

A ROBUST APPROACH TO MONETARY POLICY: MONETARY POLICY FOR THE EU'S 'NEW NEIGHBOURS'¹

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ABSTRACT

In recent years it has become conventional to suggest that sustainable monetary policies will tend to lie at the ends of the spectrum of fixed and flexible exchange rates. Thus countries bordering the EU and hoping to join it are faced with a choice of opting for a currency board or even full euroisation on the one hand or inflation targeting on the other. In turn inflation targeting normally has strong requirements for data, modelling and forecasting the economy if it is to be successful, yet this is incompatible with the position of such countries. This creates a dilemma for countries who feel that a measure of exchange rate flexibility would be of value in facing some of the asymmetric shocks they may receive in the years before close convergence and EU and EMU membership can become a reality. Building on the ideas of 'Inflation Targeting Lite' that have been developed by Mark Stone and others, this paper suggests that there may be a credible approach to inflation targeting based on 'robust policy' as set out by Carl Walsh inter alia. Under robust policy, a central bank is more concerned to avoid making large errors than it is to achieve an optimal policy. It therefore tries to set policy in a way that will be consistent with a variety of plausible views about how the economy may work and so that a wide range of likely shocks will be consistent with the achievement of its inflation target. Such a

policy strategy has an asymmetric approach, involving limited action when policy appears on track but firm pre-emptive action when the inflation target is threatened. It thus seeks to avoid both the lack of credibility associated with soft targets and the implausibility fine tuning in the face of poor information. We illustrate the scope for such an approach with examples from the EU's 'new neighbours'.

One of the problems of regime change from a command to market economy for the European transition countries is that the extent of the changes in relative prices and use of resources required has tended to destabilise the general price level in the short run. Re-establishing price stability then requires overcoming the loss of confidence that has ensued and entails a believable commitment that there will not be another bout of inflation every time the economy faces substantial difficulty. Since simply expressing the commitment is easy to do and to break subsequently, the words have to be backed up by some commitments in the monetary policy framework that make it look unlikely that the underlying objective will be overturned. These requirements apply whatever approach to monetary policy is used, from a hard peg for the exchange rate to inflation targeting and mixed strategies in between.

Various checklists have been promoted that set out key characteristics of the necessary framework for monetary policy on issues such as independence, accountability and transparency (Grilli et al., 1991; Eijffinger and Geraats, 2003; Cukierman, 1992; Siklos, 2002). The accession process to the EU and subsequent convergence for euro area membership give specific bite to the assessment. These lists (which have been extended to the central and eastern European countries, Schobert, 2005; Note, 2005) relate mainly to the nature of the legal framework and what the bank does rather than to the reality of the relationships. As Cukierman (2005) points out there can be large gaps between the legal and actual positions – the actual can change markedly without any change in the legal. However, for credibility it is neither the legal nor the actual per se that is the determining factor but the beliefs that are held about how the practice will operate. Clearly the legal framework and the experience of actions as a bank builds up a reputation are core ingredients of the assessment.

However, the external framework alone is insufficient. There are further operational requirements that are essential for credibility. The most important of these is that people can believe that implementation of the monetary policy strategy is feasible. In the case of euroisation, feasibility is straight-forward in the narrow sense. In the case of a currency board, transparent operation of the system of exchange between the backing currency and domestic currency should be sufficient for credibility but neither of these is a guarantee of price stability. The link between the currency and inflation may be beyond the control of the central bank and in the hands of the fiscal authorities. When it comes to inflation targeting, however, the links are much less transparent. As a result, over the years inflation targeting countries have made major investments in trying to improve their understanding of the linkage, of which the 244 page description of the Bank of England's new model (Harrison et al., 2005) is but a recent example.²

There is, however, a danger of assuming that this level of sophistication is a necessary prerequisite for credibility. Haldane (2000), in evaluating the early years of inflation targeting in the UK, describes the process rather nicely as 'ghostbusting'. The central bank needs to form a view about where inflation is likely to go and what it needs to do to attain the target – in other words it needs to form a view on the transmission mechanism of its actions into impacts on future inflation. Since the mean forecast error for inflation in the UK one year ahead was 1% and the target width only 2% one might expect that hitting it was going to be difficult. Nevertheless the Bank of England has a 100% success rate and other central banks have a fairly similar experience. Morandé and Schmidt-Hebbel (2000) show that the same has been true for Chile: actual inflation has turned out to be closer to the target than inflation forecast. Sherwin (2000) makes a similarly humble claim for New Zealand's strategy when it first started round the time of the 1989 Reserve Bank Act. Even softer is Truman's (2003) 'inflation targeting countries should be serious about wanting to achieve and maintain low inflation rates, and their fiscal position should not threaten macroeconomic stability. Beyond this, the institutional and environmental elements often identified as pre-conditions for inflation targeting – financial system stability, central bank independence, and deep knowledge about the

monetary transmission mechanism – should be viewed as desirable, not essential’ (p.47).

Money targeting is likely to make the links even more obscure as the lags are ‘long and variable’. The success of the Bundesbank in controlling inflation while espousing money targeting illustrates the point neatly. The key element was the credibility. Siklos (2002) suggests that their policy may be better described as inflation targeting and Svensson (1999) goes so far as to remark that they have been successful ‘despite’ money targeting. Similarly, while Mishkin (2004) can be rightly critical of the IMF’s monetary programmes for emerging markets, they can nevertheless help achieve substantial price stability if the framework for credibility also exists.

The missing ingredient in the process is the strategy that the central bank applies to achieve price stability in the face of the difficulties of poor data, poor forecasting ability, limited knowledge of the transmission mechanism, rapid change in economic structure and behaviour and of course limited resources and time in taking decisions. This can perhaps be described as ‘robust’, although there are several definitions of robust policy. It is robust in the sense of not attempting to fine tune but to get the direction of policy right. It is also robust in the sense of being consistent with a range of models of economic behaviour and a broad spectrum of the shocks thought likely to hit the economy in the forecast horizon. It is essentially a decidedly non-linear approach to policy making, as described in Mayes and Razzak (2000) for New Zealand and Mayes and Virén (2005) for the EU countries. Outside periods of crisis or high inflation most meetings of monetary policy committees in central banks do not result in changes to the setting of instruments. If price stability is not threatened, such changes as are made are usually cautious. But if there is a threat then policy responds quickly and firmly. That in itself is part of the process of engendering and maintaining credibility and confidence.

In this article, we therefore consider in turn in the remaining sections the three facets of a successful monetary policy that can be applied in transition economies: a credible framework; suitable means of implementation and the ingredients of robust policy. The fourth

section then explores empirical evidence about the feasibility of robust policy among the EU's 'new neighbours' in the light of knowledge of the transmission mechanism and the forecastability of inflation.

1 A CREDIBLE FRAMEWORK FOR MONETARY POLICY

Since the beginning of the 1990s the transition countries in central and eastern Europe have been making choices about their monetary policy regimes (Table 1 summarises the current position). Ten of the countries have already become members of the EU which has assisted the credibility of their policy, whatever the detailed course. Some like Estonia moved rapidly to a regime they have stuck to, while others have made a series of steps, some planned and some enforced by circumstances. The Czech Republic and Poland, for example, have moved to inflation targeting but see this as a transition before entering ERM2 and ultimately adopting the euro. Hungary and Slovakia on the other hand have a mixed strategy as their inflation targeting is subject to limits of exchange rate fluctuation. Four more countries Bulgaria, Croatia, Romania and Turkey are at the next stage of discussions on membership, while most of the remainder are a step further away, with accession as a plan, except Belarus, Moldova and the Russian Federation. While issues of credibility still apply to the ten new members of the EU our focus is on the remainder.

The various columns in Table 1 lay out the options. The simplest route to a credible framework is not to have one's own currency at all but to adopt that of another. In the European context this is the route that has been followed by Kosovo and Montenegro, both of which have adopted the euro. Such a step does not prevent inflation but it makes it more difficult if the economy is to any extent open as goods and services could be obtained from abroad but paid for in 'local' currency. There are thus limits to divergence. It is particularly important to recognise, as stressed by Rose and Frankel (2002) that on adoption of a currency union the two economies are likely to integrate rapidly and trade far more with each other than would otherwise have been the case. Thus one cannot start with the current state of the economy and assume that its structure will be invariant with respect to the monetary and exchange rate regime it chooses.

In any case, there are also limits in these circumstances on the government's ability to run and monetise fiscal deficits. However, this choice does illustrate that in some respects there can be a tradeoff between the framework for policy and directly addressing the objective of policy. It may make more sense to go for a very robust framework, although it cannot deliver all of the desired price stability, because it is achievable, rather than to go for a regime that could deliver the stability in theory but is not credible at the time. Thus, for example, several of the euro area countries have less price stability than when they were independently targeting inflation but they have less uncertainty and cheaper finance. At the margin the credibility and other benefits are judged to be worth more than the last fraction of price stability.

Slightly less dramatic but also imposing strong constraints is the creation of a currency board as practised by Estonia, Bulgaria, Bosnia-Herzegovina and Lithuania. There they have their own currency but it can be freely converted at a fixed rate for the backing currency – the euro. Here *prima facie* credibility will be lower, as the option of breaking the link between the two currencies could be exercised quite easily, as Argentina demonstrated. It is not necessary to default on government debt as well to break a very strong link between currencies and a beneficial exit can be organised, as when Ireland broke the link with sterling in 1979.

The same arguments obviously apply to hard exchange rate pegs, as in the case of Latvia since the beginning of 2005. Here it can be more difficult to design a system that makes the automaticity of the response of policy clear, if the rate is not fixed exactly. Distinctions between smoothing operations and outright intervention may be difficult when the acceptable range for the exchange rate is at all wide. The tendency, therefore, when the peg is not completely fixed, as with Denmark's Nationalbank, is to try to keep actual fluctuations within a range small enough that non-financial firms will not want to change any of their pricing, even for very frequently repriced items like food. This reflects the treatment under the Bretton Woods arrangements. ERM2 on the other hand acts as a much weaker discipline and it is no surprise that none of the countries participating in it are using the full width of variation permitted.

It is actually the regime at the other end of the spectrum, where exchange rates are not the direct target but prices are, which has generated the greatest emphasis on the importance of a credible structure. The reason is simple. It is not possible by observing day to day trading to judge definitively whether or not the central bank is following its target. That will only appear over a longer time horizon. With a new regime, markets will not necessarily give a central bank the benefit of the doubt and will price in a margin for the risk that they will not do what they say. Hence, the literature on inflation targeting emphasises that this approach to monetary policy is characterised by the existence of a clear commitment to a specific target for inflation and a framework that provides a credible commitment by the central bank to the achievement of that target. Leiderman (1999, p.50) puts this rather neatly. Because the central bank is facing an uncertain future and, in the case of Israel that he was dealing with, there is a history of bouts of high inflation, the bank will be more successful in influencing future inflation if it is aggressive. This is a major point that we address in Section 3 but there is a corollary for the framework. It needs to be clearly harsh and indeed operated that way or it will lose its credibility. But it must not be unbelievably harsh. The target must not be implausible. Over time, as the bank demonstrates its commitment and credibility rises, so the terms of the framework do not need to be so rigid. Indeed, one consequence of credibility is that markets do not respond adversely to 'mistakes' – the second round effects from a supply shock to prices will be small and persistence changes from being a problem to being an advantage.

The problem is thus one of balance. Central bankers need to be given the freedom to do their jobs effectively but not the licence to take actions outside their brief. Targets need to be narrow enough to constitute price stability but not so narrow that their observance stretches credibility. People need to be accountable for their actions but not for the consequences of uncertainty that lies outside their control. Where the point of balance lies in each dimension depends on the circumstances and to some extent can only be guessed at in advance. The two percentage point inflation band that has become common round the world was only introduced originally in New Zealand as being the smallest plausible round number. Even then it was hedged by a set of 'caveats' in the first Policy Targets Agreement

(Huang et al., 2002), as the Reserve Bank was not at all sure how readily it could be achieved.

With the benefit of hindsight, such ranges appear feasible, especially for a credible central bank. While the most recent Policy Targets Agreement still contains the qualifications, albeit much more simply expressed,³ it is unusual to see the target being expressed in public as anything other than 1 to 3% inflation in the CPI. The key point of the caveats is to exclude from central bankers' responsibility factors affecting inflation over which they have no control, viz. external shocks, government decisions, natural shocks, particularly those affecting food production. While maintaining price stability entails that monetary policy needs to offset changes in demand pressures, the same is not true for 'supply' shocks.⁴

Other regimes, where there are multiple targets or overlapping responsibilities for exchange rate policy and monetary policy will be inherently more difficult to make credible – but not impossible as the United States demonstrates. One result of this concern for both inflation and real activity in the US is that the economics literature traditionally uses models that have both objectives and models with simply a price stability target (Black et al., 1997) are less common even though that is the more common legal requirement. In practice, however, there will be considerable observational equivalence between the two (Mayes and Chapple, 1995) if the price stability target is applied in what is labelled a 'flexible' manner, giving time for effects to come through and seeking to control the outcome within a range rather than bring it to a single point. Israel (Leiderman, 1995), Hungary and even Chile (IMF, 2000) have faced problems of credibility when exchange rate and inflation targets have appeared contradictory.⁵ The uncertainty this generates has a cost.

To make the commitments credible, three mechanisms are usually applied (Table 2). The first is to make those involved personally responsible for failure, so that they lose their jobs if price stability is not maintained. This does not even require a formal contract to this effect, simply the knowledge by the ministers, central banks governors and their staffs involved that they would have to go in the event of a failure and that their careers would be harmed in the

process. (If they can exit into the private sector at greatly increased salaries then this sort of commitment is not going to be worth very much.) It is an intrinsic requirement for any such ‘contract’ that the terms have to be clear and the observance of it obviously and independently verifiable. This entails spelling out the objective. While the norm is that the government sets the objectives, this is not always the case. In the Eurosystem case, for example, the treaty does not spell out what price stability is and the ECB needed to do that before operations began.⁶

The second mechanism is to make it very difficult legally to change the objective of monetary policy, say by making the commitment part of the constitution, which requires a two-thirds majority in both houses of a parliament and agreement by the President, for example. Even so, in a crisis governments can and do act beyond their powers – constitutions can be overridden and the result validated (or not) after the event. If the link has been successfully broken, establishing that it was the result of an illegal move does not put it back.

The third mechanism is to make breaking the link so expensive to the country that it would only be undertaken as a last resort. (The reputational loss outlined for personal responsibility is of course part of the same line of argument.) This can occur from the costs of the contracts that are broken, the premium that will have to be paid in raising new debt, the loss of GDP involved in the transition and so on. If there is no such cost at the time, the usual time consistency problem described by Kydland and Prescott (1977) and set out by Rogoff (1985) in the case of monetary policy applies. (If it is easy to exit then a system will not become credible, even though it has all the other ingredients for credibility, because people will believe that the commitment will be broken under pressure.)

The traditional indexes of the monetary policy framework tend to be couched in terms of independence (Cukierman, 1992) which focus on (16 aspects of) the legal framework, although he too considers the rate of turnover of central bank governors as being a better measure of reality than the legal position (Sturm and de Haan, 2001). Secondly, they focus on aspects of accountability, although many of these are more practical and relate largely to implementation concerns

that we deal with in the next section. Unfortunately, such lists are rather arbitrary as they represent a series of features against which countries can be ranked. However, it is very difficult to say whether each of these features is equally important – how for example might one decide the relative importance of whether the governor having a term of office that exceeds five years or whether some members of the board are political appointments? Fortunately, Freytag (2003) not only offers a comparison of some of the different indexes for a group of central and east European countries (Cukierman et al., 2002; Maliszewski, 2003; Dvorsky, 2000) but he provides 13 criteria of his own, which he labels an ‘index of monetary commitment’. This is much closer to the flavour of what we are describing here but, even so, these criteria are still simply a checklist of relevant features and assigning them equal weights and adding them is still arbitrary.

Freytag’s list importantly includes accountability. In one sense it is not so much that a central bank has to be held to account (Briault, Haldane and King, 1996) but that it has the opportunity to explain itself in public. Clearly it can do so directly by publishing and distributing reports but being able to report to parliament on a regular basis is useful not just to help increase understanding but so as to help ensure that the basis for judgement is fair. In the United States the regular twice yearly hearings by congress are perhaps the most important opportunity for explaining policy and having the opportunity to lay out the central bank’s concerns before the administration. However, a bank that was not required to account for itself and did not do so could be thought to have something to hide.

These checklists are full of exceptions. The Hong Kong Monetary Authority for example has no proper basis in law yet it is a highly credible, respected and independent institution. The Reserve Bank of New Zealand has little financial independence – it has a five year funding agreement with the government for its budget, it manages the reserves on behalf of the government and other public sector entities without owning them. The government also has the right to over-ride the agreement on the policy target, yet New Zealand is ranked very highly in terms of credibility. The central bank actually raised interest rates in the run up to an election (August 1990) when there were signs of ‘fiscal slippage’ (Bernanke et al., 1999).

The largest OECD economies are not inhibited by their framework from picking what they think is the most appropriate to their objective. The ECB has defined what it means by price stability, the UK is targeting inflation on a definition laid down by the government and the US is following an inexplicit approach to achieving multiple goals that is clearly delivering quite stable prices.

2 PRACTICAL REQUIREMENTS FOR A CREDIBLE POLICY

Currency boards and euroisation do not require central banks as such, nor really do credible hard exchange rate pegs, and the authorities providing over such regimes are often referred to as Monetary Authorities or Banking and Payments Authority in the case of Kosovo. Their required actions are largely automatic and hence their role is more one of monitoring and detecting strains to the system, rather than needing complex decision-making about what should be done in an uncertain world. Indeed that is precisely their attraction when uncertainty is high.

More traditional monetary policy is however somewhat clouded in mystique. Not surprisingly practitioners wish to demonstrate their skills but as Sherwin (1999) points out in Blejer et al. (1999), which is a helpful guide to the practice of inflation targeting, there is a tendency to believe that there is quite a long list of demanding requirements. In practice the early inflation targeters did not have luxury of the tools that are now available and yet were adequately successful. This point is emphasised by Stone (2003) and Carare and Stone (2003) in their discussion of what they label 'Inflation Targeting Lite'. They distinguish fully fledged inflation targeting from its 'lite' sibling not in terms of the tools available but in terms of the credibility of the commitment. Fully fledged inflation targeting is possible with limited tools, as is discussed in Section 3. What will not work well is a regime with low credibility, however sophisticated the tools. Hence the credible framework, whether earned by a period of success, inherited from another institution or imposed through the legal structure, is the essential ingredient.

If we focus on the case of the first inflation targeter, New Zealand, which had to develop credibility for itself, without recourse to the previous success of others, it did not have:

- a good basis of reliable relevant data
- a tested and reliable model of the economy
- good estimates of the relationship between the instruments of monetary policy and inflation all of which are nowadays thought to be essential ingredients for success.

In the late 1980s New Zealand did not have quarterly national accounts, although most of the components existed. It did not and still does not have a monthly CPI, the index is published quarterly, although various of the components are available monthly. The economy had undergone a period of dramatic structural change in the previous few years (Bollard and Mayes, 1993a,b) and this had caused the Reserve Bank's main model of the economy to break down.⁷ This change from probably the most regulated to among the less regulated OECD economies in just a few years is probably the most dramatic structural break in post-war recovery developed economies before the collapse of the Soviet Union. Its approach to forecasting was based on spreadsheets, employing a number of indicator models and simple rules of thumb to enhance sectoral expertise and impose accounting conventions. The approaches to forecasting inflation (Beaumont et al., 1994) were largely in the form of a mark up. This gave pride of place to the role of the exchange rate, which, in an open economy like New Zealand, fed through into import prices and hence directly and indirectly into consumer price inflation. This was enhanced by a detailed examination of the components of inflation, including administered prices, which still formed a noticeable portion of the variance. As a result policy decisions were dominated by the exchange rate channel, despite the fact that primary impact of the setting of policy fell on interest rates.

Until 1999, New Zealand operated a slightly unusual approach to affecting market interest rates by managing quantities and the cash ratio in the overnight market (Huang et al., 2002). This had some impact on volatility and enhanced the role of explanation over direct measures in affecting interest rates and interest rate and inflation

expectations. In particular it meant that the relationship between the Reserve Bank's direct actions and inflation was difficult to predict. The strong role for expectations entailed a large element of judgement and the intermediating role of the exchange rate meant that policy had to be very contingent. The Bank would have to reappraise its policy settings when it saw the impact of a change on the shape of the yield curve and the exchange rate. This meant that in practice the Reserve Bank set a 'comfort zone' of exchange rate movements that were thought consistent with maintaining price stability and hence required no second round reaction from the setting of policy instruments. This idea of a 'comfort zone' is a key component of the argument for robust policy in the next section but here the point is that it reflected only a very simplified view of the impact on inflation. Departures from the status quo needed to be substantial before action would be taken. Typically policy decisions to move desired interest rates would be in steps of 50 basis points. Anything smaller would imply more accurate knowledge of the transmission mechanism than was realistic.

This pattern of being able to make reasonably accurate statements about the transmission of foreign prices through to inflation and about the exchange rate channel, if the exchange rate is not fixed, has been typical of transition countries (Randveer and Sepp, 2002). Similarly the direct impact of changes in other components of the price level, whether administered prices or wages can be judged. Where forecasting tends to fall down is in second round effects and in assessing other transmission channels, particularly for interest rates and expectations. Bank lending, balance sheet and credit channels tend to be much less important when financial markets and the financial system are limited.

There was, of course continuous work both to 'repair' the econometric model and to develop substitutes but it was not until over five years after inflation targeting was begun that more complexity was introduced, in 1994/5, with the incorporation of a Phillips curve using an output gap, that the complexity of dynamic response over the course of the cycle began to be rigorously incorporated and the policy horizon pushed out from one to two years (Mayes and Riches, 1996). It was a further two years until the Reserve Bank's new model

(Black et al., 1997) began to be used in the forecasting and policy process.

It is significant that this new model was calibrated rather than fully econometrically estimated, although of course such calibration is based on estimates (Dennis, 1997, for example), as even over a decade after the reform process began it was still not possible to produce reliable estimates of some key areas of economic behaviour, particularly in the labour market. The new EU members have similarly found themselves needing to have a strong element of calibration (CNB). The economy is thus modelled with an emphasis on economic theory and the behaviour of other countries so that the database can be extended. These models are strongly structural in character, so that they can aid thinking through policy rather than having a strong pretence at high accuracy. Indeed the more they are tuned the less informative they tend to be as people become less able to understand how they work.

The main compensating approach is to try to extract information direct from the data, with little regard to theory, by using some form of VAR or other fairly mechanical form of representing the dynamics of the economy. This form of modelling was followed by the NZ Institute of Economic Research in the early years following the start of the reform process and provided the main external counterweight to the RBNZ's forecasts (Easton and Wells, 1986). This is in addition to the statistical time series models applied at the sectoral level that have already been mentioned. Forecasting thus becomes a combination of simple theory, statistical regularity and judgement, with relatively little confidence in the results more than a limited number of months ahead.

It is worth reflecting that the ubiquitous Taylor rule for monetary policy is not actually forward looking (Taylor, 1993). It simply suggests that for the US a suitable policy could be characterised by reaction of interest rates to the deviation of inflation from its desired value and to some measure of the output gap. It can therefore be thought of as a simple error correction mechanism. The correction implied for interest rates needs to be strong to bring inflation back on track but not so strong that it overshoots. Since our information on

inflation and economic activity is only available with a lag, applying a Taylor rule would strictly require estimating current levels of these variables. Even if lagged information is used the result will not be substantially different. Huang et al. (2002) explore the effects of a range of leads and lags in the application of Taylor rules for New Zealand. While using current or even information lagged one quarter can explain policy quite well, the main difference is that previous interest rates become much more important relative to inflation in the explanation. Looking one to three quarters ahead seems to provide the best explanation. Thus although in theory policy was looking further ahead in practice only a fairly short horizon seems to act well as a description.

Because it is only possible to affect inflation with a lag the further ahead a central bank can look the better. If the reliable forecasting horizon is short, or even non-existent there is a danger that policy will have to react more vigorously and could cause some instability in the economy of its own.

The Reserve Bank of New Zealand was not only the first central bank to adopt inflation targeting but it faced somewhat greater problems from data and structural change from some of the others. It is noticeable, for example, that the Bank of Canada, which started the regime in 1991 was able to implement the main suite of tools within five years (Bernanke et al, 1999). However, attaining credibility for the target also took two or three years. Like New Zealand, much of the credibility came from the actual achievement of price stability after years of higher inflation. New Zealand took only two years to achieve the inflation target, rather faster than actually intended as described in the next section.

There is, however, one major difficulty with using very mechanical models of the transmission mechanism to assess the needs of policy. While they may be able to reproduce much of the interest rate and exchange rate channels, they will tend to be weak on the expectations channel and on the very issue which matters most – what will be the impact if the central bank takes one decision rather than another.⁸ As is emphasised in both Black et al. (1997) and Coats et al. (2003) for the Czech National Bank, their forecasting and policy systems

are if anything more valuable for simulating the impact of different policy decisions and different scenarios than they are for producing a baseline forecast. VAR models include in their coefficients the 'normal' response of monetary policy and hence can only show the impact of monetary policy 'surprises'. Traditional, more structural models tend to play down the impact of a 'surprise'. If a central bank does not do what people expect will be necessary to achieve its target, this may cause people to change their expectations, which will have a large and immediate effect on financial markets that can be translated through to inflation quite rapidly.

For example, failure to act when expected may be interpreted as implying that the inflation target is of less importance than was previously thought and hence weaken the credibility of the current stance. In the same way a surprisingly vigorous response may shock expectations back to the target. Huang et al. (2002) argue that policy needs to be over-vigorous when credibility is limited. This is difficult to model and is widely ignored. The problem is compounded where forecasts for anything other than the very short run are produced on the basis of 'constant short run interest rates' (Kontulainen et al, 2004). Such an assumption implies that a forecast can be put together which is partly counterfactual in assuming that policy does not change, while many short run forecasting methods, including VARs do not make that assumption. The normal process of combination of methods will then water down the impact of holding policy constant compared to doing what people expect. It will give the impression that monetary policy is relatively ineffective and hence that inaction is less harmful (action is less beneficial) than is actually the case.

Thus while the tools at hand can be simple yet effective, it is essential that they include estimates of the most important aspects of the transmission mechanism even if in very general terms.

3 INGREDIENTS OF THE ROBUST APPROACH

Lars Heikensten (2005) Governor of the Sveriges Riksbank puts the action of the policy maker in its most straightforward terms 'We have ... worked with a simple policy rule: If inflation is forecast

to be above target one or two years ahead we normally raise the repo rate and vice versa if the forecast is below.’(p.1). This statement has two key ingredients. The first is that it states how far ahead the Riksbank tries to look and the second is that it only relates to the direction of change. Such a policy rule is very easy to communicate. It is not mechanical but it leads people to know what to expect, however, it is not clear in one vital respect, namely, what is meant by ‘the target’. Looking at the examples given in the charts he clearly means deviations from the 2 percent middle of the range target, but deviations that amount to at least 0.2%. This is rather fine tuning.

The approach to robust policy developed in this section argues that a rather coarser approach to policy could be followed where there is more uncertainty. However, it can also be quite simply explained. We can distinguish three sorts of circumstance that can face the policy maker when needing to make a decision:

- expected and current inflation are consistent with price stability
- inflation is moving away from the desired range and expected to continue to do so
- inflation is or will be clearly outside the target for what is acceptable

These three circumstances in turn imply three types of response:

- no action
- a measured change in the right direction
- firm action in the right direction.

The picture is clearly non-linear. It is inherent in this framework that price stability constitutes not an unchanging price level but that one which moves within acceptable bounds. Hence there is range of acceptable movement requiring no intervention and a range of outcomes that are unacceptable and would be interpreted as poor performance – leading to changes at the top of the central bank – and therefore require sufficient action to avoid their eventuating. In between the picture is less clear – there is some threat and a response is needed but errors in judgement can be corrected subsequently

without moving into unacceptable territory. The inaction range in the Swedish case is quite small.

Much of the problem is to determine where these boundaries lie. Moreover there is no reason to believe that they should be symmetric (Mayes and Riches, 1996; Mayes and Virén, 2005; Peersman and Smets, 2005). They are in any case statements in probability as the shocks which will assail inflation in the future are by definition largely unknown or at least probabilistic. Determining where they are will in most cases be partly the result of experiment, it is to be hoped without serious error. In the central zone of acceptability, actions by the central bank to correct observed fluctuations in inflation are more likely themselves to increase the variance of prices and increase uncertainty in the outside world. Straying into the third area implies either previous policy errors or unusually large shocks where clear corrective moves are required. In the middle area, the moves are largely anticipatory – of unwelcome outcomes that it is thought could be avoided.

This non-linear approach appears to characterise monetary policy in EU countries even without any explicit inflation target. Mayes and Virén (2005) find that there is effectively a corridor for monetary policy running from 0-4% for inflation or -2 to +2% for the output gap over the period 1993 to 2001.⁹ Inside the corridor the policy response is much weaker than outside. It also appears that central banks have responded more vigorously to deflation than to inflation above the corridor. In part this may reflect the finding in Peersman and Smets (2005) that a monetary policy tightening is more effective in an expansion rather than a recession.¹⁰ Non-linearity was also built into policy and models at the Reserve Bank of New Zealand through treating the Phillips curve as a curve and not a straight line (Mayes and Riches, 1996; Mayes and Razzak, 2000). Here the implication is that policy needs to respond increasingly rapidly as demand pressure rises but that low levels of demand pressure inflation tends to bottom out.

3.1 Deciding What is Acceptable

It is a well known adage, attributed to Keynes, that it is better to be roughly right than precisely wrong. This clearly applies in the case

of monetary policy. Achieving price stability does not mean that the general price level remains invariant, simply that the variations in it remain sufficiently small that they are largely neglected in much of ordinary transactions. What constitutes ‘sufficiently small’ is largely a behavioural matter rather than something that can be defined in advance, although in a sense that is exactly what the designers of monetary policy regimes have done. Something of the order of the price level not varying from that expected by 1 per cent either way seems to be that laid down in inflation targeting, while how much drift should be permitted in the base level itself varies from none (after correcting for measurement error) to around 1 per cent in the EU countries and Canada. These definitions exclude erratic items and in the case of the Czech Republic a number of administered items that are expected to show an upward drift.¹¹ This issue of handling these items is part of our concern for robust policy. There is a separate issue that we do not address fully here, which is how transition economies wish to handle the steady relative price increase that can be expected between nontradeable services and tradeable goods and services, often captured by the idea of the Balassa-Samuelson effect. Since productivity increases are difficult to achieve in many industries, because output is measured largely in terms of labour input, the rise in real wages that occurs as the transition countries converge on their better off trading partners is likely to be reflected in prices if the exchange rate cannot appreciate.

Of course many central banks do not offer any explicit definitions of price stability, including the Federal Reserve, and one might look at their actual performance to get an indicator of what they felt was appropriate. However, actual performance may be better or worse than the central bank’s wishes. On the whole there has been no comprehensive attempt to measure or assess exactly how people behave, although one could perhaps consider escalator or renegotiation clauses in contracts which are not normally for less than one percentage point where price refixing is at all costly.

Hence outcomes which are in this sort of range are likely to be acceptable. Indeed if exchange rate targeting is followed the chances are that it will be difficult to keep variation within such a narrow band, unless the two economies are very similar and well integrated.

We noted in Section I that it does not make sense to make central banks responsible for price changes that are outside their control, namely, the initial impact of supply shocks and government policy decisions. Nevertheless, these price changes take place and do affect people's reactions and perception of price stability. Inflation targeting central banks therefore face a dilemma about how they should view their target. From the point of view of how they should stabilise the general level of prices, they need to exclude the 'erratic' items from their operational target. It is particularly important to exclude items that relate to interest rates otherwise policy could become procyclical, reacting to increases in inflation that are the consequence of the central bank's attempts to reduce inflation by raising interest rates and hence having a spiral of tightening (albeit a convergent one).¹² This means that they often derive some measure of core or underlying inflation that strips out factors which might be thought to distort the general tendency and use that measure as the focus for policy. However, it is not at all clear that the general public will view the target in the same way, whatever the nature of the agreement with the government.

The dilemma in design for credibility is thus

- should the public target be what people understand by inflation/what is normally quoted publicly as the rate of inflation, in which case there are likely to be more occasions on which outcomes vary from the target, or
- should it be some sort of underlying measure (which can be independently computed so that the central bank is free of charges of manipulation), in which case the central bank is likely to succeed more often in terms of the agreement with the government but not have any greater success in achieving the desired outcomes in terms of how people view the stability of prices.

The general experience seems to have been that these underlying measures may be sensible as operational targets but that they have problems as communication devices. The Eurosystem has been going through just such a dilemma in recent years, with headline inflation being higher than underlying inflation excluding non-processed food and energy prices. The price index they use (the Harmonised Index

of Consumer Prices, HICP) already has a number of exclusions, particularly in the field of housing, because comparable information was not available from all the member states. There is thus some element of luck over the extent to which the commonly accepted definition of inflation matches both with what it would be most suitable for the central bank to target in practice and with what it is easier for the central bank to control. With an exchange rate target, the central bank has to hope that foreign prices will be stable and that non-monetary pressures limit other influences on prices.

In any event the definition of price stability which the central bank has as its target needs to be generally accepted. That limits the temptation to manipulate it. The target will lose credibility if it is frequently changed (Huang et al., 2002) and can result in discontinuities in policy and consequently in inflation if it is imposed on the central bank by the government.¹⁵ From a practical point of view the chosen definition of price stability, whether chosen by the bank or imposed on it by the government will offer a range of acceptable variation over the short run (usually over a year) and possibly over the longer term as in the case of the ECB. The longer the time period the more limited the acceptable variation is likely to be and the more items that are excluded from the target the narrower the range. The Reserve Bank of Australia, which had probably the longest list of exclusions from its target index, targeted a 'thick point' effectively a one percentage point range (Haldane, 1995).

3.2 Moving in the Direction of Acceptability

In achieving acceptable outcomes the central bank can follow a number of strategies. However, the literature is dominated by the model used by Rogoff (1985), Taylor (1993) and Walsh (1995) *inter alia*, which suggests that society and hence the central bank will have a loss function in terms of deviations of inflation from its target and output from its sustainable growth path. This largely reflects the existence of multiple objectives for monetary policy in the US. Since many other central banks only have other targets that are subordinated to price stability, it is probably more general to focus just on the price stability objective. Fortunately, there is quite a wide

range of outcomes where putting a reasonable weight on the inflation objective and none on output still achieves outcomes that are not far away from those deemed optimal under joint policies: '[inflation forecast-based] rules prove more efficient at minimising inflation and output variability than standard Taylor rule specifications, and almost as efficient as fully optimal rules. These results seem robust across different model specifications' (Batini and Haldane, 1999, p.5). Very similar targeting rules are incorporated in the Reserve Bank of New Zealand model (Black et al., 1997) as representing their policy objective. The rules are of the general form

$$r_t = \alpha r_{t-1} + (1 - \alpha) r_t^* + \sum \beta_i (\pi_{t+i}^e - \pi^o)$$

where r is the policy interest rate the rate of inflation; superscript e denotes a forecast value, $*$ the equilibrium rate and o the target. Batini and Haldane (1999) use a value of 0.5 for α and find that values of β between 0.5 and approaching 1 seem to generate the most favourable outcomes.

The important features of these results are that optimality requires looking forward only a little, 2-3 quarters, and a degree of inertia or willingness to move steadily rather than directly to achieving the target. This fits neatly with the concept of flexible inflation targeting (Svensson, 1999). However, this all reflects ex post analysis. The Reserve Bank of New Zealand had been running inflation targeting for nearly a decade before these results appeared. In Mayes and Riches (1996, p.15) we made it clear that we were aware that there were trade-offs but 'We have not seen any evidence as yet which would allow us to calibrate the[m]'.

The key ingredients are that policy should point in the right direction when expected inflation is away from the desired value and that it should seek to bring inflation back to the desired value at a measured pace. As pointed out in Mayes and Riches (1996), it was clear with the benefit of hindsight that monetary policy had been too tolerant of inflationary pressure in 1993-4 and allowed too great momentum to emerge. The 'comfort zone' that had been applied was that on the simple model that was employed (Beaumont et al., 1994) inflation was not expected to get within 0.2% of the

edge of the target zone of 0 to 2% inflation¹⁴ (although not stated as such at the time but as pointed out by Nicholl, 1995, it could be inferred). It was anticipated there would be enough time to correct any misjudgements.

That judgement was shown to be wrong when inflation exceeded 2% in the second quarter of 1995 and the June Monetary Policy Statement announced that as a result, in future policy would be always aimed to bring inflation back into the 'middle of the range' 6 to 18 months ahead. What was meant by the middle was not defined in the Statement. However, a look at subsequent forecasts suggests that outcomes after the application of policy were normally expected to be in a range of less than 1 percentage point.¹⁵ Although this sounds quite a mild change in approach it altered the focus of policy from avoiding going outside the target range to steering towards the middle of the range all the time. Subsequent inflation targeters, who had their target defined as a point with a tolerance band round it, such as the UK, had a clear incentive to focus on the middle from the outset.

However, the more relevant period for the transition countries outside the EU is that before policy became fairly closely calibrated. When inflation targeting started in New Zealand, policy focused on moving inflation in the right direction, without any great knowledge of how large an interest rate change was required. Thus, with headline inflation running at 7% a year when inflation targeting started, the aim was to bring it down to the zero to 2% range over a period, intended to be three years (later extended to four by the new government just over a year later). In practice it was achieved in two years. Similarly in 1994, as it became clear that inflation seemed set to rise, policy was tightened progressively. Interest rates ultimately rose by 600 basis points over the course of 18 months but a tightening of this order was not contemplated at the outset nor indeed did it seem likely well into the process.¹⁶ Policy making was characterised by a steady revision in forecasts. However, this is not simply a feature of one country with limited data and limited forecasting resources in the middle of a period of structural change. The same applies to the ECB (ECB, 2005) where an appraisal of all the published forecasts shows they have been steadily revised and that inflation

has been much more stubborn than expected. Continuing revision is thus to be expected and policy progresses very much one step at a time even though the appraisal at the outset traces through a path to maintaining price stability at each step.

3.3 Handling Uncertainty

Robust policy is a means of handling uncertainty (Kilponen, 2003). However, the three main sorts of uncertainty which are normally distinguished: additive, multiplicative and 'model' uncertainty, each require different strategies for monetary policy, so it is necessary to be clear what applies in the particular circumstances. In the case of 'additive' uncertainty, which often simply reflects the uncertainty about what may happen in the future, there is no need to take special measures, certainty equivalence applies. Such uncertainty is not thought to alter the mean over the future it simply reflects the variance and in many cases is not really possible to parameterise.¹⁷ In theory a central bank might adopt a different policy stance if there were more or less uncertainty. This is certainly true round turning points where policy tends to become rather cautious and more heavily debated. It is to be distinguished from the risk assessment, which is common among central banks, that considers whether the distribution of likely outcomes of the future is skewed. Indeed, policy will shift if there are specific scenarios that are rather different from the main forecast seem quite likely. In effect policy makers may hedge their bets (Novo and Pinheiro, 2003). In other words, on occasion, it may appear more important to lower the risk of very unwelcome events than simply to target what is most likely.

The main prescription in the literature, however, relates to multiplicative or Brainard (1967) uncertainty, which considers the problem that the central bank is uncertain about the main parameters in the transmission mechanism. Here the prescription is clear, policy makers should exercise caution and take smaller rather than larger steps as they may be making mistakes. However, in the main the traditional literature ignores the fact the people learn (Kilponen, 2003). The key issues are how do central banks learn from their mistakes and how do markets and other agents learn when they also

see central banks making what they think is inappropriate decisions. The framework in which uncertainty about how the economy actually works and the ability to influence it requires a more complex set of feedbacks.

The implications of the caution from multiplicative uncertainty are very different from the ideas of robust policy and uncertainty about the whole model of how people behave. In the latter case it is possible to set limits to likely behaviour but the problem can be inverted. In the Brainard case policy starts from a position of comfort and tries not to move into a problem. In the robust policy case the idea is reversed and the bank has to consider what sorts of things could happen that make their policy decisions incorrect. Thus there is a substantial area of ‘outcomes’ that will not threaten price stability if the central bank has taken a decision based on the most likely future and their best guess as to how the economy will function.

What the policy maker seeks is a form of robust control (Hansen and Sargent, 2002; Onatski and Stock, 2002; Kilponen, 2003) whereby despite ignorance about how the economy works, the current position and the shocks that might assail it, shocks and errors are corrected sufficiently quickly that the economy does not veer outside the zone of acceptable variation. Clearly it is not possible to cover all eventualities but the requirement of a robust policy is that it is compatible with a large range of them. In particular, by virtue of its robustness a robust rule will be adequate but less than optimal in circumstances where more is known but more effective under greater uncertainty than more specific approaches based on models that turn out to be poorly specified (Kilponen, 2003).

What these ideas of robust control suggest is that the greater the uncertainty then the more aggressively the policy maker needs to react and, not surprisingly, the more averse the policy maker is to a particular outcome the more aggressive the reaction. The key point is that this is a process. As time goes past so the policy maker slowly learns about how the economy works, gets better information on the current position and understands more about the likely distribution of shocks. As this happens so the area in which

aggressive responses are not needed widens. However, the target is not fixed. Particularly in transition economies, the economy itself is changing, the structure of activity, the nature of regulation, the range of financial instruments and above all people's behaviour will change in the light of experience. The problem is thus not static but even in a dynamic environment it is possible to learn and hence narrow the extent of ignorance. Indeed it is the existence of dynamic processes and the need to stop difficulties multiplying rapidly out of hand that underpins the most straightforward objections to Brainard style caution (Söderström, 2002).

A crucial feature of robust control is that by its very robustness it offers a measure of credibility to people. They can appreciate how it works by observing firm and coherent action. Thus while the central bank faces uncertainty itself it generates more confidence for others by acting in a clear manner. In many respects the theory behind robust control works on the 'evil agent' principle. The central bank needs to consider what is the worst that could happen in the various dimensions in which it operates. Mayes and Razzak (2000) describe this for the case of the impact of interest rates and the exchange rate on inflation in New Zealand in the mid-1990s. (Another example of policy running ahead of the supporting theory.) The Reserve Bank had a moderately accurate estimate of the impact of exchange rate changes on inflation as described above. It was rather less sure about the impact of interest rates, even though it was interest rates rather than the exchange rate that it could affect directly. Studies in other countries suggested that the degree of openness of the economy was the major factor but estimates varied between the extremes of the effect of a 100 basis point change in the real 3month TBill rate being equivalent to a change in the real effective exchange rate in the range 1 to 3 percentage points.

Hence robust policy was run on the basis of the most unhelpful outcome (Figure 1.) From a starting point with which the Bank was comfortable the Bank would intervene to alter policy on the basis of what was the least favourable outcome with respect to the impact on inflation. It would do nothing if inflation was not threatened but would change the setting of policy at whichever of the 3 to 1 range gave the earliest sign of a threat to the target either upwards

or downwards, giving a zone of inaction as illustrated in the Figure. (In that period the normal interest rate adjustment was 50 basis points).¹⁸ The greater the uncertainty, then the smaller will be the comfort zone.

The remarks thus far embody general principles rather than explicit prescriptions for action. Much of the literature on robust policy assumes that central bank's will apply some sort of 'rule'. As McCallum (2003) explains clearly, rules in this context are a contingency plan – a predictable but evolving process of decision making instead of a series of unrelated decisions – not a rigid scheme that could be applied use a narrow formula. Hence they are a strategic approach to policy making. While a traditional Taylor Rule type of approach may work quite well in the conditions of substantial information available in the US and elsewhere, it is not so robust when applied under uncertainty, especially uncertainty about the size of the output gap (Ehrman and Smets, 2003; Orphanides, 2003).

What is advised by Walsh (2004) is following a 'first difference rule', namely focusing on the rate of change rather than the level. A range of output indicators can suggest that growth is picking up even if it much more difficult to decide whether growth is above or below potential. They at least suggest the direction that policy should move.

Basing responses on the rate of change provides a simple framework for applying robust policy. Where current settings seem effective small changes are unlikely to require much in the way of a response. Larger changes that seem likely to move inflation noticeably merit a measured response while changes that suggest a threat to price stability require firm action. However, all of this needs to be placed in a framework so that the actions by the central bank are viewed at the time as being part of a coherent strategy for maintaining stability. Moreover, because of the credibility of the framework price setters will act in the expectation that the bank will succeed, which will in itself make the continuing achievement of price stability easier. As far as possible the central bank needs to be forward-looking but with this form of robust action responses based more in the present can nevertheless help to avoid the making of errors of a scale that would harm credibility.

4 THE EXTENT OF UNCERTAINTY

In order to see how far it is possible to run a robust policy we have explored the extent of the unpredictability of inflation in a subset of the EU's new neighbours and compared it to the conditions facing some of the early inflation targeting countries. This analysis proceeds in four steps. We first consider just how much variation there is in inflation in itself. We then go on to assess its persistence and hence how easy it is to forecast using just the few monthly frequency variables that are typically available. We take this in three parts, first considering the exchange rate as the determinant, then examining a simple money demand function and lastly putting all the ingredients together in a simple VAR. As is clear from the work of Pelipas (2005) on Belarus, which is one of the most inflationary of our examples, it is nevertheless possible to get a cointegrated and reasonably well determined VAR with sensible properties.

The initial step is simply to compute the standard deviation of inflation (Figures 2 and 3).¹⁹ Inflation has fallen in recent years across the board. Over the fifteen year period 1991-2004 shown in Figure 2, the standard deviation of monthly inflation was over one percent in 18 of the 25 transition countries shown.

Over the period 2000 to 2004 only Albania, Belarus, Armenia and Tajikistan were in that category and since then inflation has become much more stable and is now similar to that in the new member states of the EU in Albania and averaging about 1 percent a month in the first part of 2005 in Belarus.

However, although standard deviations and means are correlated (Figure 4), some countries like Albania and Armenia show much higher variation than would be expected from the average level of inflation (Figure 5). An important part of this stems from a strong seasonal pattern. This variation stands in clear contrast to Canada, Chile, Israel and New Zealand, shown to illustrate the position of early inflation targeters. There only Chile and Israel had comparable inflation variation prior to adopting the inflation target, even if the actual levels of inflation were clearly well above the target in Canada and New Zealand.

These differences are reflected in the ability to forecast inflation in these countries using lagged values and the lagged exchange rate (Figure 6). Here we have used 60 month rolling windows, starting in 1995.1 to project inflation in each month in the year following the estimation period. Average Root Mean Square Errors (RMSE) for all of the rolling forecasts are shown. The more persistent inflation is, the easier it is likely to be to forecast in this framework. In the more recent period only half of the countries have a RMSE exceeding 0.3%. Nevertheless the striking feature of Figure 6 is that inflation was much more predictable in the countries that did adopt inflation targeting. Since in the main this relates to the period before inflation targeting it suggests they started with quite an advantage over the transition countries, in statistical terms at least.

The picture is more varied when it comes to money demand (Figure 7). (Demand is assumed to depend upon the policy interest rate, (Artis and Beyer, 2004).)²⁰ Here the sample is smaller because of the constraints of the data, just seven transition countries, four of which have already joined the EU.

Nevertheless it is clear that relationship for countries like Albania, Bulgaria and Romania are not out of line with the other countries or indeed the inflation targeting countries. In part this is because of reverse causation in countries with an IMF monetary programme. However, as in the previous case, the results are subject to reservation because of the shortness of the sample period.

Finally, for the few countries for which a reasonable dataset could be constructed we look at the full set of variables: inflation, exchange rate, policy interest rate and M1 as a VAR. It can then be seen that by applying simple rules for policy appear to result in reasonably stable inflation. Since this is applying the structure of the countries before the adoption of the new policy, if the experience of the inflation targeting countries is repeated, it is reasonable to expect that inflation could be even more closely controlled.

Table 1. Monetary Policy Regimes in Central and Eastern Europe

Currency board	exchange rate target	inflation target	other
Bosnia Herzegovina	Belarus	Albania*	Kosovo euro
Bulgaria	Cyprus	Czech Republic	Montenegro euro
Estonia	Larvia	Hungary*	Romania*
Lithuania	Malta	Poland	Ukraine
	Slovenia*	Slovakia*	Croatia
	Russia	Turkey	Serbia
			Moldova

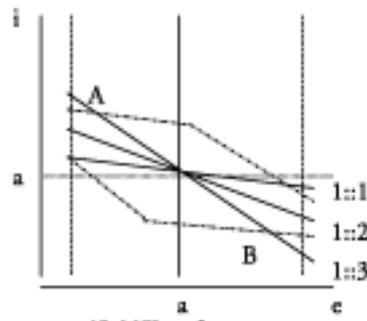
* Various countries are somewhat debatable as to the regime they should fit in. Slovenia is in ERM2, Hungary is following a mixed strategy of exchange rate and inflation targeting, Albania has a stated inflation target but has not technically adopted inflation targeting, it is still follow an IMF monetary programme, Slovakia describes itself as inflation targeting within the context of ERM2 but its longer term plan is clearly convergence to the euro, Hungary is following the same strategy, Romania is moving towards inflation targeting from an IMF monetary programme, Moldova has money targets as its operational target but these are aimed at achieving an inflation target.

Table 2. Credibility Features in the Monetary Policy Framework

Cukierman criteria	
G1	governor not appointed by government
G2	governor appointed for more than 5 years
G3	governor can only be dismissed for non -political reasons
B4	board not appointed by the government
B5	board appointed for more than 5 years
R6	no mandatory government representative on the board
R7	government approval of monetary policy not required
C8	statutory responsibility to pursue monetary stability
C9	legal provision supporting the bank in conflicts with government
D10	direct credit facility not automatic
D11	direct credit facility at market interest rate
D12	direct credit facility only temporary
D13	direct credit facility of limited amount
D14	bank does not participate in primary market for government debt
D15	all direct credit securitised
M16	discount rate set by the central bank
M17	supervision of commercial banks not by central bank/no only by central bank

Freitag Index of Monetary Commitment	
1	Objective of policy
	only price stability
	others stated
	others equally important
	none stated
2	Form of legal basis
	constitution
	central bank law
	decree
	not defined
3	Government discretion
	none over bank policy
	exchange rate by agreement
	exchange rate
	can over-ride the bank
4	Conditions for appointment and dismissal of governor
	relevant qualifications and experience required
	fixed term appointment
	dismissal only for criminal or performance reasons
5	Opportunities for lending to government
	granting of credit
	purchasing public bonds in the primary market
6	Who supervises and regulates the financial system
7	Accountability
	required to inform the public
	inform parliament in public hearings
	inform government in private
8	Exchange rate regime
9	Extent of convertibility
	multiple exchange rates?
10	Can other currencies be used in domestic transactions?

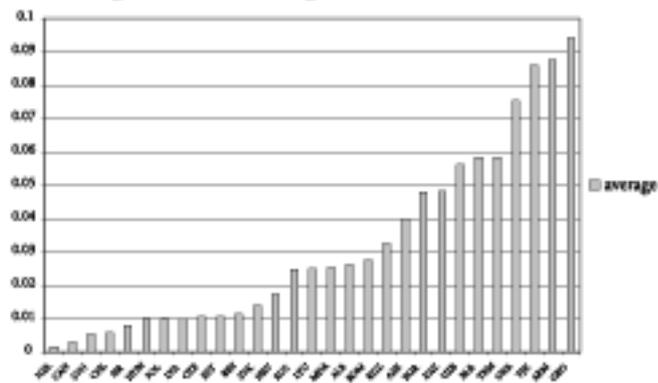
Figure 1. The Comfort Zone for Monetary conditions



Source: Mayes and Razzak (2000)

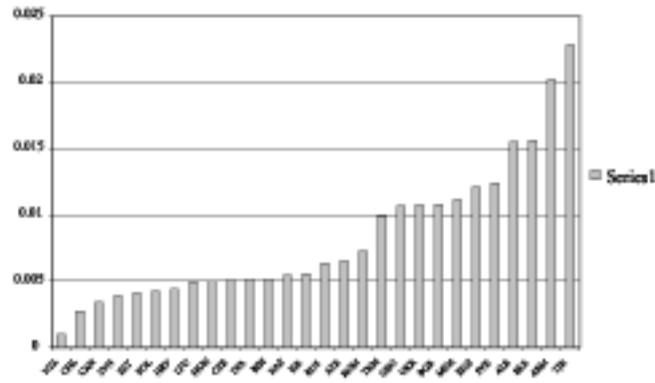
(d) MCI comfort zone
 Note: The area inside the dashed lines defined the 'comfort zone' within which market movements from the cross in the centre of the graph, in the absence of any change in other economic conditions, would not normally elicit any policy response. The lines 1:1, 1:2 and 1:3 denote the ratios of the effects of interest rates, i , and the exchange rate, e , on inflation.

Figure 2. StDev(d(log(CPI)) 1991-2004



Note: see Appendix for country abbreviations. Canada, Chile, Israel and New Zealand are shown for the years 1986-2004 as a contrast.

Figure 3. StDev Dlog(CPI), 2000-04



Note: Canada, Chile, Israel and New Zealand shown for 1986-90 to approximate the position before starting inflation targeting.

Figure 4. Monthly Inflation vs. StDev, 1991-2004

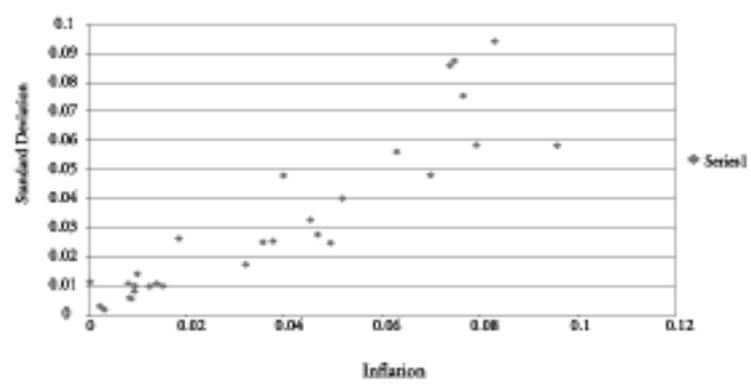


Figure 5. Average Monthly Inflation $d(\ln(CPI))$, 2000-04

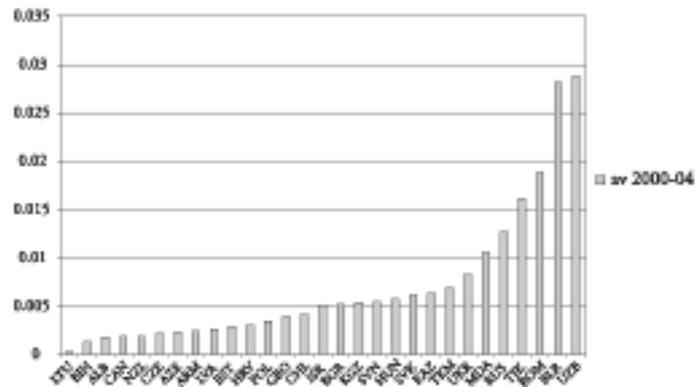
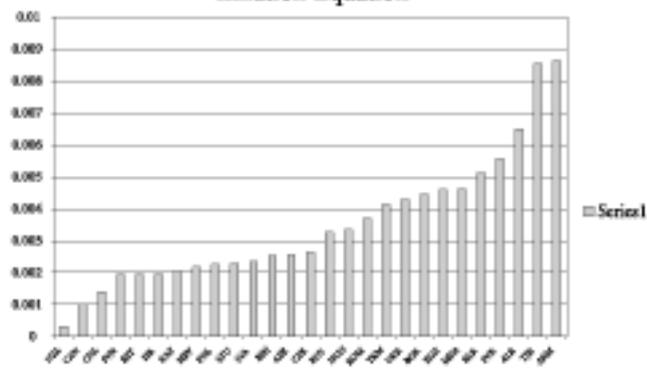
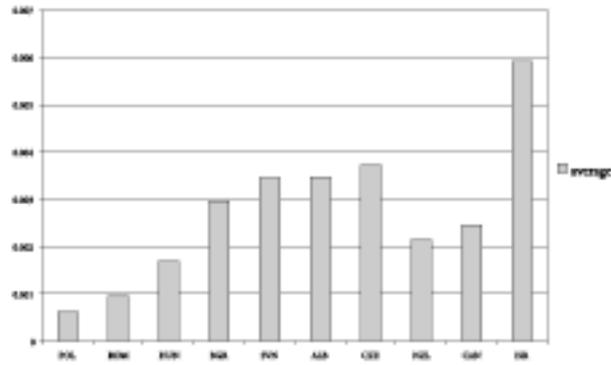


Figure 6. RMSE (1995:1-1999:12)-(1999:1-2003:12)
- Inflation Equation



Note: Canada and New Zealand shown for (1985:1-1989:12) - (1989:1-1993:12),
Chile and Israel for (1990:1-1994:12) - (1994:1 - 1998:12)

Figure 7. Average SSFE - Money demand equation



Note: sample periods vary and relate to full period for which data are available, as shorter samples presented some estimation problems. Thus the high value for the Czech Republic is in part because of the longer data period. (Israel is only a point estimate) SSFE (sum of squared forecast errors).

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APPENDIX

Country Names in Figures			
ALB	Albania	KGZ	Kyrgyzstan
ARM	Armenia	LTU	Lithuania
AZE	Azerbaijan	LVA	Latvia
BIH	Bosnia-Herzegovina	MDA	Moldova
BLR	Belarus	NZL	New Zealand
BGR	Bulgaria	POL	Poland
CAN	Canada	ROM	Romania
CHL	Chile	RUS	Russian Federation
CZE	Czech Republic	SVK	Slovakia
EST	Estonia	SVN	Slovenia
GEO	Georgia	TJK	Tajikistan
HRV	Croatia	TKM	Turkmenistan
HUN	Hungary	UKR	Ukraine
ISR	Israel	UZB	Uzbekistan
KAZ	Kazakhstan		

ENDNOTES

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¹ The views expressed in this article are those of the authors and do not necessarily coincide with any that may be held by the IMF or the Bank of Finland. We are grateful to Dermot Hodson for comments.

² No doubt the description of the Bank of Finland's new model AINO will be similarly weighty (Kilponen et al., 2004).

³ It runs 'For a variety of reasons, the actual annual rate of CPI inflation will vary around the medium-term trend of inflation, which is the focus of the policy target. Amongst these reasons, there is a range of events whose impact would normally be temporary. Such events include, for example, shifts in the aggregate price level as a result of exceptional movements in the prices of commodities traded in world markets, changes in indirect taxes, significant government policy changes that directly affect prices, or a natural disaster affecting a major part of the economy.' <http://www.rbnz.govt.nz/monpol/pta/0124848.html>.

⁴ There are in effect three sorts of 'supply' shock, those which are likely to have a temporary effect on the price level and be offset in future periods, such as year to year climatic fluctuations affecting food prices, those which are to some extent permanent but one off, such as changes in indirect tax rates, and those which are likely to be repeated, say adjustment of administered to market prices. The policy response needs to reflect the different circumstances, in particular whether the change is in any sense predictable, as it may be with government decisions.

⁵ As a result of the conflict Chile abandoned its exchange rate band in 1999 and moved to a floating regime.

⁶ There has been a continuing academic dispute about whether the ECB's target is clear enough, which is ironic given that the Federal Reserve does not (at present) spell out any quantitative targets yet gets less criticism (Issing, 1999).

⁷ This was the thirteenth in the line of increasingly larger scale models developed over a couple of decades; see Mayes and Razzak

(2002) for a summary.

⁸ While the credit and related channels will be an important part of the transmission mechanism, this does not appear to be the case yet in many of the transition economies (Mayes, 2004).

⁹ Lack of published data meant Greece and Luxembourg were excluded.

¹⁰ Their data set is longer, more detailed but covers fewer countries.

¹¹ The Czech National Bank targets 'net inflation' ignoring these items of 2 per cent, which translates into 3 per cent for the CPI, which includes them. It is common for central banks to make some such core, underlying or 'net' concept their operational target even when the target for which they are held accountable is headline inflation, as it is a more reliable means of stabilising the headline that targeting it directly.

¹² In many countries the consumer price index does not include credit charges but it did in New Zealand in the first decade of inflation targeting and to a lesser extent in the UK, whose target was expressed as RPIX, excluding such perverse elements. Nevertheless, consumers' disposable incomes are reduced by any such increases in charges and will feature in their wishes for their future nominal and real incomes in wage negotiations etc.

¹³ As Mervyn King pointed out (Daily Telegraph, 16th August, 2003) it is like taking 'a shot at goal only to find someone has moved the posts', such a change could be 'strange' and 'might confuse people'.

¹⁴ The extent of the comfort zone was revealed to markets, initially in general terms and later more explicitly (Nicholl, 1995)

¹⁵ Forecasts were thus made with policy changes included., although the adjustment was crude until the FPS model came into operation at the end of 1996 (Black et al., 1997)

¹⁶ Over the course of the cycle the Monetary Conditions Index increased by the equivalent of 1200 basis points.

¹⁷ A common description of uncertainty is just that it is not parameterisable (Dow, 2004). If it is then we describe it as a risk.

¹⁸ There is an important controversial corollary here. The Reserve Bank started with the presumption that market movements were in response to some movement in expected outcomes. Hence if a noticeable movement occurred the first reaction should be to look

for a probable cause. If one could be identified then the Bank should consider how the setting of policy should be changed. The chances were of course that the Bank would also detect the shock and would be appraising what it meant for policy irrelevant of the market signal. The discussion in the text therefore relates to reactions where there was no obvious reason for policy to react except that market changes, described as ‘portfolio shocks’ challenged the inflation target.

¹⁹ The dataset does not include Turkey, which is one of the ‘new neighbours’, simply because it is not classified as a transition country in the IMF database. Clearly it should be added in later analysis as it is a significant omission.

²⁰ Initial work with industrial production proved too volatile to be usable.

