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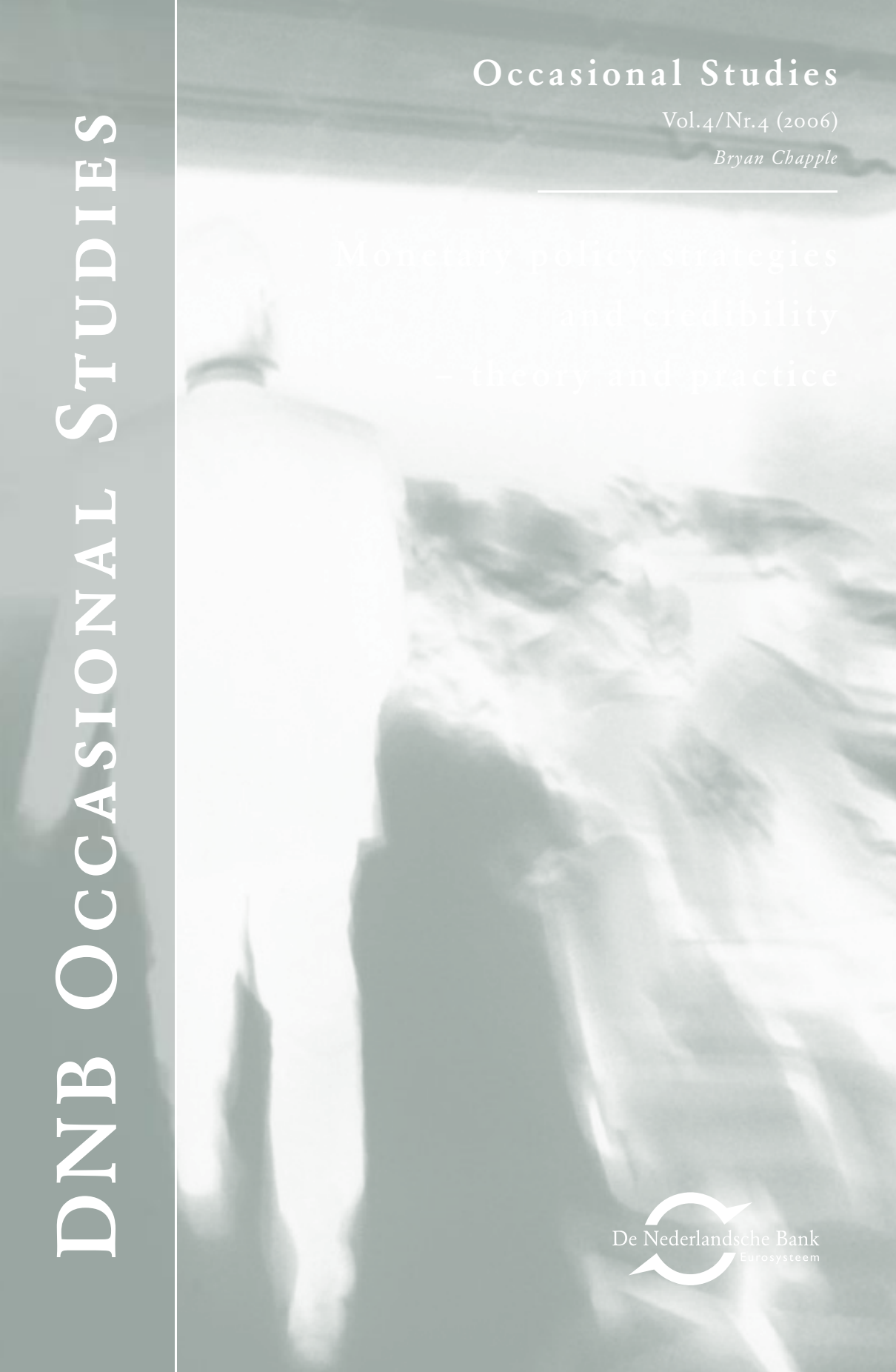
Bryan Chapple

Monetary policy strategies and credibility – theory and practice



De Nederlandsche Bank
Eurosysteem

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Central bank and prudential supervisor financial institutions

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1 Introduction

The practice of monetary policy has changed markedly in recent years. In addition to changes in the technical operating procedures, monetary policy strategies have been the focus of increased attention over the past 30 years. Monetary policy has been fortunate in that the interaction between academic theory and practice has been particularly marked (see, e.g. Blinder, 1998). King (2000) ascribes this to the large numbers of economists now working in central banking relative to other areas of economic policy. Whatever the reason, the interaction has been fruitful for those on both sides of the fence.

The focus of this article is credibility. For central banks, for whom reputation is everything, credibility cuts to the heart of the issues that they constantly grapple with. It is also a field in which academic insights have helped confirm and formalise the hunches of practitioners and have led to concrete changes in the monetary policy strategies adopted. The following section discusses the development of theory regarding credibility, including suggestions on how to obtain it. Section 3 turns to the practice of monetary policy to examine how central banks have drawn on the lessons of theory, while Section 4 considers the empirical evidence on credibility and the links to monetary strategy. In practice, central banks have taken somewhat different approaches to incorporating theoretical insights. However, the empirical evidence in Section 4 suggests that major central banks enjoy similar levels of credibility, despite strategy differences. This evidence begs the question of why these central banks have made different strategy choices. Section 5 therefore speculates on some of the factors lying behind central banks' different monetary policy strategies. Section 6 concludes.

2 The theoretical basis for credibility

The explicit consideration of private sector agents' expectations lies behind much of the recent theoretical literature on monetary policy. Friedman (1968) and Lucas (1972) formalised the notion that only unexpected monetary policy shocks affect real output. Once agents adapt to the changed monetary policy (and in the absence of further shocks), output returns to the natural rate level. This work helped overturn the then-prevailing Phillips curve notion of a long-run trade-off between inflation and unemployment, and laid the groundwork for a focus on price stability as the only long-run objective for monetary policy (King, 1999). However, the idea of a short-run inflation-output trade-off remains. The risk that central banks might try to exploit this trade-off was formalised (in a line of work initiated by Kydland and Prescott, 1977 and Barro and Gordon, 1983a) by taking into account the incentives of monetary authorities to diverge from previously announced plans – once private sector expectations are set. A monetary authority seeking to minimise a loss function incorporating both higher output and price stability has an incentive to generate 'surprise' inflation above the announced objective so as to (temporarily) boost output. However, assuming the private sector understands this temptation to pursue so-called time-inconsistent policies, expectations adjust, resulting in higher inflation but no output gains in equilibrium. This phenomenon has been termed an inflation bias and arises when the central bank tries to boost output above the 'natural' level of economic output that the economy can sustain.

The insights regarding a possible inflation bias came at a time that policymakers in many countries were grappling with the problems of trying to combat high inflation and stabilise output growth – the relevance of the theoretical work was therefore readily apparent. In the literature, possible mechanisms to counter the inflation bias have become associated with the concept of credibility because they seek to ensure that private sector expectations match the objectives of the central bank. A credible central bank can therefore be defined as one whose policy intentions are accepted at face value – that is, the private sector does not expect the central bank to try to temporarily boost output. This will normally arise once a central bank has established a reputation for delivering on what it promised. Within this framework, the benefit for a central bank of being credible is that inflation will therefore be lower, without leading to adverse output consequences.

The reduction in the inflation bias is a key theoretical benefit of credibility. However, even when the central bank does not try to boost output above its natural level, the literature illustrates that forward-looking expectations imply that commitment can generate benefits. Clarida et al. (1999) show that when price setting depends on future economic conditions, a central bank that can credibly commit to low inflation faces a better inflation-output trade-off (in the sense that inflationary shocks can be countered with less of an output cost) than under discretion. Their insight comes from recognising that the public's expectations affect not only prices in the current period, but also those in the future.

2.1 Mechanisms to build credibility

Given the potential importance of credibility, a considerable literature has developed on how to obtain it. The remainder of this section groups the various suggestions made into the following categories: reputation, monetary policy rules, institutional settings, central bank preferences, transparency, and a synthesis mechanism.

In an initial contribution, Barro and Gordon (1983b) use the notion of reputation to illustrate how, in a multi-period game, the public can increase inflation expectations and effectively 'punish' a central bank that cheats on its commitment to deliver a particular inflation rate. Subsequent literature (beginning with Backus and Driffill, 1985) has tended to focus on inflation performance as a signal of the underlying preferences of a central bank (which the public can never be sure that it knows). By delivering low inflation, a central bank can signal its implicit preferences and build up its reputation.

The concept of time inconsistency also gave new impetus to the debate on rules versus discretion for monetary policy. Originally, the issue concerned the usefulness of discretion. For example, Friedman (1959) argued that given the long and variable lags in the monetary policy transmission mechanism, discretion could not usefully be exploited and a fixed rule was preferable. Since the development of the time-inconsistency literature, the focus has been on the idea that credibility can be enhanced by using a rule to force the central bank to behave in a time-consistent manner. Inflation targeting and exchange rate pegs with a low inflation country are examples of targeting rules. However, following fixed rules also reduces the central bank's flexibility to react to shocks. In this case, better inflation performance comes at the cost of greater output volatility.

Institutional solutions have also been suggested to reduce the inflation bias; examples include the creation of independent central banks, and legislation setting price stability as the sole or primary objective of monetary policy (e.g. Cukierman, 1992). A legislative requirement can be interpreted as raising the cost of engaging

in surprise inflation (e.g. via institutional embarrassment, Walsh, 2003), even where no direct sanctions are imposed. Central bank independence is also consistent with the notion that politicians are the source of the inflation bias (e.g. based on their temptation to engineer a temporary output boost in order to be re-elected).

Alternative mechanisms involve trying to explicitly alter the preferences of the central bank. As noted above, central bank loss functions are typically assumed to incorporate a concern for both inflation and output. The inflation bias can be reduced (or eliminated) by requiring the monetary authority to have a greater concern for inflation than does society in general (or the government). Rogoff's (1985) suggestion to appoint a 'conservative' central banker, with preferences other than those of society (or the government), is logically associated with central bank independence in that the central bank needs to be independent if it is to implement a policy that deviates from what society would choose. Relatedly, Walsh (1995) draws on principal-agent theory in order to design contracts that provide policymakers with the desired incentives. Solving an inflation bias problem is then a matter of creating a contract that ensures that the central bank's incentives are aligned with those of society.

Transparency is also an instrument that can be used to influence credibility. To some extent it is incorporated in the suggestions noted above but is worth noting separately given the increased attention paid to transparency by both central banks and academics in recent years. The key idea is that by revealing information regarding its actions, policy preferences or objectives, and its assessment of economic prospects, the public and financial markets can more easily interpret a central bank's actions and future intentions. This can help influence the expectations of the public and financial markets and thereby reduce the inflation bias.

Finally, a recent strand of literature explores policymakers' desire to have both the credibility associated with rules, and the short-term flexibility to respond to shocks. Such a literature represents a synthesis of the rules and discretion debate, and is also partly a synthesis of theory and practice. For example, King (1997) illustrates how a policy that focuses on price stability, but allows for a short-run response to shocks, dominates both traditional discretionary and simple rules-based policies. In order to be able to reach such a first-best, state-contingent monetary policy rule, the policymaker has to have the credibility to ensure that short-run responses to output shocks are not interpreted as deviations from the long-run objective. A sound reputation and institutional factors such as central bank independence can potentially contribute to reaching such a position. A greater emphasis on communication is also linked to this literature, and will be explicitly discussed in the context of transparency in Section 3.

2.2 Criticisms of the theory regarding time inconsistency

A number of criticisms of the reasoning developed above have arisen in the literature. One issue is that the time-inconsistency problem typically arises when monetary authorities seek to stimulate growth above potential. McCallum (1997) and Blinder (1998) suggest that this literature is flawed because it takes insufficient account of reality. They argue that central bankers realise the futility of attempting to generate surprise inflation on average over long periods of time. If inflation expectations are rational, and the central bank implements time-consistent policies, expectations will eventually adjust to reflect that – even in the absence of commitment technology.

In terms of the solutions proposed to the problem of time inconsistency, a key criticism is that they imply the relocation of the problem (McCallum, 1997). Why is the government willing, for example, to appoint a conservative central banker, to sign a contract requiring the central bank to not attempt to boost output, or to make a central bank independent, if it is not able to operate monetary policy itself in a manner consistent with this approach? In terms of principal-agent theory, the government, as principal, faces worse incentives than the agent – given its desire to be re-elected. However, by signing such a contract, the government is effectively signalling that it does not intend to generate inflation surprises. The merits of transparency have also been questioned. For example, it is not always the case that the provision of more information by central banks is useful to markets (i.e. it can create noise). In addition, in some models greater transparency can actually increase the inflation bias by reducing the reputational benefits of low inflation. Finally, in some circumstances additional information from the central bank may lower social welfare by reducing the weight placed on private information. These findings illustrate that theoretical literature regarding transparency is currently characterised by a tendency for results to be model-dependent.

Despite the various criticisms of the theory, it remains the case that analysis of the role of private sector expectations has had a pronounced effect on both the theory and practice of central banking. The following section discusses how the theoretical insights have been incorporated in central banking practice.

3 Credibility in practice

The past 20 years have witnessed a remarkable change in central banking practice and led to central banks being 'in a position of power and responsibility unrivalled in their history' (King, 1999). The key change lying behind the increase in power and responsibility is the increase in independence from governments. However, other changes, based on the theory discussed above, have also been significant, such as the explicit monetary policy focus on price stability and the greater openness regarding the formulation and execution of policy. Central banks have typically sought to encompass many of the theoretical lessons on how to build up credibility through the introduction of a monetary policy strategy. A strategy can be seen as a means of describing how the central bank intends to achieve its objective, and can include a further clarification of that objective as the European Central Bank (ECB) has provided, for example. The general approach the central bank will take to interpreting economic developments is also frequently explained. So defined, the purpose of a strategy is largely to help provide a coherent framework for communication with the public and to assist in building credibility. However, a strategy also forms a framework for organising internal discussions during the decision making process which may be particularly valuable when the policymaking group consists of individuals from different backgrounds or monetary policy traditions. This section highlights some of the links between changes in central banking practice and the theoretical discussion, although a direct mapping is not always possible given the diversity of ways in which central banks have incorporated the theoretical lessons.

3.1 **A focus on price stability**

Consistent with the general consensus concerning the vertical long-run Phillips curve, a focus on price stability is now seen as the appropriate long-term objective for monetary policy (e.g. Issing, et al., 2001) and this has been reflected in central banking practice in recent years. The notion of reputation stresses the importance of consistently achieving price stability in order to build up credibility. Some central banks have focused on price stability for a rather longer period. The Bundesbank, with its primary objective of safeguarding the currency, has always placed considerable importance on monetary and price stability, although the constraints of the Bretton Woods system and subsequent European exchange

Table 1 Monetary policy framework in selected countries

	Mandate	Strategy	Price stability definition	Who specifies definition?
Australia	Multiple	IT	2-3% over cycle	CB (government approved)
Canada	Multiple[1]	IT	2% (1-3% band)	CB and government
Euro area	Price stability	Hybrid	<2% (but close)	CB
Japan	Price stability	Eclectic	Not quantified	CB
New Zealand	Price stability	IT	1-3%	CB and government
Sweden	Price stability	IT	2% (±1ppnt.)	CB
Switzerland	Multiple[2]	Hybrid	<2%	CB
UK	Price stability	IT	2% (±1ppnt.)	CB and government
US	Multiple	Eclectic	Not quantified	CB

1 The statute of the Bank of Canada requires the Bank to regulate 'credit and currency in the best interests of the economic life of the nation'.
2 Article 99 of the Swiss Federal Constitution states that the Swiss National Bank 'shall pursue a monetary policy serving the interests of the country as a whole'.

rate systems at times limited the ability of monetary policy to focus on domestic inflation (Deutsche Bundesbank, 1995). A few countries, including the Netherlands, also sought to achieve or maintain price stability by maintaining a close exchange rate band with the German mark. Over time, other countries have also moved to adopt a clearer focus on price stability. Some have done so without any formal change in the legislation governing the central bank. Following the appointment of Volcker as chairman of the Board of Governors of the US Federal Reserve in 1979, a marked change in US monetary policy occurred with the introduction of an explicit focus on reducing inflation although the legislative mandate of the bank was unchanged. A similar pattern has also been followed in Canada and Australia where the legislation governing the central bank does not give explicit priority to price stability (see Table 1). However, in contrast to the US situation, explicit inflation targets have been in place in Canada and Australia since the early 1999s in those countries, with the agreement of the respective governments.

As Table 1 illustrates, in a number of countries (including the euro area) central bank legislation explicitly sets out that price stability is to be the overriding objective of monetary policy. Any other objectives (if included, and typically framed as supporting the general economic policies of the government) may only be pursued when this does not compromise the price stability objective, consistent with the approach previously followed in German legislation. However, it is worth noting that in several countries (e.g. the United Kingdom and New Zealand) legislative change effectively ratified the pre-existing policy direction, where monetary policy

was already directed at a reduction in inflation. Legislative change is therefore not necessarily the point at which the monetary policy strategy is radically changed. That said, legislative change has been a key feature of the institutional change made in some countries. Even when legislation 'only' formalises changes already implemented, it can act to entrench these changes by raising the threshold for any return to time-inconsistent policies (see Dawe, 1992).

3.2 Independence from governments

Modifying the institutional structure of central banks to ensure a degree of independence from governments (at least in terms of operational decisions) is one of the recommendations in the literature in order to reduce the incentive of central banks to temporarily boost output. This suggestion has found widespread acceptance over recent years in those countries where the central bank was not previously independent. This tendency towards independence has often been coupled with the provision of a specific legislative focus on price stability, sometimes seeking to incorporate elements of optimal contract theory. New Zealand legislation includes the provision that the governor can be dismissed for poor performance and in the United Kingdom the policy committee is required to write a letter of explanation to the government if inflation is more than one percentage point away from the specified target. Such mechanisms represent an attempt to impose costs on policymakers if targets are not achieved.

In terms of independence, a distinction in the literature has been made between instrument and goal independence (Debelle and Fischer, 1994). Those central banks able to make a trade-off between different objectives (i.e. the US Federal Reserve) are termed goal independent. Where the goal is specified and the central bank only has independence in the choice and setting of the monetary policy instrument (e.g. the Bank of England) the term instrument independence applies. In practice, central banks have varying degrees of goal or instrument independence and it is not evident exactly where the line should be drawn. The European Central Bank, for example, has price stability as an objective, but is free to determine precisely what that means. It therefore sits somewhere between the Bank of England and the US Federal Reserve as regards goal independence. Moreover, such a distinction only represents one aspect of independence. Indices of independence that have been constructed also refer to issues such as the appointment procedure and term of office of policymakers, the existence of override procedures where the government can issue instructions to the central bank, and so forth (e.g. Siklos, 2002).

3.3 Transparency

Stories abound about the mystique traditionally associated with central banking (Goodfriend, 1986). Given that, the current degree of openness is all the more remarkable. Monthly press conferences held by the President of the ECB; the release of summary minutes and voting records by central banks in the United States, the United Kingdom, Japan and Sweden; and even the announcement of the targeted level of the policy interest rate in the United States are each relatively recent innovations in central banking. The publication of detailed macroeconomic analyses and in many cases macroeconomic projections are now regarded as standard central banking practice. In part these developments can be seen as the natural counterpart to the increased independence from governments enjoyed by many central banks. But the need for greater accountability is not sufficient to explain the moves seen, as transparency has also increased at central banks that were already independent (e.g. the Federal Reserve in the United States and the German Bundesbank).

The revolution in openness is directly linked to insights into the importance of expectations in influencing macroeconomic outcomes and to the increased role of financial markets in the transmission of monetary policy. In line with the discussion above, central banks have sought to use transparency to boost credibility. At the same time, openness also improves the effectiveness of monetary policy. As Issing et al. (2001) note, central banks only control short-term interest rates, while long-term interest rates are frequently the most relevant for macroeconomic developments. Given that long-term rates can be seen as a weighted average of current and expected future short-term rates (plus a risk premium), long rates can be affected by influencing expected future short rates. In order to influence rates in a way that it desires, a central bank needs to be frank and open regarding its view of the fundamental factors guiding monetary policy (Blinder, 1998). If it is successful in being transparent and credible, financial markets will react to economic developments in a manner consistent with the strategy of the central bank (Perez-Quiros and Sicilia, 2002).

Those central banks with the worst reputations (due to a poor track record in maintaining price stability) have typically been the central banks to place the most emphasis on openness, often as part of a move to an inflation targeting strategy. Measures of transparency, such as that of Eijffinger and Geraats (2004) indicate that inflation targeting central banks are often (although not always) in the vanguard of transparency. However, even central banks with sound reputations have become considerably more open over recent years, as Poole and Rasche (2003) document for the Federal Reserve.

The role of transparency in contributing to the effectiveness of monetary policy is also reflected in the increasing tendency for monetary policy communications to

be forward looking. Central banks devote increasing attention to describing how they expect the economy to develop – often by publishing economic forecasts or projections – and to the uncertainties and policy challenges that they see. Some central banks have sought to provide additional information regarding their preferences and the tradeoffs they expect to face in the future by also indicating the path in short-term interest rates (i.e. future monetary policy decisions) that would be consistent with their objectives and the developments they expect to see in the economy. The usefulness of such information is debated by some authors. Ehrmann and Fratzscher (2005a) argue that there is a risk that markets react 'too little' to macroeconomic developments when central banks are very explicit about future policy moves. They also note the argument that it can be difficult for central banks to characterise the conditional nature of statements regarding future policy intentions.

3.4 Gaps between theory and practice

While the interaction between theory and practice has been extensive, there are some areas where theory has been less relevant in practice or provides no clear answers for policymakers. One example concerns the optimal level of inflation, or what price stability actually means in practice. In reality, no central bankers target a negative inflation rate as suggested by Friedman (1969) and there is no consensus in the literature regarding the precise inflation rate that central banks should target. Despite that, the inflation objectives of central banks tend to be broadly similar where these are specified (see Table 1). There is also no consensus regarding the merits of a point target for inflation versus a range, and practice varies.

Further gaps exist regarding the implementation of monetary policy. The theoretical literature on rules versus discretion has continued to develop (e.g. Taylor, 1999), while practitioners have tended to try and find ways of having the best of both rules and discretion. Typically, central banks try and use monetary policy strategies as a means of committing to rule-like behaviour regarding a long-term focus on price stability, while at the same time explicitly retaining flexibility to respond to short-term shocks (King, 1997). Finally, the desirable extent of transparency is also unclear in the theoretical literature and central banks have made different choices here. The consequences of the different choices made by central banks in these areas, and possible reasons for these choices, are discussed in the following sections.

4 The importance of credibility in an empirical sense

Having seen that central banks have tended to follow somewhat different approaches in seeking to build or retain credibility, a logical question is whether it is possible to conclude that one approach does in fact work better than another. This section assesses the empirical evidence concerning the relationship between credibility and monetary policy strategies. A problem associated with such studies is that credibility is difficult to measure. Our definition of credibility is that a central bank's policy objectives are taken at face value, and this cannot be directly measured. However, there are proxies that can be used. These proxies are derived from the insight that if a central bank is credible, regular monetary policy moves will not be seen as deviating from the monetary policy strategy and should therefore not have marked implications for long-term inflation expectations. The first proxy is long-term interest rates. If long-term inflation expectations are little affected by monetary policy actions, the response of long-term interest rates to monetary policy moves should also be limited. A second proxy for credibility is to use measures of long-term inflation expectations directly. These expectations are likely to be well anchored around the level of the central bank's (implicit or explicit) inflation objective if the bank is credible. A third and more indirect proxy concerns the way in which shocks influence inflation. If inflation expectations remain constant, temporary shocks to inflation (e.g. oil price or exchange rate movements) may result in fewer so-called second round effects on wages, making it easier to maintain low inflation. Empirically testing this last proxy is particularly difficult in that structural changes and structural reforms (which have also been widespread over recent years) are likely to have altered the response of the economy to price shocks.

Before turning to assess these proxies, it is worth noting that empirical studies on credibility initially focused on the costs of disinflation in terms of the sacrifice ratio (e.g. Ball, 1993). This approach arose from the desire to test whether credibility does in fact reduce disinflation costs by lowering inflation expectations. In these studies, central bank independence is typically used as a proxy for credibility. The results of these studies suggest that credibility does not in fact reduce sacrifice ratios. Blinder (1998) concludes his review of this strand of the literature by noting that 'much fascinating theory to the contrary, I do not know a shred of evidence that supports it [the notion that credibility lowers the costs of fighting inflation]. It seems to be one of those hypotheses that sounds plausible but turns out on careful examination

to be false' (p 63). Instead, it may be the case that inflation expectations have declined along with declines in inflation – not with the announcement of targets or changes in institutional settings (Bernanke et al., 1998). This implies that, in terms of developing credibility, actions speak louder than words and a reputation in terms of delivering on inflation is what matters most, as is frequently suggested by central bankers.

A literature has also developed concerning the response of interest rates to monetary policy changes. As noted above, long-term interest rates should not change markedly in response to monetary policy changes, assuming that the monetary policy strategy is unchanged. Haldane and Read (2000), examining data up until 1997, find that long-term interest rates show almost no response to monetary policy decisions in the United States and Germany, while a larger response is found in the United Kingdom and Italy. The authors interpret their results as implying that both the Federal Reserve and Bundesbank had established a reputation for delivering price stability and that their policies were seen as credible. The authors argue that over the time period studied, the process of building credibility was incomplete in the United Kingdom and Italy. Studies using more recent data are those by Perez-Quiros and Sicilia (2002) covering the ECB and the Federal Reserve, and by Ross (2002) covering the ECB, the Federal Reserve and the Bank of England. Both studies find only small responses on long-term interest rates arising from monetary policy decisions, suggesting all three central banks are seen as credible by financial markets.

Evidence from proxies for long-term inflation expectations portray a similar picture. Table 2, based on Castelnuovo et al. (2003), illustrates that these are well anchored around the inflation objective sought in all countries considered. Van der Cruijsen and Demertzis (2005) go further and show that transparency appears to help anchor inflation expectations (reducing the link between expectations and actual inflation). In particular, transparency regarding the inflation objective of the central bank appears to be important here.

The third, and more indirect, proxy is changes in the inflation process. Given that the private sector's expectations are important in determining inflation, the anchoring of inflation expectations can be expected to have altered how the economy reacts to inflation shocks. More specifically, if the central bank is seen as committed to maintaining low inflation, an inflationary shock is less likely to lead to second-round effects and a wage-price spiral (i.e. inflation would become less persistent). Several authors (e.g. Rogoff, 2003 and Borio and White, 2003) argue that the changing time series properties of inflation provide a first indication of a structural change in the inflation process, with inflation being better anchored and more likely to revert to mean following shocks. A link has also been found to the introduction of a new monetary strategy in several countries (Batini and Nelson, 2001 and Kuttner and

Table 2 Long term inflation expectations

	Inflation goal	Average level		Standard deviation	
		1991-2002	1999-2002	1991-2002	1999-2002
Australia	2-3% over cycle	3.16	2.48	0.79	0.07
Canada	2% (1-3% band)	2.21	1.99	0.46	0.10
Euro area	<2% (but close)	2.48	1.82	0.59	0.09
Japan	Not quantified	1.51	0.88	0.67	0.34
New Zealand	1-3%	-	1.86	-	0.19
Sweden	2% (±1pp)	-	1.96	-	0.05
Switzerland	<2%	-	1.63	-	0.41
UK	2.5% (±1pp)	3.00	2.33	0.63	0.10
US	Not quantified	3.1	2.56	0.51	0.07

Source: Castelnuovo et al. (2003).

Posen, 1999). Other studies examine the pass-through of external prices to domestic inflation. Hooker (1999) shows that the previously strong relationship in the United States between oil prices and inflation excluding energy prices broke down in the early 1980s, although the direct link from oil prices to headline inflation is not significantly altered. The pass-through from exchange rate shocks also appears to have reduced in some countries over recent years (Stevens, 2003 and Gagnon and Ihrig, 2002). Finally, further evidence of a change in inflation behaviour is contained in Castelnuovo et al. (2003) who illustrate that the correlation between short-term and long-term inflation expectations is low and generally decreasing.

These studies provide indicative evidence of a change in the inflation process in recent years. However, the evidence regarding the cause of any change is less robust. Improved monetary policy may have played a role, but structural change and better fiscal policy settings are also potential candidates. A few studies have attempted to examine what lies behind changes in macroeconomic performance. While Rogoff highlights the role of globalisation and increasing competition, Kuttner and Posen argue that the introduction of inflation targeting has played a role in some countries.

There is an ongoing debate regarding the impact of particular monetary policy strategy settings on credibility and economic performance more generally. Some studies argue that inflation targeting has led to improved monetary policy outcomes (e.g. Levin et al. 2004). However, it is difficult in these cross-country studies to identify whether it is inflation targeting per se that is responsible, or related institutional settings such as central bank independence (which is also associated with better

economic performance). In practice, it is plausible that the sharper monetary policy focus on inflation, and structural changes in the economy, including increased competition, act as mutually reinforcing factors in reducing inflation persistence. For example, the reduction in the prevalence of wage indexation can be expected to reduce inflation persistence. However, it is unlikely that wage indexation would be abolished at high and variable rates of inflation. Price stability therefore facilitates this type of structural change.

5 What lies behind the monetary policy strategy choice?

The discussion above illustrates that central bank credibility is not obviously related to the monetary policy strategy followed (Coppel and Conolly, 2003 and Castelnuovo et al., 2003). Central banks in the industrialised world appear to enjoy broadly similar levels of credibility, despite differences in their strategies that are seen as important, at least in the academic literature or by central banks (see, e.g. ECB, 2001). Clearly, as the examples of the Bundesbank and the Federal Reserve show, doing what you say you will do in terms of delivering and maintaining price stability is the most important contribution that a central bank can make to building credibility (Blinder, 1998 and 1999). A further difficulty in finding robust evidence on the impact of different monetary policy strategies is the fact that a focus on price stability is the key objective of central banks – whatever their detailed strategy. Similar outcomes regarding credibility are therefore perhaps not so surprising. It is also worth noting that we lack a counterfactual. While following different strategies may have led to similar outcomes, we cannot therefore conclude that the choice of strategy is irrelevant – what works in one country will not necessarily work in others. Having said that, an interesting question, on which the literature has largely been silent, is why central banks have made the choices that they have made regarding the detail of their strategy. This section sets out some general thoughts on the issue that might be the subject of future research.

One way to approach the issue is to focus on the circumstances in place at the time countries chose their strategy. A number of interrelated factors appear to be relevant – the historical performance of monetary policymakers, including the monetary strategies previously followed; cultural factors in the country concerned; and the state of knowledge at the point in time.

Countries have often changed their monetary policy strategy when forced to by external events. In the case of the Bundesbank, the end of the Bretton Woods system of fixed exchange rates required a new anchor. In the United States, there was growing concern regarding inflation developments, reflected in the realisation that the money growth targets set under the newly introduced Humphrey-Hawkins Act of 1978 would not be met without changes in policy. The Bundesbank and Federal Reserve were searching for new tools at a time when monetarism had gained prominence – a greater focus on money, at least in communications, was therefore

logical, particularly when explaining the need for difficult policy actions (Bernanke and Mishkin, 1992).

In contrast, the choice of the United Kingdom and New Zealand to adopt an inflation targeting strategy reflected their view that no single intermediate target could be relied on in all circumstances (Bowen, 1995). Inflation targeting fitted within the pattern of the literature at that time, with its focus on time-inconsistency and the need for clear incentives to be in place for central bankers. A clear objective was perhaps also useful given the previous track records of monetary policy in the United Kingdom and New Zealand. The approach also fits within the context of policymaking in these countries, where transparency and accountability have become increasingly important. Making these central banks independent in such an environment, in the absence of clear objectives and accountability mechanisms, would have been unthinkable.

Of course, strategies change over time. The role of money has gradually diminished in the strategy of the Federal Reserve. Nevertheless, it played its part in helping reduce inflation. The maintenance of low inflation in the US is seen as credible despite this change. Communication practices have also changed considerably – but within the prevailing framework. Two reasons for the lack of any fundamental change in the strategies of the Federal Reserve and the Bundesbank over the past two decades are that the performance of these banks was good and they were both already independent. Poor performance and moves towards independence logically lead to a broader consideration of the objectives and strategy of a central bank. Those triggers were missing in the US and Germany.

An additional consideration is that individual aspects in the choice of a monetary policy strategy cannot be seen in isolation from each other. There is an interaction between them. Ehrmann and Fratzscher (2005b) make this point in linking the decision-making style of the central bank (collective or individualistic) with the communication style followed (expression of varying views or lining up behind an agreed position). They argue that the way that decision making and communication styles are combined has an influence on the impact of the central bank's communication on financial markets. This reinforces the notion that central banks cannot simply adopt aspects of the strategies followed by 'successful' central banks without careful consideration of the context within which they operate.

In this context, it is useful to consider the strategy choices made by the ECB in 1998. The broad parameters under which the ECB has to operate are set out in the (amended) Treaty establishing the European Community. The Treaty safeguards the independence of the ECB and stipulates that the primary and overriding objective of monetary policy is to maintain price stability. Within those broad parameters, the ECB has the freedom to provide further specification of how it interprets these

provisions and how it intends to achieve this objective. In 1998, the ECB published its strategy and this has gradually evolved in the subsequent years.

Before briefly discussing the strategy itself, it is worth noting the specific institutional context of the ECB. On the one hand, it was a new central bank for a new monetary area with no track record. On the other hand, the ECB took over the reigns from (then) 11 national central banks that had differing degrees of credibility and widely varying strategies (ranging from inflation targeting, through money targeting to exchange rate pegs). Not only do the languages literally differ between monetary union members, but the style and content of monetary policy communication that had been used by the various national central banks were the result of the specific institutional setting in that country. Given this background, the strategy chosen by the ECB can be seen as an attempt to combine elements of the strategies used by successful national central banks into a coherent framework that would have elements of continuity in most member countries.

Two distinguishing features of the ECB's strategy are the quantitative definition of price stability and the prominent role given to monetary analysis. The decision to provide a definition of price stability was intended to aid the transparency and accountability of monetary policy (ECB, 2001). However, in not adopting inflation targeting, the ECB also signalled a desire for more flexibility than is sometimes associated with inflation targeters. The prominent role for money represents a deliberate element of continuity with the previous money targeting strategy of the Bundesbank, although the strategy overall acknowledges that focussing only on money is insufficient to guide monetary policy (Issing et al., 2001). Monetary analysis forms one pillar of the strategy, with the other being a broad-based assessment of the risks to price stability from non-monetary indicators. Consistent with other central banks, the ECB has sought to find a strategy that provides clarity regarding policy intentions (rule-like), while ensuring a sufficient degree of flexibility (discretion) to react to shocks and to deal with the greater uncertainties about the monetary policy transmission mechanism within this new monetary union.

6 Conclusion

Looking ahead, perhaps the only certain thing is that strategies will adapt further – in response to experience, to academic insights and to the broader environment in which central banks operate. Recent years have seen a gradual convergence of monetary policy strategies. Inflation targeters are becoming more flexible, while non-inflation targeters are becoming increasingly transparent about their objectives and approaches. Differences in strategies remain, but they are increasingly differences of style, rather than differences of substance. In the long term, the rule-like focus of central banks is on maintaining price stability. In the shorter term, discretion is available to react to shocks hitting the economy. That has proved to be credible, and is consistent with what theory would recommend.

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Notes

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2 In other words, credibility ensures that in equilibrium, the economy can grow at its potential rate without inflation. In fact, because inflation generates distortions that reduce economic growth, price stability results in higher long-run growth (see Fischer, 1995, for a discussion of the costs of inflation).
3 Such a trade-off continues to be a feature of much work on monetary policy rules. See, for example, the various contributions in Taylor (1999).
4 As is the case with monetary policy rules, there is a trade-off between the flexibility to respond to output shocks and the elimination of the inflation bias.
5 Transparency is also a means to ensure that monetary policy makers are accountable for their actions, as a counterpart to independence. Given that the focus in this article is on credibility, issues related to accountability are not dealt with explicitly, beyond noting that there are overlaps between the two aspects of transparency. Geraats (2002) provides an excellent analysis of recent theoretical developments regarding transparency and Blinder et al. (2001) provide a more policy-related overview of the issues involved.
6 Many models in the literature consist of single or two period games which effectively take insufficient account of the punishment for cheating that exists in reality when policy makers and the public will be interacting over an infinite horizon.
7 Geraats (2002) surveys literature showing that, for example, increased central bank transparency can result in the public placing too much weight on the information from the central bank and too little on other sources of information. As a result, it is possible for the public's expectations to become more volatile.
8 If the central bank's preferences are fully transparent, there is in some theoretical models no longer an incentive to deliver low inflation in order to build up a good reputation. When this happens, transparency can increase the inflation bias.
9 See Demertzis and Hoeberichts (2005) for a recent contribution to this literature.
10 Given the greater prevalence of decision making by committee, rather than by an individual, the common frame of reference provided by a strategy becomes increasingly important.
11 Although the idea that there is no long-term benefit from monetary expansion is not new, e.g. Hume (1752).
12 In the case of Australia, the central bank announced the inflation objective and the government has subsequently agreed to it being the appropriate focus of monetary policy.
13 In the UK, an explicit inflation target was announced following sterling's exit from the ERM in 1992. While the government retained control of monetary policy, the advice of the Bank of England to the government was made public (see Bowen, 1995 for a description). The Bank of England was formally made independent in 1997. In New Zealand the initial objective (announced in 1986) was to reduce inflation to below the level of that of trading partners. As inflation fell through the late 1980s, this was further specified to price stability (Spencer, 1990). Formal central bank independence took effect in 1990.
14 In Germany, the United States, the Netherlands and Switzerland, for example, central banks were already effectively independent from government in terms of decision making – albeit to varying extents in terms of formal independence.
15 The Bank of England and the Reserve Bank of New Zealand are examples of this shift. Demertzis and Viegi (2005) illustrate in formal model how when communication and the provision of public information is otherwise bad, the provision of an inflation target can provide an anchor which helps the public to coordinate their inflation expectations.
16 See for example the Inflation Reports of the Norges Bank or the Monetary Policy Statements of the Reserve Bank of New Zealand.
17 See for example the various contributions in Haldane (1995) and ECB (2003).
18 A caveat to this is if central bank actions lead financial markets to alter their view of the future path of the economy and therefore of long-term interest rates.
19 Some studies actually found that more independent central banks tended to face higher sacrifice costs. In general, the results are not robust to changes in methodology or assumptions.
20 For example, Issing et al. (2001) and Blinder (1998) and (1999).
21 Coppel and Connolly (2003) reach a similar conclusion for Australia.

22 These studies also tend to discuss the predictability of policy interest rates in the short-term. Given that market expectations for these rates can easily be steered by a central bank, regardless of its credibility, we do not analyse these findings here.
23 Rogoff, for example, finds that G7 inflation was non-stationary between 1960 and 1981, but was stationary from 1981-2003.
24 In contrast, a number of studies find no evidence of a change in the inflation process, e.g. Andersen and Wascher (2001). Berben (2004) illustrates that the exchange rate pass-through to the Netherlands from changes in the German mark-guilder exchange rate increased in the lead-up to monetary union.
25 While a strategy could, in theory, be updated each time new ideas become available, in practice this would undermine the role of a strategy in providing a framework for monetary policy over the long term. Aside from at crisis points, in which radical change in needed, strategy changes therefore tend to emphasise continuity (e.g. ECB, 2003).
26 Dissatisfaction with earlier experiences with intermediate targets is a common theme amongst inflation targeters. The various contributions in Haldane (1995) make clear that similar considerations also applied in Australia and Sweden.
27 An illustration of this can be seen in one of the recommendations of the Svensson (2001) report on monetary policy in New Zealand. He recommended that a committee should set interest rates, rather than only the governor. In their response to this recommendation, the government noted that it prefers to retain the governor as sole decision maker in order to maintain clear lines of accountability (Cullen, 2001).
28 The Bundesbank also missed money growth targets at times. The bank's reputation was sufficient to ensure that this could occur without loss of credibility, as it continued to be trusted to maintain low inflation.
29 Much has already been written on this topic. Official sources include Issing et al. (2001) and European Central Bank

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