws some conclusions.

2 Discussions with banks

We held discussions with bank staff who provide hedging products for exporters and importers. We spoke with people at three major banks: ANZ National, Westpac, and BNZ. Our discussions were informal, our aim being to get a better understanding of what was going on with respect to hedging activity, rather than to collect data.

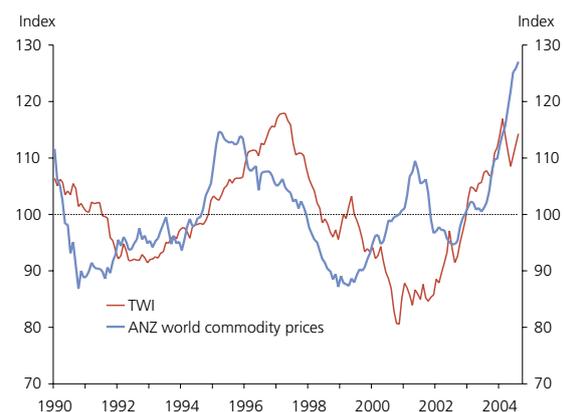
Firms had so far been coping well with the high exchange rate. Bank staff confirmed that so far the high exchange rate seemed to have caused distinctly less discomfort from their exporting clients than in the earlier cycle. Four factors were seen as having contributed to this greater resilience:

- A favourable starting point. The unusual combination of high commodity prices and low exchange rate through 2001 meant that exporters had got a double boost to their earnings and this had resulted in an improvement in their balance sheets ahead of the appreciation phase (see Figure 3).
- Exporters had hedged heavily while the exchange rate was low. Banks reported that many of their exporting

clients had taken out unusually large amounts of forward exchange cover in 2001 when the exchange rate had been low. Some firms had sought approval from their boards of directors to hedge more of their sales or to hedge for longer time periods than their hedging policies would usually allow. Although this long-term hedging had now largely expired, it had delayed the effect of the appreciating exchange rate on export earnings.

- Commodity prices had offset the TWI's recent rise. The re-establishment of the usual positive correlation between commodity prices and the exchange rate had helped offset the impact of a higher NZD on exporter revenues. During the mid-1990s, exporters had run into difficulties when the commodity prices had begun to decline while the TWI was continuing to rise (Figure 3).
- Firms increasingly believe that the exchange rate moves in cycles. There seemed to be a greater acceptance by firms of the cyclical behaviour of the exchange rate – bank staff reported that there was a growing sense in the export sector that “what goes up will come down”. This meant that exporters had been less willing to hedge when they saw the exchange rate reach high levels (US65c+). Those firms that were still hedging were tending to take shorter-term cover or to make greater use of options. Options provided them with some insurance if the exchange rate continued to appreciate but would not result in them being locked in at high levels if the exchange rate did start to depreciate. Consistent with this behaviour, bank staff had a strong sense that their

Figure 3
Commodity prices and the TWI
Index, base: average for 1990–2004 = 100



exporting clients currently had less exchange rate cover than in recent years.

But there were some risks regarding future exchange rate movements. The tendency to shorten hedge duration and make greater use of options meant that exporters' hedging would not provide such a large negative offset to export earnings when the exchange rate did depreciate.

However, the recent reduction in hedging activity meant that exporters were very exposed if the New Zealand dollar continued to appreciate. Continued appreciation would be particularly problematic if it was accompanied by a fall in commodity prices.

Also, while the export sector had so far been better placed to deal with the appreciation in the exchange rate than it had been in the mid-1990s, this did not imply that they were necessarily in a position to withstand a prolonged period where the exchange rate stayed high.

Hedging behaviour by industry

Following our discussions with bank staff, we attempted to summarise what the usual period of forward cover is for each sector (see the table below). Generally, the period mentioned in the table is the maximum length of time for which firms in that sector would arrange forward cover. However, as noted above, bank clients appeared to be currently covering for shorter-than-usual periods of time.

A general rule of thumb, according to some bank staff, is that firms which "own" the goods they are selling, such as forestry firms, tend to hedge for relatively long periods, while

Table 1
Forward cover by industry

Industry	Maximum period for which forward cover is usually arranged
Forestry	18 months
Dairy	15 months
Wool	6 months
Fishing	Variable
Manufacturers	Tend to always hedge confirmed export orders; purchases of imported capital equipment often hedged when confirmed
Meat	Generally very short term (even weekly)

"margin firms", such as meat producers, tend to hedge for shorter periods. Margin firms want to keep open the option of increasing the prices that they pay to their suppliers if the exchange rate were to fall. If they can't do this, because of their hedging, then their suppliers may move to dealing with competing firms who aren't hedged.

3 Review of existing data sources and recent studies

Existing data

One place to start looking for data on hedging is in the data releases on the balance of payments and the International Investment Position (IIP) which are produced each quarter by Statistics New Zealand. The IIP data shows the stock of the economy's international financial assets and liabilities. New Zealand's assets include equity assets and financial assets, while the country's liabilities include equity liabilities and financial liabilities. Financial assets include financial derivatives; the totals for these assets refer to the "in the money" positions of derivatives to which enterprises resident in New Zealand are a party. A derivative is said to be "in the money" when its current value, calculated using current market rates for the underlying asset (eg: using the current exchange rate), is such that it would produce a gain.² Similarly, financial liabilities also include financial derivatives; the totals for these refer to the "out of the money" positions of derivatives to which enterprises resident in New Zealand are a party.

Can this data be used to calculate, or to even get a rough idea of, how much hedging is being done by New Zealand firms? The major problem is that the financial derivatives referred to in the IIP cover arrangements between New Zealand firms and foreign firms. That is, for each of these derivatives there is a New Zealand party and a foreign counterparty. However, a large proportion of the derivatives that New Zealand non-financial sector firms take out to cover exports and imports are with banks resident in New Zealand. Hence these derivatives are not included, at least directly, in the IIP.

² This is an unrealised gain. The actual gain, or loss, resulting from the derivative will depend on the value of the underlying asset at the time the contract matures.

It can be argued though that they are included indirectly since banks handle their own foreign currency exposures by arranging derivatives with foreign counterparties. Some of these derivatives will cover the exposures resulting from derivatives between banks and resident firms.

There is another reason why the IIP data are not useful in estimating the level of hedging related to exporting and importing. Many of the financial derivatives referred to in the IIP are likely to cover capital transactions – such as debt servicing costs and the repayment of debt – rather than just transactions related to trade.

An annual supplement to the IIP survey collects some data on hedging. However, while this survey gives information on the levels of foreign currency denominated debt covered by financial derivatives, it does not give any information on the hedging of trade flows.

Looking across the Tasman, the Australian Bureau of Statistics (ABS), with support from the Reserve Bank of Australia (RBA), supplemented its quarterly survey of international investment in June 2001 with an additional questionnaire on foreign currency hedging. However, the ABS not only asked questions about the hedging of debt, as our IIP supplementary survey does. The ABS also attempted to collect data on foreign currency denominated receipts and payment from trade in goods and services expected in the 12 months to June 2002, and the hedging of these expected transactions. However, the data on trade flows was not considered to be sufficiently robust to publish. Clearly, there are difficulties involved in trying to get accurate estimates of the hedging of trade flows via mail surveys of firms.

We also looked at data from the triennial survey on foreign exchange and derivatives activity undertaken by the Bank of International Settlements (BIS), and also at the data from the RBNZ's daily foreign exchange turnover survey. The BIS survey collects data on forward transactions. However, it is not possible to accurately estimate what proportion of these transactions relates to trade flows and what proportion relates to capital transactions, such as the purchasing of financial assets. There are similar difficulties with the data from the RBNZ survey.

Studies on hedging

Over the last decade a number of studies have been undertaken in New Zealand on the use of derivatives by local firms. The studies are generally of two types:

- those which analyse firms' annual reports and relate the level of derivative use to other characteristics of the firm (Berkman and Bradbury, 1996, is an example of this type of study); and
- those which survey firms directly, asking them about derivative use (Prevost, Rose and Miller, 2000, is an example).

Most of these studies have had a management or accounting focus. It is probably fair to say the motivation behind some of the studies was to see how firms were handling derivative use in the wake of the derivative-related problems which beset some overseas firms in the 1990s.

Generally, the studies show that the use of derivatives by New Zealand firms has increased over time, but that derivatives are now being used more conservatively. For example, the use of exchange-traded instruments has fallen and most firms use over the counter products, supplied by a domestic bank. Big firms tend to use derivatives more than small firms. The use of derivatives by firms in New Zealand is higher than in the US, but is at a similar level to that of firms in the UK and Germany.

None of the studies we reviewed attempted to estimate the financial gains or losses from hedging.

4 Visits to businesses

As part of our business visits undertaken during 2004, we asked firms a number of questions regarding their hedging practices. The questionnaire was generally meant to initiate informal discussions with firms about their hedging, but as we will see below, it was possible to use the results to make tentative estimates of the level of hedging, and its effects on the returns from trade.

Only a few of the firms which we interviewed were in the service sector. We therefore decided to exclude them from our analysis and focus on firms that were producing and

selling goods. Our suspicion is that only a relatively small proportion of service sector exports are hedged. A large proportion of services exports are related to tourism, and such services tend to be priced in New Zealand dollars.

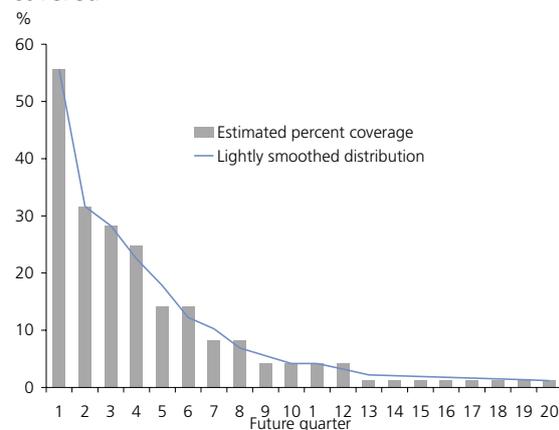
We ended up with 42 documented interviews with goods-producing firms. Of these 42 firms, 25 were exporting, and of these 20 were hedging. Only 16 of the 42 firms were importing directly, and of these, 12 were hedging their imports.

Some of our general findings were as follows:

- Many, but not all, companies take forward cover for firm orders. Hence the majority of cover taken is for around 3 months.
- Forward contracts are used for most short-term cover. There is an increasing use of options for longer term cover.
- Some firms cover all of their expected exports, particularly for the coming quarter, but other firms cover only a proportion of their exports.
- In line with what the banks had told us, we found that some exporters tend to increase their cover, and to take it for longer, when the exchange rate is low. They also tend to reduce cover, or use options instead of contracts, when the exchange rate is high. Other firms take no view on the currency, using their hedging rules to smooth income, and allowing the firm to focus on growing its business over the long term.
- One exporter noted that hedging buys time when the exchange rate appreciates, allowing the company to focus on improving productivity.
- The major currencies for which exporters are hedging are USD, AUD, the euro, the pound, and the yen. The USD probably wasn't as dominant as we had expected. (This tallies with what one bank told us: that the USD accounts for around 40–50 per cent of the total.)
- Importers also hedge. An accounting company that we visited reported that its importing clients have now locked in "a lot of cover". Some exporters also take forward cover for imported capital equipment.

Of the 20 exporters who were hedging, all of them gave us an indication of the maximum time horizon over which they were hedging. Most firms also gave us an indication of the proportion of future exports that they were covering. From this we were able to derive a distribution, across future quarters, of the proportion of expected exports that were covered (see Figure 4).

Figure 4
Distribution of export cover (sampled firms)
Percent of expected goods exports that are covered



The bars in the chart are our estimates of the percentage of expected exports that are covered into the future. The line is a lightly smoothed version of the distribution. In this version, the coverage rate declines steadily over time.

In deriving this distribution, we have assumed that all surveyed firms have equal weight. In reality, our surveyed firms will be of different sizes, and will export markedly different amounts of product. Even so, it is tempting to think that our distribution might broadly describe the hedging behaviour of New Zealand goods exporters. There is at least one glaring omission from our sample though – it does not include New Zealand's biggest exporter, Fonterra. From public statements made by Fonterra, it appears that the firm covers all of its expected exports, and is continually taking on cover for 15 months ahead. Assuming that this is correct, we have derived a distribution for Fonterra and combined it with our smoothed distribution from Figure 4.

The result is shown in Figure 5. Note the big step down in the distribution between quarters 5 and 6. This is the result of Fonterra's hedging for 5 quarters out, but no further.

We now use this distribution to estimate the effects of hedging on export returns. We assume that this distribution is the “desired” distribution of New Zealand firms for each quarter. This isn't realistic – we know that the desired distribution is likely to change over time, especially as the exchange rate changes. Also, Fonterra's hedging strategy has changed over time. Hence, in using this distribution to estimate past gains or losses from hedging, we are simply aiming for ball-park figures, which, as our literature review showed, do not seem to currently exist.

Figure 5
Assumed distribution of export cover (all firms)
Percent of expected quarterly goods exports that are covered

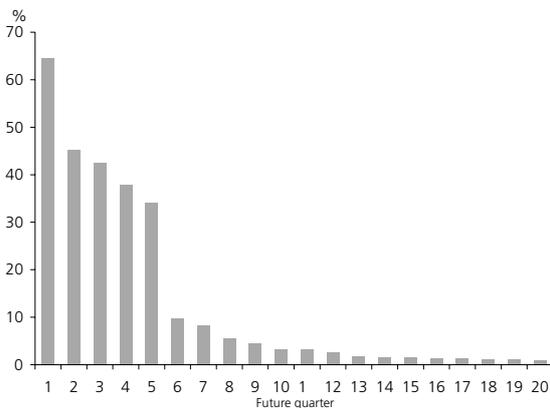
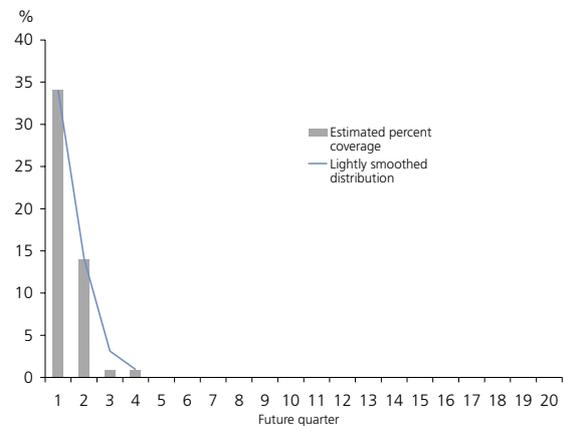


Figure 6 shows the distribution for imports as derived from our sample of firms. The smoothed distribution is assumed to apply to all firms. Like our earlier distribution for exports, this distribution is indicative only. However, it appears that forward cover for imports is for a much shorter duration than for exports, and that the proportion of transactions covered is also lower.

Figure 6
Distribution of import cover (sampled firms)
Percent of expected goods imports that are covered



Returning to exporters, we use a truncated version of the distribution in Figure 5 – a version going out only 12 quarters – to estimate the gains or losses to exporters from currency hedging. This estimation involves a number of steps:

- We use the distribution to estimate the new cover that is taken on each quarter, This is fairly straightforward. Let's assume that the distribution in Figure 5 applies in all quarters. Suppose we now move one quarter into the future. The 65 per cent cover that we had for one quarter out now matures, and the cover that we had for quarter 2, which was 45 per cent, now becomes cover for one quarter out. But if we want to keep the distribution the same as before, we now have to top up this cover from 45 per cent to 65 per cent. That is, we have to take on 20 per cent more cover. It's a similar situation across the distribution – we have to top up the cover in each category so that it matches the previous level for that category. Hence, the new cover taken on for each category is the difference between adjacent bars in Figure 5. Now that we have the distribution of new cover taken on each quarter, we can easily derive a distribution that shows the age (in quarters) of the cover that is maturing in a particular quarter. This is the distribution that we use in our simulations.
- We assume that exporters can accurately predict their future export sales. That is, we assume that expected sales will equal actual sales, as finally measured via trade data. This means that we can apply our age distribution

of maturing cover, which is expressed in percentage terms, to actual sales, in dollars, and obtain values, in dollars, for the exports that are covered.

- We make some further simplifying assumptions. We assume that all the cover is in the form of forward contracts, and we ignore the fees involved in setting up these contracts. More importantly, we assume that the exchange rate that is set in the forward contract is equal to the spot rate for the quarter in which the contract is taken out. In reality, it will differ from the spot price owing to the difference between local and overseas interest rates. Finally, in using GDP values for goods exports and goods imports, we are assuming that they exclude all hedging.
- The final calculations are relatively straightforward. For each quarter, we calculate export earnings using the hedged rates (ie: using the exchange rates from earlier quarters, when the hedging was taken out). The difference between this total and actual export earnings, as measured in the GDP accounts, is the gain or loss from hedging.

Using the distribution in Figure 6, and taking a similar approach, we also estimate the gains or losses from the hedging of imports.

As Figure 7 shows, the estimated gains from hedging were positive in the mid-1990s as the exchange rate rose, but turned negative in late 1997 as the exchange rate fell. The gains became positive again in 2002 and were particularly high over the year to March 2004, when they averaged nearly 6 per cent of total exports. (Note that we are using total exports in the denominator; as a proportion of goods exports, the gains averaged nearly 8 per cent).

These gains seem high. It could be argued that they are maximum values, given that our hedging distribution was derived from a sample of large- and medium-sized firms. We know from our review of hedging studies in New Zealand that small firms generally hedge less than large firms. Hence, in reality the level of hedging may not be as high as we have assumed in our simulation, and hence recent gains may be lower.

The forecast values in Figure 7 were produced using the output from the Reserve Bank's macroeconomic forecasts for the September 2004 *Monetary Policy Statement*. On the basis of these forecasts, the gains from hedging are now declining, and can be expected to turn negative in 2005, provided that the exchange rate declines as assumed in the September MPS.

Figure 7
Estimated gains from hedging on exports
\$million, and percent of total exports



Figure 8 shows the "hedged exchange rate" that exporters face, and the spot rate. The hedged rate is smoother than the spot rate, indicating that hedging does decrease the short-term variation in export returns. Also, the hedged rate doesn't quite reach the peaks or the trough that the spot rate does. This is because the hedged rate is made up of hedged transactions and some unhedged transactions. Only the unhedged transactions are undertaken using the highest (or lowest spot) rate; the hedged transactions are undertaken using earlier values of the exchange rate. For the same reason, the hedged rate lags the spot rate. The average lag length was estimated to be around 2.4 quarters.

This simulation suggests that the peak in the hedged rate will not occur until the June 2005 quarter. Despite this, the recent gains from hedging have been only a partial offset to the effects of a higher exchange rate. Figure 6 illustrates this; the hedged rate, as well as the spot rate, has risen sharply since 2002 and this has lowered export returns. If we were getting a full offset from hedging, the hedged rate would be flat (ie: constant).³

Figure 9 shows the gains from hedging for importers. As we would expect, they move in the opposite direction to gains from export hedging. The gains have largely been negative recently, indicating that as the exchange rate has risen, importers who had been hedging have in fact paid more for their imports than importers who hadn't hedged.

Figure 8
TWI and "hedged exchange rate" faced by exporters
 (Quarterly average value)

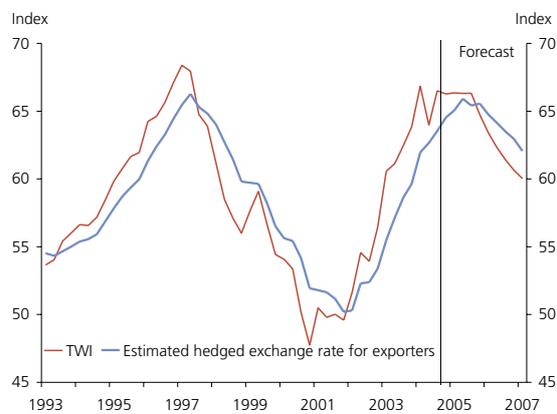
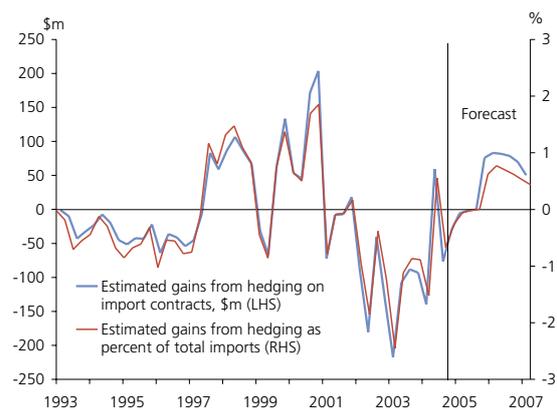


Figure 9
Estimated gains from hedging on imports
\$million, and percent of total imports



Note that the absolute size of the gains or losses from imports are estimated to be much lower in magnitude than those from exports. This finding reflects the lower amount of cover put on. The average lag length between the spot exchange rate and the hedged rate was estimated to be 0.5 quarters, much shorter than the estimated 2.4 quarters for exporters.

5 Conclusions

Our simulations – despite all their assumptions and approximations – back up the view that exporters' gains from hedging have been relatively large over recent years. These gains have helped to offset the effects of the sudden exchange rate appreciation on export returns. While importing firms have suffered losses from hedging over recent times, it seems that these losses were lower than exporters' gains. It seems reasonable to conclude that over the last two years, hedging has significantly altered the incomes of firms, and indirectly affected consumption and investment, thereby helping to keep economic growth high.

However, as noted earlier, over the longer term, many firms would expect to lose as much as they gain from hedging. Most of the gains from hedging should not be seen as being windfalls, but rather as offsets to the losses arising from exchange rate movements. Our interest in estimating hedging gains or losses has been largely due to the fact that these gains and losses – these offsets to exchange rate movements – are not accounted for in the GDP figures for exports and imports.

Our simulations were undertaken assuming that firms didn't change the distribution the forward cover they were putting on. In effect, we were assuming that firms were not "taking a view" on where the exchange rate would go. Even so, our simulations indicated that there are benefits from hedging. While many of these seem obvious, they are probably worth listing:

- The hedged exchange rate is smoother than the spot rate in the short term, reducing the variability in export earnings that arise from sudden exchange rate movements.

³ The argument here is not that a flat hedged rate is, in itself, a desirable thing. A flat hedged rate would result in big variations in total export earnings owing to cyclical changes in commodity prices.

- The hedged rate reaches neither the peaks nor the troughs of the spot rate. Hedging has probably enabled some firms to keep exporting during the last year, rather than withdrawing from foreign markets as exporting became unprofitable.
- There can be a significant lag between changes in the spot rate and the hedged rate. When the exchange rate is appreciating, this lag “buys time” for exporters, giving them the opportunity to implement productivity improvements or to change exporting strategies. On the other hand, when the exchange rate is falling, hedging delays the benefit of higher export returns, which may be much needed.
- Hedging can have some impact on export earnings even over the medium term (2–3 years), providing some offset – albeit a limited offset – to the impact of exchange rate movements on earnings.

Overall the benefits from hedging for a firm are largely in terms of smoothing income, rather than producing net increases in income.

Some issues still remain regarding the measurement and monitoring of hedging. We know from our discussions with banks that many firms do take a view on where the exchange will go and adjust their forward cover in the light of this. However, there are currently no suitable data sources that would allow us to accurately measure these changes. Furthermore it seems unlikely that a direct survey of firms, as attempted by the ABS in Australia, would give us anything more than rough estimates of the level of hedging. The best approach to getting accurate measures of hedging cover, and of changes in hedging behaviour, may be via banks’ administrative records of the forward cover that they provide for clients. We are currently talking to banks about whether it would be feasible to analyse this information. Clearly there would be a need to ensure that information relating to individual bank clients remains confidential, and that only aggregate data is used.

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GDP-12 – the Bank’s measure of trading partner demand

by Mark Smith, Economics Department

This article provides readers with the technical details of the Bank’s measure of external demand. GDP-12, as it is known, is a summary measure that is used to help gauge trading partner demand for New Zealand’s exports. Although GDP-12 is a useful summary measure, there are other external influences affecting the demand for our exports and economic activity more generally. Bearing this in mind, the Bank considers a wide range of developments in its monitoring and forecasting of the world economy.

Introduction

Being small and open, the New Zealand economy is heavily influenced by its trading partners. The level and growth of activity in trading partner economies has a direct bearing on the volumes and prices of the exports New Zealand sells abroad and on the prices it pays for its imports. Reaching a view about the world economy is therefore an important part of the Reserve Bank’s assessment of the prospects for the local economy and for monetary policy.

The Bank’s analysis of the world economy takes a number of forms. Economic data from individual trading partner economies are watched closely and the views and commentaries of a range of international analysts are scrutinised. Trends and developments in international financial markets are also continuously analysed. This, among other things, provides useful information on inflation developments and future monetary policy settings abroad.

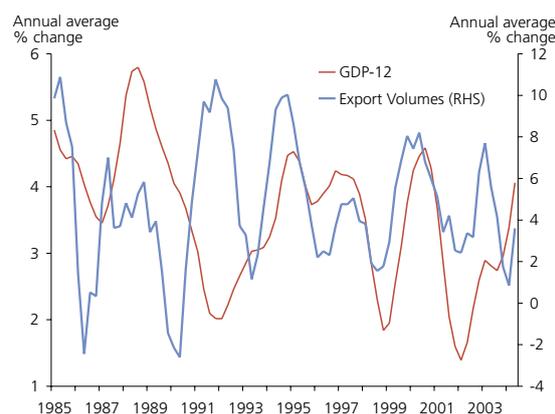
As part of its assessment of the global economy, the Bank constructs an aggregate of trading partner GDP, known as GDP-12. GDP-12 is a summary statistic of trading partner activity and is a variable used in the Bank’s Forecasting and Policy System (FPS) model of the economy. The GDP-12 measure will be familiar to readers of the Bank’s monetary policy statements, where it is used to help illustrate prospects for the world economy.

This short article provides details about the construction of GDP-12, its trend over time, and the methods currently used to forecast it.

What is GDP-12?

As the name implies, GDP-12 is a summary measure of the economic activity of 12 of New Zealand’s major export destinations.¹ The Bank is primarily concerned with finding a measure that proxies the demand for the quantity of New Zealand’s exports, hence an export-weighted aggregate is more suitable than weighting together the individual GDP’s in terms of economic size. Countries taking a larger share of exports (such as Australia) therefore have a proportionately greater weight in GDP-12. Table 1 lists these country areas and summarises their share of merchandise exports.²

Figure 1
GDP-12 and aggregate New Zealand export volumes



¹ The Bank started reporting an export weighted GDP measure for world demand in the November 1998 *Monetary Policy Statement*. Prior to that OECD industrial production was used. In September 2003, GDP-14 was changed to GDP-12 as GDP from the Eurozone replaced output in Germany, France, and Italy.

² Merchandise exports do not include services exports (which make up about one-quarter of New Zealand’s total export receipts). Although data quantifying the value of each of New Zealand’s major services export markets is not available, these countries are likely to be the same as for merchandise

Table 1

Growth in NZ exports and GDP-12 country areas since 1985

	Weight in GDP-12 (%)	Average annual growth in NZ exports (%)	Average annual GDP growth (%)
Australia	26.7	6.7	3.4
US	18.4	5.3	3.1
Japan	14.2	3.9	2.4
EU-12*	12.0	5.0	2.3
China	6.7	10.7	9.2
UK	6.0	1.6	2.6
South Korea	4.8	10.8	6.6
Taiwan	2.8	8.5	6.3
Hong Kong	2.4	6.1	4.9
Malaysia	2.3	7.0	6.4
Canada	2.2	4.5	2.8
Singapore	1.4	4.3	6.7
Total GDP-12	100.0	5.2	3.5
Non-Japan Asia**	20.5	8.6	6.6

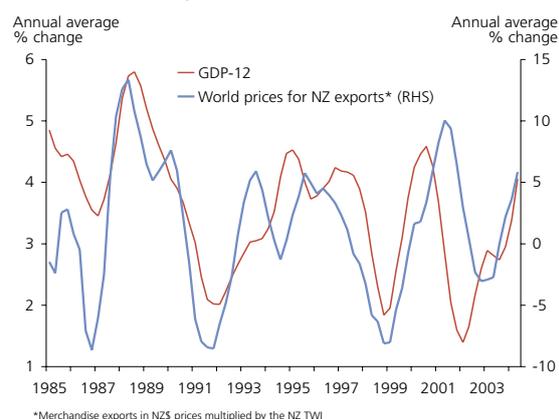
* Consists of Germany, France, Italy, Spain, The Netherlands, Belgium, Austria, Finland, Ireland, Portugal, Luxembourg, and Greece

** Includes China, South Korea, Taiwan, Hong Kong, Malaysia, and Singapore.

The countries included in GDP-12 purchase around 80 percent of New Zealand merchandise exports by value.³ GDP-12 includes many of the major economies including all of the G7 members, and the rapidly growing Chinese and east Asian economies. Australia, the US, Japan, and the Eurozone area are major export markets and account for about 60 percent of total merchandise exports, and nearly 75 percent of total merchandise exports for the countries in GDP12. China, United Kingdom and South Korea each account for about 5 to 7 percent of merchandise exports of the GDP12 total, with Taiwan, Hong Kong, Malaysia, Canada, and Singapore making up the remainder.

Growth rates for GDP-12 have roughly tended to track changes in the world prices for New Zealand's merchandise exports (figure 2). This correlation suggests that the prices for many exports are at least partly determined by general world demand conditions, rather than necessarily market-specific factors.⁴ There are episodes, however, where New Zealand's export prices have been more influenced by supply-and-demand conditions specific to the type of export

Figure 2
GDP-12 and the world prices for New Zealand's merchandise exports



(for example, the influence of weather patterns, biological factors, and institutional arrangements on prices for agricultural products). The Bank's analysis of future export-price trends attempts to take these factors into account as well as prospects for world supply-and-demand conditions more generally.

It is sometimes asked why GDP-12 has not been extended to cover more countries with whom New Zealand trades, such as the European economies outside the Eurozone and UK or those of South America. The issue is largely one of practicality. More countries could be added, but their small share in trade means that doing so is likely to be of marginal benefit. The timeliness and reliability of data and the availability of external forecasts have also been considerations in choosing

³ Merchandise imports from GDP-12 countries constitute a roughly similar portion of total merchandise imports. The value of New Zealand's merchandise imports is typically larger than exports. Merchandise trade deficits are frequently incurred against most trading partners, with the notable exceptions of the US and UK.

⁴ However, prices for other exports (including service exports such as tourism and some niche products) will tend to reflect domestic conditions. See Smith (2004) for further details.

Box 1

How the Bank constructs GDP-12

GDP components

Data for real GDP volumes are obtained from Datastream. Seasonally adjusted estimates in quarterly frequency are available for most countries, but for some Asian countries seasonally adjusted estimates have to be calculated. Estimates of quarterly Chinese GDP are obtained by interpolating annual official GDP estimates. In constructing the GDP-12 index, the GDP volumes for each country area are converted to index form, with the base periods set to 1995Q1=100.

Export weights

Export weights are based on merchandise export values obtained from Statistics New Zealand. For each country area, they are expressed as a portion of total GDP-12

export receipts. Export values are volatile, so the weights used to construct GDP-12 are based on a 2-year moving average.

Constructing the GDP-12 index

To ensure the aggregate index better reflects changes in export patterns, GDP-12 is calculated as a Fisher Ideal Index. A Fisher Ideal Index (Q^F) is the geometric mean of a Laspeyres (Q^L) and a Paasche Index (Q^P). The Laspeyres index uses the export shares of the base period as weights, whereas the Paasche index uses the export shares of the current period.

$$Q^F = (Q^L \times Q^P)^{1/2}$$

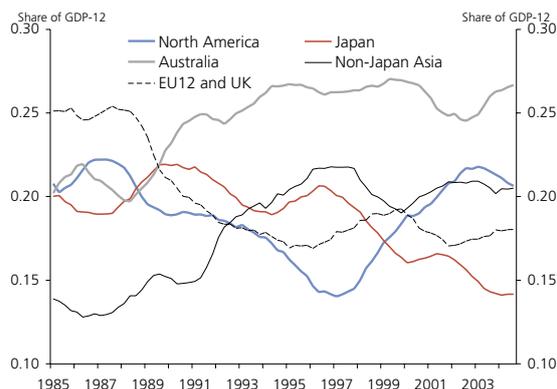
$$Q^L = Q^1 W^0 / Q^0 W^0$$

$$Q^P = Q^1 W^1 / Q^0 W^1$$

Where: Q = GDP index at time t=0 and 1.

W = export weight in time t=0 and 1.

Figure 3
Share of GDP-12 merchandise exports by country area
(2 year moving averages)



the threshold for inclusion. The composition and coverage of GDP-12 is regularly reviewed in line with changing trade patterns.

How is GDP-12 constructed?

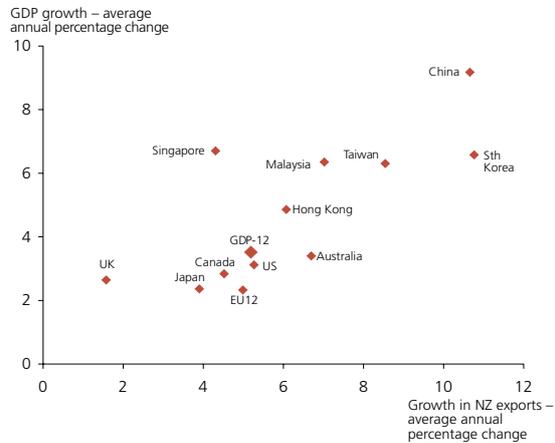
To calculate GDP-12, individual trading partner GDP is weighted according to its share of New Zealand's merchandise exports. The weight applied to each country in GDP-12 is based on a 2-year moving average. The moving average is used to ensure that the export weights applied to each country reflect their evolving influence as an export destination, whilst smoothing through quarter to quarter volatility. Box 1 contains further details.

Figure 3 shows how the relative shares of each of the major export destinations in GDP-12 have evolved. Since the late 1980s, Australia has become New Zealand's largest market for merchandise exports, with its export share on a gentle upward trend. Conversely, the share of New Zealand's merchandise exports destined for Japan, the UK, and the Eurozone has been on a gradual decline. Although quite cyclical, the share of merchandise exports destined for North America is now roughly where it was in the mid 1980s.⁵

Increases in the value of New Zealand's exports tend to be positively correlated with the rate of economic growth

⁵ This possibly reflects the impact of greater cyclical swings of the NZD/USD exchange rate which affect NZD denominated export receipts.

Figure 4
Average NZ export value growth and GDP growth of export markets (1985-2004)

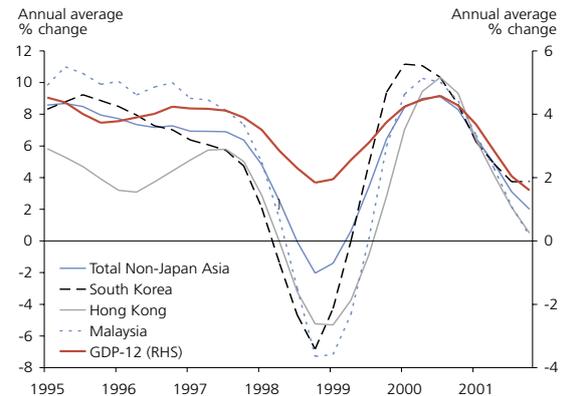


in the particular market (figure 4). This is particularly true for emerging countries such as China, which has recorded consistently high rates of growth over the recent past and has been one of our fastest growing export markets. As such, the export weight applied to Chinese GDP in the GDP-12 calculation has steadily increased and is now above that of the UK. As a result of these shifts, the impact of changes to Chinese GDP growth has a proportionally greater impact on GDP-12 now (and probably in the future) than it did just a few years ago.

Volatility in trading partner economies

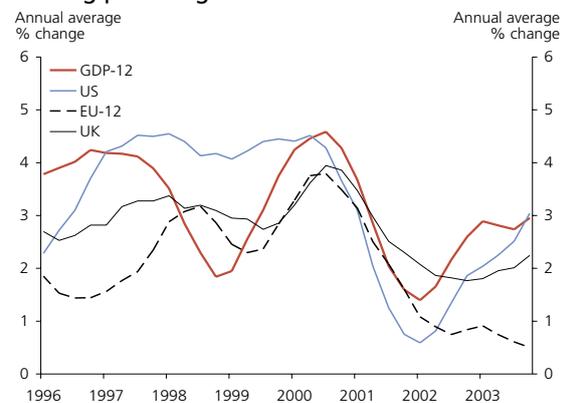
Although the growth rates of GDP-12 tend to be relatively smooth, movements in GDP for some of our individual trading partners have been considerably more volatile. The Asian financial and currency crisis of the late 1990s is one case in point. Output declined outright in Singapore, Malaysia, South Korea, Japan, and the pace of growth declined sharply in China and Taiwan (figure 5). Consequently, New Zealand's export growth to these countries slowed sharply, and the share of exports to the region dipped as proportionately more exports were sold to other markets. This regional shock dampened aggregate GDP-12 growth, although it was partly offset by continued strong growth in the US, Eurozone, and Australian economies.

Figure 5
Asian trading partner growth



Following the recovery from the Asian crisis, growth in GDP-12 slowed sharply again at the end of 2000. The surge in IT investment and associated build-up in equity wealth had led to a strong expansion in domestic demand in the US, UK, Eurozone and other countries. When the bubble burst, the fall in equity values contributed to an outright recession in the US and a significant slowdown in growth in many countries around the world (figure 6).

Figure 6
Trading partner growth around Y2k



How does the Bank forecast GDP-12?

As foreign demand conditions are likely to have a significant influence on New Zealand's output and inflation, it is important for the Bank to anticipate future prospects for the world economy. Because of the significant resources that would be required, the Bank does not attempt to produce its own forecasts for the individual countries in GDP-12. Instead, GDP forecasts for the countries comprising GDP-12 are obtained using a survey of forecasts contained in the

Consensus Forecasts publication.⁶ These forecasts are added to official GDP statistics to produce an index for GDP-12, which is then used as input into the Bank's projections of the New Zealand economy.

The Bank uses *Consensus Forecasts* as a guide only. Previous work at the Bank has highlighted the positive serial correlation in *Consensus Forecasts* – the forecasts tend to consistently under- or over-predict actual GDP for periods of time, though these forecast errors are not usually substantial. In instances where we believe there are solid grounds for deviating from the *Consensus Forecasts*, we do so.⁷ During typical forecasting rounds, the Bank also generates a range of alternative scenarios for the world economy that differ from the *Consensus Forecasts*. For example, the Bank has recently assessed the potential impact of alternative oil price profiles on world activity and inflation prospects.

Are there other alternatives to GDP-12?

Although GDP-12 appears to provide a reasonable historical measure of world demand from the New Zealand perspective, it has its limitations. Other aggregates could potentially do a better job explaining the demand for our exports. GDP may not be the ideal proxy for export demand when exports to a country are destined to a particular sector of its economy. For example, fluctuations in New Zealand's manufactured export volumes to Australia tend to be more closely correlated with the Australian residential building cycle than with cycles in Australian GDP per se. This is likely to reflect the importance of goods such as building materials, carpets and household appliances in the basket of exports sold to Australia. Similarly, work at the Bank has suggested that changes in household

consumption in some trading partner economies may be more closely correlated with movements in exports.⁸ The factors influencing demand for some categories of exports – such as commodities – can be very complex. Supply conditions affecting other world producers and institutional changes (eg changing subsidies) can also have an important bearing on demand for particular exports.

Given the diversified nature of New Zealand's exports, there is unlikely to be a summary measure that captures all of the factors influencing demand in each particular export market. Needless to say, these considerations underscore the importance of looking beyond simple statistical measures when analysing growth prospects.

Conclusion

The Bank has developed GDP-12 as a summary indicator of the demand for New Zealand's exports. As New Zealand exports a wide range of goods and services to a variety of different markets, it is unlikely that one statistic will provide an accurate representation of the demand conditions in each market. Where there are other influences affecting the demand for New Zealand's exports, these are taken into account judgementally.

The Bank's analysis of the international economy encompasses a wide range of economic and financial market developments. Rather than exclusively focusing on the GDP-12 aggregate, other developments in the world economy are also considered.

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⁶ This is produced by Consensus Economics Inc. in the UK. Every month the Consensus survey compiles forecasts for a number of macroeconomic aggregates (such as real GDP growth and CPI inflation) from a number of forecasting institutions. Forecasts for the current calendar year and year ahead are published monthly, with forecasts for longer horizons published in the April and October surveys.

⁷ The most visible example was at the time of the Asian financial crisis in the late 1990s. In the December 1997 *Statement* and March 1998 *Economic Projections*, the Bank used a subset of 'pessimistic' forecasts from *Consensus Forecasts* for its forecasts of world output. This was taken at a time when prospects for many Asian economies were taking a turn for the worse and allowed the Consensus panel time to adjust their forecasts.

⁸ Further work investigating the merits of using alternative measures of world output is underway.

A note on the Reserve Bank inflation calculator

by Graham Howard, Knowledge Services Group, and Matthew Wright, Corporate Affairs Department

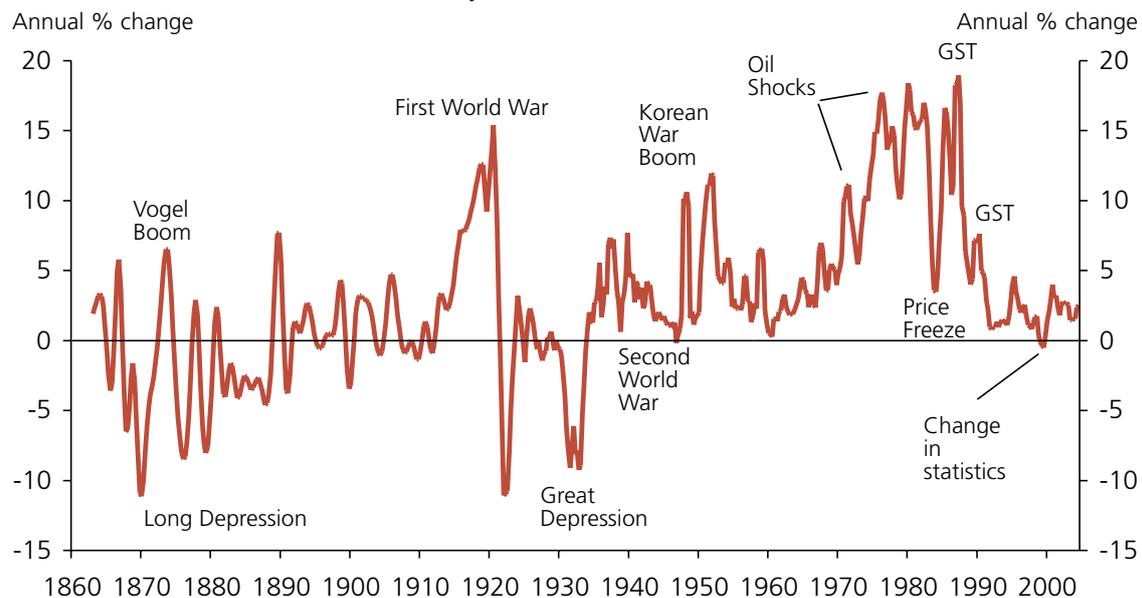
In June 2003 the Reserve Bank published an inflation calculator ("the Calculator") on its website. This application enables interested users to calculate the effect of inflation on a "basket" of goods and services between two dates selected by the user. The Calculator has attracted significant attention, and well over 20,000 "hits" were recorded on the Calculator's home page during 2004. Links to the Calculator were established on a number of financial, educational and government websites, including Statistics New Zealand and the official New Zealand government historical site. This article documents an extension to the Calculator, enabling it to provide estimates of purchasing power back to 1862.

Last year, the Reserve Bank released a web-based inflation calculator, enabling users to select two dates and a dollar amount, and calculate a figure adjusted for inflation between the dates. Initially the period covered by the Calculator included every quarter from the latest available back to 1919. The start date was chosen because only partial official data was available before then. However, it was known that unofficial estimates of inflation covering earlier years were in existence, and after the calculator had been in operation for some time, we decided that this material could be incorporated, as long as suitable cautions were given.

The start date of the Calculator was therefore extended back to the first quarter of 1862, which appears to be the earliest date for which useful figures are available. None of the data prior to 1925 is available on a quarterly basis so an interpolated quarterly track was generated to fill the unobserved quarters.

Some CPI observations are available between 1914 and 1919, and these were used to piece together a quarterly CPI index going back to 1914. The second source was an unofficial index of the prices of food and rent, averaged for the four main centres, which was once published by Statistics New Zealand (SNZ).¹ This series was used for the

Figure 1
Inflation rates 1862-2004 and selected key events²



¹ *New Zealand Official Year Book*, 1990, p 614.

² The removal of interest rates from the CPI regimen caused the apparent, but illusory, dip below zero inflation in 1999.

years between 1891 and 1913, and was linked into the first official CPI observation, the June 1914 quarter. The data between 1862 and 1890 comes from a 1911 publication by James W. McIlraith,³ in which the author provided price indices for general prices from the early 1860s to 1910. This index was used for the years between 1862 and 1890. We note, however, that this series is more akin to that of a GDP deflator (using general as opposed to consumer prices), so a degree of caution is advised where dates covering this period are entered.

The 1862-1914 data as a whole are not as comprehensive as the official CPI and should not be regarded as being of the quality of the official series, but it should provide a fairly reasonable gauge of CPI inflation over this period. The indices for these series have been rebased to the current CPI base (June 1999 quarter=1000) and linked to make a continuous series.

Please refer to the website notes about the calculator, or Wright and Howard (2003), for details on using the calculator.

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Systemic financial crises – resolving large bank insolvencies

An address by Dr Alan Bollard, Governor, Reserve Bank of New Zealand, to the Federal Reserve Bank of Chicago Conference

2 October 2004

This speech addresses a theme that has received increasing attention internationally and at the Reserve Bank of New Zealand of late – the issue of how a host supervisory authority can most effectively maintain a sound banking system and respond to bank failures when the system is dominated by foreign-owned banks.

For any country, the stability of the financial system is critical to a healthy economy – a point that becomes dramatically apparent when systemically important banks fail. This is equally true for a financial system dominated by foreign-owned banks as for one composed mainly of domestically-owned banks. In either case, the supervisory authority and central bank – whether home or host – must ensure that they have the capacity to maintain a robust financial system and to respond quickly and effectively to any financial crisis – often within hours. This is a challenge for any supervisor, but it is all the more complicated when it is a foreign-owned bank that gets into difficulty, given different jurisdictions, potentially different statutory objectives between home and host authorities, and a greater degree of jurisdictional separation between taxpayers and depositors than is the case with domestically-owned banks.

In a world of increasing global and regional integration, the difficulties faced by a host supervisory authority is an issue of growing importance for many countries throughout the world. My counterparts in Central and Eastern Europe, Scandinavia and Latin America will readily relate to this theme, given that they also face increasing foreign bank participation in their financial systems. The challenge, therefore, is to ensure that home and host authorities respond to these changes in ways that enhance the stability of both of their financial systems, while continuing to derive the benefits that cross-border banking can provide.

New Zealand's banking system is dominated by foreign banks.

The Reserve Bank of New Zealand – New Zealand's banking supervision authority – is well practiced at being a host supervisory authority. Our banking system has been dominated by foreign-owned banks for over a decade now. Few, if any, countries have a banking system as foreign-dominated as ours. Let me quote some statistics to illustrate the point:

- All but two of the 16 registered banks in New Zealand are foreign-owned.
- All of the four systemically important banks in New Zealand are Australian owned – holding around 85 per cent of banking system assets.
- The four large banks dominate the banking system, with individual market shares ranging from around 15 per cent to 35 per cent of banking system assets.

Overall, the strong presence of foreign banks has brought many benefits to New Zealand, in terms of both soundness and efficiency. It has enhanced risk-management capacity within the banking system, facilitated the entry of new banking products and services, and reduced the financial system's vulnerability to domestic economic shocks.

Against these benefits, of course, there are also risks associated with such strong dominance by foreign banks. The New Zealand financial system is exposed to contagion risk from the parent banking systems – all the more so given the strong industry concentration and the dominant position of banks from just one country. Extensive foreign bank participation in the banking system can also complicate the supervision of banks in the host financial system – particularly if core functionality is outsourced to parent banks. It also complicates the process for dealing with bank crises in ways that adequately meet the needs of the host financial system.

In order to maintain a sound financial system when most of the banks are foreign owned, robust host supervision arrangements are essential; so too are structures for coordinating home and host supervision. But, as I will shortly explain, the coordination of home and host supervisory arrangements in ways that meet the needs of both countries is both complicated and challenging.

Differences in the interests of home and host supervisors

One of the important issues arising from a banking system dominated by foreign banks is the relationship between the home and host supervisory agencies and central banks. Home and host countries undertake their banking supervision roles and responsibilities within the framework of home-host supervision set out in the Basel Concordat – the internationally agreed framework for the supervision by national authorities of multinational banks. The Concordat emphasises the general responsibility of home country authorities to supervise banks' worldwide consolidated activities, as well as the host country responsibility to supervise foreign bank establishments in their territories as individual institutions. The Concordat, and its subsequent elaborations, have a strong emphasis on the need for adequate exchange of information, but have not – to date – sought to establish an international framework for the cross-border coordination of interventions responding to bank distress. It will not be easy to establish such a framework.

A host financial system derives benefit from the home supervision of the parent banks. This provides some assurance to the host supervisor that the parent bank's and consolidated group's soundness comes under regular scrutiny by the home authority, including in respect of capital adequacy, risk positions, risk management systems, governance arrangements, and parent oversight of foreign subsidiaries and branches. Equally, the home supervisor benefits from effective supervisory and bank governance arrangements in the host country – especially when the home country's banks have substantial foreign operations.

In New Zealand, we openly acknowledge the benefit that our financial system derives from the role played by the

Australian and other regulatory authorities in this regard. However, this does not cause us to be complacent or to place excessive reliance on the home supervisory authorities. We are well aware that, although home and host supervisory authorities and central banks have broadly complementary interests, they can also have divergences – and even conflicts – of interests in some key respects. Indeed, the areas of potential divergence or conflict are likely to become most apparent when the stakes are at their highest – in a bank distress situation.

The potential divergences and conflicts can arise in a number of ways. For example:

Home and host authorities may have different statutory objectives to meet in the exercise of their supervisory responsibilities. In some countries, depositor protection is a primary goal of supervision. In other countries – such as New Zealand – the soundness and efficiency of the financial system is the primary goal. Such divergences can lead to significant differences in supervisory policies and in the strategy for responding to financial crises.

There can also be conflicts of interest between the home and host authorities in the allocation of capital and risks across a multinational banking group. The home authorities have an interest in retaining as much capital within the home jurisdiction, and particularly within the parent bank, as possible. Conversely, the host authority would like to see a reasonable portion of the group's capital vested in the local subsidiary. A similar dichotomy of interest applies in respect of the spread of risk across the banking group. In times of stress, the allocation of capital and risk within the group can be crucial. Tensions between home and host authorities can quickly become apparent in those circumstances. This is especially so when the bank subsidiary is under-capitalised and the host authorities are requesting the parent bank to inject more capital. The situation is even more complicated when the bank in distress is a branch of a foreign bank.

The home and host authorities may also have different interests in deciding the response to a banking crisis. The home authorities' primary interest and (generally) their primary statutory duty is the maintenance of stability in the home financial system. They have no responsibilities for the

stability of the host financial system. To the extent that they are interested in the stability of the host financial system, it is likely to relate to the possible impact on the parent bank's operations in that system and the likely flow-on effects to the home financial system. A host supervisor therefore cannot rely on the home supervisor to act in the interests of the host financial system. Similarly, host countries do not generally owe any formal duties to home countries or their supervisory authorities.

The home and host countries can have very different views on the choice of techniques for responding to bank distress. Clearly, the authorities in each country will have a menu of choices available, ranging from institutional bail-outs to liquidation, with intermediate options available in some circumstances. These choices have to be made on the basis of an assessment of the costs and benefits of alternative approaches within each market, and there can be no assurance that different countries will – or should – necessarily come to the same conclusion.

Moreover, home and host authorities may have quite different perceptions of when a crisis is systemic. The failure of a bank operating in the home and host countries may represent a major systemic crisis or a threat to the reputation of the financial system in the host country, while being of relatively minor significance in the home country – or vice versa. In the former case, the host authorities would therefore attach great importance to a quick and effective resolution of the crisis, while the home authorities may be less concerned. Again, this could impede the ability to implement a coordinated response to the crisis.

These matters are not straightforward when there is a largely bilateral relationship between home and host countries, of the kind faced by New Zealand. Matters become even more complicated when a parent bank has many operations in different countries. In these circumstances, the prospect of a large number of supervisors being able to agree on co-ordinated action within a short time-frame is not good. The international record tends to show that supervisors have effectively been placed in a position where they have had to act on their own judgement, in the light of their own particular circumstances, when complex cross-border bank insolvencies have occurred.

The need for robust host supervision arrangements

For these reasons, and in the absence of any fair and formalised, operationally and legally robust, international framework, we at the Reserve Bank of New Zealand think it would be very imprudent for a host authority to rely on the home authority to protect the host financial system. This does not mean that we are not still considering the issues with an open mind. But at this point, we need to continue to place importance on our ability to supervise the New Zealand banking system and to respond to a banking crisis in ways that enable us to protect New Zealand's interests without placing undue reliance on the actions of the home authorities. That said, we also recognise that the most effective response to a cross-border crisis would desirably involve close cooperation and coordination between the home and host authorities.

We are therefore actively working towards the implementation of enhanced home/host supervisory and crisis-response arrangements, while still retaining a strong capacity to independently manage a banking crisis. Our dual aims are to maintain the capacity to protect the New Zealand financial system on a stand-alone basis, while also building the framework for closer coordination between the host and home authorities. Let me highlight the key features of both aspects of this approach.

Our supervisory tools are similar to those of a home supervisor. While we have adopted a somewhat less intrusive approach than some supervisors, we require all banks, whether foreign-owned or domestically-owned, to comply with the same basic requirements, including in respect of minimum capital adequacy, related party exposure limits, comprehensive public disclosure requirements, governance requirements, and so forth. We monitor all banks on a regular basis and consult with the senior management teams of each bank annually, again, regardless of whether they are foreign-owned or domestically-owned. We also take a close interest in the parent banks of the systemically important banks in New Zealand, including monitoring their financial condition and meeting with their senior management teams.

In all of these areas, we have sought to dovetail our supervisory arrangements with those of the home supervisors – particularly Australia – in order to keep banks' compliance costs relatively low and to avoid excessive operational inefficiencies for banks. We are a welcoming, but responsible, host. This approach is reflected in a range of areas, including in the approach we have taken to the prudential requirements for banks and in the way we monitor and assess banks. Looking forward, we see scope for further dovetailing of this nature in the context of closer coordination between the New Zealand and Australian authorities.

However, the dominance of foreign banks in the New Zealand banking system has resulted in some additional supervisory measures being taken to ensure that the interests of the New Zealand financial system can be protected. By and large, these policies are common to many countries, particularly countries with substantial foreign bank participation. In New Zealand, they form a key part of being a responsible host supervisor. I would like to highlight two of our most recent requirements:

- that all systemically important banks be incorporated in New Zealand; and
- that foreign-owned banks in New Zealand are not overly reliant on parent bank or other outsourced functionality.

Like many supervisors, we require all systemically important banks to be incorporated in New Zealand, rather than operate as a branch of a foreign bank. Currently, all but one of the systemically important banks in New Zealand are locally incorporated. We are working with the other bank to determine how it can meet our requirements.

The local incorporation policy has three main objectives.

First, local incorporation is an important element of being able to respond to a financial crisis effectively, in New Zealand's interests. It provides a significantly higher degree of certainty over the balance sheet of a bank in New Zealand, enabling a statutory manager to assume control of a failed or distressed bank with greater certainty over legal jurisdiction than would be the case with a branch.

Second, local incorporation enhances the Reserve Bank's ability to supervise the banks on an ongoing basis in the interests of the New Zealand financial system. It enables the imposition of minimum capital adequacy requirements and risk limits, and provides a degree of separation between the subsidiary and the parent, thereby reducing intra-group contagion risk. Not least, local incorporation makes it much more difficult, legally and practically, for assets to be removed from the local operation to the parent bank; any such transaction must be for good value. This is not the case for a branch.

Third, local incorporation establishes a basis for sound bank governance in the host country, including a board of directors with a responsibility to act in the interests of the local bank. This is particularly important in New Zealand, given the strong emphasis we place on the role of corporate governance as the foundation for effective risk management. In our supervision framework, we stress the need for the local board of directors to take ultimate responsibility for overseeing the management of the bank, including its risk management capacity. Of course, we also recognise that, subject to complying with the laws and regulations of the country in question, the parent bank has the right to determine the strategic direction and overall management of its foreign operations – in New Zealand and elsewhere. But we wish to ensure that, within this overall constraint, the local board has much more than a rubber-stamping role.

Another important policy requirement that we are developing to protect the New Zealand financial system relates to the growing practice of outsourcing core bank functionality. Here, I am referring to the tendency for foreign-owned banks to move large parts of their functionality to the parent bank or to third parties – which are often in another country. In New Zealand, this has been occurring on a significant scale. And it has not just been confined to the obvious areas, such as IT systems, accounting functions and the like. Outsourcing to the parent banks has also included the movement of risk management capacity, some treasury functions, and some senior and mid-level management and technical expertise.

Outsourcing makes it more difficult to supervise a bank effectively on an ongoing basis. This is especially so where core risk-management functionality has been migrated

offshore. In these circumstances, there is a limit to what any supervisor can achieve in seeking to promote sound risk-management structures within the local bank. It also has the potential to weaken the role of the local board, thereby compromising the ability to ensure that governance arrangements are adequate to protect the interests of the local bank.

But when the storm clouds gather, the effect of outsourcing can be very serious for a host banking system. In a situation where a parent bank is in acute difficulty, it is likely that its foreign operations will also be in difficulty. If the parent bank is unable or unwilling to provide financial support to the subsidiary, and if the home authorities are unable or unwilling to extend official support to the foreign subsidiaries of the parent bank, then the host authority needs to have sufficient functionality in the bank in its jurisdiction to maintain systemically important functions.

A bank that relies substantially on outsourced services to its parent, or on inadequately outsourced arrangements to unrelated third parties, will not have that capacity. It will be substantially dependent on the outsource provider in order to maintain even quite basic functions. In a situation where the outsource provider is in serious strife, there is no guarantee that the bank will be able to maintain essential functions. In this situation, the host authority has limited scope to manage the crisis in its own jurisdiction.

For these reasons, and in accordance with our legislation, we have initiated an outsourcing policy for application to all systemically important banks and potentially to some of the other banks. In essence, the policy will require banks to maintain sufficient functionality within the jurisdictional reach of its board of directors – and of a statutory manager if the bank has failed – to enable the bank to maintain all essential functions if the parent bank, or any other service provider, fails. We have no difficulty with outsourcing, provided that it is done properly and prudently, and that it meets our required outcomes. We must have the capacity to manage a bank distress or failure in ways that minimise damage to the New Zealand financial system.

Managing financial crises

As with any supervisory authority and central bank, the Reserve Bank of New Zealand attaches great importance to the ongoing preparedness to respond to a financial crisis. We have a broad range of measures in place and under development to ensure that we have the capacity to resolve a banking crisis in ways that maintain a robust financial system, preserve market disciplines, and minimise moral hazard risks. In this regard, our statutory duty is to protect the soundness and efficiency of the New Zealand financial system, rather than seeking to protect particular institutions or depositors.

The tools required by a host supervisor to respond effectively to a banking crisis are much the same as those required by a home supervisor. However, in the case of a host supervisor, two elements are worth emphasising:

- First, there is a need for clear legal and operational capacity to assume control of, and to maintain operational capacity within, banks that are in acute distress or insolvent.
- Second, there is a need for balance sheet certainty for banks operating in the host country.

As I outlined earlier, our supervisory policies are intended to deliver these outcomes.

I wish to make particular reference to one aspect of our crisis management work - the development of what we currently call “bank creditor recapitalisation”. This is a mechanism that would enable the Reserve Bank to respond to a bank failure – including the failure of a systemically important settlement bank – in a manner that avoids or minimises the cost to the taxpayer, while still maintaining systemic stability. It comprises a number of elements, including:

- applying a “haircut” to depositors and other creditors of the failed bank at a level assessed to be sufficient to absorb likely losses;
- giving depositors access to the non-haircut portion of their deposits within a very short period of the failure occurring, but providing a government guarantee of those deposits so as to encourage depositors to keep their funds at the bank; and

- facilitating either the recapitalisation of the bank or some other resolution option that is consistent with maintaining a sound financial system.

While we are still developing the concept, we see this failure management structure as an important potential option for meeting systemic stability objectives, while preserving – indeed enhancing – market disciplines.

Enhanced cooperation and coordination between home and host authorities

Although these measures are all essential, we are mindful that a banking crisis in a largely foreign-owned banking system should preferably include coordination between the home and host supervisors and central banks. This is most likely to occur when there is a well-developed relationship of cooperation between the parent and host authorities – in good times and bad, in sickness and in health.

We are therefore now developing our thinking, and building on the existing relationships we have with the supervisor and central bank in Australia, as to the arrangements required to ensure that there is effective coordination between home and host authorities, both in the day-to-day supervisory process and, especially, in periods of financial distress. We want to ensure that there is a clear understanding between the banking supervisors, the central banks, and the finance ministries of both countries as to their respective roles and responsibilities. We want to explore the scope for more defined and potentially more formalised cooperation and coordination so that both sides are better placed to supervise their respective financial systems more efficiently and effectively. And we want to have well-designed structures for responding swiftly and effectively to cross-border financial crises in ways that recognise the respective roles of the relevant government agencies in each country.

What would be the key elements in these arrangements? Ideally, they would include a number of attributes, such as:

- Closer cooperation between the home and host authorities in the design and implementation of supervision policy, possibly including areas of

policy harmonisation and mutual recognition. The implementation of Basel II provides a good opportunity for this, as do a number of other supervisory policy areas. Indeed, the implementation of Basel II is perhaps the greatest “fair weather” challenge for cooperation and coordination between home and host regulators for many years. Striking a balance between the consistent adoption of Basel II methodology, while retaining the ability to set capital requirements that reflect each country’s risks, is essential. This is not to mention the challenges arising from the more regulatory intensive nature of some elements of the Basel II requirements.

- * Improved coordination of on-site and off-site supervision in some areas, including the regular candid exchange of information on banks operating in each other’s jurisdictions;
- agreement on the allocation of responsibility for the provision of liquidity support between the home and host central banks in defined circumstances;
- formal understandings on the respective roles of the home and host supervisors, central banks and finance ministries in responding to a cross-border bank failure, including protocols for determining when and how a joint home/host bank resolution strategy could be used to resolve a cross-border crisis;
- facilitating coordination of public communication between the home and host authorities in responding to cross-border financial crisis, where appropriate.

This framework for coordination and cooperation needs to be pre-determined in order to be reliable. Memoranda of Understanding between home and host authorities can be useful, but they might not prove to be sufficiently reliable in a crisis situation. Indeed, most Memoranda of Understanding between home and host authorities tend to take a soft-edged approach to the respective obligations of the parties, creating too much uncertainty for them to be useful in a crisis.

Some form of formalised cooperation arrangement between the home and host authorities is therefore likely to be necessary. This needs to strike a balance between

creating reasonable certainty of coordination in specified circumstances, while preserving the flexibility for each country's authorities to take independent steps to protect their own interests. It also needs to be structured in ways that recognise that bank ownership – and hence home country supervision – can change. There is therefore a need to avoid being locked into arrangements that might later prove to be unworkable or no longer appropriate. And there is a need for home/host arrangements to maintain a degree of internal consistency in the supervisory frameworks of the respective countries, so as to maintain clarity and to avoid conferring any competitive advantages or disadvantages on particular categories of banks. Creating the right balance in all of this is no easy task.

Even if formalised coordination frameworks can be developed, their utility ultimately depends on how effective they are in a crisis. Rather than wait for a financial crisis to occur to see if the coordination arrangements work, it would be better to periodically test their effectiveness. Although no form of testing can ever fully simulate a real crisis and the tensions that go with it, we think that periodic crisis simulation exercises involving home and host supervisors, central banks and finance ministries will become an important mechanism in testing coordination arrangements. They could also make a material contribution towards building closer and more cooperative relationships between home and host authorities and central banks.

Conclusion

Maintaining a sound and efficient financial system and being able to respond to a crisis effectively is a crucial prerequisite for a country's economic and social welfare. This is true whether the financial system is largely composed of domestic banks or dominated by foreign banks. And it is

critical in a small, open, indebted, economy, such as New Zealand's, given the potential vulnerability to international sentiment and cross-border capital flows.

In the absence of any fair and formalised, operationally and legally robust, transnational regulatory framework, the financial stability buck stops at national laws and the supervisor's and central bank's duties under those laws. The financial stability stakes are too high to pass on such a responsibility lightly. In banking, while the home and host authorities have some complementary interests, they also have areas of potentially diverging and conflicting interests, as well as jurisdictional limits.

The Reserve Bank of New Zealand is committed to doing all it can to maintain a sound and efficient financial system in New Zealand. We believe that it is essential to maintain the frameworks needed to fulfil our responsibilities. This includes a clear legal and practical basis to supervise the financial system and the capacity to respond to a financial crisis effectively on a stand-alone basis if necessary. Equally, we must have a clear legal basis for providing liquidity support when required, on the basis of bank balance sheets and capital positions that are as meaningful and clear as they can be in the circumstances.

But, we also recognise the benefits of mutual recognition and harmonisation of regulatory policies, where sensible, and the benefits of cooperation and coordination between the home and host supervisory authorities. The efficiency and effectiveness of our banking supervision will be greater, and the crisis management options wider, the closer the home and host authorities are.

The Reserve Bank of New Zealand is committed to remaining a welcoming, albeit responsible, host. However, the regulatory risks and rewards have never been greater.

Excerpt from: A prosperous but vulnerable nation

An address to the New Zealand Society of Actuaries in Napier by Adrian Orr, Deputy Governor, Reserve Bank of New Zealand

17 November 2004

When we talk about the risks of indebtedness, it is important to remember that New Zealand is a reasonably prosperous nation. We can take on a certain amount of debt with comfort, and in some cases it is sensible to do so. The growth in borrowing in the last decade has not, in itself, raised the odds of a major financial crisis. But if things do go wrong, the losses from such a crisis could be severe – and more so now than they would have been, say, 10 years ago.

The Reserve Bank's interest in this area stems mainly from two features of borrowing behaviour in New Zealand. First, New Zealand relies heavily on funds borrowed from offshore, and a large and increasing share of these funds is channelled through the banking system. This channel has become more industry and geographically concentrated: just four Australian banks now own 85 per cent of New Zealand's banking system assets, and they also perform some of the key functions of their New Zealand operations. In a banking sector crisis, an interruption to these intermediation services would create disruptions across the whole economy.

Second, a great deal of the funds raised offshore end up as household debt. In normal times, households are quite capable of managing their own balance sheets, and their decisions about spending, saving and investment may well be rational. But there is always a risk, albeit small, of a major economic shock that could leave many households without any income to service their debts.

Ideally, households would have used the recent run of strong economic growth to build up a buffer against such an event; instead, they have tended to leverage up further and invest more heavily in a few domestic asset classes, especially housing. The result is that a major shock could result in more defaults and heavier losses for banks and other lenders.

For policymakers, the stakes are higher now than they have been in the past. In response, we have taken a fresh look at our approach to banking regulation and supervision. In particular, we are developing our capacity to respond to banking crises in ways that serve the interests of New Zealand. This includes policies that aim to ensure that foreign-owned systemically important banks can be run legally and operationally from New Zealand on a stand-alone basis if and when needed. We are also working to ensure that there is as much coordination and cooperation as is possible between regulatory authorities both here and abroad during times of financial stress.

We also have a brief to monitor the wider financial system for emerging signs of stress. The publication of our first regular *Financial Stability Report* is another step in raising awareness and debate around financial stability issues.

Banking policy should be part of a safeguard against rare, but costly, financial crises. We can think of it as a form of insurance: if the potential loss from an unforeseen event rises, it is appropriate to add a little more insurance cover. We believe that recent policy developments provide this extra cover, in ways that are consistent with our duty to promote the soundness and efficiency of the financial system.

RESERVE BANK DISCUSSION PAPERS

This section sets out the abstracts of recently issued Reserve Bank Discussion Papers. Papers are available for download on www.rbnz.govt.nz and may also be requested in hard copy from the Reserve Bank.

DP2004/08: Examining finite-sample problems in the application of cointegration tests for long-run bilateral exchange rates

Angela Huang, October 2004

Numerous empirical studies investigate whether exchange rates are related to “economic fundamentals” in the long-run and find a range of relationships through cointegration analysis. We report similar cointegrating relationships for the value of the New Zealand dollar relative to the US dollar (NZD/USD) and for the value of the New Zealand dollar relative to the Australian dollar (NZD/AUD). These include determinants such as commodity prices, 90-day interest rate differentials, and inflation and growth differentials.

However, Godbout and van Norden (1997) demonstrate that finite-sample problems may have affected the conclusions of such cointegration studies. Through a simple Monte Carlo study, we consider whether the cointegration coefficients can reasonably be interpreted as “long-run” elasticities of the exchange rate to changes in fundamental variables. The simulation results suggest that given a relatively short span of data it is possible for cointegration analysis to indicate that a long-run relationship has been found when in fact there is only a cyclical relationship. Therefore caution is advised when interpreting the empirical results and making policy assessments about the nature of exchange movements relative to its broad trend.

NEWS RELEASES

For the record: news and information releases issued by the Reserve Bank, September-November 2004

Foreign exchange and derivatives turnover survey

29 September 2004

New Zealand's foreign exchange market handled an average of US\$7.5 billion per day in April 2004 (relative to US\$4.2 billion and US\$7.6 billion per day in April 2001 and 1998 respectively), according to a Reserve Bank survey released today.

These results are part of a triennial survey of 52 central banks and monetary authorities co-ordinated by the Bank for International Settlements (BIS) and reported in US dollars. In New Zealand the survey captured the activity of five major banks participating in the local wholesale financial markets.

Commenting on the survey, Deputy Governor Adrian Orr said "About three quarters of the increase in the value of foreign exchange turnover since 2001 is due to a rise in the New Zealand dollar, with the remainder being due to growth in transaction volume."

The survey also covered interest rate derivative products, such as forward rate agreements and interest rate swaps. Average daily turnover in these products was US\$1.8 billion – a threefold increase since 2001.

This press statement follows similar releases from the BIS and other central banks at 1500 GMT earlier today. The BIS preliminary global report can be found at <http://www.bis.org/publ/rpfx04.htm>. The complete survey results are also available. These results are preliminary and are subject to change.

Need for effective local supervision of banks

2 October 2004

The Reserve Bank is emphasising the continuing need for countries with predominantly foreign-owned banks to have the capacity to maintain the stability of their financial systems and to respond to a banking crisis.

Speaking at a US Federal Reserve conference in Chicago on bank insolvency, Reserve Bank Governor Alan Bollard outlined the particular challenges increasingly facing countries with banking systems dominated by foreign banks. He also discussed the ways foreign and domestic regulatory authorities can better cooperate and coordinate their actions, including in the case of Australia and New Zealand.

Dr Bollard said that responding to a banking crisis was "a challenge for any supervisor, but it is all the more complicated when it is a foreign-owned bank that gets into difficulty, given different jurisdictions, potentially different statutory objectives between home and host (supervisory) authorities, and a greater degree of jurisdictional separation between taxpayers and depositors than is the case with domestically-owned banks.

"In the absence of any fair and formalised, operationally and legally robust, trans-national regulatory framework, the financial stability buck stops at national laws and the supervisor's and central bank's duties under those laws. The financial stability stakes are too high to pass on such a responsibility lightly. In banking, while the home and host authorities have some complementary interests, they also have areas of potentially diverging and conflicting interests, as well as jurisdictional limits.

"The Reserve Bank of New Zealand...believe(s) that it is essential to maintain the frameworks needed to fulfil [its] responsibilities. This includes a clear legal and practical basis to supervise the financial system and the capacity to respond to a financial crisis effectively on a stand-alone basis if necessary. Equally, we must have a clear legal basis for providing liquidity support when required.

"But, we also recognise the benefits of mutual recognition and harmonisation of regulatory policies where sensible, and the benefits of cooperation and coordination between the home and host supervisory authorities. The efficiency and effectiveness of our banking supervision will be greater, and the crisis management options wider, the closer the home and host authorities are."

RBNZ 2004 Annual Report

5 October 2004

The Reserve Bank today made public its 2004 Annual Report. Copies have been sent by courier and posted to the news media, and the document can be viewed on the Bank's website at www.rbnz.govt.nz.

As in previous years, this Annual Report also includes in its editorial section a separate annual report prepared by the Bank's Board of Directors.

September 2004 Reserve Bank Bulletin released

6 October 2004

The Reserve Bank today released the September 2004 issue of the *Reserve Bank of New Zealand Bulletin*.

The September issue contains articles spanning most of the Reserve Bank's core functions. It also includes two speeches recently given by the Governor – one on the banking supervision framework and the other on the New Zealand property markets.

The first article is on the long-run effects of monetary policy on economic growth. It looks at how interest rates and inflation affect growth in a country's investment capital, labour supply, and technology. The evidence indicates that keeping inflation low and stable makes a positive contribution to long-run economic growth and that this is the most effective contribution that monetary policy can make to the economy's performance over time.

The second article summarises a joint project led by the New Zealand Institute of Economic Research (NZIER) to evaluate whether sharp swings in the average level of capacity utilisation in the New Zealand economy, as measured by the NZIER, may have been influenced by sampling changes used in the NZIER's calculations. It found that changes to the sampling framework used by the NZIER do not appear to have had a significant impact on the measure of capacity utilisation and that the swings in capacity utilisation are due to underlying economic developments, including productivity changes.

The third article discusses the Reserve Bank's views on bank corporate governance and summarises the issues the Bank is currently reviewing, with a view to assessing possible options for enhancing governance within banks. It notes the importance of sound corporate governance, with particular emphasis on the need for the boards of banks having ultimate responsibility for the stewardship of and risk management within their banks.

RBNZ's first *Financial Stability Report*

20 October 2004

The Reserve Bank today issued the first of a regular series of *Financial Stability Reports* which will assess the current state of New Zealand's financial system.

Topics covered in the report include:

- a review of the current economic and financial environment;
- an assessment of New Zealand's financial institutions;
- recent developments in banking regulation and supervision;
- recent stress testing of the banking system; and
- an overview of the foreign exchange and government bond markets.

Reserve Bank Governor Alan Bollard commented "The Reserve Bank sees the New Zealand financial system as being stable and functioning effectively, and the banking system as being financially robust and resilient. However, there are always risks. Experience shows that financial instability often has its origins in periods of long economic expansion, such as New Zealand is enjoying at the moment.

"Among the issues currently receiving attention is the possible implications of increased debt that has been taken on by households, and the relatively rapid growth in lending by some non-bank institutions. A significant slowing of the economy, and of the property market in particular, or higher than expected interest rates, could result in some strains for heavily indebted households. Difficulties could also be faced by non-bank financial institutions that have taken on

greater risk by funding speculative property developments or unproven business.

“We are also cognisant of the increased concentration of the New Zealand banking system, given the amalgamation of the ANZ and National Bank. As the report describes, the four systemically important banks in New Zealand now account for 85 per cent of the banking system’s total assets. Their systemic importance underscores the importance of policies that provide the Reserve Bank with the capacity to maintain their operations, should they come under serious financial stress.

“This new six-monthly publication reflects the increased emphasis that the Reserve Bank is placing on financial stability issues. We are seeking to ensure that New Zealanders can have the benefits of a financial system that is both sound and efficient.”

You can view a series of additional highlight sheets (PDF 156KB) or read the full *Financial Stability Report* (PDF 888KB) at www.rbnz.govt.nz.

Reserve Bank increases OCR to 6.50 per cent

28 October 2004

The Reserve Bank has increased the Official Cash Rate from 6.25 per cent to 6.50 per cent.

Reserve Bank Governor Alan Bollard said “New Zealand’s economy is still performing strongly and recent domestic economic data has delivered positive surprises. Resources will remain stretched for some time yet, and there are still inflation pressures.

“However, the recent monetary policy tightenings still have to work their way through the economy, and the high exchange rate will also have its effect. Given this, we believe that the current settings of monetary policy are now doing enough to ensure price stability as defined in the Reserve Bank’s Policy Targets Agreement.

“The Reserve Bank will continue to monitor events as they unfold. The release of the Bank’s next *Monetary Policy Statement* is scheduled for Thursday 9 December 2004.

RBNZ releases draft outsourcing rules for banks

2 November 2004

The Reserve Bank today published its proposed policy on outsourcing by large New Zealand banks. The Reserve Bank is seeking feedback from registered banks and other interested parties before finalising the policy in early 2005.

Reserve Bank Deputy Governor Adrian Orr commented “The Bank is not against outsourcing per se, and sees it as part of the fabric of the global financial system. However, outsourcing can expose banks, and hence New Zealand’s financial system as a whole, to risks that must be managed.

“The proposed policy would require a large bank’s board of directors to have the legal and practical ability to operate their bank stand-alone, if the bank’s owner, or another provider of services to the bank, failed. This would also need to apply should a statutory manager of the bank ever be appointed.

“The proposed policy would also require the board of each large New Zealand bank to exercise meaningful control over the terms of employment of the bank’s chief executive, and would require the bank’s staff to report ultimately to that chief executive.

“The proposed policy would not permit systemically important banks to outsource key functions where, as a result, their ability to keep operating in a crisis could be put at risk. Thus, for example, if a large New Zealand bank wanted its owner or another party to process its transactions, this would not be permitted if it meant that the New Zealand bank couldn’t function if the owner or other party failed.

“We have tried to ensure that efficiency is not unduly impeded in our proposed policy by focusing on the outcomes we require, rather than being prescriptive. This provides banks with flexibility to meet our requirements in a way that suits their individual circumstances and business models.”

“These proposals continue the development of the Reserve Bank’s bank failure management framework, which has been underway for some time. They also reflect the 2003 amendment to the Reserve Bank of New Zealand Act

which explicitly made outsourcing a relevant issue for the registration and supervision of banks.

A fact sheet is attached and the proposed policy, with a letter to all banks providing context is available.

Changes to New Zealand's "Silver" coins?

11 November 2004

The Reserve Bank today announced details of proposals to modernise New Zealand's "silver" coloured coins. The Reserve Bank emphasised that no decisions have been made, and is now seeking feedback from the public. The Bank expects to make final decisions in early 2005. If changes are to occur, they will be implemented in mid-2006.

The proposals are:

- the current 50, 20, and 10 cent coins would be made smaller and of a lighter and lower-cost plated steel; and
- the 5 cent coin would be taken out of circulation.

The \$1 and \$2 coins will be retained, as will the existing images on the 50, 20, and 10 cent coins, including the Queen.

Reserve Bank Currency Manager Brian Lang said "Our silver coins are among the largest and heaviest in the world. Due to past high inflation, our 5 cent coin is now worth less than half what a cent was worth back in 1967. The proposals issued today would give New Zealand a coherent and logical set of coins that would be more convenient for the public, easier for those handling coin in bulk, such as banks and security firms, and less costly to manufacture, saving annually about \$2 million.

"In preparing these proposals the Reserve Bank has commissioned research and consulted extensively with community groups, commercial interests, and those who handle coin in bulk. Nonetheless, there may be aspects that we haven't considered yet, and we are very keen to hear from the public and from groups with a particular interest in the nation's coinage.

"Feedback can be provided by emailing to: silvercoin@rbnz.govt.nz by 4 February 2005 or by writing to:

Silver Coin Review

Reserve Bank of New Zealand

P O Box 2498

Wellington

"To stimulate discussion, we have prepared a pamphlet, *Changing New Zealand's "silver" coins?*, which shows the proposed new coin sizes and explains what's been suggested and why. You can view the brochure on our website or a hard copy is available on request by phoning 0800 4COINS (0800 426 467).

Financial stability stakes higher

17 November 2004

Reserve Bank Deputy Governor Adrian Orr is warning that the rise in New Zealand's external debt in recent years stresses the need for policies to promote the soundness of the financial sector. That's come in a speech in Napier to the New Zealand Society of Actuaries entitled "A prosperous but vulnerable nation".

An excerpt from that address is reprinted on p. 42.

PUBLICATIONS

<i>Annual Report</i>	Published in October of each year
<i>Financial Stability Report</i>	Published six-monthly. A statement from the Bank on the stability of the financial system. First copy free.
<i>Monetary Policy Statement</i>	Published quarterly. A statement from the Bank on the conduct of monetary policy. First copy free, subsequent copies \$12.00.
<i>Reserve Bank of New Zealand Statement of Intent, 2004–2007</i>	
<i>Snakes and Ladders – a guide to risk for savers and investors</i>	

Recent Reserve Bank Discussion Papers

2004

DP2004/01	Estimating a time varying neutral real interest rate for New Zealand Oliver Basevant, Nils Björkstén, and Özer Karagedikli
DP2004/02	Do inflation targeting central banks behave asymmetrically? Evidence from Australia and New Zealand Özer Karagedikli and Kirdan Lees
DP2004/03	The equilibrium exchange rate according to PPP and UIP Dominick Stephens
DP2004/04	Estimates of the output gap in real time: How well have we been doing? Michael Graff
DP2004/05	What can the Taylor rule tell us about a currency union between New Zealand and Australia? Nils Björkstén, Arthur Grimes, Özer Karagedikli and Christopher Plantier
DP2004/06	Improving implementation of inflation targeting in New Zealand: An investigation of the Reserve Bank's inflation errors Philip Liu
DP2004/07	A model of equilibrium exchange rates for the New Zealand and Australian dollar Simon Wren-Lewis
DP2004/08	Examining finite-sample problems in the application of cointegration tests for long-run bilateral exchange rates Angela Huang

Full lists of Discussion Papers are available from Administration, Economics Department. Lists of the Working Papers and the Research Notes can also be obtained from the Economics Department.

Pamphlets

Central Banking in New Zealand
This Is The Reserve Bank
Monetary Policy over the Business Cycle
Your Bank's disclosure statement – What's in it for you?

For further information, go to www.rbnz.govt.nz, or contact:

Knowledge Centre,
Knowledge Services Group,
Reserve Bank of New Zealand,
2 The Terrace, P O Box 2498
WELLINGTON,
phone (04) 4722–029

Articles and speeches in recent issues of the *Reserve Bank of New Zealand Bulletin*

Vol. 66, No. 4, December 2003

Articles

New Zealand's financial sector regulation

The relationship between inflation expectations, survey data and inflation

The Reserve Bank Inflation Calculator

Speeches

After the National Bank acquisition: living with big Australian banks

Investing in a low inflation world

Vol. 67, No. 1, March 2004

Articles

Impact of the exchange rate on export volumes

The Reserve Bank of New Zealand Amendment Act 2003

Designation of payment systems – new Part VC of the Reserve Bank of New Zealand Act 1989

Speeches

Asset prices and monetary policy

Vol. 67, No. 2, June 2004

Articles

Interpreting Clause 4(b) of the Policy Targets Agreement: avoiding unnecessary instability in output, interest rates, and the exchange rate

What drives the New Zealand dollar?

Developments in the New Zealand banking industry in 2003

Outcomes of the Financial Sector Assessment Programme for New Zealand

Musings on financial stability issues: an interview with Professor George Kaufman

Bank regulation and foreign-owned banks

Speeches

Speech excerpt on the Reserve Bank's exchange rate intervention proposal.

Vol. 67, No. 3, September 2004

Articles

The long-run effects of monetary policy on output growth

NZIER's Capacity Utilisation index

Promoting strong corporate governance in New Zealand banks

Speeches

Supervising overseas-owned banks: New Zealand's experience

What's happening in the property sector?