Central bank communication and the publication of interest rate projections

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An explosion of interest in the subject of central bank communication has been seen in recent years. Whereas at one time clever obfuscation was prized, now there is almost a competition to be the most transparent. Central banks are graded on how they speak[2], and how they write[3], with those achieving low grades questioning most strongly the validity of the criteria used. The Bank of England, winner of the writing competition, prides itself as achieving substantially improved policy effectiveness by harnessing the power of transparency.[4] [5]

Transparency is no mere fashion thing, no empty beauty parade. As many have pointed out, transparency is (in many if not all constitutional traditions) an essential counterpart of giving the unelected central bank the power to set interest rates for the nation; valuable in harnessing the power of expectations to improve the central bank's leverage over financial conditions and pricing behaviour; and valuable too in reducing uncertainty over the actual objectives of monetary policy.[6]

These benefits have turned out to be rather more important than initially thought. A reflection of the power of expectations to aid the monetary control process is the otherwise-inexplicable improvements in policy outcomes in recent years. Inflation has become low and remarkably stable, without monetary policy needing to generate additional output instability in the process. If anything, the output cycle has become smoother.

These good outcomes are surely not the result of an unusually benign period. A stand-out feature of the last few years has been the juxtaposition of large scale of commodity price and exchange rate swings with consumer price inflation stability. Nor, surely, can we explain these gains by reference to increased contestability of local and international markets. These very welcome developments have powerfully affected relative prices, but it would be odd to ascribe improvements in aggregate *nominal* stability to slow-moving structural changes in the *real* economy. Nor can we explain these substantially better policy outcomes as the results of large improvements in the technical capability of central bankers – our crystal balls remain

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[1] The views expressed in this paper are personal, and should not be attributed either to the Bank for International Settlements or the Reserve Bank of New Zealand (where the author worked until July 2004).

[2] How do central banks talk? (Blinder et al (2001)).

[3] How do central banks write? (Fracasso et al (2003)).

[4] See, for example, King (2004).

[5] Perhaps not surprisingly, a counter-reaction is emerging, as seems to occur with most trends. Mishkin (2004), for example, argues for the most simple of communications – essentially, little more than a public acknowledgement that both output and inflation matter and what is revealed by actual policy adjustments. In effect, he claims that markets are too naïve, or central bankers too incapable of making complex issues understandable, to support more fulsome explanations of policy intent.

[6] See, for example, Blinder (2004).

incredibly murky, as I will illustrate later. Furthermore, our power to direct financial conditions may even have diminished with deregulation and the increasing sophistication of financial markets. The explanation left standing is that expectations have been favourably affected by a changed approach to policy.

Most central bankers seem convinced of the virtues of increased transparency, even if they would not go as far as me in terms of the perceived benefits. However, there are limits to virtue, it seems. A limit I want to discuss today is the extent of *forward-looking information about policy intentions* that central banks are prepared to disclose.

Of the 21 inflation targeting central banks covered in a recent survey of central bank's inflation reports, all but one present quantitative forecasts on a regular basis. But only two (New Zealand and Canada) connect those forecasts directly to *current* policy decisions by publishing the forecasts or projections explicitly as an explanation of or elaboration on the policy choice.[7] And only one – New Zealand – goes so far as to lay out a quantitative projection for interest rates. This seems quite remarkable, for a number of reasons.

First, as Alan Blinder has so nicely argued, monetary policy making is about evaluating the policy options as if solving a dynamic programming problem.[8] Monetary policy operates with lags, lags that are different for different variables of interest (inflation and output). And all this happens within the context of substantial uncertainty. The current policy decision is thus the result of thinking through both the first and the subsequent steps, considering in the process the magnitude of the policy problem to be addressed and the degree of uncertainty one faces. Should we move more now, or back-load the adjustment? How certain are we of the magnitude of the problem? These are the questions that central bankers regularly ask themselves. In Blinder's words, "today's monetary policy decision must be thought of as the first step along a path." Yet these are the issues in relation to which central banks are *least* transparent.

Second, it is also remarkable in light of the importance of expectations, as already noted.

Third, and closely related, so much of monetary economics in the last three decades has been concerned with the problems that can arise when people doubt, or are uncertain about, the objectives of the policy maker. Dynamic inconsistency problems arise when policy makers cannot commit, and are perceived to have an incentive to renege. Much work has been done to clarify policy objectives, and build structures that make reneging less likely. Inflation targeting frameworks are adopted for exactly these reasons. Yet central banks remain very reluctant to spell out the policy actions would fit with the currently-anticipated evolution of the economy. Instead, beyond disclosing today's first step, most will offer only coded directional hints at what might be coming.

Finally, recall that one of the prime rationale for transparency is to open the central bank to public scrutiny in relation to its exercise of delegated power. Withholding key information about the prospective use of that power could be seen as an attempt to avoid accountability.

For an answer to this puzzle, I turned to the most comprehensive survey available on how central banks communicate – How Do Central Banks Talk?[9] Given co-author Alan Blinder's clear views of the forward-looking nature of central bank decision-making and of the role of transparency, one might reasonably expect a cogent explanation as to why central banks are reluctant to say too much about future policy settings. Unfortunately, the only answers

[7] Fracasso (2003) op cit.

[8] Blinder (1998), Chapter 1.

[9] Blinder et al (2001) op cit.

proffered are that central banks do not disclose quantitative projections of interest rates because they do not have concrete plans for the future path of interest rates; and if they were to disclose such paths, they might be misunderstood by jumpy markets.

This is unsatisfactory. Central banks and many others publish projections for variables for which they do not have concrete plans. Central banks even publish projections for inflation that diverge from target because no policy reaction is assumed. Not only are such projections not intended to represent plans, markets do not take them that way. Jumpy though they can be, most of the time markets understand the conditionality of projections, a handful of counter-examples notwithstanding. A topical illustration is provided by the Fed's recent experience with talking – rather more than previously – about future policy actions that would at a "measured" pace take interest rates closer to neutral. A rout in bond markets was predicted with the first move away from a policy stance described as holding interest rates low "for a considerable period." Far from a rout, the shift in stance has been produced if anything too little response. Markets have shown themselves able to understand the context within which policy is set.

The puzzle as to why more central banks have not moved in the Fed's direction, and as to why none have yet followed the Reserve Bank of New Zealand's example, is the subject of this paper. I begin by describing arrangements in New Zealand, where interest rate projections are published.

The New Zealand arrangements

Since 1998, the Reserve Bank of New Zealand has published quarterly Monetary Policy Statements containing macro-economic projections, styled as the Bank's official projections.[10] These Statements are normally released at the same time that interest rate decisions are announced,[11] and are intended to support and help explain those decisions.

Until the middle of 1997 the Bank's internal and published projections were prepared on the assumption of no change in policy, and no change in the nominal exchange rate. That was an uncomfortable position for a central bank whose rhetoric was focussed on bolstering the credibility of the new inflation target. To publish an "official forecast" showing inflation moving off track while asserting that the central bank would do whatever was needed to keep inflation within reasonable bounds was thought likely to create a public relations problem. (As will be argued later, the ability of the public to understand the conditionality of projections was perhaps under-rated.)

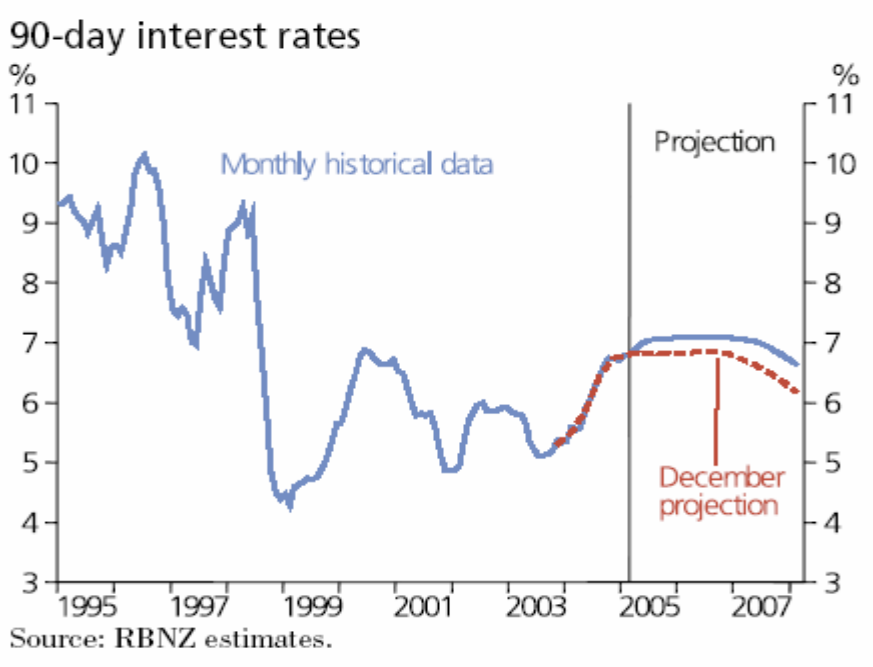
With the implementation of a new dynamic general equilibrium forecasting model in early 1997, the Bank faced a decision of what to do with the monetary policy closure rule. The decision was taken to publish projections based on time-varying, endogenously-determined

[10] Previously, Monetary Policy Statements were published 6-monthly without full projections, while separate Economic Projections were published in the intervening quarters. As Monetary Policy Statements came to refer increasingly to the forward-looking considerations underlying policy decisions, and Economic Projections commented increasingly on the policy implications of the outlook, a decision was taken to merge the documents, adopt a quarterly timetable, and style the projections as the Bank's rather than the Economic Department's.

[11] Interest rate reviews are also programmed for mid-way point between Monetary Policy Statement dates, making 8 review points per annum. These between-Statement reviews are accompanied by a short press release, whether or not policy settings have been changed. The right has been reserved to change interest rates other than at a programmed review point; it has been used once (shortly after the September 11, 1991 events).

interest rates, and to show the resulting interest rate path.[12] Figure 1 shows the typical graph that has since been used in successive Monetary Policy Statements, this one from the March 2005 Statement.[13]

Figure 1



The final published projections are model-based, but with model calibrations and assumptions that are adjusted to reflect the policy-maker's views. The process sometimes involves a few iterations before the policy maker is comfortable with both the economic outlook and the policy component of that outlook. The staff's role is to highlight the issues involved in choosing between alternative calibrations and assumption sets, including any problems of data-consistency.

In order to generate the interest rate projection, a number of components are required, each of which require confronting important issues:

1 Endogenous monetary policy

To endogenise policy, one must model monetary policy itself. The Reserve Bank's model embeds a simple, ad hoc inflation forecast based (IFB) interest rate reaction function. The reaction function is focused on the average gap between the centre of the target range and projected inflation 6 to 8 quarters ahead, with a weight on last period's interest rate. Initial parameterisation of this reaction function was based on modeller judgement coupled with

[12] The Czech National Bank also projects on the basis of endogenously-determined interest rates, but it does not publish the resulting interest rate path.

[13] It should be noted that the path of 90 day interest rates is shown, whereas the policy rate is an overnight rate. This is mostly for historical reasons, and has only second order implications for the ability of the market to interpret the projected policy path. As will be seen later, these second order implications are swamped by uncertainty surrounding the policy path itself.

stochastic simulation exercises, with the key calibration criterion being replication of the likely policy response in the simulated circumstances.

That calibration has been adjusted over time, in three ways.

First, to get a *better match with the policy maker's preferences*, as revealed in consistent, repeated reactions to the staff's first-pass projections presented at the beginning of each policy round. A consistent reaction that the first-pass policy response is too aggressive – in the sense that it aimed at too rapid convergence of inflation to target with consequential adverse implications for the business cycle – would, and has, lead to changes in calibration.

An important point to register here is that published policy projections simultaneously serve two purposes. They are designed to help the policy maker evaluate the implications of alternative policy paths, and they are designed to help the public understand the likely nature of policy in given circumstances. For both purposes, the modeller's imperative is to reflect policy maker preferences and judgement, not to dictate that judgement.

Second, from time to time the reaction function has been recalibrated *to maintain consistency with the policy maker's preferences in the face of changes in the structure of the New Zealand economy*. Key examples of changes in structure include better anchoring of inflation expectations, lower exchange rate pass-through, and reduced sensitivity of factor and product pricing to pressure on productive resources. Given such structural evolution, the speed and power of monetary policy's response to incipient inflation perturbations has reduced, and the targeting horizon[14] has been lengthened, to avoid prospective volatility that would be inconsistent both with an efficient policy frontier and with preferences. In short, an economy that is less inflation prone demands less aggressive policy if nominal and real stability are both to be reduced in suitable proportions.

And third, the effective policy reaction function has been altered judgementally during the course of many policy rounds. Because a simple policy reaction function cannot hope to capture the full range of factors relevant to monetary policy decision-making, ad hoc adjustments are often applied. Commonly, the missing factors relate to assessments of *risk and uncertainty*. Policy maker preferences may be closer to mini-max than standard quadratic. Risks may be assessed to be asymmetric or non-linear in nature, in ways not captured within model structures. And the forecasting process may not consistently deliver mean projections, drifting between the mean and the mode as new issues are treated in the heat-of-the-moment discussions that take place around the policy table. Thus a given policy round might feature a faster-than-normal policy response to projected disinflation pressures on the grounds of greater-than-normal uncertainty about the response of confidence to a negative shock – as occurred following the September 11, 2001 terrorist attacks in New York.[15]

This rather ad hoc treatment of risk and uncertainty is fairly standard in live policy-making environments. It would be possible systematically to capture a carefully-assessed risk distribution within a mean projection, using certainty-equivalence to deal with additive uncertainty and attenuated policy responses to deal with multiplicative uncertainty. It would also be possible to relax many of the constraints on the shape of the loss function and on the

[14] Note that in this paper, "targeting horizon" refers to the distance into the future that is focussed on to gauge the appropriate policy response. "Policy horizon," on the other hand, refers to the distance into the future that policy is aiming to return normal-sized inflation shocks to target.

[15] The consequences of an alteration to the policy reaction function would show up as higher or lower projected inflation in a modal projection, but target-consistent inflation in a mean projection.

nature of uncertainty and produce a distribution of projections from which a particular policy path is selected.[16] Such an advance would be worth exploring.

The important points to capture out of the Reserve Bank of New Zealand's experience with endogenising policy within the projection framework are the following:

1. Simple reaction functions, whether IFB or Taylor rule in form, do a reasonable job at producing an approximation to "normal" policy in "normal" circumstances. As such, they are a useful starting point.
2. Such reaction functions need updating for changing or abnormal circumstances. Policy preferences, not some ad hoc instrument reaction function, should be the stable base of policy.
3. Thus although the starting point is a simple instrument rule, in practice that "rule" turns out not to be static.

It is worth noting at this point that Svensson's optimal policy schema would in principle provide a vehicle for producing interest rate paths that are *consistent with stable policy preferences*, and closer to a *realistic representation of policy* in most circumstances.[17] An explicit loss function would need to be applied systematically in the projection optimisation process, rather than an implicit loss function being reflected – more or less accurately – in the judgements imposed during iterations of the projection. For my part, this overly-maligned approach offers a sensible way forward, though I expect the result would be refinements of a second order rather than substantial gains.[18] It makes sense to have policy preferences as the explicit stable fulcrum for policy discussions, in formal modelling exercises and in policy projections. That is consistent with efforts of inflation targeting central banks to enrich public discussion of monetary policy beyond single-minded and hard-nosed inflation control. It is also consistent with the drive towards increased transparency of policy objectives. For most central banks, however, getting to second base is the next point in the sequence, with published optimal policy projections being a possible third base objective.

2 Endogenous inflation expectations

Modelling inflation expectations is not restricted to central banks that form projections on the basis of endogenous monetary policy. However, dynamic general equilibrium models – the work horse for endogenous monetary policy simulation – motivate more careful attention to the characteristics of the expectations process. Why? Because to generate nominal dynamics that match the real world's characteristics, and to capture the essence of the monetary policy process, inflation expectations need to play an active role.

Consider the following scenario. Eniplace is a country with a typical inflation record: secularly positive since early in the 20th century, higher and bumpy in the 1970s, with a reversion to low but still positive numbers in the 1990s and early 21st century. The Central Bank of Eniplace has an inflation target of 1-3%. Three months ago, the central bank disclosed that

[16] As suggested by Svensson (2003).

[17] Svensson (2003) op cit.

[18] As is common, detractors have stylised Svensson's approach in straw-man terms in order more easily to criticise it. That Svensson would use optimisation technology to illuminate the tradeoffs facing the policymaker, rather than relying either on unthinking instrument rules or casual experience-based reasoning, does not mean that he would hand policy making over to economic theoreticians and computer programmers. Nor does it mean removing judgement and experience from the analysis. What it does mean is being systematic about identifying policy objectives, and about the link between policy objectives and policy actions in all manner of circumstances.

because of revised data, output growth was now thought to be outstripping the growth rate of capacity to an extent that was estimated to add 1% to the inflation rate by 2 years time. Nonetheless, it had decided not to adjust interest rates from the level that had previously been judged appropriate to keep inflation at 2%. In the following three months, new data had confirmed the existence of unexpectedly high growth. Today's new inflation report from the central bank disclosed a new projection with inflation moving beyond 3% at the projection cut-off. Notwithstanding, the central bank indicated that interest rates would still not be adjusted.

Given the clarity of the central bank's statement that interest rates would not be altered despite the adverse inflation news, inflation expectations have begun to rise, as most of us would expect. Accordingly, real interest rates have started to fall, adding further stimulus. In turn, that is further amplifying the original shock, adding to the upward revision of projected inflation. Thinking beyond the central bank's disclosed projection horizon, if interest rates remained fixed in nominal terms, the inflation dynamic would become explosive, absent a convenient disinflationary shock. Forward-looking agents would bring the future real interest rate reductions and the resulting inflation forward in time by altering their behaviour accordingly.

The scenario just painted ought to be typical of an unchanged policy projection, but it is not. What is crucially different is that most unchanged policy projections do not have agents acting as if the nominal shock is explosive. Implicitly, the projection is assuming an undisclosed future negative shock, an undisclosed future policy reaction, or turning off or detuning the inflation expectation channel so that real interest rates are essentially unchanged.

On the grounds that it would be deceitful for published projections to contain undisclosed shocks, whether exogenous or policy, it would seem that the expectations channel is muted in most unchanged policy projections. That solves a potential public relations problem, and does not cause any issues for model closure since such models typically are not used for long run dynamic policy analysis. However, in view of the crucial importance of the expectations process for monetary policy, it has the unfortunate consequence of sweeping one of the most important policy issues under the rug.

Endogenous policy projections, on the other hand, have to confront the issue head on. A difficulty is that we know too little about how expectations are formed, and especially about the response of the expectations process itself to changes in the inflation environment. The burgeoning literature on how agents learn about the structure of the economy and about policy will possibly offer a potential solution, in time. In the meantime, the policy maker is faced with a simple but awkward choice: assume predominantly forward-looking agents, or predominantly backward-looking agents? With increasing evidence of well-anchored expectations, one might reasonably alter the expectations structure in favour of forward-looking agents who can observe the favourable outcomes resulting from a stabilising policy reaction. That would better match very recent, and prospective, cycles in the nominal and real economies, which are much reduced compared with earlier cycles. But making the expectation process entirely forward looking risks assuming away the consequences of policy mistakes in the recent past, and biasing policy excessively towards inaction.

3 Endogenous exchange rates

For an open economy with a flexible exchange rate, an assumption of an unchanging nominal exchange rate makes an uncomfortable bed partner with a time varying interest rate. Apart from violating uncovered interest rate parity, assuming unchanged exchange rates shuts down a channel of monetary policy transmission, and removes sources of both shocks and shock-mitigation. Endogenous policy projections thus require the modeller to endogenise the exchange rate.

It might seem that little would be lost by retaining an assumption of unchanged exchange rates, on the grounds that random walks do empirically as well as – or better than – fundamentals-based exchange rate models. Unfortunately, it turns out that there is no easy escape from the need explicitly to model the exchange rate.

First, for some countries there is a systematic and quite powerful response of the exchange rate to shocks to the interest rate differential vis-à-vis the rest of the world.[19]

Second, dynamic policy simulations cannot explain typical variances without a changing nominal exchange rate – which is after all one of the most variable of variables.

Third, and probably most important at a practical level, the assumption can have significant implications for projections of tradable sector activity, and hence the overall outlook. The no-change assumption exaggerates the effects of recent exchange rate developments, by presuming they are permanent in nominal terms and counter-factually long-lasting in real terms. Policy signals provided to the policy-maker by the projected interest rate track are thus distorted in the direction of suggesting a stronger policy reaction to the exchange rate than is likely to be optimal.

What to do? Without good fundamental models of exchange rate determination to work from, the Reserve Bank's approach has been to assume mean reversion of the real exchange rate as the baseline, with the pace of reversion consistent with empirical evidence on half-lives of real exchange rate disequilibria. The baseline pace of reversion is modified by the interest rate differential to the rest of the world, and by judgement where there is some confidence in the view of the short term outlook extracted from market intelligence gathering exercises.

The New Zealand experience with published interest rate projections

It is exceedingly difficult to formally evaluate the practice of publishing interest rate projections, given the absence of a counterfactual, and the existence of a myriad of other influences on monetary policy that makes cross-country comparisons fraught. However, it is possible to reflect on experience in relation to problems anticipated by sceptics. It turns out that many of the presumed problems have not caused great difficulty in New Zealand, while some are yet to be tested.

The discussion that follows is structured to address these presumed problems in turn.

1 The proper basis for a loss function

Considering the option of publishing interest rate projections derived from something like an optimal policy process, some years ago Charles Goodhart expressed concern about the step of choosing a loss function.[20] In his view, it would be inappropriate in a democratic society for central bankers to choose the loss function. As a consequence, it would be inappropriate to place a loss function at the heart of the policy setting procedure. Although the use of an ad hoc policy reaction function such as an IFB interest rate rule might at first sight seem to sidestep this issue, in reality the parameterisation of the reaction function is calibrated to match policy preferences, as explained.

But if selection of an ad hoc rule does not sidestep the issue of determining the appropriate loss function, nor would day-to-day policy making under conventional arrangements, whether or not a forecast is published. Evaluation of policy options inevitably involves thinking through their output and inflation consequences. Indeed, Goodhart argues for bringing asset price

[19] See, for example, Gourinchas and Tornell (2004) and Munro (2004).

[20] Goodhart (2001).

consequences into the mix as well. What is the metric against which these options are assessed? In the absence of a clear legislative prescription of how to treat the tradeoffs, the answer has to be the policy maker's own understanding of what would maximise societal welfare over the long run.

One of the greatest benefits of publishing interest rate projections is that the exercise of arriving at suitable projections brings these otherwise-submerged issues to the surface. Two facets are especially worth noting in this regard.

- First, different views on the appropriate tradeoffs between objectives come to light rather more quickly. Because the system is calibrated to match policy preferences, such policy preferences need to be discussed.
- Second, because internal consistency is forced by placing the analysis within a dynamic general equilibrium framework, awkward tradeoffs are simply harder to slide by. For example, allowing a distaste for raising interest rates (due perhaps to anticipated interest group or political reactions) to impact on the interest rate path by applying forcing adjustments to the reaction function is revealed in projected inflation consequences. It is just harder to get away with convenient internal inconsistencies.

In short, policy preferences are in play in any case, and it is valuable to bring them to the surface.

2 Committee decision making

The New Zealand experience casts only weak light on this issue, as the Governor is the sole decision maker. However, the current and past Governors have chosen to use a committee of advisers who individually provide written advice, essentially in the form of votes with argumentation. As both the current and previous Governors have encouraged free debate amongst these advisers over the policy decision and the projected policy path, some hints at the probable issues facing a committee are available.

As it has turned out, by far the greatest source of difference between advisers' views on the current policy decision and the projected policy path has been different judgements on how the economy is likely to evolve. Those differences emanate from alternative perspectives on economic behaviour, on the degree of stress currently in the system, and on how exogenous shocks are likely to play out. Disagreements on policy objectives exist, but they tend to be swamped by these other differences.

In this context, each adviser's awareness of the wide confidence intervals around their own projections has translated into a willingness to approach the selection of the projected interest rate path as an exercise in reasonableness. The question is not "what will happen?" but rather "what is a reasonable representation of an appropriate policy response in the event that the projected scenario unfolds?" With this question, it seems quite easy to disagree on what interest rate decision to take today but to agree on a projected forward path that matches the interest rate setting that the Governor has determined.

What would be the alternative if first, one was dealing with a decision making committee and second, that each member was unwilling to treat the exercise as an attempt to find a "reasonable representation" of how policy would likely behave in given circumstances? It seems to me that a voting strategy could be arranged, allowing a median path to be extracted from a set of individually-preferred paths. Alternatively, and perhaps more informatively, the set of paths could be presented in a similar spirit to that applying to publication of fan charts. The "braid" of interest rate paths would in some sense encapsulate the collective view of the decision-making committee as to the most likely range of interest rate paths ahead, given the range of views on how the economy will evolve. This range would almost certainly be narrower than a fan chart of interest rates, but would provide potentially useful information on the degree of certainty within the committee on the central part of that fan, and on any obvious asymmetries in the distribution of views.

In short, committee decision-making is unlikely to be a major barrier to publishing forward interest rate paths – that is, unless committee members have unwarranted faith in the quality of their personal crystal balls and are unwilling to concede the possibility that others might turn out to be more correct.

3 Credibility

The most common concern is that the conditionality of the projected interest rate path would not be recognised by financial markets and price setters. A forward interest rate path might be interpreted as a policy *plan*. We know that there are often gaps between today's view on the likely course of interest rates in the future and what turns out to be reality. Interpretation of the forward interest rate path as a plan could thus result in a charge of misleading the public. The credibility of the central bank might be damaged.

The New Zealand experience strongly reinforces the point that the future is highly uncertain, so projections are almost always made with error. A recent evaluation of the Reserve Bank's forecasting record indicates that over the horizon that is generally thought to be most important for efficient policy – one to two years ahead – the Bank's projections do not significantly outperform a random walk.[21] This should not be surprising. We only have limited insight into the current state of the economy, and a weak understanding of how current influences on the economy will play out. Our knowledge of how the economy behaves in general – let alone in any particular set of circumstances – is partial. And, by definition, we know absolutely nothing about events which have not yet happened.

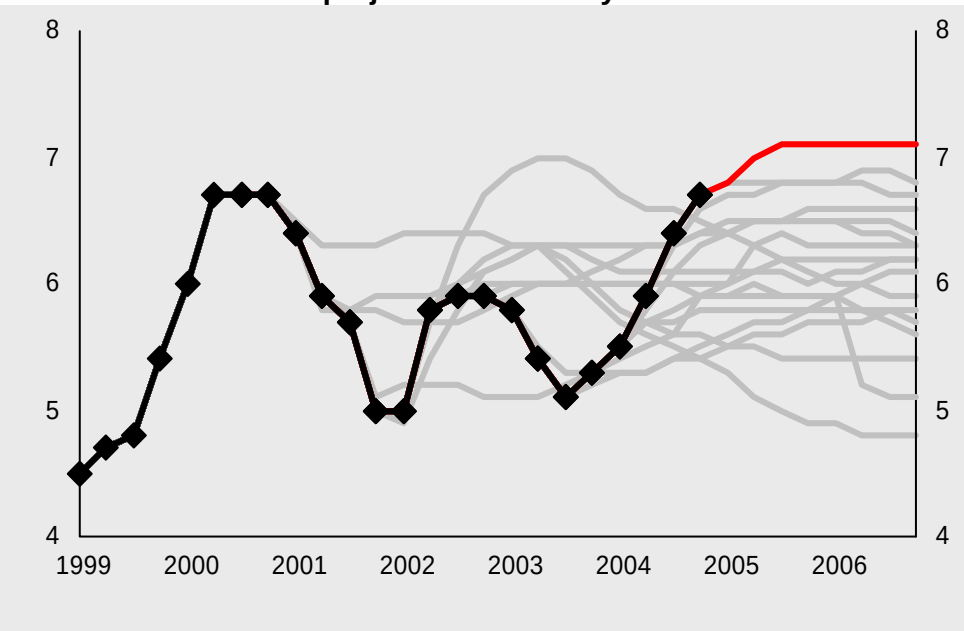
How uncertainty and unpredictability impacts on credibility is relevant for all central banks. People notice when policy settings are based on understandings that turn out to be erroneous: the sharpness of 20/20 hindsight is the bane of central bankers' lives. Central banks that publish forecasts – a process of making more transparent the understandings on which current policy settings are based – are more vulnerable to examination under 20/20 hindsight. Publishing forward interest rate paths increases this vulnerability still further. Why? Because the interest rate path essentially summarises all of the projection and associated uncertainty in a single variable.

This is vividly illustrated in Figure 2, which traces a succession of projected interest rate paths from a sequence of Monetary Policy Statements from 2001 through March 2005. The actual, realised interest rate path is indicated by the diamonds. The spread of interest rate paths projected through this period was just over 200 basis points wide, and actual interest rates moved through about the same range. Interestingly, that is inconsistent with usual experience, in which actual interest rate variance turns out greatly to exceed the variance contained in successive forecasts, reflecting the conservative bias that is associated with standard, no-policy change forecasts. Of even more relevance to the point under discussion, the record of both projected and actual interest rates contains a number of reversals of direction, and wide gaps between projection and outcome.

[21] McCaw and Ranchhod (2002).

Figure 2

Successive projections of 90 day interest rates



This record illustrates the strongest point of difference between publishing projections based on time-varying policy (with internally-consistent inflation outcomes), and projections based on unchanged policy (with internally-inconsistent inflation outcomes). The former approach reveals the central bank's assessment of the implications of new data quite comprehensively. Even if the policy interest rate is not adjusted, reflecting uncertainty over the future, the outcome thought to be most likely is put in display. In contrast, the latter approach involves progressively revealing the central bank's views on the new world via policy interest rate decisions that evolve in a smoothed fashion. Little is revealed of the ebb and flow of the central bank's state of mind. For most intents and purposes, the central bank can create an image of having been confident in its evolving view all along (although unexpected reversals of direction will need to be explained).

Against this background of a confidently-evolving official view, market predictions of how policy will evolve tend to show greater instability. Market participants react to new information which, although it may have a low signal-to-noise ratio, potentially contains persistent signals. Aversion to reversal of view, should the innovation prove to be more temporary than allowed for, seems to be lower for market participants than for central bankers.

To a first order, the path of *actual* interest rates would be the same whether the central bank was projecting on an unchanged policy basis or a time-varying policy basis. But in sharp contrast, publishing forward interest rate tracks reveals much more of the evolution of the central bank's thinking about the potential implications of emerging information. Recall that in an endogenous policy exercise, expectations are allowed to respond to the (hypothetical) inflation shock, requiring a larger (hypothetical) adjustment of nominal interest rates to be Taylor-consistent. As can be seen from the projected policy paths displayed in Figure 2, the Reserve Bank's projections as to how policy may need to change to offset evolving inflation shocks *and* their associated expectational responses has resulted in the Bank's projections sharing some of the instability that often characterises market predictions.

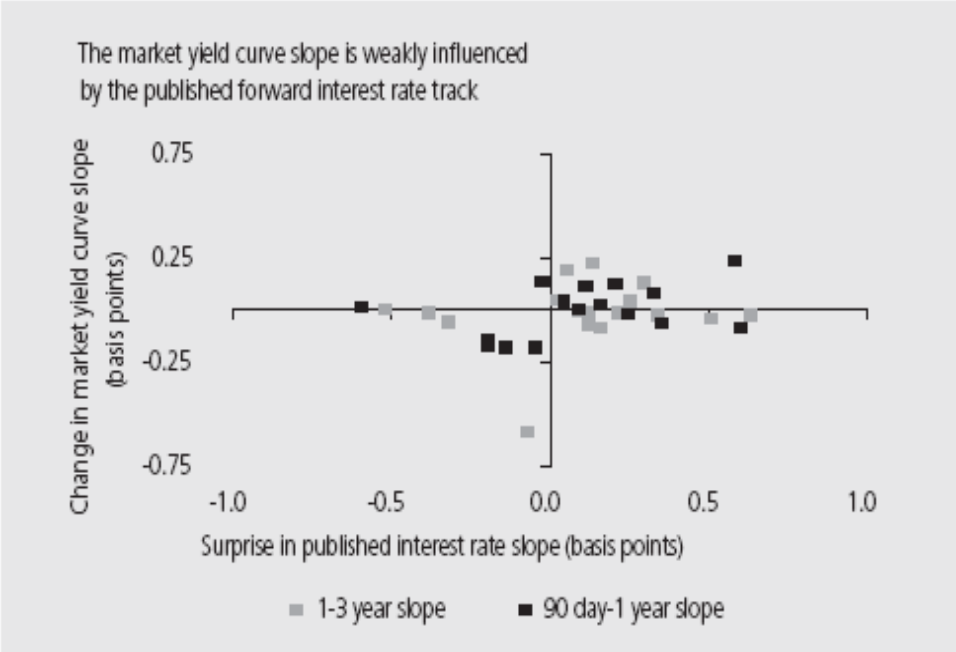
What are the consequences for credibility, and other things, of projecting internally-consistent inflation paths and in so doing displaying an apparently unstable view of the future? A number of possible consequences can be conjectured; unfortunately as yet we have no way of evaluating their practical importance. On the down side:

1. The transparent revelation of the Bank's progressive change in view consequent on the arrival of new data (and reinterpretation of old data in the light of the new) may come at the cost of a tarnished image. To use a metaphor, to some extent observers are awakened to the limited coverage provided by the emperor's clothes. But how much credibility is damaged is difficult to assess.

   For keen observers, it would not be new information that there are severe limits to the central bank's ability to predict the future. Far from regarding the projected interest rate path as representing a policy plan that the central bank is committed to deliver, informed observers will have discounted the information content of the projection appropriately. Some evidence that such observers are in the majority can be obtained by examining the extent to which a surprise change in the central bank's projection automatically results in a corresponding change in market prices. The scatter-plot presented in Figure 3 shows the change in yield curve slope – along two segments of the curve – consequent on an unanticipated change in the Bank's forward interest rate path.[22] Clearly, the relationship is not very tight, for either the shorter segment of the curve evaluated – 90 days to 1 year – or the longer segment – 1 to 3 years.

Figure 3

The power of publishing forward interest rate paths?



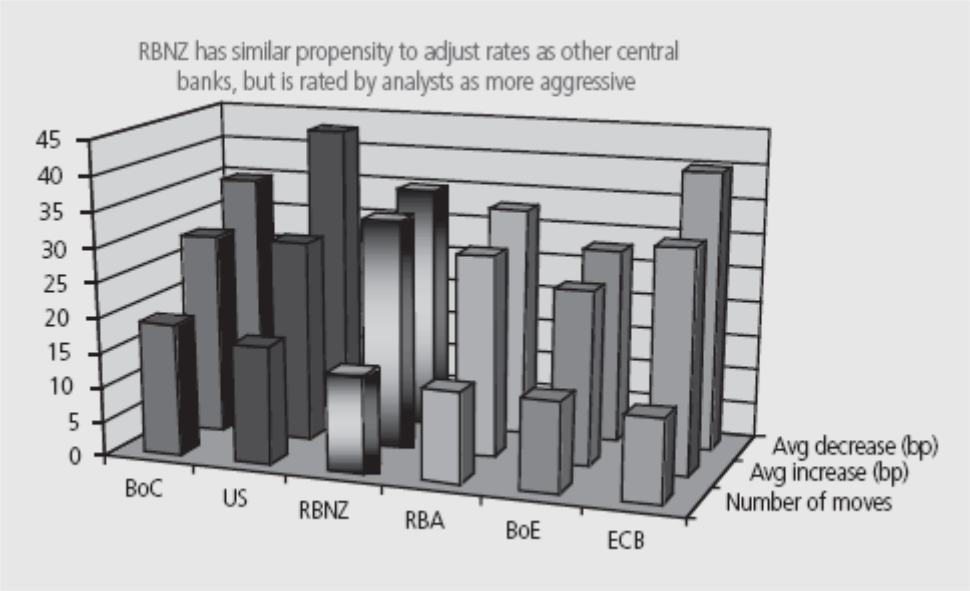
2. A consequence of repeated reminders that the central bank would be prepared to adjust interest rates, if necessary, may be an impression of a greater readiness to alter interest rates than intended. There is little doubt that the Reserve Bank of New Zealand has a reputation as a relatively aggressive central bank even though – as can be seen from Figure 4 – that reputation is not deserved. The Bank adjusts interest rates no more often

[22] Expected changes in the Bank's projection for interest rates were inferred from the change in the market yield curve over the period starting three days after the previous projection until 5 minutes before release of the new projection. Over that interval, the implications of new and old information for the Bank's likely view should have been processed and captured in market prices.

than do other central banks, and in no larger steps than is typical. It is possible, in other words, that repetition of the central message might have been over-done.

Figure 4

Aggressiveness? - perception & reality



3. Given that the forward path for interest rates is model-driven, using a representative policy reaction function, the technology of monetary policy analysis becomes more prominent than otherwise. There is a danger that it becomes too prominent, leading to a public impression that policy is driven by black-box computer models, rather than experienced decision makers fully aware of the nature of the uncertainties and risks inherent in the business. Acquiring a reputation of ivory tower technologists, out of touch with the real world, would most certainly not help credibility, especially as experience has amply demonstrated that not all of the relevant elements of policy targeting can be incorporated in a representative policy reaction function.

But there are also upsides that also need to be weighed in the balance.

1. As noted, uncomfortable issues are forced into the open in internal discussion, in the context of a framework that focuses continuously on inflation outcomes. By virtue of having established the precedent of publishing both inflation and interest rate paths, the issues cannot be ducked.

2. Market specialists have considerably more insight into the nature of the Bank's analytical approach and typical policy reaction than would be the case without published interest rate paths. Even on occasions where there is no change in the Official Cash Rate, there may well be a change in the forward track. Thus many more observations of policy reactions – hypothetical as well as actual – are available to analysts.

   As a consequence, the Bank's actions are easier to interpret and anticipate, and the credibility of the stated policy target reinforced. On balance, in my view, the Reserve Bank's credibility has actually been enhanced by simultaneously reducing the degree of pretence over monetary policy's ability to deliver finely tuned results and increasing the frequency with which the core policy objectives are reinforced.

3. Some leverage is obtained over the yield curve shape, which is one of the purposes of providing information about the future path of interest rates. However, as was seen from

Figure 3, that leverage is tempered by the market's understanding that the Bank's projections may well not come to pass. On average, for the shorter segment of the yield curve, a 50 basis point surprise change in the slope of the Bank's forward interest rate path leads to a 20 basis point change market yield curve slope, and a smaller change for the longer segment.

In short, publishing forward interest rate tracks makes more obvious the limits of the central bank's knowledge, but simultaneously provides more opportunities for the central bank to describe how policy would behave in given circumstances. Whether the net effect is beneficial or harmful to credibility depends on peoples' attitude to understanding the imperfections of professionals who have an important influence on their lives.[23]

4. Front-running

Another common concern is that the publication of a forward path for interest rates will induce markets to bring forward indicated future interest rate adjustments – that is, "front run" policy settings. Such a concern is not limited to the publication, in quantitative terms, of projected policy settings. It also applies to any indication of the likely future course of policy, such as in statements of policy bias.

The preceding discussion has shown that this concern is misplaced. Markets quickly learn that projections of future policy are conditional, and need to be assessed in probabilistic terms. Equally, markets will front run even when there are no official pronouncements on the future of policy. Expectations of future policy reactions to anticipated economic events will still be factored into market prices.

In short, the issue is not whether markets will front run, but the information base on which market expectations are formed.

A half-way house – using market forward rates?

Recognising the internal inconsistency of projections based on unchanged policy, a number of central banks are now publishing projections based on the market's collective view of likely forward interest rates. Amongst those central banks are the Central Bank of Brazil, Norges Bank, and most recently the Bank of England (in relation to the central projection).

Market interest rate expectations contain a joint assessment of the implications of new data for pressures on inflation and the likely policy response. If policy objectives are well understood, discrepancies between market expectations and the central bank's own projections would normally be small – it is rare that the central bank is privy to information not available to the market, and such situations do not last long. Accordingly, it would seem a reasonable base for forming projections. It would also seem a reasonable base for a discussion of policy, the more so that the central bank was prepared to highlight situations where its own views differed materially from those implicit in market prices.

Having said that, one should be alert to potential problems.

1. Market analysts typically do not provide supporting material that allows one to disentangle the influence of different views on the shocks facing the economy, on economic behaviour in response to shocks, and on the role of policy. In part this is

[23] A parallel might be the disclosure practices of medical specialists. Some patients prefer to be informed of the balance of probabilities and the uncertainties around diagnosis and treatment, and place greater faith in medical specialists who convey that information well. Some prefer to be prescribed treatment with little explanation other than an assurance that the treatment will be helpful.

because private forecasters typically do not use forecasting techniques that allow them to treat such influences independently.

2. Market forecasts display follow-the-leader tendencies. Incentives facing market forecasters drive behaviour towards "beating the index" (the median forecast) by enough to be noticed rather than putting one's best guess on display.
3. Market prices and market analysts' forecasts often diverge. There is no ability to reconcile the two, making it doubly difficult to assess the consistency of the policy-maker's view and a projection based on market prices.
4. To some extent, market prices may mirror the central bank's projections of interest rates. In an extreme, use of market prices as the basis for the central bank's own projections would imply indeterminacy. As illustrated by the New Zealand experience, however, markets are capable of forming independent views, and do so. The problem of indeterminacy, and of a loss of independent information extractable from market prices, has been seriously overstated.
5. One of the key benefits of projecting on the basis of endogenous policy – namely forcing those involved in policy making to confront issues around the choice of objective function – is not captured.

In short, while use of market forward rates makes sense – especially where the central bank is prepared to indicate at least qualitatively how it might differ from the market's collective view – but it casts dimmer light on policy preferences than does publication of endogenously-determined forward interest rate paths.

Concluding remarks

Concerns about determination of the appropriate objective function and committee decision making are side issues. The key issue is credibility.

In that regard, choosing how to communicate with the public so as to maximise credibility involves a difficult balancing act. Quite naturally, central bankers are keen to provide the impression of assurance, dependability, and reliability. Part of the motivation for this is entirely reasonable. If credibility is thereby improved, the efficiency of policy will be enhanced by reducing the need for overt policy action and thus minimising the economic costs of achieving targeted outcomes. Part of it may be unreasonable. Almost certainly the former desire to cloak policy making in a veil of mystery had stronger roots in bureaucratic self-interest than in the economic efficiency of policy implementation.

The recent trend has been to improve the transparency of policy makers' underlying motivations. There are good reasons for this. They are rooted in the search for low cost policy implementation and for effective accountability. The problem, and source of the need for a balancing act, is that transparency and the desire for an assured appearance can come into conflict as a result of very real limitations to central bankers' knowledge of the state of the economy and its likely future evolution. Full transparency reveals those limitations.

In my view, the balance is tilted in favour of revealing the limits of knowledge in the course of publishing projections that include a policy response. Over-selling the ability of policy to deliver finely-tuned outcomes is itself dangerous, so revealing these limits may be valuable in its own right. Endogenising policy also forces one to confront issues around policy objectives and the treatment of expectations that ought not be dodged. Finally, revealing the conditional policy response to new data provides opportunities to reinforce key policy messages, even when the projected policy response proves unnecessary.

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