A cash rate system for implementing monetary policy

By David Archer, Andy Brookes and Michael Reddell, Financial Markets Department

This article explains in greater depth a number of considerations relevant to the decision announced on 8 February to adopt an Official Cash Rate as the Bank's primary instrument for implementing monetary policy. It should be read in conjunction with the 8 February briefing document reproduced on page 46. This article sets out:

- what monetary policy implementation is all about;
- the reasons for moving to an Official Cash Rate approach;
- the background to some of the specific choices we made in shifting to the new system; and
- the impact we expect the new system to have on financial markets.

1 Foundations of monetary policy implementation

Monetary policy has two separate components. First, and by far the most important, is an assessment of the monetary policy likely to be needed to maintain price stability (policy **formulation**). The second is adjustments to the central bank's operations to effect the chosen stance. The recently announced changes relate solely to the second component - commonly referred to as the **implementation** of monetary policy. Linkages from a central bank's operations, via monetary conditions (all the financial variables that affect economic behaviour), to expenditure decisions and ultimately inflation, are collectively described as the "transmission mechanism" of monetary policy. In somewhat stylized form, the transmission mechanism begins with the central bank's influence over the price (interest rate) of the "cash" – balances in settlement accounts at the Reserve Bank – that banks use for the settlement of transactions in the economy. That cash interest rate in turn influences other short-term interest rates, longer term interest rates, and the exchange rate. All those then end up influencing economic behaviour in various ways.

The transmission mechanism is multi-faceted, and the ultimate effect of central bank operations on the end objective of price stability is very indirect. Partly because the linkages are so indirect, public and market expectations of future policy changes play a very important role in monetary policy. In effect, they can provide a short-cut, bringing the beginning and end of the transmission mechanism closer together. Specifically, expectations about future monetary policy actions can directly affect spending and investment decisions.

A central bank can structure its operations in various ways to get effective leverage over the financial variables at the beginning of the transmission mechanism. The choice between these alternatives is partly a matter of institutional structure and history, partly a matter of relative efficiency, and partly a matter of how well expectations are shaped by the chosen form of central bank actions.

To understand the nature of the choices made recently, further detail is required about how these variables at the initial phase of the transmission mechanism are influenced by central bank actions. As noted, the beginning of the transmission mechanism involves the quantity or price of the call or overnight settlement cash deposits that banks place with the Reserve Bank.

To explain a little further, three structural features are significant:

- The Reserve Bank is the only legal issuer of notes and coins. Banks purchase notes and coin from the Reserve Bank, and the Bank in turn insists on being paid in settlement cash.

- The role of the Reserve Bank as banker to the government provides an additional reason for settlement cash to play a special role. Transactions between the government and individuals and firms need to be settled, and again the Bank requires that settlement cash is used.

- The Reserve Bank's undoubted credit standing in any case makes settlement cash the best asset for final settlement of the enormous volume of transactions flowing through the banking system each day. On behalf of their customers who transact with customers of other banks, banks effect final settlement via exchanges of settlement cash. Banks could use other assets to effect settlement, or simply take IOUs from each other, but the former is generally riskier and less efficient while the latter simply involves deferral of final settlement.

The first two of these factors **compel** banks to hold settlement cash balances with the Reserve Bank. Thus settlement cash is special because no other asset can easily substitute for the role it plays. The combination of the lack of ready substitutes and the fact that the Reserve Bank is the monopoly supplier gives us the leverage that underpins monetary policy.

2 Implementation arrangements in New Zealand's recent history

So far, we have referred both to the quantity and the price of settlement cash as elements the Bank can influence at the start of the transmission mechanism. In many circumstances it is only possible to control one or the other. In fact, it is usual to structure central bank operations either around directly controlling the quantity **or** controlling the price, allowing the other to adjust in response to fluctuations in demand.

In the mid-1980s – when the just-abandoned operational structure was initially put in place – the focus was on controlling the quantity of settlement cash.[1] It was recognised that controlling the quantity would affect interest rates, but it was felt that the quantity of central bank supplied liquidity was a particularly important part of the transmission mechanism in its own right.

Quite quickly it became clear that the relationship between the quantity of settlement cash supplied, bank behaviour

and interest rates was not very tight or predictable. For any given quantity of settlement cash, bank lending, interest rates, the exchange rate and other important variables in the transmission mechanism could vary widely. Put more generally, the same level of settlement cash is consistent with a wide range of activity levels and inflation rates in the New Zealand economy.

As we increasingly recognised the unpredictability of the relationship between the **quantity** of settlement cash and overall monetary conditions, we increased the attention paid to financial **prices** in the transmission mechanism. However, the formal operational structure for implementing monetary policy continued to be quantity-based. Two types of innovation were used to tighten the linkage between our policy intentions and actual monetary conditions. The first type reduced the extent to which the quantity of settlement cash was allowed to vary from day to day. The second type, and ultimately the more important, involved the increased use of "signalling" to clarify the intended effect on monetary conditions, reserving actual adjustments to the quantity of settlement cash as a backstop measure if required.

Signalling statements made by the Bank about the appropriateness of prevailing monetary conditions became a key feature of monetary policy implementation in New Zealand over the last decade. By international standards the use of signalling in the implementation part of the monetary policy process was taken to unusual lengths, reflecting the limitations of the operating system we were using.

Signalling evolved as circumstances changed and different elements of the transmission mechanism were emphasised in the short-term management of monetary conditions. At various times, the gap between short-term and longer-term interest rates (the slope of the yield curve), and the exchange rate, were each given special emphasis. Later, emphasis moved to the combination of the level of short-term interest rates and the exchange rate, expressed in the form of the Monetary Conditions Index (MCI). Our view on the appropriate stance of monetary policy was periodically updated in the light of new assessments of the degree of inflation pressure in the economy.

In broad terms the use of signalling to supplement the quantity-based operations proved an effective way of

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[1] In fact, the focus was on the quantity of "primary liquidity", which comprised settlement cash and assets exchangeable on demand for settlement cash (latterly, Reserve Bank bills).

implementing monetary policy. For the most part, inflation has been kept within the target range. Moreover, for considerable periods of time the quantity of settlement cash was able to be left unchanged while signalling successfully influenced monetary conditions. The system worked through the strong tightening and then a marked loosening cycles that monetary policy has required to keep inflation on track. But the combination of a quantity-based operational structure and signalling still had a number of drawbacks.

- First, on occasions imprecise guidance provided by way of statements led to confusion. To give more precision, desired monetary conditions were quantified in MCI terms, and threats to change the target quantity of settlement cash were used to keep conditions close to that identified as desired. While threats of action indeed proved credible enough to achieve close control over monetary conditions, close control is inappropriate in number of circumstances[2] and, in fact, led to unnecessary and inappropriate volatility in short-term interest rates.

- Secondly, the prominent role of signalling in the implementation of monetary policy (the day-to-day or, latterly, week-to-week threat of statements) tended to distract public attention from the more important issues associated with the judgements as to the appropriate stance of monetary policy.

- Thirdly, the beneficial role of expectations was constrained. Often, market expectations about likely policy actions take interest rates and the exchange rate in a direction appropriate for achieving the policy target. For instance, an expectation of future policy tightening, triggered by new information about growing inflationary pressures, tends to drive up 90-day interest rates and the exchange rate. But, because the Reserve Bank does not revisit its view on appropriate monetary conditions each day, signals as to appropriate conditions are not updated immediately on the arrival of new information. The more tightly that the Reserve Bank was perceived to want actual monetary conditions (in 90-day interest rate

and exchange rate terms) to conform to its last signal of desired monetary conditions, the less fully expectations of future policy actions could be reflected clearly in interest rates and the exchange rate.

3 Changes to the implementation regime

Faced with these problems, it was natural to examine the main alternative approach to implementation. That alternative is to do as most other developed countries now do and focus implementation on controlling the interest rate (price) on settlement cash.

The details of the new implementation arrangements are set out in the briefing document that is reprinted on pages 46 to 50 of this *Bulletin*. The main features of the new system are:

- The Official Cash Rate will be reviewed approximately every six weeks.

- In our dealings with financial markets, the Reserve Bank will pay an interest rate 25 basis points below the Official Cash Rate for money deposited overnight in settlement accounts, and the Bank will provide overnight cash (using repos[3]) at 25 basis points above the Official Cash Rate. That is, the Official Cash Rate will be the centre of a 50 basis point wide "corridor" between the interest rates at which the Reserve Bank will inject or absorb overnight funds on demand.

- Operations used to support the quantity-based control approach, such as the issuance of Reserve Bank bills, discounting, and the float tender, will be discontinued.

In focusing monetary policy implementation on the price of settlement cash – the Official Cash Rate – the Bank had the following criteria in mind:

- Implementation arrangements should be **effective** in achieving control over some financial price prevailing in the markets (consistent with the long-held view that

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[2]   Refer to the Hunt and Orr, 'Inter-forecast monetary policy implementation: responding to unexpected exchange rate of development,' which appears on pp 62-74 of this *Bulletin*.

[3]   In this case, repos (repurchase agreements) involve the Reserve Bank providing funds by the purchase if securities and a commitment to sell those securities back at an agreed price on some future date. Repos are similar, in economic effect, to secured loans.

prices matter more in the transmission mechanism than quantities). The quantity lever of the previous regime (the settlement cash target) was only loosely connected with financial prices at the beginning of the transmission mechanism, and needed to be reinforced with signalling. The Official Cash Rate system, by contrast, directly anchors interest rates at the very short end of the yield curve.

• By controlling directly a financial price at the very beginning of the transmission mechanism – the overnight cash rate – and exerting less direct control over those parts of the transmission mechanism in which expectations of future monetary policy are reflected (such as 90-day rates and the exchange rate), the beneficial role of expectations is provided freer reign.

• Implementation should be **transparent and straightforward**. First, financial market participants and individuals and firms across the economy should be clear what monetary policy the central bank is setting. A tightening or loosening in the monetary policy stance should be obvious. Secondly, it is helpful to investors and commentators if the operating mechanics are as simple and straightforward as possible.

The Official Cash Rate system is more transparent and easier to understand than the previous regime. At the time of each review, the Official Cash Rate will either be adjusted in clear fashion, or left unchanged. The setting of the official cash rate clearly and unambiguously expresses the desired stance of monetary policy, and between reviews the actual cash rate will stay close to the Official Cash Rate.

• Implementation should be **efficient**. The systems a central bank uses to implement monetary policy typically impose some costs on the private sector. For example, discounting securities at significantly penal interest rates – a feature of the previous quantity-based arrangements – is costly to the counterparty concerned. Conversely, under the quantity-based arrangements, significantly sub-market interest rates were paid on deposits placed at the central bank. These costs should be minimised, consistent with maintaining sufficient leverage over monetary conditions.

the new implementation arrangements will result in modest cost savings to settlement bank account holders. The margin between rates at which funds can be obtained and the rate at which funds can be invested has been reduced to just 50 basis points, a fraction of the previous very wide margin.

4   Cash rate corridor or target?

There are two broad ways of implementing a cash-rate-based implementation system. In the first, a channel or corridor is set for overnight interest rates, and the central bank stands ready to deal with its counterparties **on demand** at both the upper and lower rates. The corridor effectively bounds the inter-bank overnight rate: banks offering funds above the upper bound of the corridor will attract few takers, since funds can generally be obtained more cheaply from the Reserve Bank.[4] The opposite will be true at the bottom of the corridor: why would banks deposit money overnight in the market at less than the rate available from the Reserve Bank? This type of corridor regime is used in Australia and Canada.

The second approach involves conducting **discretionary** operations – injecting or withdrawing liquidity – in order to influence the market towards the official cash rate. In this approach, the stated official cash rate represents a target. The best-known example is the federal funds rate target used by the Federal Reserve System in the United States.

Three main considerations led us to select the corridor approach (though the advantages are not necessarily very significant either individually or collectively).

• Automaticity of operations. Because transactions through the standing facilities at the top and the bottom of the interest rate corridor are initiated by the private sector, and are passive from the Reserve Bank's perspective, there is no danger of any "signal" being read into the day-to-day details of the Bank's operations.

• Secondly, under a target approach, each day the central bank has to choose the right structure and amount of operations that will most closely achieve the target cash

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4   This assumes that potential borrowers have sufficient eligible securities to use in the repurchase transactions through which the Bank will provide funds.

rate. Because there is not a tight relationship between the quantity of settlement cash provided and the resulting interest rates, that choice would not always be straightforward. As a matter of observation, cash rates tend to be more volatile day-to-day in these sorts of systems.

- Thirdly, the use of standing facilities avoids the need for the Bank to "hunt" each day for the right structure and amount of operations to achieve the target official cash rate, with attendant savings in resource costs.

5 The width of the corridor

Having chosen the corridor approach, we had to decide how wide the corridor should be. In earlier thinking about a cash rate system for monetary policy implementation (see the Discussion Document issued by the Bank in March 1997, reprinted in the March 1997 *Bulletin*), a corridor perhaps as narrow as plus and minus 10 basis points around the target rate was envisaged. The choice of a wider corridor – plus and minus 25 basis points – was based on market feedback and further analysis of other countries' experience. Other countries have found that too narrow a corridor tends to make transactions with the central bank the first preference of banks with surpluses or deficiencies of cash, thereby undermining the interbank market. There is a balance to be struck between keeping the costs of monetary policy implementation to a minimum, and not intruding the Reserve Bank unnecessarily into normal market processes. In this context, the choice of a 50 point range represents a pragmatic judgment, rather than the application of any great science. We will be monitoring closely the way markets adjust to the 50 point corridor.

6 Frequency of review

There were a number of options in considering how frequently the Official Cash Rate should be reviewed. From a purely macroeconomic perspective we could readily have settled for a quarterly review only, in line with the frequency of the *Monetary Policy Statements*. However, that would have been out of line with predominant international prac-

tice. Markets are of course free to anticipate even infrequent changes to the Official Cash Rate, adjusting other interest rates and the exchange rate. However, such an infrequent review of the Official Cash Rate itself would probably have invited unnecessary criticisms at times that the Bank's reactions to emerging data were too slow.

The choice of a six-weekly review reflects both international practice (typically monthly or six-weekly review), and our experience that on occasions the appropriate policy stance can change quite notably over a six week period, when the unexpected happens. These are not normal occurrences, but neither are they so infrequent that they can be disregarded. The six-weekly review will also allow us to adjust gradually at times when we are particularly uncertain whether the emerging data will justify a large adjustment in the Official Cash Rate.

Note finally that one important element of the changes announced on 8 February is the discontinuance of the weekly Wednesday "window" for commenting on conditions. This window was an integral part of the old signalling-based system. In the new system, by contrast, between formal reviews of the inflation outlook the cash rate will be managed reliably and unobtrusively simply by means of the Bank standing ready each day to borrow and provide funds at pre-announced interest rates.

7 Size of adjustments to OCR

The minimum size of adjustment to the Official Cash Rate will be 25 basis points. In some overseas systems very small adjustments are sometimes used, primarily as a way of signalling the discomfort of the authorities with conditions. Most of the countries we compare ourselves with, however, tend to adjust in multiples of 25 basis points, recognising that anything much smaller would look – and be – spuriously precise, given the nature of the uncertainties central banks face. Note also that adjusting in multiples of 25 points does not mean that the normal adjustment will necessarily be 25 basis points.

8 Overnight and intra-day liquidity

As part of the real-time gross settlement system (RTGS) put in place last year,[5] the Reserve Bank also provides substantial amounts of liquidity intra-day to settlement account holders. This liquidity is provided by intra-day repos, in which account-holders sell securities to the Bank and then repurchase them at the same price (in effect, interest free) at the end of the day. If the securities are not bought back at the end of the day, the term of the repo is extended to provide overnight cash. Under the previous quantity-oriented arrangements for implementing monetary policy, which tightly controlled the supply of overnight cash, it was important to ensure that the ability to rollover an intra-day repo did not undermine the settlement cash target. So a very high penalty cost was imposed when rollovers did occur.

Under the new arrangements, we will be implementing monetary policy by directly managing the overnight cash rate. The quantity of settlement cash left in accounts at the end of each day will not be a policy lever, and will, in fact, be determined largely by the account holders themselves (who will be able to enter overnight repos with us without limit). So there is now little policy-related need to keep a tight distinction between intra-day and inter-day liquidity, and this will be reflected in the much-reduced penalty rates imposed on rollovers of intra-day repos.

9 Daily liquidity management operations

With the shift from a quantity-oriented implementation system to a system that relies on managing the cash rate, what is the role of open market operations? As noted above, we will be managing the cash rate through the "automatic" mechanisms of standing facilities: providing and absorbing settlement cash on demand at near-market prices.

However, these mechanisms complement rather than replace open market operations (OMOs) which will, for the time

being at least, continue unchanged. Although any marginal end-of-day additional supply of settlement cash will be provided by the overnight repo facility, the big day-to-day fluctuations in government spending and revenue (all of which affect the level of settlement cash) will continue to be managed by the daily OMOs. Open market operations in the new environment should be thought of very largely as resembling the activity of a very large corporate treasury managing its day-to-day cash flows. We borrow cash to cover days when the Crown spends more than it receives, we invest cash on the days when the Crown receives more than it spends, and we try to link the maturities of these borrowings and investing transactions to the expected future cash flows. OMOs provide a relatively stable backdrop for banking system liquidity, offsetting known flows. The overnight repo facility will "invest" unforeseen inflows (forecast errors), and cope with short-term fluctuations in account holders' own demand for settlement cash.

10 What difference will the Official Cash Rate make?

The move to a cash rate is expected to change behaviour in financial markets.

The volatility of the overnight interest rate is likely to fall. Table 1 compares the volatility of the overnight rates in Australia, Canada, the United States and United Kingdom. Australia and Canada, whose implementation regimes align most closely with New Zealand's Official Cash Rate system, experience relatively low levels of overnight volatility. Locally, the cash rate is expected to trade within the 50 basis point corridor in all but exceptional circumstances.

The overnight rate has often traded a long way away from bank bill rates for prolonged periods of time. This occurred not because of any obvious expectations of near-term changes in monetary policy, but rather because of periodic attempts by banks to manipulate the cash market. Distortions of this sort appear to have been related to the small size of the New Zealand market and the use of the quantity-based operating system, in which the Reserve Bank did not anchor the level of interest rates at any point. Under the new ar-

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5 See Bruce White, "Payment system reform in New Zealand – the start of real-time gross settlement" in the March 1997 *Bulletin.*

rangements, a much closer link between the average cash rate and bank bill rates is almost certain. Again, this relationship tends to be close in the comparable Australian and Canadian systems.

New Zealand 90-day interest rates have historically been quite volatile. Ninety-day rate volatility in New Zealand actually increased over 1996-99, at a time when comparable countries were experiencing lower volatility than in the previous three years (see table 1). This volatility was accentuated over 1997-98 by the use of narrow indicative bands around the desired MCI. Ninety-day bill rates tended to move very quickly in response to all or most exchange rate movements, and exchange rate volatility thus fed directly into interest rate volatility. As we moved away from tight indicative bands, interest rate volatility fell away in the second half of last year. However, 90-day volatility is expected to fall further under the Official Cash Rate system. A less volatile 90-day rate, with most significant changes reflecting changes in expectations about future monetary policy, will provide a clearer signal to investors and consumers making financial decisions. It will also make it easier for the Bank accurately to interpret market expectations when considering adjustments to the Official Cash Rate. (See charts at end of article.)

None of this means that if the Official Cash Rate is not expected to change, the cash rate and the 90-day rate will be the same. There are number of factors – including credit and liquidity considerations – which could put a permanent wedge between the average cash and 90-day rates. Only time and experience will show whether there is such a wedge and, if so, how large it is. As the accompanying graphs show, a range of comparable countries have had a variety of different experiences on this score. Australia and Canada have the most directly comparable systems, and in both countries the wedge appears to be small.

A reduction in 90-day rate volatility is likely to have a number of consequences. First, New Zealand financial assets become more attractive. Not only are funding costs in the overnight market more certain, but price volatility is likely to be reduced for financial assets where the 90-day rate was a significant influence on price. This is complemented by the extent to which the new regime is more straightforward for foreign investors to understand. As volatility attracts trad-

ing activity in financial markets, the volume of activity in the bank bill market may drop, somewhat offset by increased activity in short-dated bonds and longer-dated bill futures contracts.

Some have argued that lower interest rate volatility will cause higher short-run exchange rate volatility. Our own consistent view, based on a review of overseas literature and of other structural changes which reduced New Zealand interest rate volatility, has been that such a rise in exchange rate volatility is unlikely. Ultimately, however, this is an empirical question, and we will be monitoring foreign exchange market developments closely. Note, of course, that the changes being considered here affect the implementation of policy, and short-run fluctuations in financial market prices. There is no reason at all to expect any material change in the amplitude of longer run exchange rate (or interest rate) cycles as a result of changing the operating regime.

Where will the market cash rate trade, within the 50 basis point band? This is not a particular policy concern – we will not be setting out actively to **ensure** that the market cash rate equals the Official Cash Rate. However, if the actual cash rate deviates persistently to one side or other of the Official Cash Rate this may be an indication that it would be appropriate to adjust the supply of settlement cash through the OMOs. In addition, in our own operations we will be using the Official Cash Rate as the benchmark cash rate in deciding whether or not to accept OMO bids. So, overall, we expect that cash will, on average, trade close to the official cash rate.

A final, more esoteric issue concerns the possible impact of the shift to the Official Cash Rate system on the Reserve Bank's own balance sheet. The most direct and obvious effect comes from ceasing the issuance of Reserve Bank bills.[6] This change will result in a level shift downwards in the size of the balance sheet of a little over $1 billion (the amount of Reserve Bank bill on issue and the corresponding investment of the proceeds with Treasury). From a Crown balance sheet perspective, however, there is no change, as the maturing Reserve Bank bills funding is replaced by other government borrowing - in the short-term by the sale of additional Treasury bills. Offsetting this reduction in the size of the Bank's balance sheet - to a minor but unknown degree - is the

possibility that the higher interest rate to be paid on settlement cash will lead banks to want to hold higher average balances. However, given that settlement cash balances will not be a particularly profitable asset for banks to hold, it is unlikely that this effect will be large.

In principle, the shift to an Official Cash Rate system could make the gross size of the Reserve Bank balance sheet more volatile. This is because we will stand willing to enter into overnight repos without limit, and will not be controlling the final level of settlement cash balances. In practice, however, we do not expect to see any material change in the variability of our balance sheet. This expectation is partly based on overseas experience, and partly on a view that the fundamental drivers of variations in the level of settlement cash – the same drivers that shape the economic cycle and inflation pressures – are not altered by the operational changes being introduced.

Much of the discussion in this section has inevitably been somewhat speculative. The article was completed before the new arrangements came into effect, and before the first Official Cash Rate was announced. However, the market reactions we have been able to observe have generally been consistent with expectations. For example, the market proxy for expected short-term interest rate volatility - from bank bill options prices - has fallen substantially and there has not been any material change in expected exchange rate volatility. Investors and financial institutions have typically welcomed the new system, and changes in bond and swap yields have also suggested some beneficial effects from the change to the cash-rate-based implementation scheme.

As with any new structural arrangement, the Bank will be monitoring closely the way markets behave over the early months of the new regime. Overseas experience and deductive reasoning are very helpful guides to likely reactions. However, each market is to some extent unique and it would be somewhat surprising if we had anticipated every way in which markets change and behave under the new regime fully.

Table 1: Average absolute inter-day change in interest rates (basis points)

	Overnight rate		90-day rate	
	Jan 94 - Jan 99	Jan 94 - Jan 99	Jan 94 - July 96	Jul 96 - Jan 99
New Zealand	11.9	8.0	6.7	9.3
Australia	2.9	3.0	3.4	2.6
Canada	8.4	4.5	6.5	2.6
United Kingdom	22.8*	2.1	2.9	1.4
United States	15.6	1.4	2.0	0.9

* 1 January 1997 onwards, reflecting the earliest collection of transactions weighted data.

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[6] Under the previous quantity-based arrangements, Reserve Bank bills could be discounted with the Reserve Bank, at penal interest rates, in order to obtain settlement cash when that cash was scarce. This access to additional settlement cash did not undermine the quantity constraint, as the quantity of Reserve Bank bills was itself constrained and the cost of additional funds became increasingly severe the more bills were discounted.
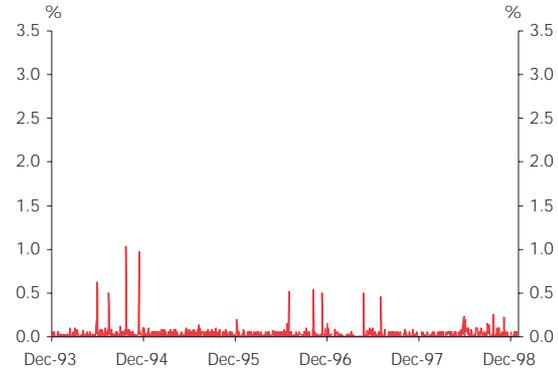
Charts

Figure 1

1a. Absolute daily change in New Zealand overnight interest rate
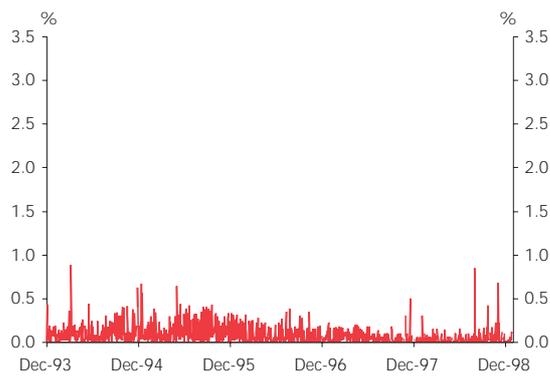*Average: 0.113*
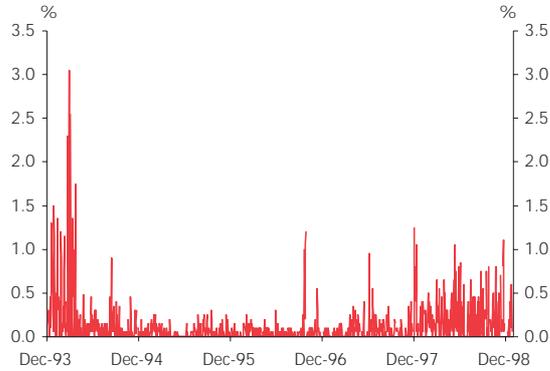
1b. Absolute daily change in Australian overnight interest rate
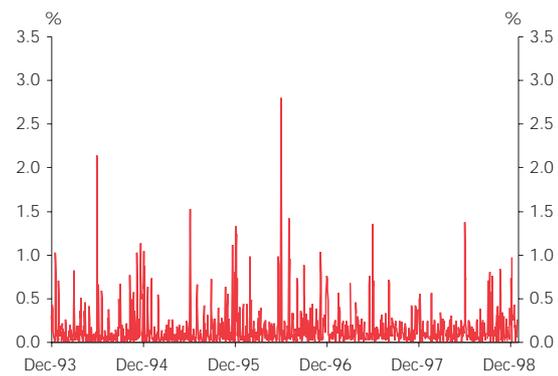*Average: 0.029*

1c. Absolute daily change in Canadian overnight interest rate
Average: 0.084

1d. Absolute daily change in US overnight interest rate
Average: 0.156

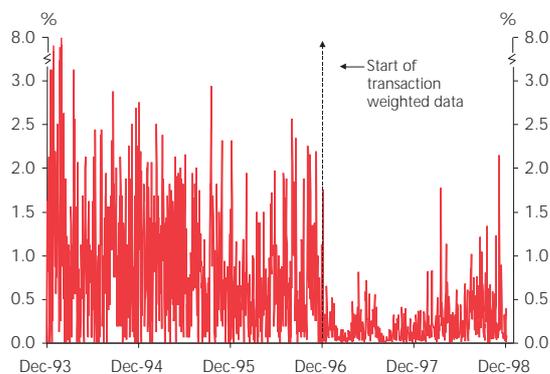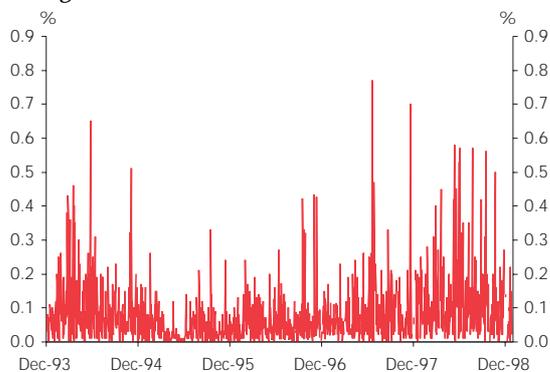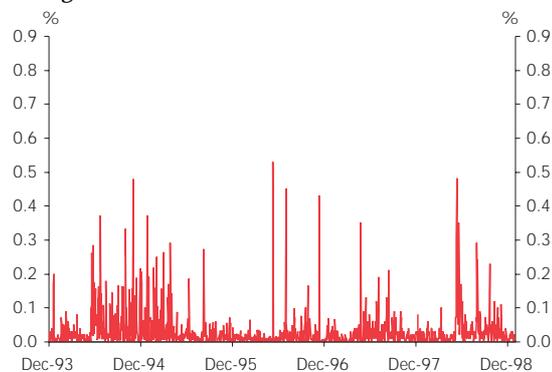### 1e. Absolute daily change in UK overnight interest rate
Average: 0.836

Figure 2

2a. Absolute daily change in New Zealand 90 day interest rate
Average: 0.077

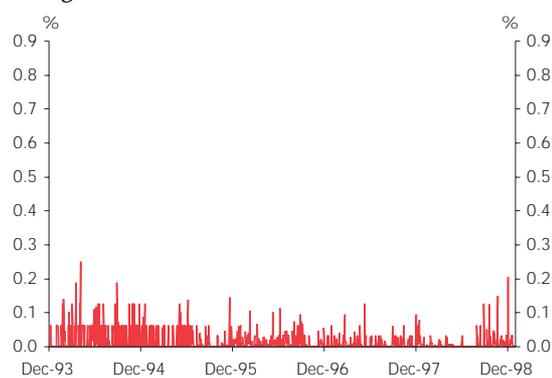### 2b. Absolute daily change in Australian 90 day interest rate
Average: 0.03

2c. Absolute daily change in Canadian 90 day interest rate
Average: 0.045
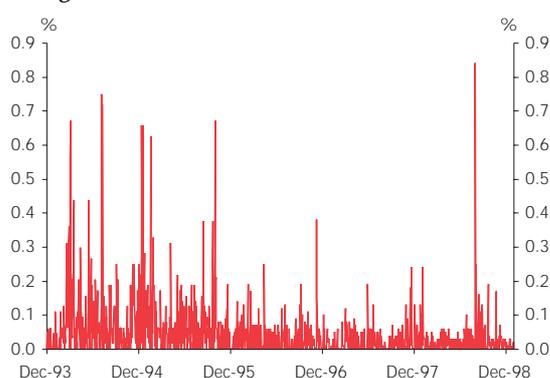
2d. Absolute daily change in US 90 day interest rate
Average: 0.014

2e. Absolute daily change in UK 90 day interest rate
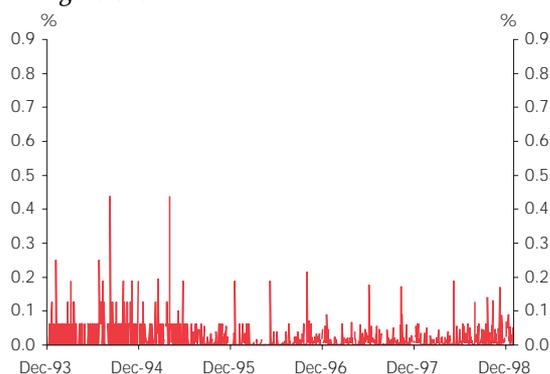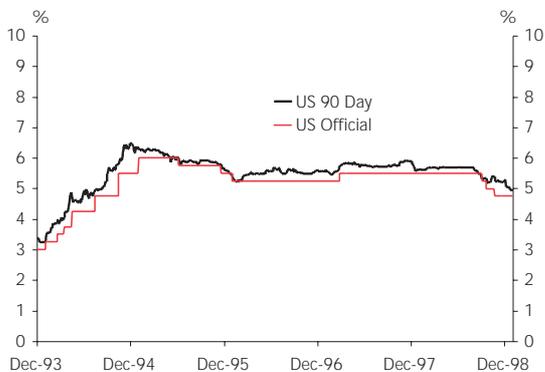*Average: 0.020*

Figure 3

3a. Australian official and 90 day interest rates

3b. Canadian official and 90 day interest rates

3c. US official and 90 day interest rates

3d. UK official and 90 day interest rates