
ARTICLES

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

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In clause 2(b) of the Policy Targets Agreement (PTA) between the Minister of Finance and Governor of the Reserve Bank, the target used to direct the Reserve Bank's pursuit of price stability is expressed as "future CPI inflation outcomes between 1 per cent and 3 per cent on average over the medium term." While the Reserve Bank has the independence to choose when and how to adjust policy settings so as to achieve the target, another clause of the PTA provides guidelines as to how this freedom should be used. In clause 4(b) of the PTA, the Minister of Finance and the Governor agree that, in using monetary policy to pursue price stability, the Bank shall take account of the implications of its actions for instability in economic output, interest rates, and the exchange rate.

This article describes how clause 4(b) affects monetary policy decision-making, and reviews the role of clause 4(b) in the current operation of monetary policy.

1 Introduction

Concern for volatility in the real economy is an important element in the conduct of monetary policy in New Zealand, as in other countries. This concern is made explicit in clause 4(b) of the Policy Targets Agreement (PTA), which states that "in pursuing its price stability objective, the Bank shall implement monetary policy in a sustainable, consistent and transparent manner and shall seek to *avoid unnecessary instability in output, interest rates and the exchange rate*".¹

The word "unnecessary" reflects two related points. First, some degree of economic volatility is an inevitable and indeed necessary part of the adjustment that occurs with changing economic circumstances: it would be counter-productive to seek to avoid this process. Second, an important part of the way that monetary policy acts on inflation is via the real economy. This fact can create a trade-off, such that beyond a certain point, reductions in the cyclical variation of inflation can only be achieved at the cost of increasing volatility in interest rates and output. Recognition of the

existence of this trade-off underlies the reason that central banks do not attempt to control inflation rigidly, regardless of the economic costs of doing so.

In the next section we begin by outlining the conceptual nature of the trade-off between price stability and the volatility of the other economic variables listed in clause 4(b). This provides a rationale for the flexible approach to inflation targeting - the term coined by Lars Svensson for policy that takes account of this trade-off - that is articulated in the PTA and discussed in section 3. Section 4 provides an overview of the monetary policy process in New Zealand and the operationalisation of flexible inflation targeting in practice. In section 5 we discuss how volatile the New Zealand economy has been in recent history, and in comparison to other countries. Section 6 briefly summarises the new policy of foreign exchange intervention and its relationship to clause 4(b). The article concludes by highlighting what clause 4(b) means for the accountability of the Governor of the Reserve Bank.

1 Emphasis added. The seventh and latest PTA was signed between the then new Governor of the Reserve Bank, Dr Alan Bollard, and the Minister of Finance, Dr Michael Cullen, in September 2002.

2 The transmission mechanism and understanding trade-offs

The relationship between the primary policy goal of price stability and the variability of interest rates, output and the exchange rate mentioned in clause 4(b) derives from the particular way monetary policy impacts upon the economy. Monetary policy affects both real variables (eg production and employment) and nominal variables (eg the price level) through a variety of channels or transmission mechanisms. The ultimate goal for monetary policy is influence on a nominal variable – prices. The consensus opinion among most economists is that, while the operation of monetary policy affects real variables in the short-term, the effect subsides or reverses in the medium to longer term, with the only lasting effect being on nominal variables.

The real effects of monetary policy arise because in the short-term domestic prices and domestic inflation are relatively slow to change. Prices for labour and output are slow to change due to a variety of frictions or transactions costs in the economy. An inherent degree of uncertainty about the economy and the behaviour of their competitors will prevent producers immediately responding to what they think may be changing demand for their product. It is also costly to change prices continuously, and customers may well prefer that prices remain stable, providing a competitive incentive to maintain prices unchanged. From the point of view of workers, it is inefficient to continuously bargain over one's wage and salary. Hence, wage and salaries are typically negotiated in the form of contracts over pre-defined periods of time. Overlaying all these reasons for price stickiness in the face of changed circumstances is the point that economic agents may well not immediately recognise that a change in circumstances has occurred - economic agents' perceptions or expectations do not fully adjust straight away to any new piece of information.

Sluggish adjustment of price expectations means that central banks are able to affect real short-term interest rates by inducing a change in the short-term nominal interest rate.² In turn, real interest rates affect economic activity, since there has been a change in the price of borrowing and spending

now rather than later. Typically, a reduction in short-term interest rates will also cause the nominal exchange rate to depreciate. Given sticky prices, this would also imply a fall in the real exchange rate, again affecting economic activity, this time by changing the relative price of buying another country's output versus one's own country's output.

These effects from the initial change in short-term nominal interest rates can be gradual: on average the effects of the real interest rate channel and of the exchange rate channel on aggregate demand occur after about a year. There is also a direct exchange rate channel to CPI inflation, since import prices enter the domestic CPI. This effect tends to occur a bit faster, although this is dependent on the extent and speed of the pass-through from the exchange rate to the domestic price of imports.³

The short-run boost to aggregate demand arising from the monetary policy stimulus will affect domestic inflation with a further lag. One way to think about domestic inflation pressures is via the pricing behaviour induced by the intensity with which the economy's resources are being used. The output gap - the difference between current output being produced to satisfy current demand and an economy's normal or trend output - is shorthand for the intensity of resource utilisation. An increase in aggregate demand will generally create a positive output gap or excess demand in the economy. This excess demand lifts inflation, as increased production increases the costs of production and firms are able to raise prices in response to strong demand. Similarly, workers are in a better position to claim wage and salary increases, as labour becomes in short supply. Given this connection to wages and prices, the central bank may have to respond to positive output gaps if it is to meet its inflation targeting obligations.

Given the lags in the monetary policy transmission mechanism described above, one immediate source of a trade-off between price stability and the variability of interest rates, output and the exchange rate is a mismatch between these lags and the policy horizon. Research indicates that that monetary policy affects inflation (via its effect on the intensity of resource utilisation) very little at all within the

2 The real short-term interest rate is the difference between short nominal rates and short-term inflation expectations.

3 The extent to which importers pass on exchange rate changes rather than absorb the changes in their own profit margins.

first few months, then with increasing power out to a peak at around 1½ to 2 years. Given this, if the Bank attempted to control inflation within, say, a 6 month time horizon, then larger shifts in our policy instrument - the Official Cash Rate (OCR) - would be required. The large hike in interest rates that would be needed to clamp down on inflation pressures within this short time frame would in all likelihood open up a large negative output gap over successive months. This policy-induced recession would then require interest rates to be eased, and aggressively so, if the imminent fall in inflation were to be turned around within a six month time frame.

The 'instrument instability' (i.e. interest rate instability) associated with a lag mismatch, while motivated by the attempt to reduce inflation variability, would result in large and unnecessary output fluctuations. It could also be associated with accentuated swings in the exchange rate, given the relationship between interest rates and currency movements. Indeed, a strict approach to inflation targeting in an open economy such as New Zealand's, that was based on this lag mismatch, would rely primarily on the exchange rate channel to alleviate inflation pressures, given the quicker pass-through from the exchange rate to domestic inflation.

In contrast, a flexible policy approach would result in lower output, interest rate and exchange rate variability, perhaps at the expense of somewhat higher inflation variability. 'Flexibility' in this sense involves the matching up of the policy horizon to the output gap-to-inflation lag.

In addition, flexibility also entails shaping the policy response to match the nature of the macroeconomic disturbance causing a change in circumstances.

To illustrate, consider a temporary supply-side disturbance that takes the form of an increase in the cost of supplying goods and services to the economy. Such a disturbance might result from, for example, an increase in the price of oil, caused by supply restrictions. In this circumstance, monetary policy-makers can either:

- tighten policy relatively aggressively to reduce inflation (perhaps by pushing up the exchange rate), which will also tend to slow the economy, exacerbating the negative effect on growth of the higher oil price; or

- follow a more cautious route, which has less effect in taming the immediate rise in inflation, but will have a smaller negative effect on output (and also tend to cause less instability in interest rates and the exchange rate).

The first option should result in inflation returning towards the target more quickly, but probably at the cost of more variability in output and interest rates. In contrast, the second option may result in inflation taking longer to return to target, but with the benefit of a more stable output path.

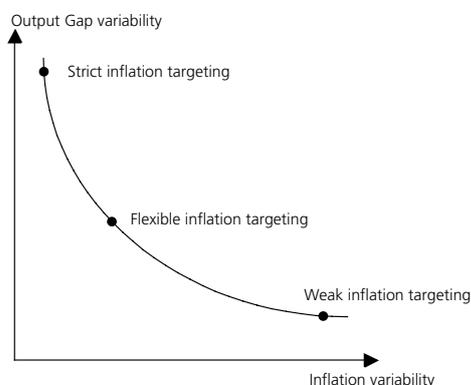
As the above example illustrates, when temporary supply-side or cost-push factors affect the economy, policy-makers will be faced with a variability trade-off. In contrast, no such trade-off between inflation and output variability arises when inflation pressures are only due to aggregate demand pressures (assuming the policy horizon is roughly matched with transmission channel lags). This is because demand pressures tend to move both inflation and output in the same direction. A positive demand shock, all else equal, opens up a positive output gap, thereby inducing inflationary pressures which would be realised in actual inflation outcomes up to about 2 years in the future. Interest rates are increased in anticipation of this forecast inflation, with a view to reducing demand pressures on the economy. In this case, controlling inflation results in less inflation variability, and more stable output around its trend path.

In summary, a relatively "strict" inflation targeting approach would entail relatively low inflation variability over the business cycle, but relatively high output and interest rate variability over the cycle, as policy is adjusted quite aggressively to counter any inflation pressures. This could arise due to an intentional or unintentional lag mismatch, or through the way the policy-maker responds to supply-side shocks.

In the monetary policy literature the policy trade-off between strict and flexible inflation targeting is illustrated by stylised "Taylor" curves that represent the set of variance-minimising combinations of the output gap and inflation around target – see figure 1.⁴

4 See J B Taylor (1979), for the original statement of this trade-off.

Figure 1
The trade-off between inflation and output gap variability



Points to the left of and below the curve are not feasible combinations of output variability and inflation variance around target. Policy choices that result in outcomes to the right of the curve would be inefficient: by changing the implementation of monetary policy at a minimum it would be possible to reduce the variance along one dimension without worsening it in the other. A strict approach to inflation targeting will accept relatively large output gap variance for a given reduction in inflation deviations around target. Conversely, an inflation targeting central bank that places more weight on minimising output deviations would be prepared to accept relatively large inflation variance in order to reduce variability in the rate of economic growth. Flexible inflation targeting therefore represents a compromise between these two extremes.

The Taylor curve depicted in figure 1 is a stylised illustration of the choice that a central bank faces between price stability and output stabilisation. In principle, we could draw similar curves that plotted the technically feasible combinations of interest rate or exchange rate variance against inflation variance and/or output gap variance, and these would also tend to show that strict inflation targeting increases interest rate and exchange rate variance while reducing inflation variance.

A final but crucial point to note about these trade-offs is that they are in terms of the variances of the relevant variables, not their levels. Thus the trade-offs described relate to variations in inflation relative to its target, in output relative to its trend, the exchange rate relative to its equilibrium, and

interest rates relative to their “neutral” level. This variance trade-off relates to, but is not the same as, the short-run “Phillips curve” trade-off that exists between the rate of inflation and the growth rate output. For a while, through the 1960s and especially the 1970s, monetary policy operated on the implicit premise that the short-run Phillips curve also existed in the long-run. Were that the case, a central bank could permanently trade off higher inflation for higher output and employment growth. However, the experience of the 1970s suggests that this is an illusion and that a central bank can only achieve a short-run output gain above trend at the cost of higher long-run inflation - in the long-run the Phillips curve is vertical. But around that long-run outcome, inflation and output growth variations will interact in the manner described by the Taylor curve.

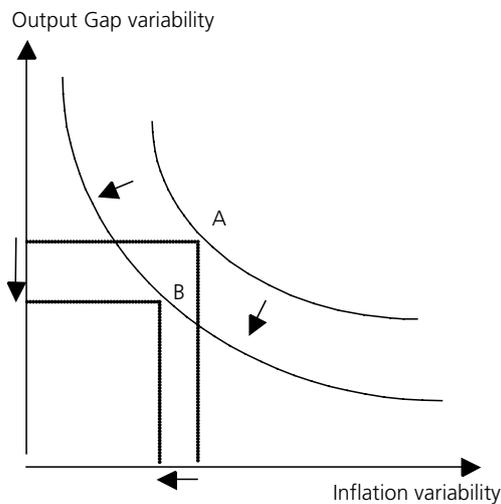
Improving the trade-offs

In figure 1, the best achievable combinations of inflation and output variability are represented in the Taylor curve. These combinations define the nature of the trade-off at any particular time that confronts the policy-maker. Ideally however, the policy-maker would like to face a trade-off that is more favourable in terms of both inflation and output variability - the policy-maker would like the Taylor curve to be as close to the origin as possible. And in fact, it seems that over the last two decades, as central banks around the world became more focussed on keeping inflation low and stable, both inflation and output variability have diminished.⁵ It appears, that the Taylor curves have moved closer to the origin. Clearly, understanding the relationship between policy choices and the position of the Taylor curve is vital for achieving good policy outcomes and satisfying the PTA mandate.

Figure 2 illustrates this stylised improvement in the inflation-output variance trade-off.

⁵ See Blinder (1998) and Taylor (1998) for discussion of this improved inflation-output variance trade-off.

Figure 2
Improving the inflation-output variance trade-off



Although we do not have the research that would firmly establish why the trade-offs might have improved, there are at least three possibilities (presented here in increasing order of importance).

First, it may well be that policy-makers better understand the lags involved in monetary policy (notwithstanding that a degree of uncertainty is inevitable), and better match the policy target horizons to these lags.

Second, as policy-makers learned from the mistakes of the 1970s and policy has become more focussed on controlling inflation, monetary policy actions themselves have become less of a source of shocks to the economy. Armed with the misapprehension that monetary policy could sustainably lift growth, policy had a tendency to oscillate from growth-boosting to inflation-reducing objectives and back again. Those oscillations were themselves somewhat unpredictable, and hence a source of shock.

Third, and most important, economic agents' expectations about inflation and central bank behaviour are important and have been affected by the refocusing of monetary policy on keeping inflation low and stable. The associated changes in the behaviour of price and wage decision-makers have almost certainly been responsible for an improved trade-off.

Actual inflation is strongly affected by expectations of future inflation - price and wage setting is influenced by the beliefs that economic agents hold about future inflation. Changing

expectations have an independent effect on actual inflation, over and above the effect on inflation that comes from the change in aggregate demand and the exchange rate.

If firms and households believe that future inflation will be within the target on average over the medium-term, then temporary shocks to inflation will cause people to alter their expectations of future inflation by less. These stable expectations help to ensure that an inflation shock has only temporary effects on inflation. In this case, the monetary authority has more leeway to allow temporary shocks to dissipate on their own, without a monetary policy response.⁶

The more that inflation is consistent with the set policy target, the easier it is for economic agents to divest resources from forming inflation expectations, and the more likely it is that they will instead presume that inflation will be within the range they have experienced and within the range the central bank has stated it will be. This line of reasoning reinforces itself: as people build expectations of stable inflation into their price-setting decisions (for example, by assuming inflation consistent with their target in wage negotiations, or by extending the length of nominal contracts), it becomes more likely that actual inflation will remain stable in response to shocks.⁷

The relationship between supply-side decisions of economic agents and their expectations of inflation is underlined by a recent IMF research paper (Bayoumi and Sgherri, 2004). The authors argue that more stable monetary policy improves the trade-off between inflation and output embodied in the 'Phillips Curve' relationship. The public learns about monetary policy over time and incorporates this reduced uncertainty in their supply decisions. Inflation therefore becomes less sluggish as nominal price adjustment becomes less backward looking. Less inflation inertia increases the flexibility of the supply side of the economy, reducing output fluctuations, since it is the price of output that will be more

⁶ Since inflation expectations affect interest rates and the exchange rate, well-anchored expectations will also reduce the volatility in the real economy.

⁷ There is some tentative evidence that inflation expectations are also becoming more 'rational' in the New Zealand context. This means that economic agents are becoming more forward-looking in how they form expectations as opposed to basing wage and pricing decisions on what happened in the past. See Basdevant (2003).

likely to adjust rather than the quantity of output over the short-run. Bayoumi and Sgherri therefore credit some of the seemingly 'magical' improvement in the supply side of the US economy since the 1970s to the behaviour of the US Federal Reserve (the US central bank).

Creating stable expectations of inflation based on concrete inflation outcomes is therefore an important way of improving the trade-off between price stability and output variability. This learning process by households and firms is buttressed by the credibility of the central bank to deliver their stated objectives. Once inflation expectations have adjusted, the degrees of freedom within which to conduct a more fully specified flexible inflation targeting regime are increased. As Lars Svensson notes, "a gradual move towards more flexible and medium-term inflation targeting [in New Zealand] is to a large extent a natural consequence" of increased credibility and well anchored expectations (p. 38).⁸

However, central banks cannot take well anchored inflation expectations for granted. In this regard a flexible approach to monetary policy is bounded. Inflation targeting that is too flexible, allows too much inflation variance, or has too long a policy horizon over which to return inflation to target, runs the risk of economic agents changing from a presumption that, once up, inflation will fall back, to a presumption that, once up, inflation may or may not fall back, depending on the circumstances. Not only would this increase the time and effort people spend in forecasting and managing the consequences of inflation, it would make inflation less stable and thereby increase the work that monetary policy has to do. The volatility trade-off would worsen.

In the next section we discuss the evolution of flexible inflation targeting in New Zealand as embodied in the changes in the PTA since 1989.

3 Monetary policy objectives and the PTA

The PTA is a formal agreement between the Governor and the Minister of Finance that operationalises the pursuit of price stability, as set out in section 8 of the Reserve Bank of New Zealand Act 1989 (the Act).⁹ The Act and the PTA framework were motivated by the negative experiences of high and variable inflation from the 1970s onwards. The experience of the 1970s and 1980s showed how high and variable inflation can impair efficient resource allocation, create uncertainty and lead to an arbitrary redistribution of wealth between borrowers and savers, to the detriment of economic growth and welfare.

The Act and the PTA framework can also be viewed in the context of the broader public sector reforms that were occurring during the late 1980s. An underlying philosophy guiding these reforms was the need to establish clear, achievable policy objectives, while assigning appropriate responsibilities and the necessary delegated authority to achieve the objectives.¹⁰

Successive PTAs have continued to operationalise the objective of price stability in terms of stabilising the Consumer Price Index (CPI) within a specified target band.¹¹ This inflation targeting framework provides an "anchor" for changes in the general price level, and to the extent that it delivers the intended outcomes, for expectations of future price changes.

In practice, however, no central bank sets policy with only inflation in mind. As discussed in the previous section, strict inflation targeting (attempting always to immediately achieve the inflation target) would produce adverse consequences for the real economy, since achieving the strict inflation target

8 Svensson (2001). Svensson's comments are drawn from his review of the operation of monetary policy in New Zealand, initiated by the government in 2000. See also the Reserve Bank submissions to the Svensson review: Reserve Bank (2000).

9 Section 9 of the 1989 Act requires that the PTA sets out specific price stability targets and that the agreement, or any changes to it, must be made public. A new PTA must be negotiated every time a Governor is appointed or re-appointed, but it does not have to be renegotiated when a new Minister of Finance is appointed. The PTA can only be changed by agreement between the Governor and the Minister of Finance (section 9(4)). Thus, neither side can impose unilateral changes. The Act can be browsed online at <http://www.legislation.govt.nz/>.

10 The institutional design of monetary policy specifically reflects the desire to overcome the politicisation of monetary policy decisions.

11 See Mishkin (1999) for an overview of different types of monetary policy regimes.

could come at the cost of increased volatility in interest rates and output, and possibly the exchange rate. The recognition of such trade-offs is typically embedded in the operational design of an inflation targeting regime and is reflected in the choice of the inflation target band, the length of time over which inflation must be returned to target in the event of an 'inflation shock', and the extent to which the monetary authority is given scope to "look through" specific shocks or temporary disturbances.

The core components of New Zealand's inflation targeting regime, together with various iterations contained in successive PTAs, reflect a flexible approach to the pursuit of price stability. That flexibility has increased through the years since the first PTA was agreed in 1990. The following points illustrate the nature of the flexibility built into successive PTAs and the increase in flexibility that has emerged through the last decade or so.¹²

- Initially, the government and Reserve Bank agreed to a phased move towards the initial inflation target of 0-2 per cent, with the original target date in the PTA signed in April 1990 being December 1992. This was extended in the second PTA, signed in December 1990, with the new target date becoming December 1993.¹³
- The target band has been changed on two occasions. It was widened to 0-3 per cent in December 1996 to enable a somewhat greater degree of inflation variability. In the latest PTA, signed in September 2002, the lower bound was raised to 1 per cent, on the grounds that at extremely low or negative rates of inflation, the volatility trade-off probably worsens.
- A clause 4(c) was included in the PTA in 1999, requiring the Reserve Bank to have regard for "unnecessary volatility" in interest rates, output and the exchange rate, in the course of conducting monetary policy. This clause was retained with modified wording in the PTA signed in September 2002, as clause 4(b).

- In the 2002 PTA, clause 2(b), specifying the inflation target, was amended from "12-monthly increases in the CPI" to keeping future CPI inflation outcomes within the target band "on average over the medium term". This change made explicit the medium-term focus for price stability, further enhancing monetary policy flexibility.
- In early versions of the PTA, the PTA contained specific provisions enabling the Bank to disregard temporary inflation deviations away from target when these are caused by exceptional events, such as changes in government charges or sharp movements in commodity prices, such as oil. In the 2002 version, clause 3 simply makes it clear that with the target focussed on medium-term outcomes, individual observations of inflation outside the 1-3 per cent target range are not in themselves reasons for monetary policy action.

The inclusion of clause 4(b) is an explicit recognition that unnecessary volatility in interest rates, output and the exchange rate would (in all probability) be detrimental to longer term growth prospects and overall economic welfare. There is also a small body of research to suggest that smoother output cycles may actually be beneficial for trend or long-run growth. Unnecessary volatility in output may amplify the costs associated with recessions and unsustainable expansions: recessions generate the social costs of unemployment, while expansions that overheat the economy can create inflation which also generates social costs. Large swings in interest rates create unhelpful uncertainty for business investment and household expenditures. Uncertainty regarding the cost of borrowing may cause spending and investment decisions to be deferred, or worse still, the wrong decisions to be made.¹⁴

Similarly, variability in the exchange rate may adversely impact on the export sector by squeezing profits when the exchange rate is very high and by possibly leading to the demise of some firms that may have turned out to be innovative and dynamic over the longer run. When the

¹² For a discussion of the elements of the successive PTAs see Reserve Bank (2000).

¹³ When the 0-2 per cent target was breached in March 1996 the Bank notified the Minister that aggressively using policy to get inflation back within the band would impose costs on the real economy.

¹⁴ This is of course a different issue than the higher average level of interest rates than elsewhere which has caused public concern in New Zealand. Our higher rates reflect New Zealanders' propensity to borrow and their risk appetite for debt, rather than the particular preferences of the Reserve Bank.

exchange rate is too low, some marginal businesses may be encouraged to set up that become unprofitable when the exchange rate returns to more average levels, tying up resources which might better have been employed in businesses with stronger long-term prospects.

However, to some degree economic volatility is also a necessary and desirable part of an economy's adjustment to an ever-changing environment. As firms and households interact with their economic environment, respond to new opportunities afforded by technological change, or shift resources from one endeavour to another, aggregate output will ebb and flow around its trend. Such swings in economic activity are desirable; they cannot and should not be avoided by monetary policy. It also needs to be borne in mind that periods of slower growth can assist to strengthen the productive capacity of the economy by weeding out less efficient firms.

For example, much of the movement in the exchange rate reflects changes in the New Zealand economy's economic fundamentals relative to other countries - growth, inflation and interest rate differentials. In effect, that variability in the exchange rate helps to buffer the economy against a range of different shocks, reducing the need for adjustment elsewhere. These exchange rate movements are a desirable consequence of operating in an open capital market; leaning against them would most likely be ineffective.

Unfortunately there are no hard and fast rules or simple mechanical calculations to enable us to precisely differentiate necessary from unnecessary volatility. This is where the role of judgement becomes paramount. The intuition of the policy-maker, combined with the lessons from historical experience, will shape specific policy responses in any given circumstance.

Clause 4(b) and the current PTA

The September 2002 PTA focussed the inflation target explicitly over the medium-term. This reinforced the flexibility added to the 1999 PTA and the requirement to seek to minimise unnecessary variability in interest rates, output and the exchange rate. As the Governor stated in a speech following the signing of the new PTA in November 2002, we

have a "little more flexibility, but it's a flexibility that needs to be applied with care".¹⁵

This flexibility is the result of the hard fought battle with inflation over the course of the 1990s. With the achievement of price stability and stable inflation expectations, the risks of inflation becoming destabilised are reduced, and the better the Bank is placed to accommodate transitory fluctuations of inflation outside the target band.

The medium-term focus to achieving price stability implies somewhat 'softer edges' to the target band. The Reserve Bank is able to tolerate inflation outside the band if this does not compromise price stability over the medium-term. This does not mean the Reserve Bank is now any less committed to price stability, but rather that the way we achieve this primary goal has changed.

International practice

Inflation targeting central banks focus on securing price stability via a publicly announced inflation target. Broader goals, such as full employment or reduced fluctuations in economic growth, are interpreted, if at all, subject to the primary price stability goal.¹⁶ However, this does not mean that inflation targeting countries attach more importance to inflation than economic growth. Rather, policy-makers in these countries think that the best way for monetary policy to support economic growth in the long-run is to maintain price stability. Moreover, countries that are not inflation targeters in the formal sense may still attach the same importance to price stability as a means to achieve other goals.

The Reserve Bank of Australia Act 1959 has full employment and stability of the currency as legislated objectives. However, the Reserve Bank of Australia's Statement on the Conduct of Monetary Policy 2003 interprets these objectives as providing a mandate for price stability. Echoing clause 4(b) of the New Zealand PTA, the Statement also stipulates that the Reserve Bank of Australia should take into account "activity," subject to maintaining price stability.

¹⁵ Bollard (2002).

¹⁶ Mishkin (1999) provides an overview of the key features of inflation targeting regimes.

Similarly, the Bank of Canada Act 1934 makes reference to maintaining the external value of the currency and fluctuations in production and employment. However, the Joint Statement between the Bank of Canada and the Canadian government (2001) sets price stability as the means to achieve these objectives laid out in legislation. The Joint Statement makes no explicit reference to avoiding undesirable volatility per se.

The remit for the Bank of England's monetary policy committee instructs it to support the economic policies of the government, subject to maintaining price stability. The remit explicitly refers to "undesirable volatility in output" that may arise if the inflation target is too rigidly applied in the event of unexpected shocks or disturbances to inflation. This is similar to New Zealand's earlier clause 3 exceptions and to clause 4(b) in the current PTA.

The 2001 Norwegian Royal Decree defines the goal of monetary policy as "stability in the krone's national and international value". At the same time, monetary policy is required to underpin fiscal policy by contributing to "stable developments in output and employment". However, the Royal Decree also states that "in accordance" with the above goals, "monetary policy shall be oriented towards low and stable inflation". Further, in a letter to the Ministry of Finance clarifying the operation of inflation targeting, Norges Bank stated that it will implement the 2.5% CPI target in a manner that seeks "to avoid unnecessary fluctuations in output and demand".

In summary, New Zealand's PTA clarifies what the pursuit of the price stability goal means in practice. Clause 2 requires the Reserve Bank to maintain a low and stable inflation environment, while clause 4(b) instructs us to do this in such a way as to minimise any adverse impact on the variability of output, interest rates and the exchange rate that is in our control. In this regard, the Bank has one clear policy objective that is defined in the Act. There are, however, different paths to price stability. The PTA requires the Bank to choose monetary policy paths that do not exacerbate the inevitable volatility that already exists in the economy.

The next section provides more detail on how we operationalise the flexible inflation targeting framework embodied in the PTA.

4 Clause 4(b) in operation: how does the Bank seek to avoid unnecessary instability in the economy?

Eight times a year, the Governor has a scheduled opportunity to decide whether to alter the Bank's monetary policy instrument, the OCR. The framework for this decision-making involves an assessment of future inflation pressure, with specific reference to forecasts for inflation six to eight quarters into the future.¹⁷

The six to eight quarter horizon at which we attempt to respond to inflation is intended to match approximately the time it takes for interest rates to have their peak effect on inflation - the transmission lag described in section 2. Essentially, we try to avoid responding to inflationary pressure if the pressure will already have dissipated by the time our response is having its peak effect. This is another way to describe the "flexible" nature of inflation targeting.

Another choice is the speed at which interest rates are adjusted. A smoother profile of interest rate adjustments is typically utilised because of the difficulty that volatile interest rates create for decision making. More predictable policy helps to condition expectations more favourably.¹⁸ In addition, the pervasive environment of uncertainty that the policy-maker faces will often attenuate the policy response. In a recent speech, US Federal Reserve Governor Bernanke described this relatively slow adjustment in the face of uncertainty as 'gradualism'.¹⁹

Gradualism cannot be the right prescription for all circumstances, however. As discussed earlier, for some

17 There is a large literature within monetary policy that argues that targeting conditional forecasts of inflation, rather than current inflation, produces better outcomes. See for example, Batini and Haldane (1999); and Batini and Nelson (2000).

18 Woodford (1999).

19 Bernanke (2004). Gradualism also has the added benefits of policy being able to better influence long-term interest rates, together with reducing the risks to financial stability.

types of shocks - surprise changes in aggregate demand for example - the volatility-minimising approach might be to move interest rates quickly to stabilise both output and inflation. Thus, the manner in which clause 4(b) considerations affect the policy rate will always depend on an assessment of the specific economic conditions prevailing at the time. In some instances caution may be warranted (the gradualism of Bernanke), while in others a more pre-emptive policy response may be appropriate.

Although the choice of inflation targeting parameters embeds concern for volatility minimisation in the manner described, it is important to consider whether flexible inflation targeting could be operated in an alternative way that did even more to stabilise the relevant variables, while continuing to successfully stabilise inflation. In the terminology of section 2, can we shift the efficient frontier of the Taylor curve to the left?

Several researchers have considered whether an explicit response to the output gap or exchange rate additional to that implicit in forecast inflation targeting is desirable. Batini and Haldane (1999) argue that there is no need for further response to the output gap, arguing that it does not improve the "Taylor" trade-off discussed in section 2. Other work, including some at the Reserve Bank, argues that including such a term would improve the inflation-output variance trade-off.²⁰ However, uncertainty around the measurement of the output gap at any point in time works against the case for responding to it directly, given the risk of measurement-induced policy errors.

Other research has examined whether responding explicitly to the exchange rate improves the variability trade-offs. For example, using a model of the Australian economy, Dennis (2003) found that if the monetary authority responds to both current inflation and the exchange rate, then the trade-off between inflation and output is improved. However, this improvement does not materialise if the monetary authority is starting from an inflation forecast targeting approach like that used by the Reserve Bank. In other words, responding to forecast inflation achieves the same thing as responding to current inflation and the exchange rate.

²⁰ See Drew and Hunt (1999).

Overall, the international literature tends to find that there is little to be gained in terms of improving the inflation-real economy variance trade-off from an explicit response to exchange rate movements, over and above the response that will result from standard flexible inflation targeting.²¹

This question has also been specifically looked at within the Reserve Bank recently.²² West (2003) examined what would happen if interest rates were used to attempt to stabilise the exchange rate in a model of the New Zealand economy. He found that reducing quarter-to-quarter exchange rate variance would result in greater output, interest rate and inflation variance.²³

West's results have been supported by Reserve Bank research using the Bank's Forecasting and Policy System (FPS) model, and a variety of assumptions about exchange rate determination. Hampton et al (2003) find greater costs to the real economy of achieving exchange rate stabilisation than West, while Stephens (2004) suggests that West's findings are robust to different models of exchange rate determination.

West suggests that the estimate of costs involved in these trade-offs are probably on the low side, as the results assume that the central bank fully understands the exchange rate and that interest rate changes affect the exchange rate in a reliable manner. While this is a conventional assumption in the theoretical literature, in practice the empirical link between monetary policy and exchange rates is complicated by a number of other influences over and beyond interest rate changes and inflation expectations. In other words, it would probably be extremely difficult for the Bank to precisely control the exchange rate using interest rates. And even if it were possible, attempting to move policy in this direction would lead to significant rises in inflation and output variability. Moreover as Leitemo and Söderström (2001) show, given uncertainty about what determines the exchange rate, it may be better to not explicitly respond to exchange rate movements.²⁴

²¹ See Dennis (2001) for an overview.

²² See Hampton, Hargreaves and Twaddle (2003); Stephens (2004); and West (2003).

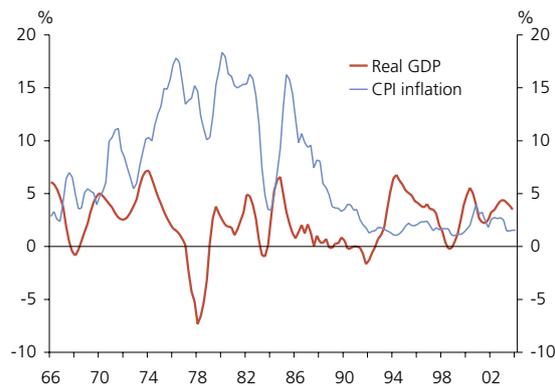
²³ Professor West conducted his research while in New Zealand as an Academic Fellow of the Reserve Bank and Victoria University of Wellington.

²⁴ Leitemo and Söderström (2001).

5 How effective has monetary policy been in meeting the requirements of clause 4(b) of the PTA?

Ideally, one would be able to look at the economic data to see how effective the Reserve Bank has been in meeting its obligations under clause 4(b) of the PTA. If we look at the data, we can see that, overall, there has been an improvement in the stability of the business cycle, and that this reduced volatility has coincided with the inflation targeting period (see figure 3). But of course, correlation never establishes causation: there are many other factors at work in the economy aside from monetary policy.

Figure 3
Real GDP growth and Inflation
(annual percentage change)



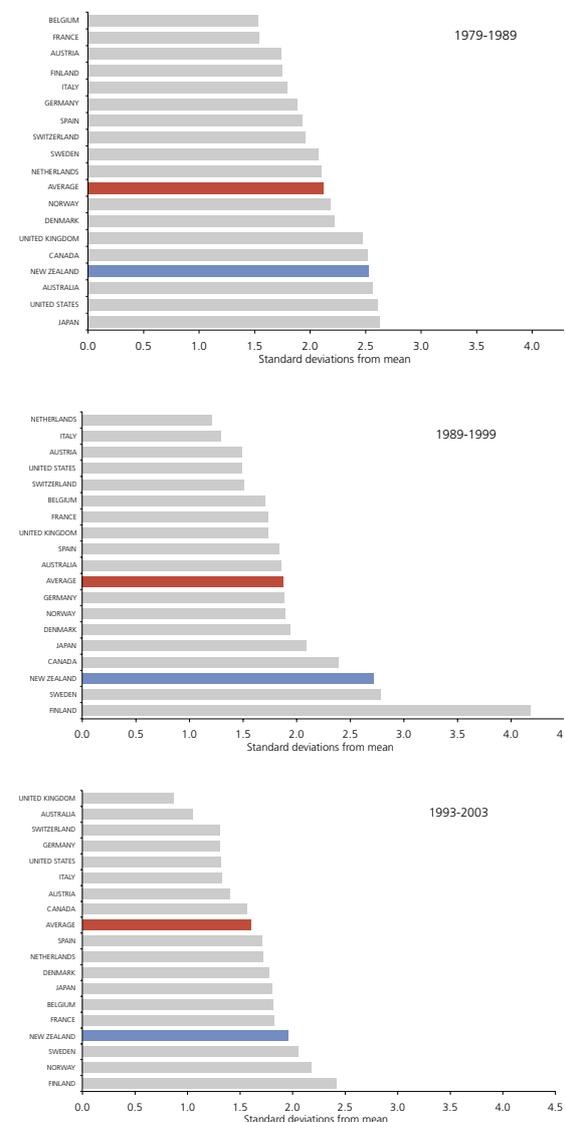
Notwithstanding this, in this section we compare New Zealand's economic variability in recent years compared with earlier periods. We also make comparisons with other, similar countries.

Output

Output volatility in New Zealand has declined since the early 1990s despite the impact of major shocks, such as back-to-back droughts in 1997 and 1998 and the Asian crisis of 1997/98. In addition, New Zealand's average GDP growth rate has improved over the course of the 1990s, while recessions have become shorter and expansions longer. The latest expansion, which began in late 1998, is the most durable of the past two decades.

New Zealand's volatility improvement has been more than matched by other countries and our relative ranking has not improved significantly. Figure 4 shows that while New Zealand's GDP volatility has improved since the early 1990s, we are still towards the bottom of the OECD ladder on a comparative basis. This is not that unsurprising given our relative size and exposure to international trade.

Figure 4
Year-on-year growth volatility ranking for 18 OECD countries



25 See Buckle, Haugh and Thomson (2001) for a brief overview of major explanatory causes for the observed volatility decline.

There are a number of (inter-linked) potential explanations, including:²⁵

- lower volatility in the components of aggregate demand, such as government spending, private consumption and investment;
- improvement in inventory management techniques associated with “just-in-time” manufacturing processes;
- fewer and smaller supply shocks;
- structural change towards a service oriented economy, and,
- better use of macroeconomic stabilisation policy, including monetary policy.

To date, evidence distinguishing these possible causes in New Zealand is scant. One study that has examined the issue highlights lower industrial sector output variance, especially in services and manufacturing (Buckle, Haugh and Thomson, 2001). In relation to monetary policy, Treasury research has found that, on the whole, monetary policy has been counter-cyclical, and improved the output-inflation variance trade-off.²⁶ Consistent with the international evidence that the variance trade-off has improved in recent times, at the very least, monetary policy in New Zealand appears not to have aggravated output variability.

Interest rates

In a briefing note on the PTA in 2002, the Reserve Bank discussed the extent to which the pattern of interest rate adjustments (shown in figure 5) has been more aggressive in New Zealand than in other countries and whether or not these changes were the result of the policy choices being made, or were due to the shocks to which monetary policy must respond.²⁷

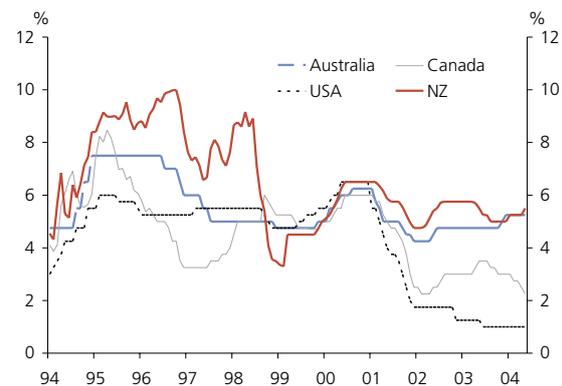
The findings are as follows:

- Comparative interest rate cycles: New Zealand short-term interest rates have not been much more variable

than foreign short-term rates, particularly since the introduction of the OCR in 1999.

- Frequency and size of interest rate adjustments: since the introduction of the OCR the Reserve Bank has behaved in a similar fashion to other central banks in advanced economies – the Bank is in the middle of the pack in terms of the frequency of interest rate adjustments.
- Model simulation: using models of monetary policy to simulate how other central bank policy-makers would behave if confronted with New Zealand data yields a similar pattern of interest rate adjustments to that actually observed - it is our economic circumstances which largely explain our interest rate cycle rather than any over-zealous central bank policy-making per se.

Figure 5
Short-term official interest rates of dollar bloc countries



The exchange rate exception

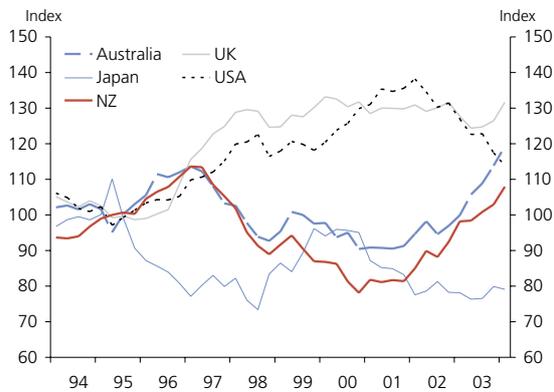
The general improvement in real economy stability has not been matched by any discernable reduction in the cyclical amplitude of New Zealand’s exchange rate. The New Zealand dollar has exhibited large swings in value. The currency appreciated by 30 per cent between the first quarter of 1993 and the first quarter of 1997. Subsequently, the kiwi fell 30 per cent and reached an all-time low of around 38c against the US dollar in 2000. On a TWI basis, the New Zealand dollar has recently reached levels nearly 50 per cent higher than that 2000 trough.

While our currency is more volatile than the OECD average, it is not an outlier. Figure 7 charts episodes of currency appreciation in various OECD countries. The nature of our

²⁶ Buckle, Kim, and McLellen (2003).

²⁷ Reserve Bank of New Zealand (2002, p. 5-21).

Figure 6
Real effective exchange rates

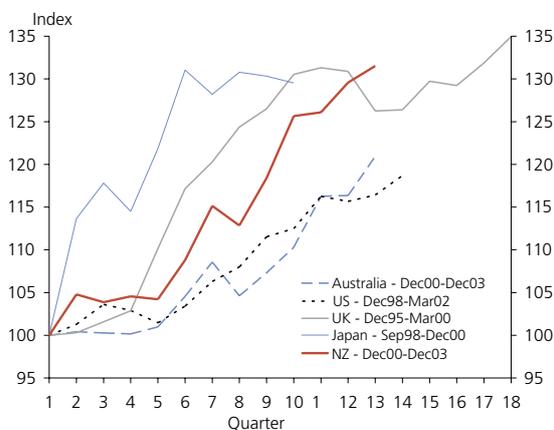


Source: IMF

currency's fluctuations is not unusual on a comparative basis.

Why have exchange rates remained volatile while other key variables have become more stable worldwide? Unfortunately, the answer is far from straightforward, as the companion article in this *Bulletin* issue notes.²⁸ While short-term interest rate differentials are an important part of the story, they are not the whole story. Trade flows create noise in short-term exchange rate movements, but over and above this there is a part of the cycle in the exchange rate that is difficult to explain solely with economic fundamentals.

Figure 7
Trough-to-peak comparison of various real exchange rates



²⁸ The article also makes reference to clause 4(b) concerns with "unnecessary volatility".

6 Alternative policy instruments

We have seen that despite the relatively stable macroeconomic climate since the early 1990s, the exchange rate continues to exhibit marked swings in value over time.

As noted above, much of this exchange rate variability cannot be offset using interest rates. This explains the recent decision to develop a capacity to intervene in foreign exchange markets. Intervention in the foreign exchange market - the buying and selling of our currency - to influence the level of the New Zealand exchange rate may provide an additional, though limited, policy lever for monetary policy. This new lever will provide modest scope to influence the exchange rate at the extremes of the cycle, trimming the peaks and troughs where this is consistent with maintaining price stability. The new policy is not expected to achieve any major attenuation of exchange rate variability. The exchange rate will continue to exhibit large swings, much of which is driven by factors outside of the Reserve Bank's control. However, any percentage point or two trimmed from the extremes of the cycle that might result from our intervention will be of help to the tradables sector.

The Bank has emphasised that it will only intervene if the exchange rate is considered to be both exceptional and unjustified by economic fundamentals, and if it is opportune to do so.

In addition to foreign exchange intervention, the Bank has also periodically reviewed other policy instruments that could be used to alleviate exchange rate pressure on the export sector. These include the efficacy of reinstating capital controls, changes to tax policy, the relationship between housing/property cycles and the exchange rate, and broader monetary and fiscal policy coordination. The Reserve Bank's views on these alternative instruments were included in the Bank's submission to Lars Svensson's Independent Review in 2000-2001.²⁹ At the time of that review we concluded that, in general, the costs of these alternative instruments outweighed any purported benefits. Since then our thoughts on foreign exchange intervention have evolved and culminated in the change in policy. However, in other areas, such as in relation to capital controls and regulatory tools,

²⁹ Reserve Bank (2000).

we remain of the view that these instruments are unlikely to be effective in achieving desired policy outcomes and would probably impose undesirable distortions on the economy.

7 Conclusion: Clause 4(b) and accountability

The PTA is a negotiated agreement between the Minister of Finance and the Governor of the Reserve Bank that operationalises the statutory objective of price stability. All PTAs to date have set out this primary objective in the form of inflation targets. The PTA also provides a behavioural framework that guides the pursuit of price stability. Clause 4(b) directs the Reserve Bank to have sufficient regard for “unnecessary volatility in interest rates, output and the exchange rate”.

This clause reflects a view that flexible inflation targeting is more likely to engender net benefits for the economy than rigid inflation targeting. In the pursuit of price stability, we need to consider the impact of monetary policy on the wider economy, because variability in interest rates, output and the exchange rate are important for economic and societal welfare in their own right.

The PTA also provides an accountability framework to assess the performance of the Governor of the Reserve Bank. Accountability in respect to price stability is admittedly somewhat clearer than that attached to clause 4(b). There are specific numerical targets for inflation that provide the benchmark for assessing the performance of the Governor in pursuit of price stability. Of course, any assessment of the Governor with respect to the inflation target will have to take into account the nature of the economic environment at the time, including the nature of shocks hitting the economy.

Inevitably, any assessment of the extent to which the Governor has conducted policy in a manner consistent with clause 4(b) will be qualitative in nature. There are no quantitative benchmarks to assist this evaluation. In assessing the Governor’s performance in relation to clause 4(b), the Reserve Bank Board, the Minister of Finance and others need to consider whether, in light of the information available to the Governor at the time monetary policy

decisions were made, those decisions were consistent with achieving inflation within the target range over the medium-term without causing avoidable instability in the real economy, in interest rates and in the exchange rate. As this article has described, this assessment is made difficult by the problem of differentiating necessary from unnecessary volatility. It is also complicated by the fact that the trade-off is non-linear - slower interest rate adjustment or ever greater inflation variability will yield ever smaller improvements in output variability, and at some point probably no gains at all.

Overall, the Bank is satisfied that the Act, the PTA and the current policy framework provide a sound basis for managing monetary policy in ways that maintain price stability, while avoiding excessive adverse impact of monetary policy on the real economy.

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