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State of the art of inflation targeting – 2012

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State of the art of inflation targeting

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Inflation targeting has been adopted by an increasing number of central banks as their monetary policy framework. At the start of 2012, some 27 central banks were considered fully fledged inflation targeters, and several others were in the process of establishing a full inflation-targeting regime.

This Handbook details the salient features of the inflation-targeting frameworks in place in all 27 inflation-targeting central banks. The Handbook was originally published in 2009 and is updated at the start of each year to reflect any changes to the country frameworks over the preceding twelve months. During 2011, there were few changes to central banks' formal inflation-targeting frameworks. However central banks continued to use unconventional monetary policy and new instruments. The financial stability remit of central banks was also given greater emphasis.

The individual country data enable us to analyse the state of the art of inflation targeting: the design features of inflation targets; the decision-making process; the legal, institutional and accountability arrangements; the models and forecasts used in central banks and their communication strategies.

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Definition of inflation targeting

Inflation targeting is a framework rather than a rigid set of rules for monetary policy. Nonetheless there are a number of essential elements of an inflation-targeting regime:

1. Price stability is explicitly recognised as the main goal of monetary policy.(1)
2. There is a public announcement of a quantitative target for inflation.
3. Monetary policy is based on a wide set of information, including an inflation forecast.
4. Transparency.
5. Accountability mechanisms.

A major advantage of inflation targeting is that it combines elements of both 'rules' and 'discretion' in monetary policy, and is therefore often characterised as 'constrained discretion'. King (2005) noted that 'An inflation-targeting framework combines two distinct elements: (a) a precise numerical target for inflation in the medium term and (b) a response to economic shocks in the short term. The inflation target provides a rule-like framework on which the private sector can anchor its expectations about future inflation'. Within this rule-like framework, the central bank has discretion in reacting to shocks, for example in how quickly to bring inflation back to target.

Woodford (2003) and Svensson (2007) show that the objectives of inflation targeting can be approximated by a quadratic loss function consisting of the sum of the square of inflation deviations from target and a weight times the square of the output gap. In practice, the respective weights given to stabilising inflation and stabilising output are likely to vary over time. They are also likely to depend on the credibility of the central bank; when a central bank is trying to establish credibility, a greater weight will be put on stabilising inflation.

Conceptual and practical development of inflation targeting

Many central banks adopted inflation targeting as a pragmatic response to the failure of other monetary policy regimes, rather than in response to new economic thinking. Theory and practice have developed together over the past couple of decades, and there is now a large body of academic literature on inflation targeting.(2)

To achieve price stability, monetary policy requires a nominal anchor. By nominal anchor, we mean fixing a nominal variable in order to tie down the price level in the long run. Historically, the nominal anchor used by central banks was the gold standard or pegging the domestic currency to another strong currency. The collapse of the Bretton Woods system of fixed exchange rates in the 1970s, combined with high inflation, led to a search for new anchors, notably the money supply. During the 1980s, monetarism was the prevailing monetary policy orthodoxy, as central banks attempted to control prices by controlling the supply of money in the economy. This depended on the existence of a stable relationship between nominal expenditure and the quantity of money; known as the Quantity Theory of Money. Milton Friedman elaborated on the quantity theory and argued that the demand for money depended predictably on a number of macroeconomic variables. Thus central banks could control spending and inflation by altering the supply of money in the economy.

Friedman's fixed money rule implied that central banks should calculate the money supply based on its relationship to macroeconomic variables to target a specific rate of inflation. Under this rule, there is little discretion for the central bank to use its judgement in assessing the supply of money needed in the economy. In practice, successful monetary targeters actively took account of the variability in the money supply and economic relationships. Bernanke argues that inflation targeting owes much to the pragmatic way that the Bundesbank conducted monetary policy in the 1980s: 'the Bundesbank indirectly targeted inflation, using money growth as a quantitative indicator to aid in the calibration of its policy. Notably when conflicts arose between its money growth targets and inflation targets, the Bundesbank generally chose to give greater weight to its inflation targets', (Bernanke and Mihov (1997)).

Ultimately monetary targeting failed in many countries as the demand for money function was not stable. This instability resulted typically from deregulation plus financial innovation; new types of money-like assets together with disintermediation from banking system. As John Crow, former Governor of the Bank of Canada famously commented: 'we did not abandon monetary aggregates, they abandoned us'.

(1) Although price stability is the primary objective, it is common for the mandate to include subsidiary objectives for economic growth and employment. See answers to question 1.2 in the country detail.
(2) The interaction between theory and practice is discussed in Hammond, Kanbur and Prasad (eds) (2009).

The failure of money targeting in the mid-1980s and the collapse of fixed exchange rate pegs in the early 1990s was followed by the emergence of inflation targeting with floating exchange rates as the new monetary policy framework of choice. The framework was consistent with the main tenets of the prevailing academic consensus of the time about what monetary policy can and cannot do.

What does monetary theory tell us? First, as both Friedman and Phelps showed, a permanently higher rate of inflation does not lead to higher growth and employment. Acceptance of this concept supported a move away from monetary policy as tool of short-term demand management, or fine tuning, to a focus on the medium-term goal of price stability, which lies at the heart of inflation targeting.(1) Second, there has been an increasing recognition of the benefits of low and stable inflation — and equally an awareness of the costs of inflation; low inflation is a social good. In inflation-targeting regimes, price stability is the primary objective for central banks. Third, the literature increasingly stressed the importance of inflation expectations in monetary policy. The effect of monetary policy decisions on private sector expectations became an important consideration for policymakers. Against this evolving consensus among economists, inflation targeting was seen as an effective way of anchoring inflation expectations.

Empirical studies on inflation targeting

There are a number of studies comparing the performance of inflation-targeting central banks with non-inflation targeters. Ball and Sheridan (2003) compared monetary policy outcomes in OECD countries and found that those with a history of high inflation before the 1990s subsequently experienced a larger degree of disinflation than countries with a history of low inflation. They argued that 'Once one controls for regression to the mean, there is no evidence that inflation targeting improves performance'.

Other studies find the opposite. Hyvonen (2004) extended the Ball and Sheridan analysis and found that the adoption of inflation targeting at least partly contributed to inflation convergence in the 1990s. Vega and Winkelried (2005) found that inflation targeting helped reduce the level and volatility of inflation in the countries that adopted it.

While the evidence on whether inflation targeters have outperformed non-inflation targeters by delivering price stability is not conclusive, there is more robust empirical evidence that a quantitative target for inflation can inform and anchor inflation expectations. Orphanides and Williams (2003) showed that the systematic approach to policy that characterises inflation targeting makes it predictable and results in more influence over expectations. By examining the extent to which expected inflation moves in response to economic news, Levin *et al* (2004) find evidence that inflation persistence is lower, and expectations better anchored, in inflation-targeting countries.(2)

There is some empirical evidence on the performance of inflation targeting in emerging market economies. Research from the IMF(3) found that 'inflation targeting appears to have been associated with lower inflation, lower inflation expectations and lower inflation volatility relative to countries that have not adopted it'. Moreover these gains in inflation performance were achieved with no adverse effects on output and interest rate volatility. The IMF also considered which monetary policy frameworks had been most successful in anchoring inflation expectations in the wake of the oil and food price shocks in 2007, concluding that 'in emerging economies, inflation targeting seems to have recently been more effective than alternative monetary policy frameworks in anchoring expectations'.(4)

More recently, Rogers (2010) found that inflation targeting proved resilient in the financial crisis while Carvalho-Filho (2010) suggested that the monetary policy of inflation targeters appeared to be more suited to dealing with the crisis.

Empirical evidence on the performance of inflation targeting is not unanimous but broadly supportive of the effectiveness of the framework in delivering low inflation and anchoring inflation expectations in both industrialised and emerging market economies. However there is an important point to be made about endogeneity. Many countries that adopted inflation targeting did so as part of a wider process of political and economic reform. Often this involved moves to strengthen the institutional structure of policymaking, for example giving statutory independence to the central bank.

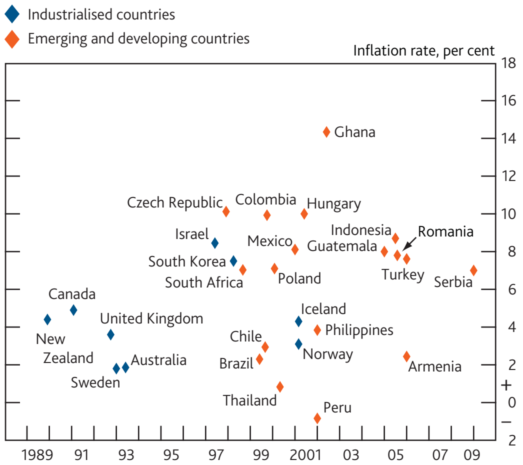
In some countries, the adoption of inflation targeting as a new monetary policy framework was also accompanied by better fiscal policies (notably in Latin American countries). The adoption of inflation targeting has often been accompanied by a building up of technical capacity within the central bank, and an improvement in the quality of macroeconomic data. As inflation targeting depends to a large extent on the interest rate channel to transmit monetary policy, some emerging market economies also took steps to strengthen and develop the financial sector. It seems likely therefore that the improvement in monetary policy outcomes after the adoption of inflation targeting reflects improved economic policymaking in a broader sense.(5)

(1) This is not to say that monetary policy does not affect output and inflation in the short run, simply that the long and variable lags in the transmission mechanism of monetary policy mean that monetary policy is not ideal for short-term demand management.
(2) See also Gürkaynak *et al* (2006).
(3) See IMF *World Economic Outlook*, Summer 2005.
(4) See IMF *World Economic Outlook*, October 2008.
(5) The IMF notes that 'the apparent benefits of inflation targeting may reflect in part the general quality of domestic monetary management in these countries and their levels of development more broadly'.

Fully fledged inflation targeters

Chart 1 shows the dates of adoption of inflation targeting(1) for the 27 countries operating a fully fledged inflation-targeting regime at the start of 2009, and the inflation rate at adoption.

Chart 1 27 countries operating a fully fledged inflation-targeting regime



Sources: Bank of England and other central bank websites.

The set of inflation-targeting central banks is very heterogeneous, including nine industrialised and 18 developing and emerging market countries from every continent. The first country to adopt inflation targeting was New Zealand in December 1989, and the most recent Serbia, in 2009. The only central banks to have exited from inflation targeting are Finland, Spain and Slovakia, in each case when they adopted the euro. Some countries adopted inflation targeting while they were transition economies; the Czech Republic, Hungary Poland and latterly Armenia. Several emerging market countries adopted inflation targeting in the wake of the 1997 crisis, which forced a number of currencies off their fixed exchange rate pegs.

Chart 1 also illustrates that most countries adopted inflation targeting when inflation was already low (and indeed negative in Peru). This supports the argument that inflation targeting may not be the optimal monetary policy regime for bringing inflation down, but it has proved effective at anchoring inflation expectations around the target, and so keeping inflation low and stable.

The main reason why low inflation is often regarded as a ‘precondition’ for inflation targeting is the difficulty of forecasting inflation, and hitting an inflation target, in conditions of high and volatile inflation. The central bank risks losing credibility from target misses in such circumstances. This explains why many central banks waited until inflation was under control before formally introducing inflation targeting. However the experience of Israel and Guatemala shows that inflation targeting has successfully been used as a disinflationary strategy. (In the case of Israel, with an informal inflation-targeting regime.)

Inflation-targeting frameworks

Legal mandate and central bank independence

Most definitions of inflation targeting include the requirement that price stability is the main goal of monetary policy. This is usually enshrined in the central bank law. In many cases the central bank law also states that, as a subsidiary objective, the central bank will support economic prosperity and welfare more broadly. The individual country tables show considerable diversity in the precise legal mandates of inflation targeters. Australia has a dual mandate for price stability and employment, for example, while in Canada the main role of the central bank is ‘to promote the economic and financial welfare of Canada’. In the wake of the financial crisis that started in 2007, the legal mandates of several central banks, including the Bank of England, have been expanded to include a financial stability remit.

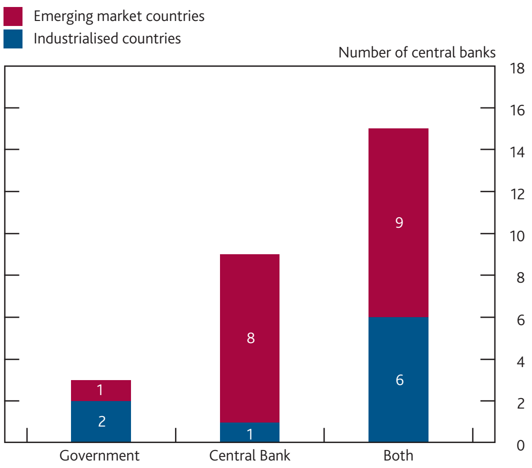
Most inflation-targeting central banks have statutory independence.(2) The literature on central bank independence often distinguishes between ‘goal independence’ ie the central bank has autonomy in setting the objective of monetary policy, and ‘instrument independence’, ie the central bank conducts monetary policy to achieve the inflation objective independent of government influence. In practice the distinction is less clear-cut. The ultimate goal of monetary policy, ie price stability, is, as we have seen, usually enshrined in law. ‘Goal independence’ then becomes a second-order question of defining ‘price stability’ ie setting the inflation target.(3)

When inflation is not at its steady state, as was the case in several emerging market countries when they adopted inflation targeting, setting the inflation target and determining the path and pace of disinflation are clearly more substantial policy questions. The ability to set the inflation target was seen as an essential part of central bank independence. On the other hand, it is clearly beneficial for the government to make an explicit commitment to the inflation target, which is more likely when the target is jointly determined, in order to promote better co-ordination — or at least no conflict — between fiscal and monetary policy. And government involvement in setting the target adds democratic legitimacy to the policy, which can help command public support.

(1) **Chart 1** shows the date of formal adoption of inflation targeting. Several countries had pursued a form of implicit or informal inflation targeting before the formal start date.
(2) The Central Bank of Brazil is the exception to the general rule; it does not have statutory independence; neither do the Governors or Deputy Governors have fixed terms of appointment.
(3) The European Central Bank (ECB) is regarded as one of the most independent central banks. Here, the goal of monetary policy is set out in the Treaty and Statutes of the ESCB as price stability. The role of the ECB has been to define price stability, currently a level of inflation ‘below but close to’ 2% per annum.

For inflation targeting the key requirement is instrument or operational independence. All 27 inflation-targeting central banks have operational independence.(1) In the majority of inflation-targeting countries — 15 out of 27 — the inflation target is jointly determined by the government and central bank. In nine cases the central bank sets the target, and in three cases, Norway, South Africa and the United Kingdom, the target is set by the government (**Chart 2**). Among the nine industrialised countries, Sweden is the only country in which the government is not involved, either solely or in conjunction with the central bank, in setting the target.

Chart 2 Who sets the inflation target?



Sources: Bank of England and other central bank websites.

The inflation targets of industrialised countries all lie between 1% and 3% (year-on-year increase in inflation). This reflects the consensus interpretation of the general range of inflation that is consistent with price stability in these countries. It would be difficult therefore for governments in these countries to adopt a higher inflation target as this would undermine credibility. So, even where the target is set by the government alone, in practice, in industrialised countries, the government is highly constrained in setting an operational definition of price stability.

It would appear *de jure* that central banks in developing and emerging markets have a greater degree of independence: in eight cases, mainly in Latin American countries,(2) the target is determined solely by the central bank, while in the other nine cases the target is jointly determined. *De facto*, the picture is more complex. In Colombia and Guatemala, for example, the Minister of Finance sits on the decision-making board of the central bank, so there is some government influence on setting the target.

What level should the target be?

There is some mismatch between theory and practice here. Theory suggests that the optimal inflation rate should be zero (in the New Keynesian paradigm), or negative (according to the Friedman Rule).(3) In practice, all inflation-targeting central banks have positive targets. How can we explain the discrepancy between theory and practice? The reasons would seem to be largely practical.

The first reason is purely statistical. Measured inflation tends to overstate actual inflation by around 0.5 percentage points,(4) so a margin above zero is required to compensate for this effect. Another argument is that a positive inflation target decreases the probability of hitting the zero lower bound on nominal rates, a point that had operational importance in the global economic slowdown experienced in 2008–09. It is likely that the costs of deflation are greater than the costs of inflation, so a positive inflation target is desirable to avoid the risk of deflation, and the resulting debt-deflation.(5) In addition, the conventional wisdom in recent years has been that a positive inflation target is desirable if there is downward nominal wage resistance. Interestingly, early evidence during the economic recession of 2008–09 suggests that wages were more downwardly flexible than previously supposed.(6)

Given the lack of a precise definition of price stability, central banks have focussed on reducing inflation to a level where people do not worry about it. The consensus seems to be that above a threshold of around 3%–4%, inflation imposes welfare costs, while the plausible gains from reducing inflation below about 2% are unlikely to outweigh the advantages of a positive inflation target.

There is even less guidance in the literature on the optimal level of inflation in developing and emerging countries, though Balassa-Samuelson effects imply that optimal inflation in these countries should be a little higher than in industrialised countries.

Table A shows the numerical inflation targets in place at the start of 2012. Industrialised countries all have inflation targets between 1% and 3%. Korea is at the top of this narrow range, with a target of 3% plus or minus one percentage point. Some non-industrialised countries also have inflation targets in this range; 2% in Peru; 2% in the Czech Republic and 2.5% in Poland. A further three countries — Chile, Hungary and Mexico — have a target of 3% and Colombia had a target range of 2%–4%. Only one country had a target above 5%, namely Ghana with a target of 8.7%.

(1) An exception to the rule was the United Kingdom experience between 1992 and 1997 when interest rate decisions were made by government.
(2) Chile, Colombia, Czech Republic, Guatemala, Hungary, Mexico, Peru and Poland.
(3) Phelps argued that the Friedman rule ignores the effects of taxation: inflation is a source of tax revenue. At low rates of inflation, distortions associated with the inflation tax might be minor.
(4) The Boskin Commission in 1996 found that CPI in the United States overstated inflation by around 1.1 percentage points in 1996. The Bank of England estimated bias in the United Kingdom to be between 0.5 percentage point and 0.75 percentage point. See *Bank of England Working Paper no. 47*.
(5) Deflation means that the nominal value of assets falls, but the nominal value of debt does not. So the real cost of servicing debt increases.
(6) See for example research published by the Wage Dynamics Network chaired by the European Central Bank.

Table A Individual countries' inflation targets

	Target set by	Target measure	Target 2012	Target type	Multiple targets?	Target horizon
Armenia	G and CB	H CPI	4% ±1.5 pp	P + T	–	Medium term
Australia	G and CB	H CPI	2%–3%	Range	–	Medium term
Brazil	G and CB	H CPI	4.5% ±2 pp	P + T	2012 and 2013	Yearly target
Canada	G and CB	H CPI	2% (mid-point of 1%–3%)	P + T	–	Six-eight quarters; current target extends to December 2016
Chile	CB	H CPI	3% ±1 pp	P + T	–	Around two years
Colombia	CB	H CPI	2%–4%	Range	–	Medium term
Czech Republic	CB	H CPI	2% ±1 pp	P + T	–	Medium term, 12–18 months
Ghana	G and CB	H CPI	8.7% ±2 pp	P + T	End 2012 and 2013	18-24 months
Guatemala	CB	H CPI	4.5% ±1 pp	P + T	2012 and 2013	End of year
Hungary	CB	H CPI	3%	Point	–	Medium term
Iceland	G and CB	H CPI	2.5%	Point	–	On average
Indonesia	G and CB	H CPI	4.5% ±1 pp	P + T	–	Medium term
Israel	G and CB	H CPI	1%–3%	Range	–	Within two years
Mexico	CB	H CPI	3% ±1 pp	P + T	–	Medium term
New Zealand	G and CB	H CPI	1%–3%	Range	–	Medium term
Norway	G	H CPI	2.5%	Point	–	Medium term
Peru	CB	H CPI	2% ±1 pp	P + T	–	At all times
Philippines	G and CB	H CPI	4.0% ±1 pp	P + T	–	Medium term (from 2012–2014)
Poland	CB	H CPI	2.5% ±1 pp	P + T	–	Medium term
Romania	G and CB	H CPI	3% ±1 pp	P + T	–	Medium-term target from 2013
Serbia	G and CB	H CPI	4.0% ±1.5 pp	P + T	–	Medium term
South Africa	G	H CPI	3%–6%	Range	–	On a continuous basis
South Korea	CB (with G)	H CPI	3% ±1 pp	P + T	–	Three years
Sweden	CB	H CPI	2%	Point	–	Normally two years
Thailand	G and CB	H CPI[(a)]	3.0% ±1.5 pp[(a)]	P + T	Target set annually	Eight quarters
Turkey	G and CB	H CPI	5.0% ±2 pp	P + T	2012 and 2013	Multi year (Three years)
United Kingdom	G	H CPI	2%	Point	–	At all times

Note:
CB = Central bank.
G = Government.
H CPI = Headline CPI.
P + T = Point with tolerance band.
pp = percentage point(s).

(a) Target proposed by central bank at start of 2012, pending cabinet approval. See page 42.

Target horizon

The target horizon tends to depend on whether inflation is within the price stability range. In the 19 countries with inflation targets of 3% or less, the target horizon tends to be medium term (this includes target horizons of two years or more, and those specified as 'at all times'). Medium-term targets have the advantage of anchoring inflation expectations, and explicitly allowing for short-term divergences from the target when shocks hit the economy. The target horizon may also depend on the length of the transmission mechanism of monetary policy. With a longer transmission mechanism, the central bank is not able to affect inflation in the short run.

Where a disinflationary strategy is employed, inflation targets are often set annually. In emerging markets, there is often a quicker pass through from policy rates to inflation, so a shorter policy horizon is warranted. And an annual target is often seen as good for accountability. Countries on a disinflationary path will often also indicate the medium-term target in order to anchor inflation expectations.

Target measure

All 27 inflation targeters use the consumer prices index (CPI) as their operational target, and all now use the headline rather than the core measure. This is largely for practical and operational reasons: CPI is available on a monthly basis, whereas other measure, which may be preferred for theoretical reasons, such as the GDP deflator, are only available quarterly. While a core measure is less volatile and may be more responsive to the policy rate, the headline measure has the overwhelming advantage of being familiar to the public. Korea used a core measure of inflation for the target measure from 2000–06[1] and then reverted to headline CPI. Moreover, measures of core inflation often exclude food as a volatile component. In some developing countries food can be around 40% of the CPI basket and excluding it would simply lack credibility.

While headline CPI is the preferred target measure, many central banks also look at measures of core inflation as an indicator of underlying inflationary pressures in the economy. Australia, Canada, Czech Republic, Ghana, Hungary, Norway, Poland, Sweden and Turkey all publish forecasts of core inflation in addition to headline inflation.[2] The shocks to oil and food prices in 2007 demonstrated the importance of interpreting core inflation measures with care. The rises in prices of food and utilities led to falls in income available for consumption of other goods and services, which in turn helped keep price rises in these sectors (core inflation) subdued. But it would have been misleading to interpret the low levels of core inflation solely as reflecting subdued underlying inflation; core inflation must be interpreted in the light of what is happening in the economy as a whole.

Point or range targets?

Point targets for inflation, including point targets with tolerance bands, have the advantage of being very precise and giving a clear signal to the markets of the central bank's objective. They can also have the advantage of being symmetric, which helps communicate the central bank's desire to avoid deflation as robustly as it avoids inflation. This has been important at times when the threat of deflation has been a concern. A point target can also help convey the medium-term nature of the objective: it is obviously impossible for inflation to hit the point target month in month out. Finally, a point target may be preferable when the volatility of inflation outturns is wider than the width of a narrow band.

With a target range it is very clear whether the target has been hit or missed. Ranges can also convey the sense that the central bank has imprecise control over the inflation objective, and that the central bank can accommodate temporary shocks to price level. In the same way, a target range allows a degree of output stabilisation.

In practice the majority of central banks, particularly those adopting inflation targeting later, have opted for the best of both worlds, with 17 inflation targeters expressing the target as a point with a tolerance band. Five central banks (Hungary, Iceland, Norway, Sweden[3] and the United Kingdom)[4] have simple point targets while the other five countries have a target range.

Decision-making under inflation targeting

This section looks at the decision-making process in inflation-targeting central banks. In most cases a decision-making committee meets regularly at pre-announced rates meetings to decide what interest rates (or other policy measures) are necessary to achieve the inflation target. But there are many variations on the model.

Decision-making body

Inflation targeters tend to make decisions by committee. Even in New Zealand where the Governor is the sole decision-maker, the Official Cash Rate Advisory Group (OCRAG), including two external appointees, serves in an advisory role. In Israel, where the Governor had formerly been the sole decision-maker, a new law was passed in 2010 to create a Monetary Committee with six members. (See page 30 for details). In thirteen countries the policy decision is taken by the Board of the central bank and in eleven countries the MPC decides on interest rates. The rationale for a separate MPC is usually to delegate the monetary policy decision to monetary policy experts. In the United Kingdom, the law requires all MPC members to be appointed on the basis of their experience or expertise in monetary policy. In some countries, such as Armenia and the Philippines, there is a two-stage process under which an internal MPC or Advisory Committee of technical experts makes recommendations to the Board, which is formally responsible for monetary policy decisions.

Size and composition of committee

The average size of decision-making committee is seven people, and this does not seem to be related to the size of the economy. Poland has the largest committee of ten; several central banks have five members on their committee. There is no clear pattern on the composition of the Board or MPC, with some committees staffed by internal central bank officials, and an equal number by central bank experts plus external appointees (**Table B**). In a minority of cases (including Colombia, Guatemala and the Philippines) the government is represented on the decision-making body. In other cases, a member of government attends as an observer, without the right to vote (Hungary, Romania, Turkey and the United Kingdom).

(1) After using headline CPI for the period 1998–99.
(2) The RBA looks at a range of measures of underlying inflation, but its preferred measures are trimmed mean measures which, while downweighting the effect of large changes in fuel and food do not exclude them. In the Czech Republic the core measure is a measure of monetary policy relevant inflation, ie headline inflation adjusted for first round effects of changes in indirect taxes.
(3) Sweden dropped the tolerance bands around its point target in 2010.
(4) In the United Kingdom there is a requirement if inflation is more than 1 percentage point away from target for the Bank of England to write an open letter. But this is an accountability mechanism and not a target range.

Table B Decision-making in inflation-targeting central banks

	Number on policy making committee	External members?	Meetings per year	Governor's term (years)	Decision making process	Votes published?
Armenia	7	No	12	6	Vote	No
Australia	9	6	11	7	Consensus	n/a
Brazil	8	No	8	No fixed term	Vote	Balance of votes
Canada	6	No	8	7	Consensus	n/a
Chile	5	No	12	5	Vote	Yes
Colombia	7	No	12	4	Vote	Majority or unanimous
Czech Republic	7	No	8	6	Vote	Yes
Ghana	7	2	6	4	Consensus	n/a
Guatemala	8	7	8	4	Vote	No
Hungary	5 to 9[(a)]	4	12	6	Vote	Yes
Iceland	5	2	8	5	Consensus otherwise vote	Balance of votes
Indonesia	6 to 9[(b)]	No	12	5	Consensus	n/a
Israel	6	3	12	5	Vote	Balance of votes
Mexico	5	No	8	6	Consensus	n/a
New Zealand	Governor	n/a	8	5	Governor decides	n/a
Norway	7	5	6	6	Consensus	n/a
Peru	7	No	12	Term of parliament	Vote	No
Philippines	7	No	8	6	Vote	No
Poland	10	9	12	6	Vote	Yes in *Inflation Report*
Romania	9	5	8	5	Vote	No
Serbia	5	No	12	6	Vote	No
South Africa	7	No	6	5	Consensus	n/a
South Korea	7	5	12	4	Vote	No
Sweden	6	No	6	6	Vote	Yes
Thailand	7	4	8	5	Vote	Balance of votes
Turkey	7	1	12	5	Vote	No
United Kingdom	9	4	12	5	Vote	Yes

(a) Currently 7.
(b) Currently 7.

Decision-making process

A majority of inflation targeters — 18 of the 26 — determine monetary policy by majority vote, rather than arriving at a consensus decision.[(1)] The Governor, as chairperson, usually has the casting vote. Eight central banks arrive at a consensus decision, and in New Zealand the Governor is the sole decision-maker (**Charts 3** and **4**).

Frequency of decision-making

Most decision-making bodies meet between eight and twelve times per year. Monthly meetings are common, and fit well with the monthly release of data. In normal times, six-weekly meetings are usually sufficient to take account of the news. In exceptional times, the committee may meet more frequently. In our sample, fourteen central banks meet 11–12 times per year and ten meet 8–9 times per year, while in Ghana, Norway, South Africa and Sweden the MPC meets six times per year.

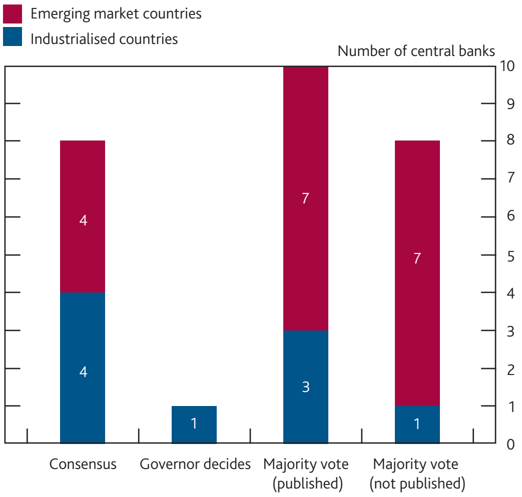
Models and forecasts

Models used for monetary policy

Inflation targeting requires strong technical capacity in the central bank to model the economy, understand the transmission mechanism and forecast inflation and output. Most inflation-targeting central banks use a suite of models approach (**Table C**), including statistical and spreadsheet forecasts, structural, macroeconomic and dynamic stochastic general equilibrium (DSGE) models. Some models are theoretically based, while others are more data driven. Some

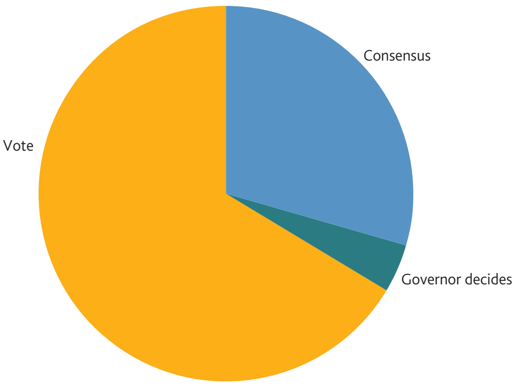
(1) In Iceland, the committee attempts to arrive at a consensus, but if not, will vote.

Chart 3 Decision-making process



Sources: Bank of England and other central bank websites.

Chart 4 Decision-making process



Sources: Bank of England and other central bank websites.

are better suited to short-term projections and others for longer-term forecast horizons. By using a suite of different models, central banks can draw both on theory and data, plus, of course, a large element of judgment, to inform policymaking.

Spreadsheet forecasts are typically used to make monthly projections of CPI over the near term (up to six months). They can incorporate information (eg on administered prices) and expert judgement on the individual components of CPI. Small-scale econometric models such as vector autoregressions (VARs) and error correction models use information in macroeconomic data to project future developments and tend to be used for projections six to twelve months ahead. The usefulness of these models depends on the quality of the data; they are less useful when there has been rapid transformation in the economy such that the past is a less reliable guide to the future.(1)

Small structural models, typically of four to six equations, have some theoretical underpinning, are tractable for forecasting purposes and also have some empirical basis. In recent years many central banks have added a DSGE model to their suite. These models have strong microfoundations(2) and are among the most theoretically coherent of models. Another big advantage is that they include forward-looking behaviour, especially forward-looking inflation expectations, which as we have seen is a key variable for inflation targeters. DSGE models are complex to build, however, and often need to be augmented with a number of *ad hoc* features in order to replicate stylised facts in the data.

Forecasts

All inflation targeters publish their forecasts of inflation, usually quarterly. Eight central banks (Australia, Canada, Ghana, Hungary, Norway, Poland, Romania and Thailand) also publish forecasts of core inflation. 16 publish GDP forecasts, and Norway and Romania publish forecasts of the output gap. A few central banks (the Czech Republic, Israel, New Zealand, Norway and Sweden) now publish projections for the policy interest rate.(3)

There are a number of separate issues here. The first is what broad type of interest rate assumption (constant or non-constant) is better for forecasting. Then there is the question of whether the time-varying path that is an input to the forecast should be model-based, market-based or based on judgement. Finally there is a separate question of communication. The question of how much a central bank should reveal about its expectations of future policy rates has been the subject of considerable debate.

There are a number of arguments in favour of a central bank publishing its own projection of interest rates. First, it can be seen as an extension of the transparent inflation-targeting framework. This will help anchor inflation expectations. Kahn (2007) argued that publishing the central bank's projections for interest rates may help markets price assets more efficiently, and Sellon (2008) found that in the United States, more explicit guidance on interest rates led to an improvement in private sector forecasts. Rosenberg (2008) found that in Sweden, the publication of the Executive Board's projection for the policy rate resulted in the Board being more involved in the forecast process.

There are equally powerful arguments against publishing the central bank's projection for policy rates. First, most central banks don't actually have a path to communicate. Many MPCs spend most of their time assessing the economic situation and outlook rather than the future path of interest rates. Goodhart (2001) makes a convincing argument on the

(1) In econometrics terms, where there are structural breaks in the data.
(2) Microfounded models include microeconomic analysis of the behaviour of individual agents such as households and firms to underpin the macroeconomic theory.
(3) Since January 2009, the Czech National Bank has also published projections for the exchange rate. In January 2012, the Federal Reserve Bank of New York adopted an inflation goal of 2% and published forecasts for federal funds rate, though it did not formally adopt inflation targeting.

Table C Models and forecasts

	Type of models	Published forecasts	Interest rate assumption	Forecast owned by
Armenia	Core medium-term projection model, short-term forecasting models, signal extraction models, satellite models	Inflation and GDP fan charts	Constant	Central bank
Australia	DSGE plus small models and single equations	GDP, inflation and core inflation	Market or constant	Central bank
Brazil	VARs, small and medium-sized macro models, DSGE	Fan chart forecasts of inflation and GDP	Constant and market	MPC
Canada	Suite of DSGE plus macro models	GDP, inflation and core inflation	Endogenous	Governing Council
Chile	Quarterly macroeconomic model, time series and DSGE	GDP and CPI	Consistent with the target	Board
Colombia	Models for statistical forecasting, structural and simulation purposes	Fan chart forecast of inflation and range forecast of GDP	Policy rule	Staff
Czech Republic	DSGE macro model	Inflation, monetary policy relevant inflation, interest rate, exchange rate and GDP	Endogenous	Central bank
Ghana	AR, ECM, (macro and calibrated models being developed)	Headline and core inflation and GDP	Not communicated	MPC
Guatemala	ARIMA; smoothing model and a semi-structural macro model	Inflation	Non-constant path	Staff
Hungary	Time series, expert, macro and DSGE	CPI, core inflation, GDP and labour market	Endogenous	Staff
Iceland	VAR, structural, macro, (DSGE being developed)	Inflation	Generated from macro model	Staff
Indonesia	DSGE, macro, ARIMA	Inflation, GDP and GDP components	Scenarios and expected inflation	Board
Israel	Suite of models	Fan chart forecasts for inflation and key policy rate. Range forecast for GDP	Forward-looking policy reaction function — endogenous	Staff
Mexico	DSGE model, ECM	Inflation, GDP and employment	Endogenous	Staff
New Zealand	Calibrated gaps model is main forecasting model. Suite of alternative models.	GDP, inflation and interest rate projections	Endogenous	MPC
Norway	DSGE models and a suite of forecasting models for 'nowcasting'	Key policy rate, output gap, CPI and core inflation	Endogenous	Governor
Peru	Semi-structural, DSGE, VAR	Inflation, GDP, BoP, inflation and GDP in trading partners	Taylor rule	Central bank
Philippines	Single equation, multi equation, (macro models being developed, DSGE model for policy simulation)	Inflation	Constant	Central bank
Poland	Suite of macroeconomic models; structural macro model is main one. DSGE model used for internal analysis	Inflation and core inflation, GDP and GDP components	Constant	Staff
Romania	Semi-structural model, timeseries models	Inflation, core inflation and GDP gap	Model-based monetary policy reaction function (Taylor rule)	Board
Serbia	Quarterly Projection Model	Inflation	Endogenous	Executive Board
South Africa	Core macro forecasting plus suite of models	Fan chart forecast of Inflation and GDP	Constant	MPC
South Korea	Dynamic Projection Model, DSGE model	Inflation and GDP	Market	Central bank
Sweden	Time series model, indicator models, structural models (eg DSGE)	GDP, CPI, core inflation and the repo rate	Endogenous	Board
Thailand	Suite of models (DSGE being developed)	Core inflation and GDP	Constant	MPC
Turkey	Quarterly Forecast Model (DSGE model being developed)	Inflation, core inflation and output gap	Endogenous	MPC
United Kingdom	Statistical and theoretical. Main forecasting model is DSGE	Inflation and GDP	Market rates	MPC

practical difficulty for a committee, particularly an individualistic committee, agreeing on an entire path for interest rates: do members vote for each month's decision? how then to aggregate these views? King (2007) suggested that markets need information on the MPC's contingent response to data as they evolve, rather than the MPC's projections of the policy rate. On a different tack, Kahn (2007) suggests that policymakers may feel tied in to a published projection and be less willing to change path in response to new information.

For some central banks, the key arguments against publishing a projection of the policy rate relate to the communication strategy, rather than technical factors. A real issue is whether markets, and more especially the general public, would understand the conditional nature of the interest rate projection, particularly as the central bank itself sets the policy rate. There is also the argument that publishing the policy rate projection could unhelpfully move the debate into aspects of forecasting and the interest rate path and away from the central message that the central bank wants to convey about meeting the inflation target.

A separate question is who owns the inflation forecast. The more clearly the policymaking body is seen to be associated with the forecast, the more directly it will be perceived as having an influence on policy. In general, decision-makers in inflation-targeting central banks tend to be very involved with the forecast: in fourteen cases the forecast is owned by the Board or MPC;(1) in six cases it is a central bank forecast and in seven cases a staff forecast.

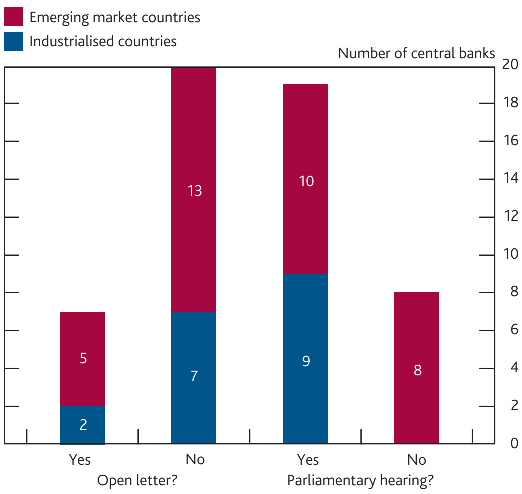
Accountability and transparency

Mechanisms of accountability

There is a large literature on the relationship between central bank independence and accountability. Individual inflation-targeting frameworks often reflect strenuous attempts to balance the two, with detailed and sophisticated mechanisms to hold the central bank to account for its conduct of monetary policy. For the United Kingdom, Tucker (2007) details the reforms that were necessary in the early 1990s to ensure independence and accountability for the Bank of England, particularly given a prevailing view that 'it was a real obstacle to independence that the Bank would not be able to account for its monetary stewardship on the Floor of the House of Commons. In a Parliamentary system of democracy, it is Ministers who are accountable'. Similarly Reddell (2006) reveals the detailed monitoring system, both statutory and as it has evolved in practice, for the Reserve Bank of New Zealand. The legislation establishes clear roles for the Governor, the Minister of Finance and the Board of Directors under the Policy Target Agreement. The Board's role includes monitoring the role of the Governor who is formally held to account for the conduct of monetary policy.(2)

Specific forms of accountability to parliament have been put in place in inflation-targeting regimes, notably 'open letters' and parliamentary hearings. Open letters are usually letters written by the Governor on behalf of the MPC to the government in the event that inflation misses the inflation target by a pre-specified amount. The central bank is usually required to explain why inflation has missed the target, what action the central bank is taking to bring inflation back to target and when this is expected to happen. The open letter is designed to be part of the communication and accountability process, and not a 'censure' on the central bank. When the original framework for the Bank of England was put in place in 1997, it included a requirement for an open letter if inflation deviated from target by more than 1 percentage point in either direction. At the time, it was expected, on the basis of previous volatility in inflation, that an open letter would be required about 40% of the time (Bean (1998)). In the event, the volatility of inflation fell markedly and it took ten years before the first open letter was written in April 2007. Among our sample, seven central banks have an open letter as part of their accountability mechanisms(3) (**Chart 5**).

Chart 5 Accountability mechanisms



Sources: Bank of England and other central bank websites.

Another important accountability mechanism is parliamentary hearings, whereby the central bank appears before parliament to provide testimony on monetary policy. All industrialised countries, but only one half of emerging and developing countries have some form of parliamentary hearing as part of their inflation-targeting framework (**Chart 5**).

Open letters and parliamentary hearings are the main forms of accountability to parliament. There are also accountability mechanisms that hold the governor or MPC accountable to the

(1) This includes Norway where the Governor is ultimately responsible for the forecast.
(2) Reddell makes clear that 'the Act does not allow the Governor to be dismissed simply for failing to meet the policy targets. The criteria in the Act refer explicitly to the performance of the Bank and the Governor in pursuit of those targets'.
(3) In addition, New Zealand and Israel have other, similar accountability mechanisms.

Table D Accountability and transparency

	Open letter	Parliamentary hearings?	Press notice/ conference	Minutes	Votes	*Inflation Report*	Frequency
Armenia	No	Yes, annual	PR	Yes, within ten days	No	Yes	4
Australia	No	Yes, twice yearly	Notice	Yes, after two weeks	n/a	Yes	4
Brazil	Yes	Yes, six per year	PR + PC for *IR*	Yes, after eight days	Balance of votes	Yes	4
Canada	No	Yes, twice yearly	PR + PC for *IR*	No	n/a	Yes	4
Chile	No	Yes, four times per year	PR	Yes, after two weeks	Yes	Yes	4
Colombia	No	Yes, twice yearly	PR, PC for *IR*	Yes, after two weeks	Majority or unanimous	Yes	4
Czech Republic	No	No (Report)	PR, PC for *IR*	Yes, after eight days	Yes	Yes	4
Ghana	No	No	PR + PC	No	n/a	Yes	4 to 6
Guatemala	No	Yes, twice a year	PR + PC	Yes, after four weeks	No	Yes	3
Hungary	No	Yes, once a year	PC	Yes	Yes	Yes	4
Iceland	Yes	Yes, twice yearly	PR + PC	Yes	Balance of votes	Yes	2 plus 2
Indonesia	No	No	PR	No	n/a	Yes	4
Israel	No	Yes, twice yearly	PR	Yes, after two weeks	Balance of votes	Yes	2
Mexico	No	Yes, not regular	PR	Yes, after two weeks	n/a	Yes	4
New Zealand	Other	Yes, four times a year	PR, PC for *IR*	No	n/a	Yes	4
Norway	No	Yes	PR + PC	No	n/a	Yes	3
Peru	No	Yes, once a year	Teleconference	No	No	Yes	4
Philippines	Yes	No	PR + PC	Yes, after four weeks	No	Yes	4
Poland	No	No[(a)]	PR + PC	Yes, after three weeks	Yes in *IR*	Yes	4
Romania	No	No	PR + PC for *IR*	No	No	Yes	4
Serbia	Yes	No[(b)]	PR + PC	No	No	Yes	4
South Africa	No	Yes, at least three per year	PR + PC	No	n/a	Yes	2
South Korea	No	Yes	PR + PC	Yes, after six weeks	No	Yes	2
Sweden	No	Yes, twice yearly	PR	Yes, after two weeks	Yes	Yes	3 plus 3
Thailand	Yes	No	PR + PC	Yes, after two weeks	Balance of votes	Yes	4
Turkey	Yes	Yes, twice a year	PR	Yes	No	Yes	4
United Kingdom	Yes	Yes, three per year	PR + PC for *IR*	Yes, after two weeks	Yes	Yes	4

Note:
IR = *Inflation Report*.
PC = Press conference.
PR = Press release.

(a) Governor reports to Lower House once a year on monetary policy in the preceding year.
(b) Governor explains reports to National Assembly. See page 38.

central bank Board and the central bank is ultimately accountable to the public. Public accountability is usually achieved through publications and the wider communication strategy.

Publications and communications

'Inflation targeting is a framework for making and communicating decisions.' King (2005) *op cit*.

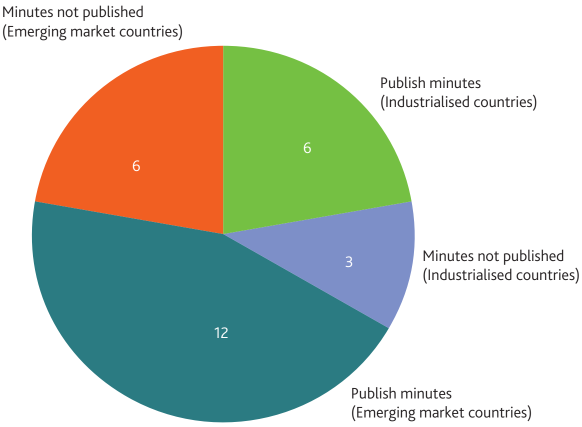
For central banks planning to introduce inflation targeting, establishing a strategic communications strategy is a key pre-requisite. Communication is an integral part of an inflation-targeting framework. Since the early 1990s, all central banks have become more transparent, as openness has replaced mystique as a guide to monetary policy, but inflation targeters are the most transparent (Geraats (2009)). Dincer and Eichengreen (2007) find that in their sample of 100 central banks the most transparent were the Reserve Bank of New Zealand, the Swedish Riksbank, the Bank of England, the Czech National Bank, the Bank of Canada, the ECB, and the Central Bank of the Philippines.

There has been some convergence on central bank communication. Most central banks communicate their monetary policy framework and objectives. Most publish their analysis of economic conditions, including the outlook for growth and inflation, as well as the major risks to that outlook. And most central banks explain the reasons for their policy decision. The main differences in communication strategy lie in how much information is revealed about differences of opinion among decision-makers, and how much guidance, either explicit or implicit, is given about the future stance of policy (see the section on forecasts for a discussion on publishing a projection for policy rates).

For inflation targeters, the main vehicle of communication is the *Inflation Report*. All 27 publish such a report, in the vast majority of cases quarterly (**Table D**). The *Inflation Report* usually presents the central bank's assessment of economic conditions and its view on prospects for inflation and growth, including its projections for these and other variables. The main upside and downside risks to the projections and alternative scenarios are often included (see **Table C** for details of published projections). The other main purpose of the *Inflation Report* is to explain the rationale behind recent monetary policy decisions.

Another important publication is the minutes of the policymaking meeting. Eighteen inflation targeters publish the minutes, usually after a lag of two to four weeks, though the Central Bank of Brazil and the Czech National Bank publish minutes eight days after the policy meeting. As **Chart 6** shows, most but not all industrialised countries publish minutes,[1] and publication of minutes is becoming more common in emerging market countries, with two thirds now publishing minutes of the policy meeting.[2]

Chart 6 Transparency



Sources: Bank of England and other central bank websites.

Inflation targeters in Europe are the most individualistic: of the 18 central banks that reach an interest rate decision by vote, six publish the individual votes; Chile, Czech Republic, Hungary, Poland,[3] Sweden and the United Kingdom. Brazil, Iceland and Thailand reveal the balance of the vote, and Colombia reveals whether there was a unanimous or majority decision.

One reason for publishing individual votes is that this gives the markets more information on the policymakers' views. In the Bank of England, revealing individual votes also accords with the principle of individual accountability among MPC members. Publishing the balance of votes is an alternative way of providing information about the views on the committee without revealing the identities of voters. One argument for not revealing individual votes is that it may make it easier for members to change their position. Since details of the vote contain market sensitive information there is an argument for publishing it when the interest rate decision is announced, rather than subsequently when the minutes are published.

All inflation targeters publish details of the monetary policy decision (usually the interest rate) immediately after the policy meeting, and it is usual for a press release or notice to accompany the decision (**Table D**). In addition, 19 inflation targeters hold press conferences, either to explain the decision or on publication of the *Inflation Report*.

Challenges for inflation targeting

Inflation targeting has been in existence for just over 20 years. During that time, frameworks have evolved, as has economic theory and consensus views on the objectives of monetary policy. The introduction of inflation targeting in many countries coincided with the 'great stability', a period characterised by moderate consumer price inflation and a reduction in the volatility of inflation and output. Following the financial crisis that started in 2007, inflation targeters (and indeed all monetary policy makers) faced new and unprecedented challenges.

Inflation targeting and financial stability

A key issue for central banks has been how to combine the goal of financial stability with the goal of price stability. It is clear that low and stable inflation does not guarantee financial stability. While there have been few changes to central banks' formal inflation-targeting frameworks, the role of financial stability has been strengthened in central banks, with some, like the Bank of England, introducing a new macroprudential policy framework to strengthen financial stability alongside the inflation-targeting framework.

(1) In New Zealand, where the decision is taken by the governor, it does not make sense to publish minutes as such. In Australia, five of the external members are from the business community, and publication of voting records could subject them to pressure from that sector.
(2) Thailand and Mexico began publishing minutes in 2010.
(3) In the *Inflation Report*, rather than the minutes.

Inflation targeting and asset prices

While inflation targeting generally resulted in low and stable consumer prices in the 1990s and early part of the 2000s, asset prices were more volatile, and there were long-standing concerns about the build-up of money and credit in some economies. Against this background, a key issue facing central banks for some years has been whether and how they should take account of asset prices in monetary policy (see for example Borio and White (2004)). On the specific question of how inflation targeters should respond to asset prices, Bean (2003) noted that 'a central bank seeking to stabilise inflation and output over a sufficiently long time horizon should necessarily aim to incorporate the possible adverse long term consequences of an asset price bubble in its deliberations'. This implies taking a longer time horizon for monetary policy decisions, beyond the one or two year horizon. For several years central banks such as the RBA have argued that central banks need to pay close attention to asset prices; what information they may contain about the stance of policy and the risks that may be building up. In Poland, the Monetary Policy Guidelines for 2010 issued by the National Bank contain more explicit acknowledgement of asset prices in interest rate setting.

The financial crisis has challenged the conventional wisdom that monetary policy could not and should not attempt to burst asset price bubbles, but rather should be used energetically in the aftermath of the bubble bursting. Yet there is still no clear consensus on how proactively central banks should lean against the wind.

Specification of the inflation target

The increased volatility in inflation since 2007 has led to some debate on the best target measure of inflation. There have been calls for the targets to explicitly include asset prices and particularly house prices. Others have argued in favour of targeting 'domestically generated inflation', in order to abstract from the headwinds and tailwinds of imported inflation. The fear of deflation led some to propose increasing the level of the target in order to avoid the zero bound. Others have suggested that, faced with below target inflation in the short run, the inflation target should be specified as an average over several years in order to anchor inflation expectations. Some have argued that this makes more sense with a price level target, and that a price level target would provide a stronger anchor for positive inflation expectations. On the other hand, there are concerns that a price level target would be less effective in coping with persistent terms of trade stocks.

Inflation targeting near the zero bound

The traditional instrument of monetary policy is interest rates. In 2009 and 2010, several central banks had reduced interest rates close to zero. Interest rates cannot usually be negative, so as further easing of monetary policy was required in order to achieve the inflation target, central banks used 'unconventional monetary policy'. This usually involves measures to increase the quantity of money or credit in the economy to provide an additional stimulus to nominal spending in order to meet the inflation target. In these operations, the central bank buys public and private sector assets using central bank money.

Some inflation-targeting central banks pursued unconventional monetary policies. The Bank of England began a programme of asset purchases in March 2009,(1) and the Bank of Canada published a framework for unconventional monetary policy under inflation targeting in their April 2009 *Monetary Report*, under which it made a conditional commitment to keep policy rates at the effective lower band until the second quarter of 2010. One benefit of the inflation-targeting framework is that monetary policy decisions are clearly linked to the inflation target. The inflation forecast provides a guide for the extent of quantitative easing that may be necessary and also the appropriate time to exit. The numerical target also provides a strong anchor for inflation expectations.

Conclusion

Inflation targeting has been successfully practised in a growing number of countries in the past twenty years. This Handbook presents the main features of the frameworks in place in the 27 countries regarded as fully fledged inflation targeters at the beginning of 2012. There is much common ground among inflation targeters, but nonetheless individual frameworks reflect local economic, political and cultural factors. Inflation-targeting frameworks have also been adapted to meet with new challenges. It is likely that further changes will occur as central banks seek to combine their financial stability objectives with the monetary policy objectives.

(1) The programme paused in February 2010 after a total of £200 billion of asset purchases but was resumed in October 2011 when a further £75 billion of asset purchases was announced.

Armenia

1. Inflation-targeting framework

1.1 Monetary authority	Central Bank of Armenia (CBA).
1.2 Legal mandate	Armenian Law on 'The Central Bank' specifies that its key objective is ensuring price stability.
1.3 Operational independence?	Yes.
1.4 Date IT adopted	January 2006.
1.5 Who sets the target?	CBA jointly with the Government.
1.6 Target measure; headline or core?	Headline CPI.
1.7 Current target	4% ±1.5 percentage points.
1.8 Target horizon	Twelve months.
1.9 Key policy rate	One week repo rate.

2. Decision-making

2.1 Decision-making body	CBA Board: Governor, Vice Governor, five Board members.
2.2 External members?	No.
2.3 Terms of appointment of members	The Governor is appointed by the National Assembly for six years, the Vice Governor is appointed by the President for six years and five Board members are appointed by the President for five years on a rotating schedule.
2.4 Decision-making process	A technical committee including the Board member responsible for monetary policy makes recommendations to the Board. The Board makes decisions based on majority voting. The Governor has a casting vote.
2.5 Frequency of decision-making meeting	Monthly.

3. Modelling and forecasting

3.1 Type of models used by central bank	Core medium-term projection model, short-term forecasting models, signal extraction models, satellite models.
3.2 Published forecasts	Inflation and GDP fan charts.
3.3 Forecast assumption on interest rates	Constant interest rates.
3.4 Forecast owned by	CBA.

4. Accountability mechanisms

4.1 Open letter	No.
4.2 Parliamentary hearings	Once a year.

5. Communication and publications

5.1 Immediate announcement of policy decision	Press release.
5.2 Press notice/conference after decision	Press release.
5.3 Publication of minutes	Within ten days after decision.
5.4 Publication of individual votes/balance of votes	No.
5.5 Inflation Report	Yes.
5.6 Frequency	Quarterly Monetary Programmes and *Inflation Report*.

Australia

1. Inflation-targeting framework

1.1	Monetary authority	Reserve Bank of Australia (RBA).
1.2	Legal mandate	The mandate is set out in Section 10 (2) of the Reserve Bank Act 1959: 'to ensure that the monetary and banking policy… will best contribute to: a) the stability of the currency; b) the maintenance of full employment; and c) the economic prosperity and welfare of the people of Australia'.
1.3	Operational independence?	Yes.
1.4	Date IT adopted	June 1993.
1.5	Who sets the target?	Government and central bank.
1.6	Target measure; headline or core?	CPI. Initially a measure of underlying inflation but since 1998, headline CPI.
1.7	Current target	Target range of 2%–3% per annum on average over the economic cycle.
1.8	Target horizon	Medium term.
1.9	Key policy rate	Cash rate (overnight loans between financial intermediaries).

2. Decision-making

2.1	Decision-making body	Reserve Bank Board. There are nine members — three *ex officio*; the Governor (chairperson), Deputy Governor, and the Secretary to the Treasury together with six external members.
2.2	External members?	Yes. Six external members who are appointed by the Treasurer.
2.3	Terms of appointment of members	The Governor and Deputy Governor are appointed by the Governor-General in Council for terms of up to seven years and can be re-appointed. Their appointments can be terminated only with the approval of each House of Parliament in the same session of Parliament. The six external members are appointed by the Treasurer for terms of up to five years and are eligible for re-appointment.
2.4	Decision-making process	In the Act, majority vote. The chairperson has a casting vote. In practice, the Board usually achieves a consensus without the need for formal voting.
2.5	Frequency of decision-making meeting	Normally eleven times each year (not January).

3. Modelling and forecasting

3.1	Type of models used by central bank	Forecasts reflect a mix of judgement and models (DSGE plus small models and single equations).
3.2	Published forecasts	Forecasts for GDP, inflation and underlying inflation are published four times a year.
3.3	Forecast assumption on interest rates	As specified: typically that the cash rate is either constant or moves broadly in line with market expectations.
3.4	Forecast owned by	RBA (forecasts are 'RBA' documents not Board documents).

4. Accountability mechanisms

4.1	Open letter	No.
4.2	Parliamentary hearings	Yes. The Governor and senior officers appear twice yearly before the House of Representatives Standing Committee on Economics.

5. Communication and publications

5.1	Immediate announcement of policy decision	Yes, with a media release.
5.2	Press notice/conference after decision	Press notice.
5.3	Publication of minutes	Yes, two weeks after each meeting.
5.4	Publication of individual votes/balance of votes	No.
5.5	Inflation Report	*Statement on Monetary Policy*.
5.6	Frequency	Four times a year.

Brazil

1. Inflation-targeting framework

1.1 Monetary authority	Central Bank of Brazil.
1.2 Legal mandate	Decree no. 3088, 21 June, 1999 formally instituted the inflation-targeting regime in Brazil.
1.3 Operational independence?	Yes.
1.4 Date IT adopted	June 1999.
1.5 Who sets the target?	The National Monetary Council (CMN). This consists of: the Minister of Finance; the Governor of the Central Bank of Brazil; and the Minister of Planning, Budget and Management.
1.6 Target measure; headline or core?	Headline Broad National Consumer Price Index (IPCA).
1.7 Current target	Point target with tolerance intervals. Target for 2012 and 2013: 4.5% ±2 percentage points. The target for 2014 will be set in June 2012.
1.8 Target horizon	Yearly target.
1.9 Key policy rate	SELIC; an overnight interest rate.

2. Decision-making

2.1 Decision-making body	Monetary Policy Committee (COPOM). There are eight members: the Central Bank's Board of Directors: the Governor and the Deputy-Governors of Monetary Policy, Economic Policy, International Affairs and Risk Management, Financial Regulation, Financial System Organisation and control of farm credit, Supervision and Administration.
2.2 External members?	No.
2.3 Terms of appointment of members	The Governor and all Deputy Governors of the Central Bank are appointed by the President of the Republic prior to approval by the Senate. There is no fixed term of appointment for the Governor and Deputy Governors.
2.4 Decision-making process	By vote. The Governor has a casting vote.
2.5 Frequency of decision-making meeting	Eight meetings per year.

3. Modelling and forecasting

3.1 Type of models used by central bank	VARs, Bayesian VAR, VECM, FAVAR, small and medium sized macro models and a DSGE model.
3.2 Published forecasts	Fan chart forecasts of inflation and GDP are published quarterly.
3.3 Forecast assumption on interest rates	Benchmark scenario using constant interest rates, and market scenario using market expected interest rate.
3.4 Forecast owned by	Monetary Policy Committee.

4. Accountability mechanisms

4.1 Open letter	Yes, in case of non-fulfilment of the inflation target, the Governor must write an open letter to the Minister of Finance setting out the reasons for missing the target, the policy measures to guarantee the return of the inflation rate to the tolerance interval, and the expected time horizon for these measures to become effective.
4.2 Parliamentary hearings	Yes, six times per year.

5. Communication and publications

5.1 Immediate announcement of policy decision	Yes.
5.2 Press notice/conference after decision	No, only after the publication of the *Inflation Report*.
5.3 Publication of minutes	Yes, eight days after each meeting.
5.4 Publication of individual votes/balance of votes	Balance of votes.
5.5 Inflation Report	Yes.
5.6 Frequency	Four per year.

Canada

1. Inflation-targeting framework

1.1 Monetary authority	Bank of Canada.
1.2 Legal mandate	According to the Bank of Canada Act the main role is 'to promote the economic and financial welfare of Canada'.
1.3 Operational independence?	Yes.
1.4 Date IT adopted	February 1991.
1.5 Who sets the target?	Bank of Canada and the Government of Canada.
1.6 Target measure; headline or core?	Headline CPI. Core inflation used as operational guide. Target is defined in terms of the twelve-month rate of change in total CPI.
1.7 Current target	2%, the mid-point of the 1%–3% range. Aim at 2% usually over six to eight quarters, but this is flexible.
1.8 Target horizon	Inflation-control target agreement with government renewed for five years until December 2016
1.9 Key policy rate	Overnight rate.

2. Decision-making

2.1 Decision-making body	Governing Council. There are six members: the Governor, Senior Deputy Governor and four Deputy Governors.
2.2 External members?	No.
2.3 Terms of appointment of members	The Governor and Senior Deputy Governor are appointed by the Bank's Board of Directors (with the approval of Cabinet) for terms of seven years.
2.4 Decision-making process	By consensus.
2.5 Frequency of decision-making meeting	In normal conditions, eight times a year.

3 Modelling and forecasting

3.1 Type of models used by central bank	TOTEM (open-economy dynamic stochastic general equilibrium model) is used as the main projection model for the Canadian economy. MUSE is the main forecast model of the US economy. BoC-GEM (Bank of Canada Global Economic Model) is the dynamic stochastic general equilibrium model that is used to assess the effects of global shocks on major countries or economic regions and their impact on Canada. BoC-GEM-Fin is the version of BoC-GEM that includes financial frictions and a banking sector. The Global Projection Model is used to forecast the rest of the world economy.
3.2 Published forecasts	Fan chart forecasts for total and core inflation plus GDP forecasts.
3.3 Forecast assumption on interest rates	Endogenous. Path of the policy rate required to achieve the inflation target.
3.4 Forecast owned by	The Governing Council.

4. Accountability mechanisms

4.1 Open letter	No.
4.2 Parliamentary hearings	Yes. The Bank's *Annual Report* is presented to Parliament by the Minister and a copy is also published in the Canada Gazette. The Governor/Senior Deputy Governor testify before Parliament/Senate twice a year after the release of the *Monetary Policy Report*.

5. Communication and publications

5.1 Immediate announcement of policy decision	Yes.
5.2 Press notice/conference after decision	Press release eight times a year. There is a press conference the following the release of the *Monetary Policy Report* four times a year.
5.3 Publication of minutes	No.
5.4 Publication of individual votes/balance of votes	n/a.
5.5 Inflation Report	*Monetary Policy Report*.
5.6 Frequency	Four times a year.

Chile

1. Inflation-targeting framework

1.1	Monetary authority	Central Bank of Chile.
1.2	Legal mandate	According to Article 97 of Chapter XII of the current Constitution of Chile, the central bank mandate is 'to ensure the stability of the value of the national currency and the normal functioning of domestic and foreign payments'.
1.3	Operational independence?	Yes.
1.4	Date IT adopted	September 1999.
1.5	Who sets the target?	Central Bank of Chile.
1.6	Target measure; headline or core?	Annual CPI (headline).
1.7	Current target	Point target of 3% ±1 percentage point.
1.8	Target horizon	Around two years.
1.9	Key policy rate	Monetary policy interest rate (MPR) an overnight interbank rate.

2. Decision-making

2.1	Decision-making body	The Board of the Central Bank of Chile. There are five members — the Governor, Deputy Governor and three other members.
2.2	External members?	No.
2.3	Terms of appointment of members	Appointed by the President and approved by Senate. Appointments are made every two years and last for ten years. Members can be re-appointed for another period of the same duration. The Governor is appointed by the President of Chile from among the Board members for a period of five years, or the lesser remaining period in her or his term as Board member. The Board itself elects the Vice Governor from among its members.
2.4	Decision-making process	By vote. Governor has a casting vote.
2.5	Frequency of decision-making meeting	Monthly.

3. Modelling and forecasting

3.1	Type of models used by central bank	Quarterly macroeconomic model, time series and DSGE.
3.2	Published forecasts	GDP and CPI with some breakdowns.
3.3	Forecast assumption on interest rates	The path of the MPR must be consistent with the target. The communications state whether the path is steeper or flatter than private sector expectations.
3.4	Forecast owned by	The Board.

4. Accountability mechanisms

4.1	Open letter	No.
4.2	Parliamentary hearings	Four times per year. One with the full Senate and the other three usually only with the Finance Committee.

5. Communication and publications

5.1	Immediate announcement of policy decision	Yes, with a press release.
5.2	Press notice/conference after decision	Press release.
5.3	Publication of minutes	Yes, two weeks after the meeting.
5.4	Publication of individual votes/balance of votes	Yes.
5.5	Inflation Report	*Monetary Policy Report*.
5.6	Frequency	Four times a year.

Colombia

1. Inflation-targeting framework

1.1	Monetary authority	Banco de la República.
1.2	Legal mandate	According to article 373, subsection 1 of the National Constitution and Law 31,1992, article 2, 'to achieve the State's objective of maintaining currency purchasing power'.
1.3	Operational independence?	Yes.
1.4	Date IT adopted	October 1999.
1.5	Who sets the target?	The Board of Directors.
1.6	Target measure; headline or core?	Headline CPI.
1.7	Current target	2011: a range of 2% to 4% with the mid-point 3% for legal purposes.
1.8	Target horizon	Yearly target by law. Central bank announced a long-term target range of 2%–4%. Maximum impact of policy rates on inflation is 18 months.
1.9	Key policy rate	Intervention interest rate (but other instruments also used).

2. Decision-making

2.1	Decision-making body	Board of Directors. There are seven members — the Minister of Finance, the Governor and five Co-Directors.
2.2	External members?	No.
2.3	Terms of appointment of members	Full-time members and the Governor are appointed for fixed periods of four years, twice renewable. The President replaces two of the full-time members every four years, halfway through the presidential period.
2.4	Decision-making process	By vote, on a one person one vote basis.
2.5	Frequency of decision-making meeting	Monthly.

3. Modelling and forecasting

3.1	Type of models used by central bank	The bank uses a wide variety of models with diverse foci (statistical and forecasting, structural and simulation).
3.2	Published forecasts	Fan chart forecast of inflation and range forecast of GDP published in the *Inflation Report*.
3.3	Forecast assumption on interest rates	Policy rule.
3.4	Forecast owned by	Staff.

4. Accountability mechanisms

4.1	Open letter	No.
4.2	Parliamentary hearings	The Board presents a twice-yearly report to the Colombian Congress on the economy's performance and prospects.

5. Communication and publications

5.1	Immediate announcement of policy decision	Yes, with a press release.
5.2	Press notice/conference after decision	Yes. Two weeks after the quarterly *Inflation Report*, the Governor presents on national television and takes questions from the public, live.
5.3	Publication of minutes	Yes, two weeks after the meeting.
5.4	Publication of individual votes/balance of votes	Indicates whether the decision is by majority vote or unanimous.
5.5	Inflation Report	Yes.
5.6	Frequency	Four times a year.

Czech Republic

1. Inflation-targeting framework

1.1	Monetary authority	Czech National Bank (CNB).
1.2	Legal mandate	Act on the Czech National Bank, December 1992 states that the primary objective of CNB 'Shall be to maintain price stability'. Without prejudice to this, CNB 'shall support the general economic policies of the Government leading to sustainable economic growth'.
1.3	Operational independence?	Yes.
1.4	Date IT adopted	December 1997.
1.5	Who sets the target?	CNB.
1.6	Target measure; headline or core?	Headline CPI (since January 2002).
1.7	Current target	Point target of 2% ±1 percentage point (from January 2010).
1.8	Target horizon	Medium term, 12–18 months.
1.9	Key policy rate	Two-week repo rate. Discount rate. Lombard rate.

2. Decision-making

2.1	Decision-making body	CNB Bank Board. There are seven members: the Governor, two Vice Governors and four Chief Executive Directors.
2.2	External members?	No.
2.3	Terms of appointment of members	Members are appointed for a six-year term and cannot hold the position more than twice. Appointed and relieved from office by the President of the Republic.
2.4	Decision-making process	Majority voting. Chairperson has a casting vote.
2.5	Frequency of decision-making meeting	Eight times a year.

3. Modelling and forecasting

3.1	Type of models used by central bank	Core medium-term prediction model is a DSGE macro model; 'g3'.
3.2	Published forecasts	Fan chart forecasts for headline inflation, monetary policy relevant inflation (headline inflation adjusted for first round effects of changes in indirect taxes), interest rate, exchange rate and GDP.
3.3	Forecast assumption on interest rates	Endogenous.
3.4	Forecast owned by	CNB.

4. Accountability mechanisms

4.1	Open letter	No.
4.2	Parliamentary hearings	The Czech National Bank submits a report on monetary development to the Chamber of Deputies of Parliament at least twice a year.

5. Communication and publications

5.1	Immediate announcement of policy decision	Yes, with a press release.
5.2	Press notice/conference after decision	Press conference.
5.3	Publication of minutes	Yes, eight days after each meeting.
5.4	Publication of individual votes/balance of votes	Balance of votes published at press conference. Individual votes published in the minutes.
5.5	Inflation Report	Yes.
5.6	Frequency	Four times per year.

Ghana

1. Inflation-targeting framework

1.1	Monetary authority	Bank of Ghana.
1.2	Legal mandate	Bank of Ghana Act 2002: 'The primary objective of the Bank is to maintain stability in the general level of prices. Without prejudice to the above, the Bank shall support the general economic policy of the Government and promote economic growth and effective and efficient operation of banking and credit systems in the country, independent of instructions from the Government or any other authority.'
1.3	Operational independence?	Yes.
1.4	Date IT adopted	Informally in 2002, formally from May 2007.
1.5	Who sets the target?	Government and central bank.
1.6	Target measure; headline or core?	Headline CPI.
1.7	Current target	2012: 8.7% ±2 percentage points. 2013: 8.0% ±2 percentage points.
1.8	Target horizon	18–24 months.
1.9	Key policy rate	Prime Rate.

2. Decision-making

2.1	Decision-making body	By law, proposals are initiated by the Monetary Policy Committee (MPC), while the Board of Directors is formally responsible for monetary policy decisions. In practice, the monetary policy decisions taken by the MPC have never to date been reversed by the Board. The Board consists of twelve members: the Governor as chairman, the First and Second Deputy Governors and nine Directors. One of the nine Directors is a representative of the Ministry of Finance and Economic Planning. The Secretary of the Bank also attends. The MPC consists of seven members: the Governor, the two deputy Governors, the heads of monetary policy analysis and banking department and two external members.
2.2	External members?	The two external members are appointed by the Ministry of Finance and Economic Planning.
2.3	Terms of appointment of members	The Governor and the Deputy Governors are appointed by the President in consultation with the Council of State for a four-year term and can be re-appointed. Board members are appointed for three years and are eligible for re-appointment.
2.4	Decision-making process	By consensus.
2.5	Frequency of decision-making meeting	Six times a year.

3. Modelling and forecasting

3.1	Type of models used by central bank	Autoregressive (AR) forecasting model; error correction forecasting model; macro econometric model and calibrated macroeconomic model (being developed).
3.2	Published forecasts	Fan chart forecasts for headline and core inflation and GDP are published in the *Monetary Policy Report*.
3.3	Forecast assumption on interest rates	Not communicated.
3.4	Forecast owned by	MPC.

4. Accountability mechanisms

4.1	Open letter	No.
4.2	Parliamentary hearings	No. However, by law, the Governor could be called by the Parliament.

5. Communication and publications

5.1	Immediate announcement of policy decision	Yes, with a press release.
5.2	Press notice/conference after decision	Press conference.
5.3	Publication of minutes	No, but statistical releases are published after each policy meeting.
5.4	Publication of individual votes/balance of votes	No.
5.5	Inflation report	*Monetary Policy Report*.
5.6	Frequency	Four–six per year, after every MPC meeting.

Guatemala

1. Inflation-Targeting framework

1.1 Monetary authority	Bank of Guatemala.
1.2 Legal mandate	The central bank's main policy objective is to attain price level stability.
1.3 Operational independence?	Yes.
1.4 Date IT adopted	2005
1.5 Who sets the target?	The Monetary Board.
1.6 Target measure; headline or core?	Headline CPI.
1.7 Current target	December 2012: 4.5% ±1 percentage point. From December 2013: 4.0%±1 percentage point.
1.8 Target horizon	End of year
1.9 Key policy rate	'Leading rate' ('tasa líder') on overnight interbank deposits.

2. Decision-making

2.1 Decision-making body	Monetary Board. There are eight members: the Governor; the Minister of Public Finance; the Minister of Economy; the Minister of Agriculture; a Director appointed by the national university; a Director appointed by the chambers of Commerce, Industry and Agriculture; a Director appointed by the Guatemalan Banking Association; and a Director appointed by the National Congress. The General Manager of Banco de Guatemala and the Superintendent of Banks are permanent advisers to the Monetary Board but they do not have the right to vote. Other permanent advisers are the Economics Manager, the Financial Manager, the legal Manager the Director of the Macroeconomic Analysis and Forecast Department, and the Director of the Monetary Policy Execution Department.
2.2 External members?	Seven of the eight members are external. The Governor is the only internal member of the Monetary Board.
2.3 Terms of appointment of members	The Governor is appointed by the President of the Republic for a four-year term that does not coincide with the political cycle. Ministers are *ex officio* members of the Board. The Director appointed by National Congress does not have a fixed term. All other Directors are appointed for one-year terms.
2.4 Decision-making process	By vote.
2.5 Frequency of decision-making meeting	The Monetary Board meets weekly. Interest decisions are made eight times a year.

3. Modelling and forecasting

3.1 Type of models used by central bank	A suite of models is used, which includes ARIMA models, an exponential smoothing model, and a Semi-structural Macroeconomic Model (MMS).
3.2 Published forecasts	Inflation forecasts are published in the Monetary Policy Report.
3.3 Forecast assumption on interest rates	Inflation forecasts from the Semi-structural Macroeconomic Model assume a particular (non-constant) path for the interest rate.
3.4 Forecast owned by	The Bank's staff.

4. Accountability mechanisms

4.1 Open letter	No.
4.2 Parliamentary hearings	The Governor has to appear twice a year before Congress to report on the conduct of monetary policy and the achievement of policy objectives.

5. Communication and publications

5.1 Immediate announcement of policy decision	Yes, with a press release.
5.2 Press notice/conference after decision	Yes. The Governor holds a press conference right after the decision is made.
5.3 Publication of minutes	A summary of the argument presented in each interest rate decision meeting is available on the central bank's website one month after the corresponding Monetary Board's meeting.
5.4 Publication of individual votes/balance of votes	No.
5.5 Inflation Report	Monetary Policy Report.
5.6 Frequency	Three times a year

Hungary

1. Inflation-targeting framework

1.1	Monetary authority	Magyar Nemzeti Bank (MNB).
1.2	Legal mandate	According to the Act on Magyar Nemzeti Bank, 'the primary objective of the MNB shall be to achieve and maintain price stability'.
1.3	Operational independence?	Yes.
1.4	Date IT adopted	June 2001.
1.5	Who sets the target?	Central bank.
1.6	Target measure; headline or core?	CPI.
1.7	Current target	Since 2007: 3% per annum.
1.8	Target horizon	Medium term.
1.9	Key policy rate	Interest rate on two-week central bank bond.

2. Decision-making

2.1	Decision-making body	Monetary Council. Consists of at least five and at most nine members. There are currently seven members. The Governor, two Deputy Governors and external members. A non-voting government representative attends the meeting.
2.2	External members?	Four (from 2010).
2.3	Terms of appointment of members	Six years.
2.4	Decision-making process	By majority vote; in case of a tie, the Governor has a casting vote.
2.5	Frequency of decision-making meeting	Once a month.

3. Modelling and forecasting

3.1	Type of models used by central bank	Simple time series and expert models for short-term forecasts; macro econometric and DSGE models for longer-term horizons.
3.2	Published forecasts	Forecasts for headline CPI, core inflation, GDP and labour market indicators are published in the *Quarterly Report on Inflation*. Fan charts surrounding the inflation and GDP projections are published in the *Quarterly Report on Inflation*.
3.3	Forecast assumption on interest rates	Endogenous (since 2011).
3.4	Forecast owned by	Staff of the MNB.

4. Accountability mechanisms

4.1	Open letter	No.
4.2	Parliamentary hearings	The Governor of the MNB reports annually to Parliament.

5. Communication and publications

5.1	Immediate announcement of policy decision	Yes, at 14:00 with a press release after each rate-setting meeting.
5.2	Press conference after decision	Yes (after scheduled rate-setting meetings).
5.3	Publication of minutes	Yes, non-attributed, abridged minutes released regularly before the next rate-setting meeting.
5.4	Publication of individual votes/balance of votes	Individual votes.
5.5	Inflation Report	*Quarterly Report on Inflation*.
5.6	Frequency	Four times a year.

Iceland

1. Inflation-targeting framework

1.1 Monetary authority	Central Bank of Iceland.
1.2 Legal mandate	According to the Central Bank Act no. 36/2001, with a later amendment in February 2009, the Bank's main objective is price stability and it is also obliged to contribute towards the government's main economic policy objectives as long as that does not undermine the Bank's main objective.
1.3 Operational independence?	Yes.
1.4 Date IT adopted	March 2001.
1.5 Who sets the target?	The Bank sets the target with the approval of the Prime Minister.
1.6 Target measure; headline or core?	Twelve-month rise in headline CPI.
1.7 Current target	2.5%.
1.8 Target horizon	On average.
1.9 Key policy rate	Rate on 7-day collateral loans, current account deposit rate and rate on 28-day Central Bank Certificates of Deposits.

2. Decision-making

2.1 Decision-making body	A five-member Monetary Policy Committee consisting of the Governor, Vice Governor, the Chief Economist and two external members.
2.2 External members?	Two external members.
2.3 Terms of appointment of members	The Governor and Vice Governor are appointed for five-year terms with possible re-appointment for a second term. The two external members are also appointed for five-year terms.
2.4 Decision-making process	By consensus if possible, otherwise the Governor invites members to vote. In case of a tie, the Governor has a casting vote.
2.5 Frequency of decision-making meeting	In normal times, a minimum of eight times per year.

3. Modelling and forecasting

3.1 Type of models used by central bank	The core forecasting model is a medium-sized macroeconomic model (QMM). This model is basically an empirically estimated error-correction type of model, but allows for forward-looking expectations. The Bank also has a small New-Keynesian structural model and a medium-sized DSGE model (DYNIMO) is under construction. Other models include VAR models and various short-term forecasting models.
3.2 Published forecasts	A quarterly macroeconomic forecast is published four times a year in the *Monetary Bulletin*.
3.3 Forecast assumption on interest rates	Interest rate path generated from macroeconomic model (a forward-looking Taylor rule with interest rate smoothing) and different non-model assumptions.
3.4 Forecast owned by	Economics staff.

4. Accountability mechanisms

4.1 Open letter	Yes. If CPI deviates from the target by more than 1.5 percentage points in either direction, the Central Bank is obliged to present the government with an open report explaining the deviation from the target and the Bank's responses.
4.2 Parliamentary hearings	The Governor is required to appear before parliament twice a year.

5. Communication and publications

5.1 Immediate announcement of policy decision	Yes, with a press release.
5.2 Press notice/conference after decision	Press conference.
5.3 Publication of minutes	The minutes of Monetary Policy Meetings are made public.
5.4 Publication of individual votes/balance of votes	The balance of votes is included in the published minutes. Individual votes are summarised in the Bank's *Annual Report*.
5.5 Inflation Report	*Monetary Bulletin*.
5.6 Frequency	Four times a year, two of which are short updates.

Indonesia

1. Inflation-targeting framework

1.1 Monetary authority	Bank Indonesia (BI).
1.2 Legal mandate	According to Act no. 23 of 1999 on Bank Indonesia, 'the objective of Bank Indonesia is to achieve and maintain the stability of the rupiah value'.
1.3 Operational independence?	Yes.
1.4 Date IT adopted	July 2005.
1.5 Who sets the target?	The government, after consultation with Bank Indonesia.
1.6 Target measure; headline or core?	Headline CPI.
1.7 Current target	2012: 4.5% ±1 percentage point.
1.8 Target horizon	Over the medium term.
1.9 Key policy rate	BI rate (This is a policy rate. BI has an interest rate corridor to guide interbank money market rates).

2. Decision-making

2.1 Decision-making body	Board of Governors: Governor, and six Deputy Governors. Currently there are seven members.
2.2 External members?	No.
2.3 Terms of appointment of members	Members are proposed and appointed by the President with the approval of the House of Representatives. The term of office is five years and members can be re-appointed once.
2.4 Decision-making process	The Board aims to reach an agreement through consensus: if it fails the Governor will exercise his authority to decide.
2.5 Frequency of decision-making meeting	Usually monthly.

3. Modelling and forecasting

3.1 Type of models used by central bank	Bank Indonesia uses a suite of models: ARIMBI (Aggregate Rational Inflation Targeting Model for Bank Indonesia) is a DSGE model for policy simulation. SOFIE (Short-Term Forecast Model for Indonesian Economy) is the main forecasting model. It is a macro-econometrics model used for forecasting quarterly GDP components, inflation (both core & non-core), monetary aggregates and the exchange rate. Time series models (ARIMA etc) are also used to support the monthly forecast of inflation and exchange rate and several leading and prompt indicators.
3.2 Published forecasts	Range forecasts for inflation, GDP and GDP components are published.
3.3 Forecast assumption on interest rates	Based on scenarios and expectations of inflation.
3.4 Forecast owned by	Board of Governors.

4. Accountability mechanisms

4.1 Open letter	No.
4.2 Parliamentary hearings	Information on the monetary policy implemented in the previous year and the monetary policy plan and monetary target for the next year is reported to the President and The House of Representatives.

5. Communication and publications

5.1 Immediate announcement of policy decision	Yes.
5.2 Press notice/conference after decision	Press release.
5.3 Publication of minutes	No.
5.4 Publication of individual votes/balance of votes	No.
5.5 Inflation Report	*Monetary Policy Report*.
5.6 Frequency	Four times a year.

Israel

1. Inflation-targeting framework

1.1 Monetary authority	Bank of Israel (BoI).
1.2 Legal mandate	According to Bank of Israel Law, 5770-2010,[1] the goals of the Bank are: 'a) to maintain price stability as its central goal; b) to support other goals of the Government's economic policy, especially growth, employment and narrowing social gaps, provided that this support…shall not prejudice the attainment of price stability…'.
1.3 Operational independence?	Yes (de jure and de facto).
1.4 Date IT adopted	Informally in 1992. Fully fledged inflation targeting from June 1997.
1.5 Who sets the target?	Government in consultation with the BoI Governor.
1.6 Target measure; headline or core?	Headline CPI.
1.7 Current target	Target range of 1%–3%.
1.8 Target horizon	Within no more than two years, continuously.
1.9 Key policy rate	Short-term interest rate (overnight transactions between BoI and banks).

2. Decision-making

2.1 Decision-making body	Monetary Committee with six members, the Governor (chair), Deputy Governor and one more BoI employee, to be appointed by the Governor and 'three additional members from among the public'.
2.2 External members?	Yes, three out of six.
2.3 Terms of appointment of members	The Governor is appointed by the President of the State on the recommendation of the Government. The Governor and Deputy Governor are appointed for five-year terms, and can be re-appointed only once.
2.4 Decision-making process	Majority vote. Chair (Governor) has a tie-breaking vote.
2.5 Frequency of decision-making meeting	By law, at least eight times per year but meets monthly.

3. Modelling and forecasting

3.1 Type of models used by central bank	The BoI employs a suite of models along with judgement to produce forecasts.
3.2 Published forecasts	The BoI staff forecast is published quarterly by the Research Department shortly after the interest rate decision for the month in which the forecast is prepared.
3.3 Forecast assumption on interest rates	Endogenous.
3.4 Forecast owned by	Staff.

4. Accountability mechanisms

4.1 Open letter	No but BoI Bill mandates that if inflation target is missed over more than six months, the IR must include reasons for miss and details of policy to return inflation to target.
4.2 Parliamentary hearings	Yes, twice a year based on Monetary Policy Report.

5. Communication and publications

5.1 Immediate announcement of policy decision	Yes.
5.2 Press notice/conference after decision	Press release.
5.3 Publication of minutes	Yes, two weeks after the announcement of the interest rate decision (unless this will compromise monetary policy).
5.4 Publication of individual votes/balance of votes	Balance of votes must be published; publication of individual votes is not mandated.
5.5 Inflation Report	Yes.
5.6 Frequency	Twice a year.

(1) A new central bank law was enacted in March 2010. The MPC was appointed in September 2011.

Mexico

1. Inflation-targeting framework

1.1 Monetary authority	Banco de México.
1.2 Legal mandate	According to Article 28 of the Mexican Constitution, the central bank's main objective is to safeguard the purchasing power of the Mexican currency.
1.3 Operational independence?	Yes.
1.4 Date IT adopted	2001.
1.5 Who sets the target?	The Board of Governors.
1.6 Target measure; headline or core?	Headline CPI.
1.7 Current target	Multi-annual inflation target. Current target: 3% ±1%.
1.8 Target horizon	Medium term.
1.9 Key policy rate	Since January 2008: tasa de fondeo bancario (overnight interbank rate).

2. Decision-making

2.1 Decision-making body	The Board of Governors. There are five members: the Governor and four Deputy Governors.
2.2 External members?	No.
2.3 Terms of appointment of members	The Governor is appointed by the President of the Republic and confirmed by the Senate or the permanent commission for a six-year term. Other members are appointed by the President and confirmed by the Senate or by the Permanent Commission for an eight-year term.
2.4 Decision-making process	By consensus.
2.5 Frequency of decision-making meeting	Eight times a year.

3. Modelling and forecasting

3.1 Type of models used by central bank	DSGE model. Error Correction Model.
3.2 Published forecasts	Inflation, GDP and employment.
3.3 Forecast assumption on interest rates	The interest rate used in the forecast model is endogenous. It comes from an optimal rule that minimises a loss function (output gap and inflation gap) subject to some economic conditions.
3.4 Forecast owned by	Staff.

4. Accountability mechanisms

4.1 Open letter	No.
4.2 Parliamentary hearings	The Governor can be called for a parliamentary hearing when parliament deems necessary.

5. Communication and publications

5.1 Immediate announcement of policy decision	Yes.
5.2 Press notice/conference after decision	Press release.
5.3 Publication of minutes	Yes, usually two weeks after the announcement of the policy decision.
5.4 Publication of individual votes/balance of votes	No.
5.5 Inflation Report	Yes.
5.6 Frequency	Four times a year.

New Zealand

1. Inflation-targeting framework

1.1 Monetary authority	Reserve Bank of New Zealand (RBNZ)
1.2 Legal mandate	The Reserve Bank of New Zealand Act 1989 specifies that the primary function of the Reserve Bank shall be to deliver 'stability in the general level of prices'. The Act also says that the Minister of Finance and the Governor of the Reserve Bank shall together have a separate agreement setting out specific targets for achieving and maintaining price stability. This is known as the Policy Targets Agreement (PTA).
1.3 Operational independence?	Yes.
1.4 Date IT adopted	December 1989.
1.5 Who sets the target?	Governor and the Minister of Finance.
1.6 Target measure; headline or core?	Headline CPI.
1.7 Current target	1%–3% on average over the medium term. The target is an agreement between the Minister of Finance and the Governor over their term of office. The PTA also requires the Reserve Bank to, where possible, meet other aims (such as avoiding unnecessary volatility in interest rates and output) when pursuing price stability.
1.8 Target horizon	Medium term.
1.9 Key policy rate	Official Cash Rate (OCR).

2. Decision-making

2.1 Decision-making body	The Governor is the single decision-maker. The Official Cash Rate Advisory Group (OCRAG) provides advice to the Governor.
2.2 External members?	Two external advisors.
2.3 Terms of appointment of members	The Governor and Board members are appointed by the Minister of Finance. The Board advises the Minister on the appointment of a Governor. The Governor is appointed for a five-year term which can be renewed. OCRAG: Internal members' terms are not specified. Some are *ex officio* members (eg Manger of Forecasting). Others are at the invitation of the Governor. External advisors are appointed for two years.
2.4 Decision-making process	By the Governor.
2.5 Frequency of decision-making meeting	Eight times a year.

3. Modelling and forecasting

3.1 Type of models used by central bank	A range of models is used when examining the outlook. These include calibrated gap-form models, DSGE and statistical models (eg Factor Augmented VARs). Calibrated gaps model (RFM — Reduced-Form Model) is central forecasting model.
3.2 Published forecasts	Forecasts of GDP, inflation and interest rate projections are published four times a year in the *Monetary Policy Statement*.
3.3 Forecast assumption on interest rates	Endogenous.
3.4 Forecast owned by	MPC.

4. Accountability mechanisms

4.1 Open letter/other	The Board is required to determine whether the Bank's monetary policy statements 'are consistent with the Bank's primary function and the policy targets agreed with the Minister'. That is, they must make some judgement on each and every *Monetary Policy Statement* contemporaneously.
4.2 Parliamentary hearings	Yes. Each quarter the Governor and senior staff appear before Parliament's 'Finance and expenditure select committee' to discuss monetary policy.

5. Communication and publications

5.1 Immediate announcement of policy decision	Yes.
5.2 Press notice/conference after decision	Press notice for every decision. Press conference four times a year when the *Monetary Policy Statement* is published.
5.3 Publication of minutes	No.
5.4 Publication of individual votes/balance of votes	n/a.
5.5 Inflation Report	*Monetary Policy Statement*.
5.6 Frequency	Four times a year.

Norway

1. Inflation-targeting framework

1.1 Monetary authority	Norges Bank.
1.2 Legal mandate	Royal Decree of 29 March 2001 states that the implementation of monetary policy shall 'be oriented towards low and stable inflation' and shall also contribute to stabilising output and employment.
1.3 Operational independence?	Yes.
1.4 Date IT adopted	March 2001.
1.5 Who sets the target?	Government.
1.6 Target measure; headline or core?	Headline CPI.
1.7 Current target	Close to 2.5% over time.
1.8 Target horizon	Medium term.
1.9 Key policy rate	Key rate.

2. Decision-making

2.1 Decision-making body	Norges Bank's Executive Board. There are seven members: the Governor (chairperson), the Deputy Governor and five external members.
2.2 External members?	Yes, five external members.
2.3 Terms of appointment of members	All seven members are appointed by the King. The Governor and the Deputy Governor are appointed for a six-year term and can be re-appointed once. The other five members are appointed for four-year terms and can be re-appointed for a total period of twelve years.
2.4 Decision-making process	By consensus.
2.5 Frequency of decision-making meeting	Six per year.

3. Modelling and forecasting

3.1 Type of models used by central bank	DSGE models and a suite of forecasting models for 'nowcasting'.
3.2 Published forecasts	Fan chart forecasts for key policy rate, output gap, CPI and CPIXE (CPI adjusted for tax changes and excluding temporary changes in energy prices) are published in the *Monetary Policy Report*.
3.3 Forecast assumption on interest rates	Endogenous.
3.4 Forecast owned by	Governor.

4. Accountability mechanisms

4.1 Open letter	No.
4.2 Parliamentary hearings	The Governor provides an assessment of monetary policy in an open hearing before the Standing Committee on Finance and Economic Affairs in connection with the *Credit Report*.

5. Communication and publications

5.1 Immediate announcement of policy decision	Yes, with the monetary policy statement.
5.2 Press notice/conference after decision	Press conference and press notice.
5.3 Publication of minutes	No.
5.4 Publication of individual votes/balance of votes	Consensus decision.
5.5 Inflation Report	*Monetary Policy Report.*
5.6 Frequency	Three times a year.

Peru

1. Inflation-targeting framework

1.1 Monetary authority	Central Reserve Bank of Peru.
1.2 Legal mandate	According to the Organic Law, the purpose of the bank is to preserve monetary stability.
1.3 Operational independence?	Yes.
1.4 Date IT adopted	January 2002.
1.5 Who sets the target?	The target is approved by the Board of Directors.
1.6 Target measure; headline or core?	Headline inflation.
1.7 Current target	Since early 2007: 2% ±1 percentage point.
1.8 Target horizon	At all times.
1.9 Key policy rate	Reference interest rate.

2. Decision-making

2.1 Decision-making body	The Board of Directors composed of seven members, including the Governor.
2.2 External members?	No.
2.3 Terms of appointment of members	The Executive Branch appoints four members, including the President of the central bank. Congress ratifies the appointment of the President and appoints the other three members. All members of the Board are renewed on 28 July of each General Election year, and necessarily within 30 days of the beginning of the first ordinary legislature. Members must be Peruvian and do not represent any entity or particular interest.
2.4 Decision-making process	By vote.
2.5 Frequency of decision-making meeting	Monthly.

3. Modelling and forecasting

3.1 Type of models used by central bank	A semi-structural Quarterly forecasting model (MPT). A DSGE model (MEGA-D model). VAR type models for short-run forecasts (SPD).
3.2 Published forecasts	The following forecasts are published in the *Inflation Report*: Fan chart forecast of inflation and GDP. GDP components. Public sector balance. Balance of payments. GDP growth and inflation in Peru's main trading partners. Terms of trade.
3.3 Forecast assumption on interest rates	Depends on economic environment. Currently interest rates are set according to Taylor-type rule.
3.4 Forecast owned by	The central bank.

4. Accountability mechanisms

4.1 Open letter	No.
4.2 Parliamentary hearings	The Governor goes to the parliament regularly, once per year, to explain the monetary assumptions of the government budget and occasionally whenever he is called upon to present monetary policy measures as well as forecasts.

5. Communication and publications

5.1 Immediate announcement of policy decision	Yes, with an informative note.
5.2 Press notice/conference after decision	Telephone conferences with the press are held in the morning after the decision.
5.3 Publication of minutes	No.
5.4 Publication of individual votes/balance of votes	No.
5.5 Inflation Report	Yes.
5.6 Frequency	Three times a year until 2008. From 2009 onwards, four times a year.

Philippines

1. Inflation-targeting framework

1.1 Monetary authority	Bangko Sentral ng Pilipinas (BSP).
1.2 Legal mandate	According to the New Central Bank Act, the primary objective of BSP is 'to promote price stability conducive to a balanced and sustainable growth of the economy'.
1.3 Operational independence?	Yes.
1.4 Date IT adopted	January 2002.
1.5 Who sets the target?	The National Government (through the Development Budget and Co-ordination Committee) in consultation with the BSP. The inflation target is announced two years in advance.
1.6 Target measure; headline or core?	Average year-on-year change in headline CPI.
1.7 Current target	2012: 4.0% ±1 percentage point. 2013: 4.0% ±1 percentage point. 2014: 4.0% ±1 percentage point.
1.8 Target horizon	Medium term.
1.9 Key policy rate	Key policy interest rates for: overnight borrowing or reverse repurchase (RRP) facility; overnight lending or repurchase (RP) facility; and term RRPs, RPs, and special deposit accounts (SDAs).

2. Decision-making

2.1 Decision-making body	The Monetary Board.
2.2 External members?	No, although the Monetary Board includes a Cabinet member who serves as government representative.
2.3 Terms of appointment of members	Monetary Board: Consists of seven members appointed by the President of the Philippines. One of the members is a member of the Cabinet. Other members serve six-year terms, can be re-appointed, and may only be removed for cause.
2.4 Decision-making process	The Advisory Committee is an internal technical body composed of senior Bank officials tasked to deliberate, discuss and make recommendations on monetary policy to the Monetary Board. It meets every six weeks prior to the Monetary Board meeting. The Advisory Committee has five members: the Governor, the Deputy Governor for Monetary Stability, the Deputy Governor for Supervision and Examination, the Assistant Governor of the Monetary Policy Subsector and the Assistant Governor of the Treasury Department. The Monetary Board is the decision-making body that decides on the policy interest rates. Decisions are taken by vote.
2.5 Frequency of decision-making meeting	Eight times a year.

3. Modelling and forecasting

3.1 Type of models used by central bank	Single equation model, a multi-equation model. A long-term macroeconomic model and Forecasting and Policy Analysis System (FPAS) are currently being developed. DSGE model for policy simulation.
3.2 Published forecasts	A fan chart forecast for inflation is published in the *Inflation Report*.
3.3 Forecast assumption on interest rates	Constant policy interest rates.
3.4 Forecast owned by	BSP (inflation forecast).

4. Accountability mechanisms

4.1 Open letter	Yes.
4.2 Parliamentary hearings	Quarterly letter submitted to the President and Congress on economic developments.

5. Communication and publications

5.1 Immediate announcement of policy decision	Yes, with a media release.
5.2 Press notice/conference after decision	Yes, press release and press conference after the policy decision.
5.3 Publication of minutes	Yes. Highlights of the meeting, which summarises the issues discussed and is approved by the Monetary Board, is published four weeks after the decision-making meeting.
5.4 Publication of individual votes/balance of votes	No.
5.5 Inflation Report	Yes.
5.6 Frequency	Four times a year.

Poland

1. Inflation-targeting framework

1.1 Monetary authority	National Bank of Poland (NBP).
1.2 Legal mandate	According to The Act on the National Bank of Poland, 'the basic objective of NBP activity shall be to maintain price stability, and it shall at the same time act in support of Government economic policies, insofar as this does not constrain pursuit of the basic objective of the NBP'.
1.3 Operational independence?	Yes.
1.4 Date IT adopted	1998.
1.5 Who sets the target?	Monetary Policy Council.
1.6 Target measure; headline or core?	Headline CPI.
1.7 Current target	Since 2004: 2.5%±1 percentage point.
1.8 Target horizon	Medium term.
1.9 Key policy rate	Reference rate (ie the rate that determines the yield on the main OMOs).

2. Decision-making

2.1 Decision-making body	The Monetary Policy Council consists of ten members: the president of the central bank (chair) plus nine external members.
2.2 External members?	Yes, nine.
2.3 Terms of appointment of members	The term of all external MPC members is six years (non-renewable). The president of the central bank is appointed by the Parliament at the request of the President of Poland for a six-year term, and can be re-appointed once. Of the nine other members, three are appointed by the Lower House of the Parliament; three are appointed by the Upper House of the Parliament and three are appointed by the President of Poland. The Act on NBP specifies that the MPC members should be specialists in the field of finance. In practice the MPC members are mostly economists. While serving on the MPC, they are not allowed to conduct any professional activity except for academic, research or educational activity, nor be active in any political party or trade union.
2.4 Decision-making process	By majority vote when there is a motion to change policy. The chairperson has a casting vote.
2.5 Frequency of decision-making meeting	Monthly.

3. Modelling and forecasting

3.1 Type of models used by central bank	Suite of macroeconomic models, with a quarterly structural macroeconomic model being the main forecasting tool and a DSGE model being used for internal analysis.
3.2 Published forecasts	Fan chart forecasts of inflation and GDP are published in the *Inflation Report* and in an accompanying presentation.
3.3 Forecast assumption on interest rates	Constant interest rates.
3.4 Forecast owned by	Staff.

4. Accountability mechanisms

4.1 Open letter	No.
4.2 Parliamentary hearings	The Monetary Policy Council draws up annual monetary policy guidelines and submits these to the Lower House of Parliament (Sejm), for information, together with the submission by the Council of Ministers of the draft budget. The MPC presents a report to the Sejm on the implementation of monetary policy guidelines within five months of the end of the fiscal year. After submitting the report, the central bank president reports on monetary policy in the preceding year at a parliamentary hearing.

5. Communication and publications

5.1 Immediate announcement of policy decision	Yes, with a press release.
5.2 Press notice/conference after decision	Yes, MPC policy statement and press conference.
5.3 Publication of minutes	Yes, two weeks after decision-making meeting.
5.4 Publication of individual votes/balance of votes	Not in the minutes. But the votes of each member are published on the central bank website after six weeks and included in the *Inflation Report*.
5.5 Inflation Report	Yes.
5.6 Frequency	Three times a year.

Romania

1. Inflation-targeting framework

1.1 Monetary authority	National Bank of Romania (NBR).
1.2 Legal mandate	Pursuant to Law no. 312/28 June 2004, the primary objective of the NBR is to ensure and maintain price stability. Without prejudice to its primary objective, the NBR supports the general economic policy of the Government.
1.3 Operational independence?	Yes.
1.4 Date IT adopted	August 2005.
1.5 Who sets the target?	The target is jointly set by the NBR and the government.
1.6 Target measure; headline or core?	Headline inflation rate.
1.7 Current target	End 2012: 3% ±1 percentage point. From 2013: 2.5% ±1 percentage point.
1.8 Target horizon	From 2013 flat multiannual target.
1.9 Key policy rate	Monetary policy rate. Interest rates on the standing facilities (the deposit facility and the lending facility) were set at ±4 percentage points around the monetary policy rate.

2. Decision-making

2.1 Decision-making body	Board of Directors: nine members: the Governor (chairperson); first Deputy Governor (Vice chair); two Deputy Governors and five non-executive (external) members. The Minister of Public Finance and one of the State Secretaries in the Ministry of Public Finance may participate, without voting rights, in the Board's meetings.
2.2 External members?	Five.
2.3 Terms of appointment of members	Members of the Board are appointed by the Parliament of Romania on the recommendation of the standing committees of the two Chambers of the Parliament. Board members are appointed for a five-year term that can be renewed.
2.4 Decision-making process	By vote.
2.5 Frequency of decision-making meeting	Eight times a year.

3. Modelling and forecasting

3.1 Type of models used by central bank	Near-term Inflation Forecasting: ARMAX model and expert judgement for the CPI components. Near-term GDP forecasting: OLS and 2SLS estimation with error correction mechanism, Dynamic Factor Models. Medium-term forecasting: semi-structural New-Keynesian model.
3.2 Published forecasts	Forecasts of inflation and GDP gap are published in the *Inflation Report*. Forecasts of CPI components, including core inflation are published.
3.3 Forecast assumption on interest rates	The interest rate projection is derived from a model-based monetary policy reaction function (Taylor rule). Alternative working hypotheses may sometimes be used, which imply a smoother trajectory for the interest rate or embed Board suggestions, but along the guidelines of the Taylor rule.
3.4 Forecast owned by	NBR Board.

4. Accountability mechanisms

4.1 Open letter	No.
4.2 Parliamentary hearings	No. The NBR's *Annual Report*, which includes the main economic, financial monetary and foreign exchange developments; monetary policy during the previous year and the guidelines for the following year, is submitted to Parliament.

5. Communication and publications

5.1 Immediate announcement of policy decision	Yes, with a press release.
5.2 Press notice/conference after decision	Press release after each Board meeting and press conference four times a year concomitantly with the release of the *Inflation Report*.
5.3 Publication of minutes	No.
5.4 Publication of individual votes/balance of votes	No.
5.5 Inflation Report	Yes.
5.6 Frequency	Four times a year.

Serbia

1. Inflation-targeting framework

1.1	Monetary authority	National Bank of Serbia (NBS).
1.2	Legal mandate	As stated in the Law on the National Bank of Serbia, the primary objective is to achieve and maintain price stability. In addition to its primary objective, the NBS shall also strive to maintain financial stability. Without prejudice to its primary objective, the NBS shall support the pursuance of the economic policy of the Government of the Republic of Serbia, operating in accordance with the principles of market economy.
1.3	Operational independence?	Yes.
1.4	Date IT adopted	Informally since September 2006, formally since January 2009.
1.5	Who sets the target?	The target is set by the NBS, in co-operation with the Government.
1.6	Target measure; headline or core?	Headline inflation.
1.7	Current target	2012 end level: 4% ±1.5 percentage points.
1.8	Target horizon	Medium term.
1.9	Key policy rate	The interest rate on two-week repo operation.

2. Decision-making

2.1	Decision-making body	Executive Board of the NBS consisting of five members: the Governor and four Vice Governors. The NBS may have two to four Vice Governors. The Minister of Finance may attend but not vote.
2.2	External members?	No.
2.3	Terms of appointment of members	The Governor: appointed by the National Assembly upon the proposal of the President. Three Vice Governors: appointed by the Council of the NBS upon the proposal of the Governor. All members are appointed for a six-year term, renewable.
2.4	Decision-making process	By majority vote. The Governor has a casting vote.
2.5	Frequency of decision-making meeting	Once a month (or more frequently if necessary).

3. Modelling and forecasting

3.1	Type of models used by central bank	Quarterly Projection Model.
3.2	Published forecasts	A fan chart projection of inflation is published in the *Inflation Report*.
3.3	Forecast assumption on interest rates	Endogenous path for policy rate. This is communicated verbally.
3.4	Forecast owned by	Executive Board.

4. Accountability mechanisms

4.1	Open letter	If inflation deviates from the target for more than six consecutive months, NBS notifies the Government in writing about the reasons for such deviations, the measures to be taken and the time needed for inflation to return to the target.
4.2	Parliamentary hearings	The NBS submits to the National Assembly the monetary policy programme for the next year, semi-annual and annual reports on the implementation of monetary policy, *Annual Report* on the stability of the financial system, and *Annual Report* on its operations and results. The Governor explains the monetary policy programme and reports to the National Assembly, but the National Assembly may not give any instructions to the NBS based on submitted reports.

5. Communication and publications

5.1	Immediate announcement of policy decision	Yes, with a press release.
5.2	Press notice/conference after decision	Yes, press conference.
5.3	Publication of minutes	Not at present.
5.4	Publication of individual votes/balance of votes	No.
5.5	Inflation Report	Yes.
5.6	Frequency	Four times a year.

South Africa

1. Inflation-targeting framework

1.1	Monetary authority	South African Reserve Bank.
1.2	Legal mandate	As stated in both the Constitution of the Republic of South Africa and in the South African Reserve Bank Act, No 90 of 1989, the primary objective is to protect the value of the currency in the interest of balanced and sustainable economic growth. The Bank regards its primary goal as the achievement and maintenance of price stability, and together with other institutions, it also plays a pivotal role in ensuring financial stability.
1.3	Operational independence?	Yes.
1.4	Date IT adopted	February 2000.
1.5	Who sets the target?	The Government sets the target after consultation with the Bank.
1.6	Target measure; headline or core?	From January 2009, the twelve-month increase in headline CPI.
1.7	Current target	A target range of 3%–6%.
1.8	Target horizon	On a continuous basis.
1.9	Key policy rate	Repo rate.

2. Decision-making

2.1	Decision-making body	Monetary Policy Committee; there are eight members: the Governor, three Deputy Governors and four senior officials of the Bank.
2.2	External members?.	No.
2.3	Terms of appointment of members	The President of the Republic of South Africa appoints the Governor and Deputy Governors of the Bank after consultations with the Minister of Finance and the Board of Directors of the Bank. Other MPC members are appointed by the Governor. The Governor and Deputy Governors are appointed for five-year terms and can be re-appointed. Re-appointment terms may be less than five years.
2.4	Decision-making process	By consensus.
2.5	Frequency of decision-making meeting	Usually six times a year.

3. Modelling and forecasting

3.1	Type of models used by central bank	A core macro econometric model specifically suited for inflation targeting purposes, complemented by a suite of other models.
3.2	Published forecasts	Fan chart forecasts of inflation and GDP growth are published in the *Monetary Policy Review* twice a year. The main elements of the central forecasts are described in the MPC statement published after each meeting.
3.3	Forecast assumption on interest rates	Constant.
3.4	Forecast owned by	MPC.

4. Accountability mechanisms

4.1	Open letter	No.
4.2	Parliamentary hearings	The Governor appears before the Portfolio Committee on Finance at least three times a year.

5. Communication and publications

5.1	Immediate announcement of policy decision	Yes, with a press release.
5.2	Press notice/conference after decision	Yes, live television coverage and webcast.
5.3	Publication of minutes	No, but a Statement of the Monetary Policy Committee is published.
5.4	Publication of individual votes/balance of votes	n/a.
5.5	Inflation Report	*Monetary Policy Review*.
5.6	Frequency	Twice a year.

South Korea

1. Inflation-targeting framework

1.1 Monetary authority	Bank of Korea (BOK).
1.2 Legal mandate	According to the Bank of Korea Act of 2003, the Bank's main objective is to promote price stability.
1.3 Operational independence?	Yes, since 2003.
1.4 Date IT adopted	April 1998.
1.5 Who sets the target?	The Bank sets the target in consultation with the Government.
1.6 Target measure; headline or core?	From 2007, headline CPI.
1.7 Current target	3% ±1 percentage point.
1.8 Target horizon	Three years.
1.9 Key policy rate	Bank of Korea Base Rate.

2. Decision-making

2.1 Decision-making body	Monetary Policy Committee. There are seven members: the Governor (chairperson), Senior Deputy Governor and five externally appointed members.
2.2 External members?	Five full time externally appointed members.
2.3 Terms of appointment of members	The Governor is appointed by the President for a four-year term. The senior Deputy Governor is appointed by the President for a three-year term Of the appointed members, the Governor, the Minister of Strategy and Finance, the chairman of the Financial Services Commission, the President of the Korea Chamber of Commerce and Industry and the chairman of the Korea Federation of Banks each recommend one member. Appointed members have a four-year term and may be re-appointed.
2.4 Decision-making process	By vote.
2.5 Frequency of decision-making meeting	Monthly.

3. Modelling and forecasting

3.1 Type of models used by central bank	BOK Dynamic Projection Model; DSGE model.
3.2 Published forecasts	Point forecasts are published for GDP and inflation.
3.3 Forecast assumption on interest rates	Market.
3.4 Forecast owned by	BOK.

4. Accountability mechanisms

4.1 Open letter	No.
4.2 Parliamentary hearings	The Governor testifies before the Strategy and Finance Committee of the National Assembly.

5. Communication and publications

5.1 Immediate announcement of policy decision	Yes, with a press release.
5.2 Press notice/conference after decision	Yes, press conference.
5.3 Publication of minutes	Yes, on the first Tuesday six weeks after the meeting.
5.4 Publication of individual votes/balance of votes	No.
5.5 Inflation Report	*Monetary Policy Report*.
5.6 Frequency	Twice a year.

Sweden

1. Inflation-targeting framework

1.1	Monetary authority	Sveriges Riksbank.
1.2	Legal mandate	The objective for monetary policy is to maintain price stability. It is also to support the objectives of general economic policy with a view to achieving sustainable growth and high employment.
1.3	Operational independence?	Yes.
1.4	Date IT adopted	The inflation target regime was announced in January 1993 and applied as of 1995.
1.5	Who sets the target?	Sveriges Riksbank.
1.6	Target measure; headline or core?	Annual change in headline CPI.
1.7	Current target	Point target of 2%.
1.8	Target horizon	Normally over two years, but in some circumstances it may be extended.
1.9	Key policy rate	Repo rate.

2. Decision-making

2.1	Decision-making body	Executive Board of the Riksbank. There are six members: the Governor (chairperson) and five Deputy Governors.
2.2	External members?	No.
2.3	Terms of appointment of members	All members are appointed by the General Council, which in turn is appointed by the Swedish parliament. The term of appointment is five or six years according to a rolling schedule. Members may be re-appointed.
2.4	Decision-making process	By vote: the Governor has a casting vote.
2.5	Frequency of decision-making meeting	Six times a year.

3. Modelling and forecasting

3.1	Type of models used by central bank	A suite of models including time series models, indicator models, structural models (eg DSGE models) and a large number of smaller models that focus on important relationships in the economy.
3.2	Published forecasts	Fan chart forecasts for GDP, CPI and the repo rate are published in the *Monetary Policy Report* and *Monetary Policy Update*.
3.3	Forecast assumption on interest rates	Since the beginning of 2007, forecasts are made based on an endogenous interest rate path.
3.4	Forecast owned by	Board of Governors.

4. Accountability mechanisms

4.1	Open letter	No.
4.2	Parliamentary hearings	Yes. The Riksbank must present a written account of monetary policy to the Riksbank Committee on Finance at least twice a year. The Governor presents this account to the Committee.

5. Communication and publications

5.1	Immediate announcement of policy decision	Yes.
5.2	Press notice/conference after decision	A press release is published the day after each monetary policy meeting.
5.3	Publication of minutes	Yes, two weeks after the meeting.
5.4	Publication of individual votes/balance of votes	Yes.
5.5	Inflation Report	*Monetary Policy Report* and *Monetary Policy Updates* published.
5.6	Frequency	Three *Monetary Policy Reports* are published per year and on the other three occasions a *Monetary Policy Update* is published.

Thailand

1. Inflation-targeting framework

1.1 Monetary authority	Bank of Thailand (BOT).
1.2 Legal mandate	As stated in the Bank of Thailand Act B.E. 2485 as amended by B.E.2008: 'The BOT implements monetary policy as specified by the Monetary Policy Committee (MPC) in order to promote monetary stability and formulate monetary policies'.
1.3 Operational independence?	Yes.
1.4 Date IT adopted	May 2000.
1.5 Who sets the target?	A target is set by the MPC on an annual basis, no later than December. The target shall be reached in agreement with the Minister of Finance, which will then require approval by the Cabinet.
1.6 Target measure; headline or core?(1)	Headline.
1.7 Current target(1)	3.0% ±1.5 percentage points.
1.8 Target horizon	Eight quarters.
1.9 Key policy rate	One-day repurchase transaction rate.

2. Decision-making

2.1 Decision-making body	Monetary Policy Committee (MPC). There are seven members: the Governor (chairman), two Deputy Governors and four external members.
2.2 External members?	Yes, four.
2.3 Terms of appointment of members	The governor is appointed for a five-year term and can be re-appointed once. External members have a fixed-term of three years, and cannot serve more than two consecutive terms.
2.4 Decision-making process	Majority vote.
2.5 Frequency of decision-making meeting	Meets eight times a year in line with reserve maintenance period (two weeks).

3. Modelling and forecasting

3.1 Type of models used by central bank	The Bank of Thailand uses a suite of models: • Bank of Thailand's Macroeconomic Model (BOTMM) is used to make forecasts of economic variables relevant to monetary policy decision-making. • Other models that are currently developed include a semi-structural model and a dynamic general equilibrium model.
3.2 Published forecasts	Fan chart forecasts of core inflation and GDP growth are published in the *Inflation Report*.
3.3 Forecast assumption on interest rates	Constant at the prevailing rate throughout the forecast horizon.
3.4 Forecast owned by	MPC.

4. Accountability mechanisms

4.1 Open letter	Yes. Under the new arrangement between BOT and Ministry of Finance(MoF), in the event that the target is missed, the MPC is expected to explain the reasons thereof, how policy is expected to bring inflation back into the target range, and the time frame in which this is expected to occur, in an open letter to the MoF.
4.2 Parliamentary hearings	The MPC is required to report monetary policy developments to the Cabinet every six months.

5. Communication and publications

5.1 Immediate announcement of policy decision	Yes, with a press release.
5.2 Press notice/conference after decision	Press conference.
5.3 Publication of minutes	Yes, after two weeks.
5.4 Publication of individual votes/balance of votes	Balance of votes.
5.5 Inflation Report	Yes.
5.6 Frequency	Four times a year.

(1) Before 2012 the target was core inflation, excluding raw food and energy. In January 2012 a target of headline inflation of 3.0% ±1.5 percentage points was proposed but not yet approved by cabinet. The law allows for the use of the previous year's target (core inflation of 0.5%–3%) to be used until the new one is approved.

Turkey

1. Inflation-targeting framework

1.1	Monetary authority	Central Bank of the Republic of Turkey.
1.2	Legal mandate	From The Law on the Central Bank of the Republic of Turkey, 'the primary objective of the Bank shall be to achieve and maintain price stability'.
1.3	Operational independence?	Yes.
1.4	Date IT adopted	January 2006.
1.5	Who sets the target?	The Monetary Policy Committee determines the inflation target together with the Government within the framework of the monetary policy strategy.
1.6	Target measure; headline or core?	Annual CPI.
1.7	Current target	2012: 5.0% ±2 percentage points. 2013: 5.0% ±2 percentage points. 2014: 5.0% ±2 percentage points.
1.8	Target horizon	Multi-year horizon (three years).
1.9	Key policy rate	One week repo auction rate. Interest rate corridor and required reserve ratios also used as policy instruments.

2. Decision-making

2.1	Decision-making body	Monetary Policy Committee: There are seven members: the Governor (chairperson); four Vice Governors; one member elected by and from among the Board, and a member to be appointed by a joint decree on the recommendation of the Governor. The Undersecretary of the Treasury/Deputy Undersecretary may participate in the meetings without voting rights.
2.2	External members?	One member is an externally appointed academic.
2.3	Terms of appointment of members	The Governor and Vice Governors are appointed for five-year terms, and can be re-appointed. The external member appointed by a joint decree also has a term of office of five years.
2.4	Decision-making process	By vote. In the case of a tie, the Governor has the casting vote.
2.5	Frequency of decision-making meeting	Monthly.

3. Modelling and forecasting

3.1	Type of models used by central bank	Quarterly Forecast Model. A DSGE model is being developed.
3.2	Published forecasts	Fan chart forecasts of headline and core inflation, plus output gap.
3.3	Forecast assumption on interest rates	Endogenous.
3.4	Forecast owned by	Monetary Policy Committee.

4. Accountability mechanisms

4.1	Open letter	Yes. In the event of a target miss, the Bank submits an open letter to the Government at the end of the year, setting out the reasons the target was missed. During the year, such explanations are contained in the *Inflation Report*.
4.2	Parliamentary hearings	Yes, twice a year.

5. Communication and publications

5.1	Immediate announcement of policy decision	Yes, with a press release.
5.2	Press notice/conference after decision	No.
5.3	Publication of minutes	Yes, a summary of the Monetary Policy Committee meeting is released within five working days after the meeting.
5.4	Publication of individual votes/balance of votes	No.
5.5	Inflation Report	Yes.
5.6	Frequency	Four times a year.

United Kingdom

1. Inflation-targeting framework

1.1	Monetary authority	Bank of England.
1.2	Legal mandate	According to the 1998 Bank of England Act: 'a) to maintain price stability; and b) subject to that, to support the economic policy of Her Majesty's Government including its objectives for growth and employment.' The precise remit for the MPC is restated annually by the Chancellor of the Exchequer.
1.3	Operational independence?	Yes.
1.4	Date IT adopted	October 1992.
1.5	Who sets the target?	Government. The target is reaffirmed each year by the Chancellor of the Exchequer in the annual budget statement.
1.6	Target measure; headline or core?	Twelve-month increase in headline CPI.
1.7	Current target	Point target of 2% annual rate of inflation.
1.8	Target horizon	At all times.
1.9	Key policy rate	Bank Rate (one week repo rate). Since 2009 asset purchases have been used as an additional instrument.

2. Decision-making

2.1	Decision-making body	Monetary Policy Committee (MPC). There are nine members: the Governor (chairperson), the two Deputy Governors, the Bank's Chief Economist, the Executive Director for Markets and four external members.
2.2	External members?	Four external members, who, by law, are appointed on the basis of their experience and expertise in monetary policy.
2.3	Terms of appointment of members	Governor, Deputy Governors appointed by the Crown on advice from government for five year renewable terms. Chief Economist and Executive Director for Markets appointed by the Governor after consultation with the Chancellor. External members are appointed by the Chancellor for three years, renewable once.
2.4	Decision-making process	By vote, on a one-person one-vote basis. The Governor has the casting vote if there is no majority. Any member in a minority is asked to say what level of interest rates (or asset purchases) he or she would have preferred.
2.5	Frequency of decision-making meeting	Monthly.

3. Modelling and forecasting

3.1	Type of models used by central bank	The Bank of England uses a suite of models, both statistical and theoretical. A new DSGE model COMPASS (Central Organising Model for Projections Analysis and Scenario Simulation) was introduced in 2011.
3.2	Published forecasts	Fan chart forecasts of inflation and GDP are published every quarter in the *Inflation Report*.
3.3	Forecast assumption on interest rates	Forecasts are conditioned on market expectations of interest rates and constant rates.
3.4	Forecast owned by	MPC.

4. Accountability mechanisms

4.1	Open letter	Yes. If inflation deviates from the target by more than 1 percentage point in either direction, the Governor must write an open letter to the Chancellor explaining the reasons for this and what actions the Bank is taking.
4.2	Parliamentary hearings	Parliamentary hearings are held at least three times per year.

5. Communication and publications

5.1	Immediate announcement of policy decision	Yes, with a press release.
5.2	Press notice/conference after decision	News release but no press conference.
5.3	Publication of minutes	Yes, two weeks after MPC meeting.
5.4	Publication of individual votes/balance of votes	Individual votes are published.
5.5	Inflation Report	Yes, with a press conference.
5.6	Frequency	Four times a year.

References

Ball, L and Sheridan, N (2003), 'Does Inflation Targeting matter?', *NBER Working Paper no. W9577*.

Bean, C (1998), 'The new UK monetary arrangements: A view from the literature', *Economic Journal*, Vol. 108, Issue 451, pages 1,795–809, available at http://economia.unipv.it/pagp/pagine_personali/gascari/bean98.pdf.

Bean, C (2003), 'Inflation targeting: the UK experience', *Bank of England Quarterly Bulletin*, Winter, pages 479–94.

Bernanke, B and Mihov, I (1997), 'What does the Bundesbank target?', *European Economic Review*, Vol. 41, pages 1,025–53.

Bernanke, B and Woodford, M, (2005), 'The Inflation Targeting Debate', Chicago, Illinois, University of Chicago Press.

Borio, C and White, W (2004), 'Whither monetary and financial stability? The implications of evolving policy regimes', *BIS Working Paper no. 147*.

Carvalho-Filho, I (2010), 'Inflation targeting and the crisis: An empirical assessment', *IMF Working Paper no*. 10/45.

Dincer, N and Eichengreen, B (2007), 'Central Bank Transparency: where, why and with what effects?', *NBER working paper no. 13003*, available at www.nber.org/papers/w13003.pdf.

Geraats, P (2009), 'Trends in Monetary Policy Transparency', *CESifo Working Paper no. 2584*.

Goodhart, C A E (2001), 'Monetary transmission lags and the formulation of the policy decision on interest rates', *Federal Reserve Bank of St. Louis Review, July*, pages 165–82, available at www.research.stlouisfed.org/publications/review/01/05/165-182Goodhart.qxd.pdf.

Gürkaynak, R, Levin, A and Swanson, E (2006), 'Does Inflation Targeting Anchor Long-Run Inflation Expectations? Evidence from Long-Term Bond Yields in the US, UK and Sweden', available at www.cepr.org/pubs/new-dps/dplist.asp?dpno=5808.asp.

Hammond, G, Kanbur, R and Prasad, E (eds) (2009), *Monetary Policy Frameworks for Emerging Markets*, Edward Elgar.

Hyvonen, M (2004), 'Inflation Convergence Across Countries', *Reserve Bank of Australia Working Paper no. 2004–04*, available at www.rba.gov.au/rdp/RDP2004-04.pdf.

Kahn, G A (2007), 'Communicating a policy path: the next frontier in central bank transparency?', available at www.kansascityfed.org.

King, M (2005), 'Monetary Policy: Practice Ahead of theory', available at www.bankofengland.co.uk/publications/speeches/2005/speech245.pdf.

King ,M (2007), 'The MPC Ten Years On', available at www.bankofengland.co.uk/publications/speeches/2007/speech309.pdf.

Levin, A T, Natalucci, F M and Piger, J M (2004), 'The macroeconomic effects of inflation targeting', *Federal Reserve Bank of St. Louis Review, July/August*, Vol. 86, No. 4.

Orphanides, A and Williams, J C (2003), 'Imperfect knowledge, inflation expectations and monetary policy', *NBER Working Paper no. 9884*.

Reddell, M (2006), 'Monetary policy accountability and monitoring', available at www.rbnz.govt.nz/monpol/about/2851362.html.

Roger, S (2010), 'Inflation targeting turns 20', available at www.imf.org/external/pubs/ft/fandd/2010/03/pdf/roger.pdf.

Rosenberg, I (2008), 'The monetary policy decision-making process', available at www.bis.org/review/r080617d.pdf.

Sellon, G H (2008), 'Monetary policy transparency and private sector forecasts: evidence from survey data', *Federal Reserve Bank of Kansas City Economic Review*.

Svensson, L E O (2007), 'Optimal inflation targeting: further developments of inflation targeting' in Mishkin, F and Schmidt-Hebbel Santiago, K (eds), *Monetary Policy Under Inflation Targeting*, Banco Central de Chile.

Tucker, P (2007), 'Central banking and Political Economy: The Example of the UK's Monetary Policy Committee', available at www.bankofengland.co.uk/publications/speeches/2007/speech312.pdf.

Vega, M and Winkelried, D (2005), 'Inflation Targeting and Inflation Behaviour: A Successful Story?', *International Journal of Central Banking*, Vol. 1(3), December.

Woodford, M (2003), '*Interest and Prices: Foundations of a Theory of Monetary Policy'*, Princeton, New Jersey, Princeton University Press.

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Blake, A, Kirsanova, T and Yates, T (2011), 'The gains from delegation revisited: price-level targeting, speed limit and interest rate smoothing policies', *Bank of England Working Paper No. 415*. Available at **www.bankofengland.co.uk/publications/workingpapers/wp415.pdf**.

Blake, A and Zampolli, F (2011), 'Optimal policy in Markov-switching rational expectations models', *Journal of Economic Dynamics and Control*, Vol. 35, No. 10, pages 1626–651.

Faccini, R, Millard, S and Zanetti, F (2011), 'Wage rigidities in an estimated DSGE model of the UK labour market', *Bank of England Working Paper No. 408*. Available at **www.bankofengland.co.uk/publications/workingpapers/wp408.pdf**.

Hammond, G (2011), '20 years of Central Bank technical co-operation: the Bank of England's Centre for Central Banking Studies', *Deutsche Bundesbank: 20 years of Technical Central Bank Co-operation*, pages 210–14.

Hammond, G, Kanbur, R and Prasad E (2011), 'Monetary policy challenges for emerging market economies', *Challenges to Central Banking in the Context of Financial Crisis*, Chapter 23, pages 405–29, Reserve Bank of India Publications.

Liu, P and Mumtaz, H (2011), 'Evolving macroeconomic dynamics in a small open economy: an estimated Markov-switching DSGE model for the UK,' *Journal of Money, Credit and Banking*, Vol. 43, No. 7, pages 1,443–74.

Liu, P, Mumtaz, H and Theophilopolou, A (2011), 'International transmission of shocks: a time-varying factor-augmented VAR approach to the open economy', *Bank of England Working Paper No. 425*. Available at **www.bankofengland.co.uk/publications/workingpapers/wp425.pdf**.

Mumtaz, H, Simoncello, S and Surico P, (2011), 'International co-movements, business cycle and inflation: a historical perspective', *Review of Economic Dynamics*, Vol. 14, No. 1, pages 176–98.

Rule, G (2011), 'Issuing central bank securities', *Bank of England, CCBS Handbook No. 30*. Available at **www.bankofengland.co.uk/education/ccbs/handbooks/ccbshb30.htm**.

Zanetti, F (2011), 'Labour policy instruments and the cyclical behaviour of vacancies and unemployment,' *Economica*, Vol. 78, pages 779–87.

Zanetti, F (2011), 'Labour market institutions and aggregate fluctuations in a search and matching model', *European Economic Review*, Vol. 55, pages 644–58.

Zanetti, F and Mumtaz, H (2011), 'Neutral technology shocks and the dynamics of labor input: results from an agnostic identification', *International Economic Review*, Vol. 53, No. 1, pages 237–56.