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# Monetary policy communication and uncertainty

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Central banks have become progressively more transparent in explaining to the public the rationale for a given monetary policy decision, often using economic projections as a vehicle for explaining policy issues. Nevertheless, increased transparency poses potential risks, particularly if the uncertainty around projected outcomes is not communicated in a way that avoids misleading readers. This article describes a number of the options available to central banks for communicating uncertainty.

## 1 Introduction

Over the past two to three decades, central banks have become more transparent about the motivation and thinking behind policy choices. Secrecy was once a hallowed concept, especially amongst central banks that managed fixed-but-adjustable exchange rates. However, the importance of central bank transparency is now more generally recognised.<sup>1</sup> In addition, the lags with which monetary policy actions affect the economy dictate that policy choices must be forward looking. As a consequence, projections of the future are always considered – whether explicitly or implicitly, formally or informally – as a part of the analysis of policy options. Publishing projections is therefore one way to increase the transparency of the policy-making process.<sup>2</sup>

However, publication of projections is not the only way to achieve effective monetary policy communication. Many highly effective central banks do not publish explicit, quantitative projections (eg the Reserve Bank of Australia). A problem of publishing explicit quantitative projections is that the world rarely turns out as projected. Measurement problems and delays in gathering statistics mean that even the current state of the economy cannot be known for sure; and no-one can know exactly how current influences on the economy will play out, or what future shocks might materialise. In a recent *Bulletin* article, we reviewed the Bank's

forecasting performance, which emphasised the many uncertainties inherent in economic forecasting and the reality that most forecasts will inevitably be wrong to varying degrees.<sup>3</sup>

Publishing explicit, quantitative, point-precise projections therefore runs the general risk of creating unrealistic impressions of the central bank's ability both to accurately read the future and to influence it. Related risks include the following:

If the interest rate projections are taken as a resolute commitment to a particular course of policy action, then those that interpret it as such will be misled. This issue is potentially more pertinent to the Reserve Bank of New Zealand because of our relatively unique approach of publishing a projected forward path for policy.<sup>4</sup>

It may encourage an incorrect perception of a mechanical link between projections and policy decisions, when the reality of policy-making is far more complex.

The central bank's competence, and hence credibility, could be called into question by the transparent revelation of forecast errors, potentially weakening our effectiveness in achieving the desired monetary policy outcomes.

It would be possible to diminish these risks by not publishing quantitative projections, or significantly disassociating published projections from policy decisions. However, there are other ways to mitigate the risks associated with publishing

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<sup>1</sup> See Blinder, Goodhart, Hildebrand, Lipton and Wyplosz (2001) and Chortreas, Stasavage and Sterne (2001) for further discussion of the merits of central bank transparency.

<sup>2</sup> The Reserve Bank of New Zealand's rationale for publishing macro economic projections is discussed in Reserve Bank of New Zealand (2000).

<sup>3</sup> McCaw and Ranchhod (2002).

<sup>4</sup> See Hampton (2002) for a discussion on publishing forward interest rate projections.

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quantitative projections, while still maintaining the transparency and information value that publication of our projections achieves. This article discusses several of the devices that we use or have considered. These devices fall into three categories:

- 1 Striking the right balance between numbers (to provide quantitative clarity to the message) and words (to add a realistic degree of qualification and conditionality).
- 2 Describing alternative possibilities for the evolution of the economy.
- 3 Showing the extent of uncertainty inherent in the central projection.

These categories are discussed in turn in the remainder of this article. In order to get a range of views on the different approaches available we consulted a number of experts in this area, including financial market participants, academics, and other central bankers. Their views are reflected to some extent in the commentary that follows.

## 2 Striking the right balance between numbers and words

### More words, fewer numbers

Using the words of the policy statement to de-emphasise the central projection puts more focus on the broad trends that drive interest rate settings, with reduced emphasis on the less important numerical detail of the projections. Words can also be used to discuss the uncertainties that exist around a given set of projections.

The Bank has progressively increased the use of explanatory narrative to discuss the rationale for a given policy decision and the uncertainty seen around the Bank's projections. The most significant changes came in the May 2002 *Monetary Policy Statement*. Since that time the *Statements* have included significantly fewer projected variables, and the projections themselves have been moved towards the back of the document to try to reduce their prominence. The text of the *Statements* has also evolved to include more discussion of the non-forecast factors that are relevant to a given policy decision.

## Rounding

Another approach that demonstrates the inherently imprecise nature of forecasting is to round all projected numbers to the nearest, say, 0.5 per cent. By 'smudging' the central projection a little, this option makes the central projection more an indication than a precise forecast. The Bank experimented with rounding the projected numbers in the *Monetary Policy Statements* to the nearest 0.5 per cent throughout 2001. However, rounding buries the actual central projection within a half-point range. This prompted Lars Svensson, when reviewing New Zealand's monetary policy framework, to say that he found "...the practice of rounding a surprising deviation from the Reserve Bank's laudable transparency record."<sup>5</sup> The Bank now rounds the projected numbers to the nearest 0.25 per cent. We think that this strikes an appropriate balance between transparency and avoiding spurious accuracy.

## 3 Describing alternative possibilities

### Alternative scenarios

One way of illustrating specific risks is to include alternative outcomes alongside the central projection. Each alternative scenario represents the impact of changing one or more assumptions underlying the central projection. Carefully chosen, alternative scenarios can provide a guide to *key* risks around the projections, and to how policy may react to outcomes that differ from those in the central scenario. In addition, alternative scenarios can be used to illustrate unbalanced risks around the central scenario. If the inflation risks are skewed to the upside (downside), this can be indicated by publishing alternative scenarios that incorporate more (less) inflation pressures than the central scenario.

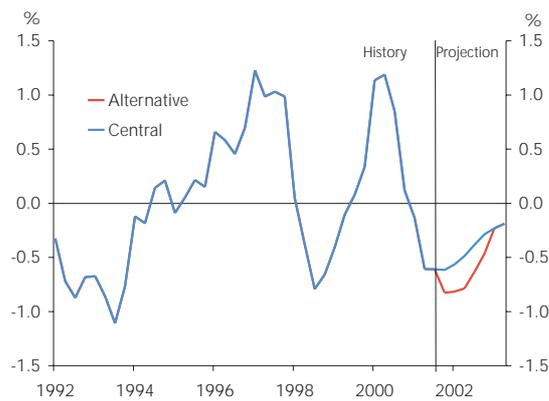
Alternative scenarios are not only useful for communication purposes, but they also aid and provoke policy discussion within the Bank, leading to a more rigorous approach to policy formulation and enabling the Bank to better assess the validity of the central scenario. As such, the internal use and occasional publication of alternative scenarios has been the practice of the Bank for a number of years. An example

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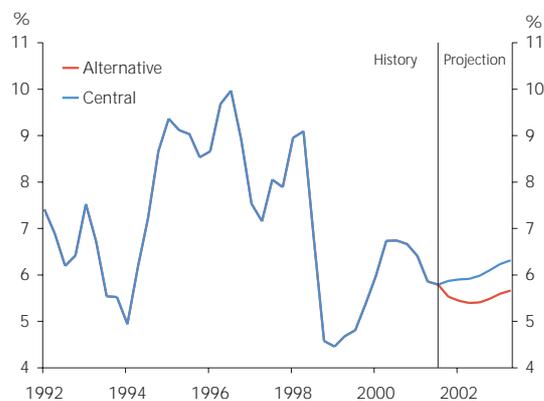
<sup>5</sup> Svensson (2001), p 63.

of a published alternative scenario was in the August 2001 *Monetary Policy Statement*. In that *Statement* we published alongside the central projection an alternative scenario that showed the potential impact of assuming a weaker outlook for world growth. These scenarios are reproduced in figures 1 and 2.<sup>6</sup>

**Figure 1**  
World output gap – central and alternative  
(percentage of world potential output)



**Figure 2**  
Nominal 90 day interest rates – central and alternative



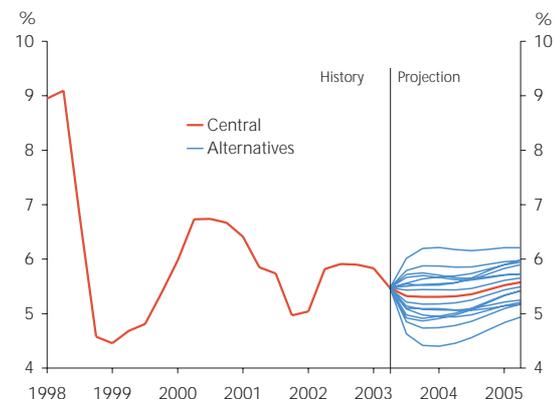
### Worm charts

A problem with publishing only one or two specific alternative scenarios is that there is an infinite number of reasons why the economy might turn out differently from the central projection. For a more comprehensive view, a suite of alternative scenarios can be produced together on what we refer to as a 'worm' chart.

The alternative scenarios plotted in the worm chart could be the interest rate response suggested by the Bank's economic model to a range of shocks, where the shocks are based on average historical forecast errors for a range of key variables and model coefficients. Because these shocks are based on 'average' errors, this approach provides little additional information about the current size or nature of the uncertainty, but aims to provide an overview of the 'normal' impact of a range of individual shocks. Conceivably, unbalanced risks can be represented by a selection of paths that is asymmetric about the central projection.

To date, worm charts have only been used internally to enhance policy debate within the Bank. A stylised symmetric worm chart around the June 2003 *Monetary Policy Statement* interest rate projection is shown in figure 3.<sup>7</sup> The worm chart shows that in the face of average sized shocks, interest rates could deviate from the central projection by as much as 100 basis points within 6 months. This interest rate reaction might seem large, until one reflects on the swings in interest rates that have occurred in the past. Many of the historical interest rate swings were not planned, but instead occurred as reactions to changed circumstances. In the next section the extent of this uncertainty is calculated and depicted in the form of a fan chart.

**Figure 3**  
Stylised worm chart around the June 2003  
interest rate projection



<sup>6</sup> See the August 2001 *Monetary Policy Statement* for a full discussion of these projections.

<sup>7</sup> See the June 2003 *Monetary Policy Statement* for more detail on these projections.

## 4 Showing the extent of the uncertainty

### Fan charts

A number of central banks, including the Swedish Riksbank and the Bank of England, publish fan charts, which represent confidence bands around the central projections.<sup>8</sup> The Reserve Bank of New Zealand has been examining fan charts in internal policy deliberations for the past twelve months or so. Figures 4 and 5 show stylised symmetric fan charts around the inflation and interest rate projections from our June 2003 *Monetary Policy Statement*.<sup>9</sup>

Figure 4  
Stylised fan chart around June 2003 interest rate projection

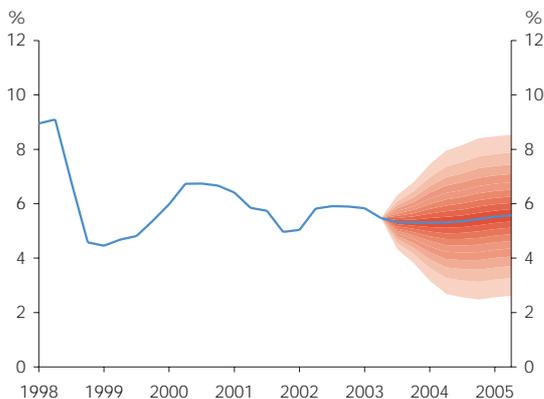
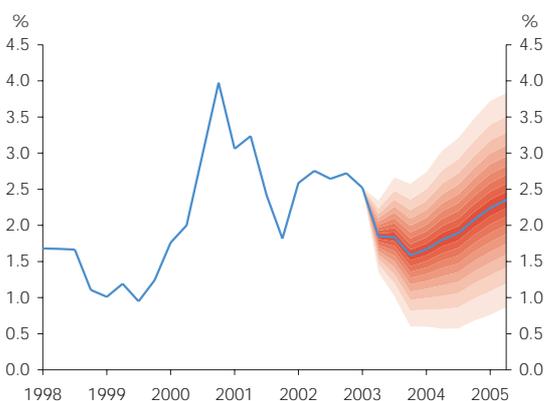


Figure 5  
Stylised fan chart around June 2003 inflation projection



The widths of the fans around the central projections are based largely on the Bank's historical forecast errors over the past few years.<sup>10</sup> The central band, coloured deep red, includes the central projection. There is judged to be a 10 per cent chance that inflation will be within that central band at any point. The next darkest shade, on either side of the central band, takes the distribution out to 20 per cent, and so on, in steps of 10 percentage points. This implies that, at the time of the June 2003 *Monetary Policy Statement*, there was approximately a one in ten chance that interest rates would be outside the range of 2.5 to 8.5 per cent in two years' time, and approximately a one in ten chance that inflation would be outside the range of 1 to 4 per cent in two years' time. It is impossible to assess these probabilities with any precision, but they represent our best estimates.

In addition to showing the 'average' degree of uncertainty, based on historical forecast errors, the fan charts can be adjusted to capture situation-specific uncertainty. During times of a perceived increase in uncertainty, say during a war, the fans can be made wider, illustrating the broader range of plausible outcomes. Similarly, the fans can be skewed up or down if the risks are seen as unbalanced around the central projection.

To further ensure that too much attention is not focused on the central projection the Bank of England fan charts do not include a plot of the actual central projection. As the then Chief Economist at the Bank of England, Mervyn King, said in a speech in 1994:

"It is absolutely crucial not to be misled by a spurious degree of precision in forecasting. That is why we do not publish a single number but present a chart which shows the most likely outcome...surrounded by a shaded area which indicates a band defined by the average forecast errors made over the past 10 years."<sup>11</sup>

The fans shown in figures 4 and 5 are quite wide. As described above, their width reflects the size of our historical forecast errors. Consider figure 6, which plots a fan around

<sup>8</sup> See Bank of England (1998) and Blix and Sellin (1999) for a discussion of the technical detail behind constructing and interpreting fan charts.

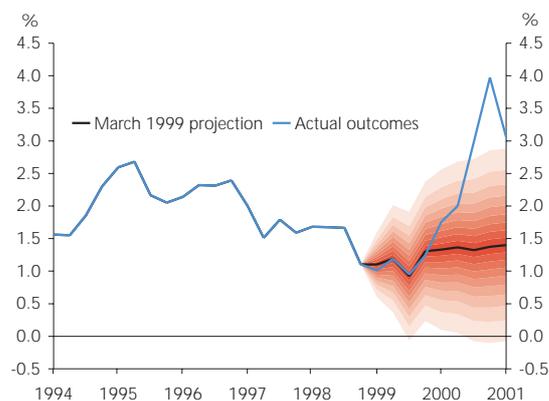
<sup>9</sup> See the June 2003 *Monetary Policy Statement* for a full discussion of these projections.

<sup>10</sup> No allowance is made for the negative historical bias in the Bank's inflation forecasts identified in McCaw and Ranchhod (2002).

<sup>11</sup> King (1994).

the central projection for inflation from the March 1999 *Monetary Policy Statement*, along with the actual inflation outcomes over the subsequent two years.<sup>12</sup> Annual inflation ended up significantly higher over that period than the Bank had projected in early 1999. This under-prediction was due mainly to the significant and unexpected depreciation in the value of the New Zealand dollar during 1999 and 2000.<sup>13</sup> The inflation forecast errors were large enough that actual inflation went outside the top of the 90 per cent confidence band that would have prevailed at the time those projections were formed – again highlighting that large forecast errors are not uncommon.

**Figure 6**  
Stylised fan chart around the June 1999 annual inflation projection and actual inflation



## 5 Overview of the options

An effective strategy for communicating uncertainty around the central projection could incorporate a number of the devices described in this article. Whichever approaches are used, the overall communication approach should reflect the factors that underlie policy decisions. In particular, if the uncertainty around the central projection influences the policy decision, then that should be communicated. The fact that the Bank publishes a projected future interest rate path in our projections enhances the need for us to explain the conditionality and uncertainty around our projections because

the projected interest rate paths could potentially be misinterpreted as promises for the future.

While we do not believe there has been a significant problem associated with the Bank having published central projections that turned out to be different from reality, there has been commentary suggesting rather more ‘flip-flopping’ in policy views than has actually been reflected in policy decisions. To reduce this perception, we have gradually moved in the direction of de-emphasising the central projection and highlighting more the general uncertainty that is always present when trying to project future economic developments. As noted earlier, the Bank continues to use a number of devices to communicate the uncertainty that exists around our projections.

Words will always be necessary to give a sense of the finer points surrounding the policy process and the uncertainty seen around the published projection – a point supported by the central bank experts we consulted. This is because many non-forecast factors invariably influence policy decisions. The practice of rounding to the nearest 0.5 per cent was not favoured by those that we consulted. However, some agreed that rounding to the nearest 0.25 per cent was useful.

Financial market participants in particular have found the publication of alternative scenarios useful. If the economy starts to unfold more like the alternative scenario than the central projection, then market interest rates are more likely to move consistent with the alternative scenario, even before the central bank publishes its updated central projection. While supporting the publication of alternative scenarios, market participants said that there should remain a clear distinction between the central projection and the uncertainty around it, so that the former remains clear.

The use of fan charts, particularly those reflecting the level of uncertainty and balance of risks around a particular projection, was largely supported by the academic and central bank experts that we consulted. One potential criticism of using fan charts relates to the fact that the fans are typically very wide; publicly displaying the extent of the uncertainty so explicitly may undermine a central bank’s credibility. Nevertheless, those who supported fan charts noted that

<sup>12</sup> See the March 1999 *Monetary Policy Statement* for a full discussion of these projections.

<sup>13</sup> Stronger than expected world demand and changes to indirect taxes are among other factors that contributed to the upward surprise in inflation over that period.

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they have already been used successfully at a number of other central banks.

The worm chart was viewed by most that we consulted as illustrating similar properties to a fan chart, except that probabilities are not assigned to the various lines or areas in the worm chart. It is interesting to note that while the policy paths shown in the worm chart are possible responses to 'average' individual shocks, the range of the paths is roughly equal to the 'average' range of plausible paths depicted in the fan charts.<sup>14</sup> This is despite the confidence bands in the fan charts capturing the range of plausible paths in response to the entire array of plausible 'average' shocks.

Despite the range of available options for communicating uncertainty, feedback from financial market participants suggested that a consistent communication approach should be maintained, and that too complicated techniques should be avoided.

## 6 Conclusion

As has been discussed in many of our past publications, the Reserve Bank of New Zealand believes there is considerable benefit from publishing projections. However, it is also important to communicate the uncertainty that exists around those projections. This is an even more pertinent issue given that our projections also include a projected future interest rate path. This article discussed a number of the devices available for communicating that uncertainty, including a number that we use on a regular basis. Needless to say, as with all facets of monetary policy, experience with the current approach and the continued development of new techniques may prompt us to make further changes to our communication strategy in the future.

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<sup>14</sup> Here we refer to the 'average' range in the fan chart as the 66 per cent confidence band, reflecting one standard deviation outcomes.